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Merrimack Pharmaceuticals, Inc. Index to consolidated financial statements

As filed with the Securities and Exchange Commission on January 13, 2012

Registration No. 333-175427

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

AMENDMENT NO. 4
TO
FORM S-1
REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933

MERRIMACK PHARMACEUTICALS, INC.
(Exact name of registrant as specified in its charter)

Delaware	**2834**	**04-3210530**
(State or other jurisdiction of incorporation or organization)	(Primary Standard Industrial Classification Code Number)	(I.R.S. Employer Identification Number)

One Kendall Square, Suite B7201
Cambridge, MA 02139
(617) 441-1000
(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

Robert J. Mulroy
President and Chief Executive Officer
Merrimack Pharmaceuticals, Inc.
One Kendall Square, Suite B7201
Cambridge, Massachusetts 02139
(617) 441-1000
(Name, address, including zip code, and telephone number, including area code, of agent for service)

Copies to:

David E. Redlick, Esq. **Brian A. Johnson, Esq.** **Wilmer Cutler Pickering Hale and Dorr LLP** **60 State Street** **Boston, Massachusetts 02109** **(617) 526-6000**	**Jeffrey A. Munsie, Esq.** **Corporate Counsel** **Merrimack Pharmaceuticals, Inc.** **One Kendall Square, Suite B7201** **Cambridge, Massachusetts 02139** **(617) 441-1000**	**Richard D. Truesdell, Jr., Esq.** **Davis Polk & Wardwell LLP** **450 Lexington Avenue** **New York, New York 10017** **(212) 450-4000**

Approximate date of commencement of proposed sale to public: As soon as practicable after this Registration Statement is declared effective.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, check the following box. o

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. o

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. o

If this Form is a post-effective amendment filed pursuant to Rule 462(d) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. o

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer o	Accelerated filer o	Non-accelerated filer ☒ (Do not check if a smaller reporting company)	Smaller reporting company o

CALCULATION OF REGISTRATION FEE

Title of Each Class of Securities To Be Registered	Proposed Maximum Aggregate Offering Price(1)	Amount of Registration Fee(2)
Common Stock, $0.01 par value per share	$191,666,670	$22,225

(1) Estimated solely for the purpose of calculating the registration fee pursuant to Rule 457(o) under the Securities Act of 1933, as amended.

(2) Calculated pursuant to Rule 457(o) based on an estimate of the proposed maximum aggregate offering price. A registration fee of $20,028 has been paid previously pursuant to Rule 457(o) based on an estimate of the proposed maximum aggregate offering price. The difference of $2,197 is being paid with this filing.

The Registrant hereby amends this Registration Statement on such date or dates as may be necessary to delay its effective date until the Registrant shall file a further amendment which specifically states that this Registration Statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933 or until the Registration Statement shall become effective on such date as the Commission, acting pursuant to said Section 8(a), may determine.

The information in this prospectus is not complete and may be changed. We may not sell these securities until the registration statement filed with the Securities and Exchange Commission is effective. This prospectus is not an offer to sell these securities and it is not soliciting an offer to buy these securities in any jurisdiction where the offer or sale is not permitted.

Subject to completion, dated January 13, 2012

Prospectus

16,666,667 shares

Common stock

This is an initial public offering of common stock by Merrimack Pharmaceuticals, Inc. Merrimack is selling 16,666,667 shares of common stock. The estimated initial public offering price is between $8.00 and $10.00 per share.

Prior to this offering, there has been no public market for our common stock. We have applied for listing of our common stock on The NASDAQ Global Market under the symbol "MACK."

	Per share	Total
Initial public offering price	$	$
Underwriting discounts and commissions	$	$
Proceeds to Merrimack, before expenses	$	$

We have granted the underwriters an option for a period of 30 days to purchase up to 2,500,000 additional shares of common stock.

Investing in our common stock involves a high degree of risk. See "Risk factors" beginning on page 12.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or passed on the adequacy or accuracy of this prospectus. Any representation to the contrary is a criminal offense.

The underwriters expect to deliver the shares of common stock to investors on or about , 2012.

J.P. Morgan

BofA Merrill Lynch

Cowen and Company **Oppenheimer & Co.**

, 2012

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We have not authorized anyone to provide you with information other than that contained in this prospectus or in any free writing prospectus prepared by or on behalf of us or to which we have referred you. We take no responsibility for, and can provide no assurance as to the reliability of, any other information that others may give to you. We are offering to sell, and seeking offers to buy, shares of our common stock only in jurisdictions where offers and sales are permitted. The information contained in this prospectus is accurate only as of the date of this prospectus, regardless of the time of delivery of this prospectus or any sale of our common stock. Our business, financial conditions, results of operations and prospects may have changed since that date.

No action is being taken in any jurisdiction outside the United States to permit a public offering of our common stock or possession or distribution of this prospectus in that jurisdiction. Persons who come into possession of this prospectus in jurisdictions outside the United States are required to inform themselves about and to observe any restrictions as to this offering and the distribution of this prospectus applicable to that jurisdiction.

Prospectus summary

This summary highlights information contained elsewhere in this prospectus. This summary does not contain all of the information you should consider before investing in our common stock. You should read this entire prospectus carefully, especially the "Risk factors" section and our consolidated financial statements and the related notes appearing at the end of this prospectus, before making an investment decision.

Our company overview

We are a biopharmaceutical company discovering, developing and preparing to commercialize innovative medicines paired with companion diagnostics for the treatment of serious diseases, with an initial focus on cancer. Our mission is to provide patients, physicians and the healthcare system with the medicines, tools and information to transform the approach to care from one based on the identification and treatment of symptoms to one focused on the diagnosis and treatment of illness through a more precise mechanistic understanding of disease. We seek to accomplish our mission by applying our proprietary systems biology-based approach to biomedical research, which we call Network Biology. Our vision is to apply Network Biology to become a global healthcare enterprise that is founded on leading science and driven to deliver integrated healthcare solutions that improve both the quality of patient outcomes and the efficiency of care.

Network Biology is an interdisciplinary approach to drug discovery and development that enables us to build functional and predictive computational models of biological systems based on quantitative, kinetic, multiplexed biological data. It provides our scientists with insights into how the complex molecular interactions that occur within cell signaling pathways, or networks, regulate cell decisions and how dysfunction within these networks leads to disease. We apply Network Biology throughout the research and development process, including for target identification, lead compound design and optimization, diagnostic discovery, *in vitro* and *in vivo* predictive development and the design of clinical trial protocols. We believe that drug discovery and development using Network Biology is more efficient and productive than traditional approaches.

We currently have five targeted therapeutic oncology candidates in clinical development. Additionally, we have multiple product candidates in preclinical development and an active Network Biology driven discovery effort. We own global commercialization rights to all of our product candidates other than rights in Taiwan to MM-398 and worldwide rights to MM-121, which we have partnered with Sanofi and have a right to co-promote in the United States. Our most advanced product candidates are:

- **MM-398:** MM-398 is a novel, stable nanotherapeutic encapsulation, or enclosed sphere carrying an active drug, of the marketed chemotherapy drug irinotecan. MM-398 recently achieved its primary efficacy endpoints in Phase 2 clinical trials in pancreatic and gastric cancer. In an open label, single arm Phase 2 clinical trial of MM-398 as a monotherapy in 40 metastatic pancreatic cancer patients who had previously failed treatment with gemcitabine, patients treated with MM-398 achieved median overall survival of 22.4 weeks. Additionally, 20% of the patients in this Phase 2 trial survived for more than one year, and we observed a disease control rate, meaning patients exhibited stable disease or partial or complete response to treatment, of 47.5% at six weeks. There are currently no approved treatments

for gemcitabine refractory metastatic pancreatic cancer, nor is there a consensus on standard of care treatment for such patients.

We are conducting a pivotal Phase 3 clinical trial of MM-398 for the treatment of patients with metastatic pancreatic cancer who have previously failed treatment with gemcitabine. The trial is expected to enroll approximately 270 patients worldwide and is designed to compare the efficacy of MM-398 as a monotherapy against the combination of the chemotherapy drugs fluorouracil, or 5-FU, and leucovorin, a regimen often used by physicians to treat this patient population. We believe that MM-398 has potential uses in a number of other indications, including colorectal cancer, lung cancer, gastric cancer and glioma. There are multiple ongoing Phase 1 and Phase 2 clinical trials of MM-398.

In July 2011, the U.S. Food and Drug Administration, or FDA, granted MM-398 orphan drug designation for the treatment of pancreatic cancer. In the United States, orphan drug designation is granted to a drug intended to treat a rare disease or condition, which is generally defined as a disease or condition that affects fewer than 200,000 individuals in the United States. If MM-398 receives the first FDA approval for the disease for which it has such designation, it is entitled to orphan drug exclusivity, which means that the FDA may not approve any other applications to market the same drug for the same indication, except in limited circumstances, for seven years. In September 2011, the European Medicines Agency also granted MM-398 orphan medicinal product designation for the treatment of pancreatic cancer.

- **MM-121:** MM-121 is a fully human monoclonal antibody that targets ErbB3, a cell surface receptor, or protein attached to the cell membrane that mediates communication inside and outside the cell, that our Network Biology approach identified as a potentially important target in a range of cancers. A monoclonal antibody is a type of protein normally produced by cells of the immune system that binds to just one epitope, or chemical structure, on a protein or other structure. MM-121 is designed to inhibit cancer growth directly, restore sensitivity to drugs to which a tumor has become resistant and delay the development of resistance of a tumor to other agents. In collaboration with Sanofi, we are testing MM-121 in combination with both chemotherapies and other targeted agents across a wide spectrum of solid tumors, including lung, breast and ovarian cancers.

  We partnered MM-121 with Sanofi after we initiated Phase 1 clinical development of this product candidate. Sanofi paid us an upfront license fee of $60 million and is responsible for all of the development and manufacturing costs under the collaboration. We are entitled to tiered royalties and aggregate clinical, regulatory and sales milestones of up to $470 million, of which we have already received $20 million for achieving two clinical milestones.

- **MM-111:** MM-111 is a bispecific antibody designed to target cancer cells that are characterized by overexpression of the ErbB2 cell surface receptor, also referred to as HER2. A bispecific antibody is a type of antibody that is able to bind simultaneously to two distinct proteins or epitopes. Our Network Biology approach identified that ligand-induced signaling through the complex of ErbB2 (HER2) and ErbB3 is a more powerful and widespread promoter of tumor growth and survival than previously appreciated. We believe that MM-111 is potentially applicable across a broad range of solid tumors. We are conducting multiple Phase 1 clinical trials of MM-111 in monotherapy and combination therapy settings.

- **MM-302:** MM-302 is a nanotherapeutic encapsulation of doxorubicin with attached antibodies that are designed to target MM-302 to cells that overexpress the ErbB2 (HER2) receptor. We believe that MM-302 has the potential to retain the safety profile of liposomal doxorubicin, in particular with respect to cardiac safety, and achieve better efficacy than either free doxorubicin or liposomal doxorubicin in ErbB2 (HER2) positive tumors. We are conducting a Phase 1 clinical trial of MM-302 in patients with advanced ErbB2 (HER2) positive breast cancer.

- **MM-151:** MM-151 is an oligoclonal therapeutic consisting of a mixture of three fully human monoclonal antibodies designed to bind to non-overlapping epitopes of the epidermal growth factor receptor, or EGFR. EGFR is also know as ErbB1. An oligoclonal therapeutic is a mixture of two or more distinct monoclonal antibodies. We have designed MM-151 to block signal amplification that occurs within the ErbB cell signaling network, which we believe may result in greater efficacy than currently marketed EGFR (ErbB1) inhibitors. We are conducting a Phase 1 clinical trial of MM-151 in patients with solid tumors.

We are developing companion diagnostics for use with each of our therapeutic oncology product candidates. We use Network Biology in our programs to identify biomarkers and develop them into companion diagnostic agents. We believe that companion diagnostics will allow us to improve the efficiency and productivity of our clinical development and enhance the efficacy and pharmacoeconomic benefit of our therapeutics.

We manufacture drug substance for use in our clinical trials and research and development efforts for all of our product candidates using current good manufacturing practices, or cGMP, at our 4,000 square foot multi-product facility. We have capacity to produce Phase 2 material for our antibody product candidates and commercial material for our nanotherapeutics.

Our strategy

Our goal is to build a global healthcare enterprise founded on a leading understanding of complex biology through the use of our Network Biology approach. Key elements of our strategy to achieve this goal are:

- Strengthen and expand our core Network Biology capabilities by continuing to invest in the technologies, methods and know-how that comprise our ability to explore, model and understand complex biology.

- Foster an integrated, multidisciplinary model of drug discovery, clinical development, manufacturing and commercialization, which is essential to our productivity, innovation and retention of knowledge across all of our processes from research through manufacturing.

- Develop a companion diagnostic for each of our therapeutic oncology product candidates so as to guide their use and enhance their benefit for patients and the healthcare system.

- Establish a focused sales and marketing organization, as we expect to retain commercial rights in the United States and Europe for our oncology product candidates, other than MM-121.

Advantages of Network Biology

We believe that Network Biology is a critical, biological data-based tool to discover important insights into biology and develop better medicines by allowing us to move beyond one-dimensional measures of molecular activity, such as protein expression levels or gene mutation status, to an understanding of the system dynamics that govern cellular decisions. In oncology, Network Biology provides us with a detailed understanding of active signaling networks within a tumor cell that we use to guide the design of targeted therapeutics that we believe will appropriately disrupt the activity of these networks.

Specifically, we have used Network Biology to:

- Generate data suggesting that, although cancer occurs as a result of a myriad of environmental and genetic factors, it may be characterized as a disease of addiction to a relatively limited number of cell signaling networks that are used for growth and survival.
- Enhance our understanding of the significant signaling pathways used for survival, such as the ErbB pathway, to design novel therapeutics and therapeutic approaches that we believe will be clinically effective.
    - Our insight into the importance of the ErbB3 receptor as a highly sensitive target led to our development of MM-121 despite ErbB3 being largely ignored as a drug target by the broader scientific community.
    - Our understanding of the importance of ligand-induced signaling in the context of overexpressed proteins, particularly the interaction of ErbB2 (HER2) with ErbB3 and its ligand, heregulin, led to the development of MM-111, a novel bispecific antibody therapeutic.
    - Our computational modeling revealed the importance of inhibiting the binding of a full range of EGFR (ErbB1) ligands as a solution for preventing EGFR (ErbB1) cell survival signaling and led to the development of MM-151.
- Create and implement strategies for predicting response to our drugs based on the molecular and physical characteristics of tumors and tumor cells.
    - By profiling the levels of five proteins, we were able to successfully and accurately predict response to MM-121 in 20 different xenograft tumor models. This profile forms the basis for our development plans for a companion diagnostic for MM-121.
    - By building computational models of the key variables involved in the transport and deposition of nanotherapeutics in and around tumors, we are developing a strategy for imaging tumors to identify which are likely to respond to treatment.
- Move our products through preclinical development at a pace, cost and success rate that we believe compares favorably to industry benchmarks.

We believe that Network Biology gives us the ability to:

- Improve the productivity of the drug development process: We believe that Network Biology can produce more precisely targeted therapeutics, increase the productivity of biomedical research and increase the probability of approval for new drugs. We believe that Network

Biology improves our decision making throughout the research and development process by providing our scientists with tools to simulate hypotheses in computer models and then test these hypotheses in preclinical and clinical settings.

- Improve patient care: We believe that integrated medicines consisting of a diagnostic paired with a therapeutic will enable physicians to deliver the right drug to the right set of patients at the right time, which will improve patient outcomes, reduce the overall costs of treating and caring for cancer patients and provide a basis for seeking favorable reimbursement of approved drugs from payors because of the benefits to patients.

- Address therapeutic areas beyond cancer: We believe that our Network Biology approach is applicable to a broad range of therapeutic areas beyond cancer, including regenerative medicine, bone and joint conditions, infectious disease, inflammation, central nervous system disease and other areas of medicine with high unmet needs.

Risks associated with our business

Our business is subject to a number of risks of which you should be aware before making an investment decision. These risks are discussed more fully in the "Risk factors" section of this prospectus immediately following this prospectus summary. In particular:

- We currently have no commercial products, and we have not received regulatory approval for, nor have we generated commercial revenue from, any of our products.

- We depend heavily on the success of our five most advanced product candidates. All of our product candidates are still in preclinical and clinical development. Clinical trials of our product candidates may not be successful. If we are unable to obtain required regulatory approvals of, commercialize, obtain and maintain patent protection for or gain sufficient market acceptance by physicians, patients and healthcare payors of our product candidates, or experience significant delays in doing so, our business will be materially harmed and our ability to generate revenue will be materially impaired.

- If we are unable to successfully develop companion diagnostics for our therapeutic product candidates, or experience significant delays in doing so, we may not receive marketing approval for or realize the full commercial potential of our therapeutics.

- We may depend on collaborations with third parties for the development and commercialization of our product candidates. If those collaborations are not successful, we may not be able to capitalize on the market potential of these product candidates. In particular, the successful development and commercialization of MM-121 depends substantially on our collaboration with Sanofi.

- Notwithstanding our large investment to date and anticipated future expenditures in Network Biology, we have not yet developed, and may never successfully develop, any marketed products using this approach.

- We have incurred significant losses since our inception and will need substantial additional funding. We expect to incur losses for the foreseeable future and may never achieve or maintain profitability. Our net loss was $61.5 million for the nine months ended September 30, 2011, $50.2 million for the year ended December 31, 2010, $49.1 million for

the year ended December 31, 2009 and $45.6 million for the year ended December 31, 2008. As of September 30, 2011, we had an accumulated deficit of $332.7 million.

Our corporate information

We were incorporated under the laws of the Commonwealth of Massachusetts in 1993 under the name Immtek, Inc. We changed our name to Atlantic BioPharmaceuticals, Inc. in 1995. In 2001, we acquired Merrimack Pharmaceuticals, Inc., a Delaware corporation, and changed our name to Merrimack Pharmaceuticals, Inc. In October 2010, we reincorporated in the State of Delaware. As a result, we are now a Delaware corporation with the name Merrimack Pharmaceuticals, Inc. Our principal executive offices are located at One Kendall Square, Suite B7201, Cambridge, Massachusetts 02139 and our telephone number is (617) 441-1000. Our website address is *www.merrimackpharma.com*. The information contained on, or that can be accessed through, our website is not a part of this prospectus. We have included our website address in this prospectus solely as an inactive textual reference.

In this prospectus, unless otherwise stated or the context otherwise requires, references to "Merrimack," "we," "us," "our" and similar references refer to Merrimack Pharmaceuticals, Inc. and its subsidiaries. The Merrimack logo is our trademark. The other trademarks, trade names and service marks appearing in this prospectus are the property of their respective owner.

This prospectus includes statistical and other industry and market data that we obtained from industry publications and research, surveys and studies conducted by third parties. Industry publications and third party research, surveys and studies generally indicate that their information has been obtained from sources believed to be reliable, although they do not guarantee the accuracy or completeness of such information. While we believe these industry publications and third party research, surveys and studies are reliable, we have not independently verified such data. This prospectus also includes data based on our own internal estimates and research. While we believe that our internal company research is reliable and that our internal estimates are reasonable, no independent source has verified such research or estimates.

The offering

Common stock offered by us	16,666,667 shares
Common stock to be outstanding after this offering	94,756,679 shares
Over-allotment option	The underwriters have an option for a period of 30 days to purchase up to 2,500,000 additional shares of our common stock to cover over-allotments.
Use of proceeds	We will use approximately $4.3 million of the net proceeds from this offering to pay accrued dividends on our series B convertible preferred stock. We expect to use the balance of the net proceeds from this offering to fund the clinical development of our most advanced product candidates, including MM-398, MM-111, MM-302 and MM-151, to fund research and development of our preclinical product candidates and for other general corporate purposes. See "Use of proceeds." Sanofi is responsible for all development and manufacturing costs under our collaboration for the development and commercialization of MM-121.
Risk factors	You should read the "Risk factors" section of this prospectus for a discussion of factors to consider carefully before deciding to invest in shares of our common stock.
Proposed NASDAQ Global Market symbol	MACK

The number of shares of our common stock to be outstanding after this offering is based on 11,834,483 actual shares of our common stock outstanding as of December 31, 2011 and 66,255,529 additional shares of our common stock issuable upon the automatic conversion of all outstanding shares of our preferred stock upon the closing of this offering.

The number of shares of our common stock to be outstanding after this offering excludes:

- 17,617,016 shares of our common stock issuable upon the exercise of stock options outstanding as of December 31, 2011 at a weighted average exercise price of $2.56 per share;
- 830,007 additional shares of our common stock available for future issuance as of December 31, 2011 under our 2008 stock incentive plan;
- 3,500,000 additional shares of our common stock that will be available for future issuance, as of the closing of this offering, under our 2011 stock incentive plan;
- 1,500,000 additional shares of our common stock that will be available for future issuance, as of the closing of this offering, under our 2011 employee stock purchase plan; and

- 2,941,897 shares of our common stock issuable upon the exercise of warrants outstanding as of December 31, 2011 at a weighted average exercise price of $3.03 per share.

Unless otherwise indicated, all information in this prospectus assumes:

- no exercise of the outstanding options or warrants described above;
- no exercise by the underwriters of their option to purchase up to 2,500,000 additional shares of our common stock to cover over-allotments;
- the automatic conversion of all outstanding shares of our preferred stock into an aggregate of 66,255,529 shares of our common stock upon the closing of this offering;
- that the warrant outstanding as of December 31, 2011 held by Hercules Technology Growth Capital, Inc. to purchase 302,143 shares of our series D convertible preferred stock at an exercise price of $3.50 per share automatically becomes a warrant to purchase 302,143 shares of our common stock at an exercise price of $3.50 per share upon the closing of this offering; and
- the restatement of our restated certificate of incorporation and the amendment and restatement of our bylaws upon the closing of this offering.

Summary consolidated financial information

You should read the following summary consolidated financial data together with our consolidated financial statements and the related notes appearing at the end of this prospectus and the "Selected consolidated financial data" and "Management's discussion and analysis of financial condition and results of operations" sections of this prospectus. We have derived the consolidated statements of operations data for the years ended December 31, 2008, 2009 and 2010 from our audited consolidated financial statements included in this prospectus. We have derived the consolidated statements of operations data for the nine months ended September 30, 2010 and 2011 and the consolidated balance sheet data as of September 30, 2011 from our unaudited consolidated financial statements included in this prospectus. The unaudited consolidated financial data include, in the opinion of our management, all adjustments, consisting only of normal recurring adjustments, that are necessary for a fair statement of our financial position and results of operations for these periods. Our historical results for any prior period are not necessarily indicative of results to be expected in any future period, and our results for any interim period are not necessarily indicative of results to be expected for a full fiscal year.

(in thousands, except per share data)	Year ended December 31, 2008	2009(1)	2010(2)	Nine months ended September 30, 2010(2)	2011(2)
				(unaudited)	
Consolidated statements of operations data:					
Research and development revenues	$ 365	$ 2,148	$ 20,305	$ 13,996	$ 21,638
Operating expenses:					
Research and development	34,528	37,658	58,278	41,860	73,101
General and administrative	8,836	12,178	11,381	8,555	11,239
Contingent consideration	—	—	(178)	37	—
Total operating expenses	43,364	49,836	69,481	50,452	84,340
Loss from operations	(42,999)	(47,688)	(49,176)	(36,456)	(62,702)
Other income and expenses:					
Interest income	1,243	81	74	54	51
Interest expense	(4,403)	(4,909)	(3,726)	(3,638)	(12)
Other, net	607	41	2,669	12	1,208
Net loss before income taxes and non-controlling interest	(45,552)	(52,475)	(50,159)	(40,028)	(61,455)
Benefit from income taxes	—	3,402	—	—	—
Net loss	(45,552)	(49,073)	(50,159)	(40,028)	(61,455)
Less net loss attributable to non-controlling interest	—	—	(55)	(19)	(348)
Net loss attributable to Merrimack Pharmaceuticals, Inc.	$ (45,552)	$ (49,073)	$ (50,104)	$ (40,009)	$ (61,107)
Net loss per share available to common stockholders—basic and diluted(3)	$ (8.17)	$ (7.28)	$ (5.57)	$ (3.94)	$ (5.92)
Weighted-average common shares used in computing net loss per share available to common stockholders—basic and diluted	6,199	7,387	10,994	10,970	11,292
Pro forma net loss per share available to common stockholders—basic and diluted (unaudited)(4)			$ (0.87)		$ (0.81)
Weighted-average common shares used in computing pro forma net loss per share available to common stockholders—basic and diluted (unaudited)(5)			57,718		74,152

(1) In 2009, we acquired Hermes BioSciences, Inc. See Note 6 to our consolidated financial statements.

(2) In 2010 and 2011, we consolidated Silver Creek Pharmaceuticals, Inc. for financial reporting purposes.

(3) The numerator in the calculation of net loss per share available to common stockholders—basic and diluted includes unaccreted dividends on our convertible preferred stock.

(4) The numerator in the calculation of pro forma net loss per share available to common stockholders—basic and diluted has been adjusted to remove gains and losses resulting from re-measurement of the preferred stock warrant liabilities.

(5) Weighted-average common shares used in computing pro forma net loss per share available to common stockholders—basic and diluted is calculated assuming the automatic conversion of all outstanding shares of our preferred stock into an aggregate of 66,254,763 shares of our common stock upon the closing of this offering and adjusted to reflect additional shares of common stock related to preferred stock dividends of approximately $4,263,000.

The pro forma balance sheet data set forth below give effect to:

- the automatic conversion of all outstanding shares of our preferred stock into an aggregate of 66,254,763 shares of our common stock upon the closing of this offering;
- the reclassification of convertible preferred stock warrant liability to common stock warrants for warrants to purchase our preferred stock that will automatically become warrants to purchase an aggregate of 303,176 shares of our common stock upon the closing of this offering; and
- the accrual of series B convertible preferred stock dividends of approximately $4,263,000.

The pro forma as adjusted balance sheet data set forth below give further effect to:

- our issuance and sale of 16,666,667 shares of our common stock in this offering at an assumed initial public offering price of $9.00 per share, which is the midpoint of the price range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us; and
- our use of approximately $4,263,000 of the net proceeds from this offering to pay accrued dividends on our series B convertible preferred stock.

As of September 30, 2011 (in thousands)	Actual	Pro forma	Pro forma as adjusted
		(unaudited)	
Consolidated balance sheet data:			
Cash and cash equivalents	$ 59,232	$ 59,232	$ 192,869
Total assets	89,252	89,252	222,889
Deferred revenue	75,516	75,516	75,516
Convertible preferred stock warrants liability	1,394	—	—
Total liabilities	95,065	97,934	93,671
Non-controlling interest	679	679	679
Convertible preferred stock	268,220	—	—
Total stockholders' (deficit) equity	$ (274,712)	$ (9,361)	$ 128,539

Risk factors

Risks related to our financial position and need for additional capital

We have incurred significant losses since our inception. We expect to incur losses for the foreseeable future and may never achieve or maintain profitability.

Since inception, we have incurred significant operating losses. Our net loss was $61.5 million for the nine months ended September 30, 2011, $50.2 million for the year ended December 31, 2010, $49.1 million for the year ended December 31, 2009 and $45.6 million for the year ended December 31, 2008. As of September 30, 2011, we had an accumulated deficit of $332.7 million. To date, we have financed our operations primarily through private placements of our preferred stock, collaborations and, to a lesser extent, through government grants, the monetization of tax credits and equipment lease financings. We have devoted substantially all of our efforts to research and development, including clinical trials. We have not completed development of any therapeutic product candidates or companion diagnostics. We expect to continue to incur significant expenses and increasing operating losses for at least the next several years. We anticipate that our expenses will increase substantially as we:

- initiate or continue our clinical trials of our five most advanced product candidates;
- continue the research and development of our other product candidates;
- seek to discover additional product candidates;
- seek regulatory approvals for our product candidates that successfully complete clinical trials;
- establish a sales, marketing and distribution infrastructure and scale up manufacturing capabilities to commercialize products for which we may obtain regulatory approval; and
- add operational, financial and management information systems and personnel, including personnel to support our product development and planned commercialization efforts.

To become and remain profitable, we must succeed in developing and eventually commercializing products with significant market potential. This will require us to be successful in a range of challenging activities, including discovering product candidates, completing preclinical testing and clinical trials of our product candidates, obtaining regulatory approval for these product candidates and manufacturing, marketing and selling those products for which we may obtain regulatory approval. We are only in the preliminary stages of some of these activities. We may never succeed in these activities and may never generate revenues that are significant or large enough to achieve profitability. Even if we do achieve profitability, we may not be able to sustain or increase profitability on a quarterly or annual basis. Our failure to become and remain profitable would depress the value of our company and could impair our ability to raise capital, expand our business, diversify our product offerings or continue our operations. A decline in the value of our company could also cause you to lose all or part of your investment.

We will need substantial additional funding. If we are unable to raise capital when needed, we would be forced to delay, reduce or eliminate our product development programs or commercialization efforts.

We expect our research and development expenses to increase in connection with our ongoing activities, particularly as we continue the research, development and clinical trials of, and seek regulatory approval for, our product candidates. In addition, subject to obtaining regulatory approval of any of our product candidates, we expect to incur significant commercialization expenses for product sales, marketing, manufacturing and distribution. We will need substantial additional funding in connection with our continuing operations. If we are unable to raise capital when needed or on attractive terms, we would be forced to delay, reduce or eliminate our research and development programs or commercialization efforts.

We expect that the net proceeds from this offering, together with our existing cash and cash equivalents, anticipated interest income and anticipated milestone payments and research and development and manufacturing funding under our collaboration agreement with Sanofi related to MM-121, will enable us to fund our operating expenses and capital expenditure requirements through at least the end of 2013. Our future capital requirements will depend on many factors, including:

- the progress and results of the clinical trials of our five most advanced product candidates;
- the success of our collaborations with Sanofi related to MM-121 and PharmaEngine, Inc., or PharmaEngine, related to MM-398;
- the scope, progress, results and costs of preclinical development, laboratory testing and clinical trials for our other product candidates;
- the costs, timing and outcome of regulatory review of our product candidates;
- the costs of commercialization activities, including product sales, marketing, manufacturing and distribution;
- the costs of preparing, filing and prosecuting patent applications and maintaining, enforcing and defending intellectual property-related claims;
- the extent to which we acquire or invest in businesses, products and technologies; and
- our ability to establish and maintain additional collaborations on favorable terms, particularly marketing and distribution arrangements for oncology product candidates outside the United States and Europe.

Conducting preclinical testing and clinical trials is a time-consuming, expensive and uncertain process that takes years to complete, and we may never generate the necessary data required to obtain regulatory approval and achieve product sales. In addition, our product candidates, if approved, may not achieve commercial success. Our commercial revenues, if any, will be derived from sales of products that we do not expect to be commercially available for several years, if at all. Accordingly, we will need to continue to rely on additional financing to achieve our business objectives.

Raising additional capital may cause dilution to our existing stockholders, restrict our operations or require us to relinquish rights to our technologies or product candidates.

Until such time, if ever, as we can generate substantial product revenues, we expect to finance our cash needs through a combination of equity offerings, debt financings, collaborations, strategic alliances, licensing arrangements and other marketing and distribution arrangements. We do not have any committed external source of funds, other than our collaboration with Sanofi for the development and commercialization of MM-121, which is terminable by Sanofi for convenience upon 180 days' prior written notice. To the extent that we raise additional capital through the sale of equity or convertible debt securities, your ownership interest will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect your rights as a stockholder. Debt financing, if available, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends. If we raise additional funds through marketing and distribution arrangements or other collaborations, strategic alliances or licensing arrangements with third parties, we may have to relinquish valuable rights to our technologies, future revenue streams, research programs or product candidates or to grant licenses on terms that may not be favorable to us. If we are unable to raise additional funds through equity or debt financings when needed, we may be required to delay, limit, reduce or terminate our product development or commercialization efforts or grant rights to develop and market product candidates that we would otherwise prefer to develop and market ourselves.

Risks related to the development and commercialization of our product candidates

We depend heavily on the success of our five most advanced product candidates. All of our product candidates are still in preclinical and clinical development. Clinical trials of our product candidates may not be successful. If we are unable to commercialize our product candidates, or experience significant delays in doing so, our business will be materially harmed.

We have invested a significant portion of our efforts and financial resources in the acquisition of rights to MM-398 and the development of our four other most advanced product candidates for the treatment of various types of cancer. All of our therapeutic product candidates are still in preclinical and clinical development. Our ability to generate product revenues, which we do not expect will occur for at least the next several years, if ever, will depend heavily on the successful development and eventual commercialization of these product candidates. The success of our product candidates, which include both our therapeutic product candidates and companion diagnostic candidates, will depend on several factors, including the following:

- successful enrollment in, and completion of, preclinical studies and clinical trials;
- receipt of marketing approvals from the FDA and similar regulatory authorities outside the United States for our product candidates, including our companion diagnostics;
- establishing commercial manufacturing capabilities, either by building such facilities ourselves or making arrangements with third party manufacturers;
- launching commercial sales of the product, whether alone or in collaboration with others;
- acceptance of the product by patients, the medical community and third party payors;

- effectively competing with other therapies;
- a continued acceptable safety profile of the product following approval; and
- qualifying for, maintaining, enforcing and defending intellectual property rights and claims.

If we do not achieve one or more of these factors in a timely manner or at all, we could experience significant delays or an inability to successfully commercialize our product candidates, which would materially harm our business.

If clinical trials of our product candidates fail to demonstrate safety and efficacy to the satisfaction of the FDA or similar regulatory authorities outside the United States or do not otherwise produce positive results, we may incur additional costs or experience delays in completing, or ultimately be unable to complete, the development and commercialization of our product candidates.

Before obtaining regulatory approval for the sale of our product candidates, we must conduct extensive clinical trials to demonstrate the safety and efficacy of our product candidates in humans. Clinical testing is expensive, difficult to design and implement, can take many years to complete and is uncertain as to outcome. A failure of one or more of our clinical trials can occur at any stage of testing. The outcome of preclinical testing and early clinical trials may not be predictive of the success of later clinical trials, and interim results of a clinical trial do not necessarily predict final results.

For example, the favorable results from a Phase 2 clinical trial of MM-398 in patients with metastatic pancreatic cancer may not be predictive of success in our Phase 3 clinical trial of MM-398 for the same indication, in particular because the trials have different efficacy endpoints and the Phase 2 trial was a single arm study that did not compare MM-398 to other therapies. Our Phase 3 trial is designed to compare the efficacy of MM-398 against a combination of 5-FU and leucovorin based on an expected efficacy endpoint of statistically significant difference in overall survival. In addition, preclinical and clinical data are often susceptible to varying interpretations and analyses, and many companies that have believed their product candidates performed satisfactorily in preclinical studies and clinical trials have nonetheless failed to obtain marketing approval of their products.

We may experience numerous unforeseen events during, or as a result of, clinical trials that could delay or prevent our ability to receive regulatory approval or commercialize our product candidates, including:

- regulators or institutional review boards may not authorize us or our investigators to commence a clinical trial or conduct a clinical trial at a prospective trial site;
- clinical trials of our product candidates may produce negative or inconclusive results, and we may decide, or regulators may require us, to conduct additional clinical trials or abandon product development programs;
- the number of patients required for clinical trials of our product candidates may be larger than we anticipate, enrollment in these clinical trials may be insufficient or slower than we anticipate or patients may drop out of these clinical trials at a higher rate than we anticipate;

- our third party contractors may fail to comply with regulatory requirements or meet their contractual obligations to us in a timely manner, or at all;
- we might have to suspend or terminate clinical trials of our product candidates for various reasons, including a finding that the patients are being exposed to unacceptable health risks;
- regulators or institutional review boards may require that we or our investigators suspend or terminate clinical research for various reasons, including noncompliance with regulatory requirements;
- the cost of clinical trials of our product candidates may be greater than we anticipate;
- the supply or quality of our product candidates or other materials necessary to conduct clinical trials of our product candidates may be insufficient or inadequate; and
- our product candidates may have undesirable side effects or other unexpected characteristics, causing us or our investigators to suspend or terminate the trials.

For example, due to a lack of efficacy in clinical trials, we suspended internal development of our product candidate MM-093, a potential therapeutic for autoimmune diseases. We subsequently terminated our development program for this product candidate and licensed it to a third party.

If we are required to conduct additional clinical trials or other testing of our product candidates beyond those that we currently contemplate, if we are unable to successfully complete clinical trials of our product candidates or other testing, if the results of these trials or tests are not positive or are only modestly positive or if there are safety concerns, we may:

- be delayed in obtaining marketing approval for our product candidates;
- not obtain marketing approval at all;
- obtain approval for indications that are not as broad as intended;
- have the product removed from the market after obtaining marketing approval;
- be subject to additional post-marketing testing requirements; or
- be subject to restrictions on how the product is distributed or used.

In particular, it is possible that the FDA may not consider the results of our Phase 3 clinical trial of MM-398 for the treatment of patients with metastatic pancreatic cancer, once completed, to be sufficient for approval of MM-398 for this indication. In general, the FDA suggests two adequate and well-controlled clinical trials to demonstrate effectiveness because a conclusion based on two persuasive studies will be more secure. Although the FDA has informed us that our pivotal Phase 3 clinical trial of MM-398, plus supportive Phase 2 data obtained to date, could potentially provide sufficient safety and effectiveness data for the treatment of patients with metastatic pancreatic cancer, the FDA has further advised us that whether one or two adequate and well controlled clinical trials will be required will be a review issue in connection with an NDA submission. Even if we achieve favorable results in our pivotal Phase 3 clinical trial, the FDA may nonetheless require that we conduct additional clinical trials, possibly using a different design. In addition, if we are unable to demonstrate comparability between MM-398 Phase 1 and Phase 2 clinical material manufactured by PharmaEngine and the material produced by us for use in our Phase 3 clinical trial of MM-398, we may be required to complete

additional studies, including clinical studies, which could delay the development and approval, if any, of MM-398.

Our product development costs will also increase if we experience delays in testing or approvals. We do not know whether any clinical trials will begin as planned, will need to be restructured or will be completed on schedule, or at all. For example, in August 2011, the FDA informed us that, before initiating a Phase 1 clinical trial of MM-151, among other things, we needed to submit additional preclinical data from our ongoing toxicology studies. In particular, the FDA requested data on the formation of antibodies against MM-151 in the test animals included in our ongoing toxicology studies. As a result, the FDA placed our investigational new drug application, or IND, for MM-151 on clinical hold until we provided all of the information that the FDA had requested. We provided this information to the FDA in November 2011. In December 2011, the FDA notified us that the clinical hold had been removed and that we could initiate the Phase 1 clinical trial.

Significant clinical trial delays also could shorten any periods during which we may have the exclusive right to commercialize our product candidates or allow our competitors to bring products to market before we do and impair our ability to commercialize our product candidates and may harm our business and results of operations.

If serious adverse or inappropriate side effects are identified during the development of our product candidates, we may need to abandon our development of some of our product candidates.

All of our product candidates are still in preclinical or clinical development and their risk of failure is high. It is impossible to predict when or if any of our product candidates will prove effective or safe in humans or will receive regulatory approval. Currently marketed therapies for solid tumors are generally limited to some extent by their toxicity. Use of our product candidates as monotherapies in clinical trials also has resulted in adverse events consistent in nature with other marketed therapies. When used in combination with other marketed therapies, our product candidates may exacerbate adverse events associated with the marketed therapy. If our product candidates result in undesirable side effects or have characteristics that are unexpected, we may need to abandon their development.

If we experience delays in the enrollment of patients in our clinical trials, our receipt of necessary regulatory approvals could be delayed or prevented.

We may not be able to initiate or continue clinical trials for our product candidates if we are unable to locate and enroll a sufficient number of eligible patients to participate in these trials as required by the FDA or other regulatory authorities. In addition, many of our competitors have ongoing clinical trials for product candidates that could be competitive with our product candidates. Patients who would otherwise be eligible for our clinical trials may instead enroll in clinical trials of our competitors' product candidates or rely upon treatment with existing therapies that may preclude them from eligibility for our clinical trials.

Enrollment delays in our clinical trials may result in increased development costs for our product candidates, which would cause the value of the company to decline and limit our ability to obtain additional financing. Our inability to enroll a sufficient number of patients for any of our current or future clinical trials would result in significant delays or may require us to abandon one or more clinical trials altogether.

In general, we forecast enrollment for our clinical trials based on experience from previous clinical trials and monitor enrollment to be able to make adjustments to clinical trials when appropriate, including as a result of slower than expected enrollment that we experience from time to time in our clinical trials. For example, we experienced slower than expected enrollment in our Phase 2 clinical trial of MM-121 in combination with exemestane for hormone-sensitive breast cancer. In response, we revised the entry criteria for the clinical trial to correspond with changes in clinical practice and also expanded the number of sites and countries participating in the clinical trial. It is possible that slow enrollment in other clinical trials in the future could require us to make similar adjustments. If these adjustments do not overcome problems with slow enrollment, we could experience significant delays or abandon the applicable clinical trial altogether.

If we are unable to successfully develop companion diagnostics for our therapeutic product candidates, or experience significant delays in doing so, we may not realize the full commercial potential of our therapeutics.

An important component of our business strategy is to develop *in vitro* or *in vivo* companion diagnostics for each of our therapeutic product candidates. There has been limited success to date industry wide in developing companion diagnostics, in particular *in vitro* companion diagnostics. To be successful, we will need to address a number of scientific, technical and logistical challenges.

Although we have developed prototype assays for some *in vitro* diagnostic candidates, all of our companion diagnostic candidates are in preclinical development or clinical feasibility testing. We have limited experience in the development of diagnostics and may not be successful in developing appropriate diagnostics to pair with any of our therapeutic product candidates that receive marketing approval. The FDA and similar regulatory authorities outside the United States regulate *in vitro* companion diagnostics as medical devices and *in vivo* companion diagnostics as drugs. In each case, companion diagnostics require separate regulatory approval prior to commercialization. Given our limited experience in developing diagnostics, we expect to rely in part on third parties for their design and manufacture. If we, or any third parties that we engage to assist us, are unable to successfully develop companion diagnostics for our therapeutic product candidates, or experience delays in doing so, the development of our therapeutic product candidates may be adversely affected, our therapeutic product candidates may not receive marketing approval and we may not realize the full commercial potential of any therapeutics that receive marketing approval. As a result, our business would be harmed, possibly materially.

Even if any of our product candidates, including our five most advanced product candidates, receive regulatory approval, they may fail to achieve the degree of market acceptance by physicians, patients, healthcare payors and others in the medical community necessary for commercial success.

If any of our product candidates, including our five most advanced product candidates, receive marketing approval, they may nonetheless not gain sufficient market acceptance by physicians, patients, healthcare payors and others in the medical community. If these products do not achieve an adequate level of acceptance, we may not generate significant product revenues

and we may not become profitable. The degree of market acceptance of our product candidates, if approved for commercial sale, will depend on a number of factors, including:

- the prevalence and severity of any side effects;
- efficacy and potential advantages compared to alternative treatments;
- the price we charge for our product candidates;
- convenience and ease of administration compared to alternative treatments;
- the willingness of the target patient population to try new therapies and of physicians to prescribe these therapies;
- our ability to successfully develop companion diagnostics that effectively identify patient populations likely to benefit from treatment with our therapeutic products;
- the strength of marketing and distribution support; and
- sufficient third party coverage or reimbursement.

If we are unable to establish sales and marketing capabilities or enter into agreements with third parties to sell and market our product candidates, we may not be successful in commercializing our product candidates.

We do not have a sales or marketing infrastructure and have no experience in the sale, marketing or distribution of therapeutic products. To achieve commercial success for any approved product, we must either develop a sales and marketing organization or outsource these functions to third parties. Our current plan for our oncology products, other than MM-121, for which we receive marketing approval is to market and sell these products ourselves in the United States and Europe and to establish distribution or other marketing arrangements with third parties for these products in the rest of the world. We plan to co-promote MM-121 in the United States with Sanofi, which otherwise holds worldwide commercialization rights to this product candidate.

There are risks involved with both establishing our own sales and marketing capabilities and entering into arrangements with third parties to perform these services. For example, recruiting and training a sales force is expensive and time-consuming and could delay any product launch. If the commercial launch of a product candidate for which we recruit a sales force and establish marketing capabilities is delayed or does not occur for any reason, we would have prematurely or unnecessarily incurred these commercialization expenses. This may be costly, and our investment would be lost if we cannot retain or reposition our sales and marketing personnel.

Establishing effective sales, marketing and distribution capabilities and infrastructure in Europe may be particularly difficult for us. We have no prior experience in these areas. In addition, there are complex regulatory, tax, labor and other legal requirements imposed by both the European Union and many of the individual countries in Europe with which we will need to comply. Many U.S.-based biopharmaceutical companies have found the process of marketing their own products in Europe to be very challenging.

We also may not be successful entering into arrangements with third parties to sell and market our product candidates or doing so on terms that are favorable to us. We likely will have little control over such third parties, and any of them may fail to devote the necessary resources and attention to sell and market our products effectively. If we do not establish sales and marketing capabilities successfully, either on our own or in collaboration with third parties, we will not be successful in commercializing our product candidates.

We face substantial competition, which may result in others discovering, developing or commercializing products before or more successfully than we do.

The development and commercialization of new therapeutic and diagnostic products is highly competitive. We face competition with respect to our current product candidates, and will face competition with respect to any products that we may seek to develop or commercialize in the future, from major pharmaceutical companies, specialty pharmaceutical companies and biotechnology companies worldwide. Several large pharmaceutical and biotechnology companies currently market and sell products for the treatment of the solid tumor indications for which we are developing our product candidates. Potential competitors also include academic institutions, government agencies and other public and private research organizations that conduct research, seek patent protection and establish collaborative arrangements for research, development, manufacturing and commercialization. Many of these competitors are attempting to develop therapeutics for our target indications.

We are developing our product candidates for the treatment of solid tumors. There are a variety of available therapies marketed for solid tumors. In many cases, these drugs are administered in combination to enhance efficacy. Some of these drugs are branded and subject to patent protection, and others are available on a generic basis, including the active ingredients in MM-398 and MM-302. Many of these approved drugs are well established therapies and are widely accepted by physicians, patients and third party payors. This may make it difficult for us to achieve our business strategy of replacing existing therapies with our product candidates.

There are also a number of products in late stage clinical development to treat solid tumors. Our competitors may develop products that are more effective, safer, more convenient or less costly than any that we are developing or that would render our product candidates obsolete or non-competitive. Our competitors may also obtain FDA or other regulatory approval for their products more rapidly than we may obtain approval for ours.

Many of our competitors have significantly greater financial resources and expertise in research and development, manufacturing, preclinical testing, conducting clinical trials, obtaining regulatory approvals and marketing approved products than we do. Mergers and acquisitions in the pharmaceutical, biotechnology and diagnostic industries may result in even more resources being concentrated among a smaller number of our competitors. Smaller or early stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies. These third parties compete with us in recruiting and retaining qualified scientific and management personnel, establishing clinical trial sites and patient registration for clinical trials, as well as in acquiring technologies complementary to, or necessary for, our programs.

If we are able to commercialize any product candidates, the products may become subject to unfavorable pricing regulations, third party reimbursement practices or healthcare reform initiatives, thereby harming our business.

The regulations that govern marketing approvals, pricing and reimbursement for new therapeutic and diagnostic products vary widely from country to country. Some countries require approval of the sale price of a product before it can be marketed. In many countries, the pricing review period begins after marketing or product licensing approval is granted. In some foreign markets, prescription pharmaceutical pricing remains subject to continuing governmental control even after initial approval is granted. As a result, we might obtain regulatory approval for a product in a particular country, but then be subject to price regulations that delay our commercial launch of the product and negatively impact the revenues we are able to generate from the sale of the product in that country. Adverse pricing limitations may hinder our ability to recoup our investment in one or more product candidates, even if our product candidates obtain regulatory approval.

Our ability to commercialize any products successfully also will depend in part on the extent to which reimbursement for these products and related treatments will be available from government health administration authorities, private health insurers and other organizations. Government authorities and third party payors, such as private health insurers and health maintenance organizations, decide which medications they will pay for and establish reimbursement levels. A primary trend in the U.S. healthcare industry and elsewhere is cost containment. Government authorities and these third party payors have attempted to control costs by limiting coverage and the amount of reimbursement for particular medications. Increasingly, third party payors are requiring that companies provide them with predetermined discounts from list prices and are challenging the prices charged for medical products. We cannot be sure that reimbursement will be available for any product that we commercialize and, if reimbursement is available, what the level of reimbursement will be. Reimbursement may impact the demand for, or the price of, any product for which we obtain marketing approval. Obtaining reimbursement for our products may be particularly difficult because of the higher prices often associated with products administered under the supervision of a physician. If reimbursement is not available or is available only to limited levels, we may not be able to successfully commercialize any product candidate that we successfully develop.

There may be significant delays in obtaining reimbursement for approved products, and coverage may be more limited than the purposes for which the product is approved by the FDA or regulatory authorities in other countries. Moreover, eligibility for reimbursement does not imply that any product will be paid for in all cases or at a rate that covers our costs, including research, development, manufacture, sale and distribution. Interim payments for new products, if applicable, may also not be sufficient to cover our costs and may not be made permanent. Payment rates may vary according to the use of the product and the clinical setting in which it is used, may be based on payments allowed for lower cost products that are already reimbursed, and may be incorporated into existing payments for other services. Net prices for products may be reduced by mandatory discounts or rebates required by government healthcare programs or private payors and by any future relaxation of laws that presently restrict imports of products from countries where they may be sold at lower prices than in the United States. Third party payors often rely upon Medicare coverage policy and payment limitations in setting their own reimbursement policies. Our inability to promptly obtain

coverage and profitable payment rates from both government funded and private payors for new products that we develop could have a material adverse effect on our operating results, our ability to raise capital needed to commercialize products and our overall financial condition.

Product liability lawsuits against us could cause us to incur substantial liabilities and to limit commercialization of any products that we may develop.

We face an inherent risk of product liability exposure related to the testing of our product candidates in human clinical trials and will face an even greater risk if we commercially sell any products that we may develop. If we cannot successfully defend ourselves against claims that our product candidates or products caused injuries, we will incur substantial liabilities. Regardless of merit or eventual outcome, liability claims may result in:

- decreased demand for any product candidates or products that we may develop;
- injury to our reputation and significant negative media attention;
- withdrawal of patients from clinical trials;
- significant costs to defend the related litigation;
- substantial monetary awards to patients;
- loss of revenue; and
- the inability to commercialize any products that we may develop.

We currently hold $5.0 million in product liability insurance coverage, which may not be adequate to cover all liabilities that we may incur. Insurance coverage is increasingly expensive. We may not be able to maintain insurance coverage at a reasonable cost or in an amount adequate to satisfy any liability that may arise.

We may expend our limited resources to pursue a particular product candidate or indication and fail to capitalize on product candidates or indications that may be more profitable or for which there is a greater likelihood of success.

Because we have limited financial and managerial resources, we focus on research programs and product candidates for specific indications. As a result, we may forego or delay pursuit of opportunities with other product candidates or other indications that later prove to have greater commercial potential. Our resource allocation decisions may cause us to fail to capitalize on viable commercial products or profitable market opportunities. Our spending on current and future research and development programs and product candidates for specific indications may not yield any commercially viable products.

We have based our research and development efforts on our Network Biology approach. Notwithstanding our large investment to date and anticipated future expenditures in Network Biology, we have not yet developed, and may never successfully develop, any marketed products using this approach. As a result of pursuing our Network Biology approach, we may fail to address or develop product candidates or indications based on other scientific approaches that may offer greater commercial potential or for which there is a greater likelihood of success.

We also may not be successful in our efforts to identify or discover additional product candidates through our Network Biology approach. Research programs to identify new product candidates require substantial technical, financial and human resources. These research programs may initially show promise in identifying potential product candidates, yet fail to yield product candidates for clinical development.

If we do not accurately evaluate the commercial potential or target market for a particular product candidate, we may relinquish valuable rights to that product candidate through collaboration, licensing or other royalty arrangements in cases in which it would have been advantageous for us to retain sole development and commercialization rights.

We plan to establish separately funded companies for the development of product candidates using our Network Biology approach in some areas outside the oncology field. These companies may not be successful in the development and commercialization of any product candidates.

We plan to apply our Network Biology approach to multiple additional disease areas outside the oncology field. We expect to do so in some cases through the establishment of separately funded companies. For example, we have established a company called Silver Creek Pharmaceuticals, Inc., or Silver Creek, to develop product candidates in the field of regenerative medicine using Network Biology. Silver Creek has received separate funding from investors other than us. Although Silver Creek is currently majority owned by us, in the future we may not be the majority owner of or control Silver Creek or other companies that we establish. If in the future we do not control Silver Creek or any future similar company that we establish, Silver Creek or such other companies could take actions that we do not endorse or with which we disagree, such as using Network Biology in a way that reflects adversely on us. In addition, these companies may have difficulty raising additional funds and could encounter any of the risks in developing and commercializing product candidates to which we are subject.

If we fail to comply with environmental, health and safety laws and regulations, we could become subject to fines or penalties or incur costs that could have a material adverse effect on the success of our business.

We are subject to numerous environmental, health and safety laws and regulations, including those governing laboratory procedures and the handling, use, storage, treatment and disposal of hazardous materials and wastes. Our operations involve the use of hazardous and flammable materials, including chemicals and radioactive and biological materials. Our operations also produce hazardous waste products. We generally contract with third parties for the disposal of these materials and wastes. We also store certain low level radioactive waste at our facilities until the materials can be properly disposed of. We cannot eliminate the risk of contamination or injury from these materials. In the event of contamination or injury resulting from our use of hazardous materials, we could be held liable for any resulting damages, and any liability could exceed our resources. We also could incur significant costs associated with civil or criminal fines and penalties.

Although we maintain workers' compensation insurance to cover us for costs and expenses we may incur due to injuries to our employees resulting from the use of hazardous materials, this insurance may not provide adequate coverage against potential liabilities. We do not maintain

insurance for environmental liability or toxic tort claims that may be asserted against us in connection with our storage or disposal of biological, hazardous or radioactive materials.

In addition, we may be required to incur substantial costs to comply with current or future environmental, health and safety laws and regulations. These current or future laws and regulations may impair our research, development or production efforts. Failure to comply with these laws and regulations also may result in substantial fines, penalties or other sanctions.

Risks related to our dependence on third parties

The successful development and commercialization of MM-121 depends substantially on our collaboration with Sanofi. If Sanofi is unable to further develop or commercialize MM-121, or experiences significant delays in doing so, our business will be materially harmed.

MM-121 is one of our most clinically advanced product candidates. In 2009, we entered into a collaboration and license agreement with Sanofi for the development and commercialization of MM-121. Prior to this collaboration, we did not have a history of working together with Sanofi. The collaboration involves a complex allocation of rights, provides for milestone payments to us based on the achievement of specified development, regulatory and commercial sale milestones and provides us with royalty-based revenue if MM-121 is successfully commercialized. We cannot predict the success of the collaboration.

Under our collaboration agreement, Sanofi has significant control over the conduct and timing of development and commercialization efforts with respect to MM-121. Although we and Sanofi have approved a global development plan, Sanofi may change its development plans for MM-121. We have little control over the amount and timing of resources that Sanofi devotes to the development or commercialization of MM-121. If Sanofi fails to devote sufficient financial and other resources to the development or commercialization of MM-121, the development and commercialization of MM-121 would be delayed or could fail. This would result in a delay in our receiving milestone payments or royalties with respect to MM-121 or in our not receiving such milestone payments or royalties at all.

If we do not satisfy various conditions under our collaboration and license agreement with Sanofi, we will not realize all of the anticipated benefits under the agreement and our business would be materially harmed.

Our collaboration and license agreement with Sanofi contains a number of conditions that we must satisfy in order to receive milestone payments and royalties. For example, Sanofi has agreed to pay us royalties on sales of products containing MM-121 if issued patents cover the manufacture, use or sale of such products. However, if we do not file the original patent application from which an issued patent claims priority by the later of December 31, 2014 or the receipt of regulatory approval for MM-121 in the United States or the European Union, the royalties, if any, that we will receive with respect to sales of products covered by such issued patent will be significantly less than the royalties we would expect to receive had we met such filing deadline. If we do not meet this deadline or achieve any of the other milestones or deadlines contained in the agreement, we will not receive all of the payments or revenues that we might otherwise receive under the agreement had we met such deadlines or achieved such milestones.

If we lose Sanofi as a collaborator in the development or commercialization of MM-121, it would materially harm our business.

Sanofi has the right to terminate our agreement for the development and commercialization of MM-121, in whole or with respect to specified territories, at any time and for any reason, upon 180 days' prior written notice. Sanofi also has the right to terminate our agreement if we fail to cure a material breach of our agreement within a specified cure period, or fail to diligently pursue a cure if such a breach is not curable within such period.

If Sanofi terminates our agreement at any time, whether on the basis of our uncured material breach or for any other reason, it would delay or prevent our development of MM-121 and materially harm our business and could accelerate our need for additional capital. In particular, we would have to fund the clinical development and commercialization of MM-121 on our own, seek another collaborator or licensee for such clinical development and commercialization or abandon the development and commercialization of MM-121.

The successful development and commercialization of MM-398 currently depend on our collaboration with PharmaEngine. If PharmaEngine does not provide clinical trial data to us, our business may be materially harmed.

We have a collaboration with PharmaEngine for the development of MM-398. Under this collaboration, PharmaEngine has rights to commercialize MM-398 in Taiwan, while we hold commercialization rights in all other countries, including the United States. PharmaEngine also has the opportunity to participate in the development of MM-398, for which we are reimbursing their costs. We cannot predict the success of the collaboration. The collaboration involves an allocation of rights, provides for milestone payments by us to PharmaEngine based on the achievement of specified milestones and provides for us to pay PharmaEngine royalties on sales of MM-398 in Europe and specified Asian countries if MM-398 is successfully commercialized in Europe and such specified Asian countries.

We rely on PharmaEngine to provide data and information to us from trials they have conducted and are currently conducting. This information is necessary for our development of MM-398 in the United States. If PharmaEngine does not provide this information to us, our development of MM-398 could be significantly delayed and our costs could increase significantly.

We may depend on collaborations with third parties for the development and commercialization of our product candidates. If those collaborations are not successful, we may not be able to capitalize on the market potential of these product candidates.

Our business plan is to enter into distribution and other marketing arrangements for our oncology products in areas of the world outside of the United States and Europe. In addition, depending on our capital requirements, development and commercialization costs, need for additional therapeutic expertise and other factors, it is possible that we will enter into broader development and commercialization arrangements with respect to either oncology product candidates in addition to MM-121 or product candidates in other therapeutic areas in the United States or Europe or other territories. In particular, while we expect to apply our Network Biology approach to some other disease areas through arrangements similar to Silver Creek, it is also possible that we will seek to enter into licensing agreements or other types of collaborations for the application of our Network Biology approach.

Our likely collaborators for any distribution, marketing, licensing or broader collaboration arrangements include large and mid-size pharmaceutical companies, regional and national pharmaceutical companies and biotechnology companies. We will have limited control over the amount and timing of resources that our collaborators dedicate to the development or commercialization of our product candidates. Our ability to generate revenues from these arrangements will depend on our collaborators' abilities to successfully perform the functions assigned to them in these arrangements.

Collaborations involving our product candidates, including our collaboration with Sanofi, pose the following risks to us:

- collaborators have significant discretion in determining the efforts and resources that they will apply to these collaborations;
- collaborators may not pursue development and commercialization of our product candidates or may elect not to continue or renew development or commercialization programs based on clinical trial results, changes in their strategic focus or available funding, or external factors such as an acquisition that diverts resources or creates competing priorities;
- collaborators may delay clinical trials, provide insufficient funding for a clinical trial program, stop a clinical trial or abandon a product candidate, repeat or conduct new clinical trials or require a new formulation of a product candidate for clinical testing;
- collaborators could independently develop, or develop with third parties, products that compete directly or indirectly with our products or product candidates if the collaborators believe that competitive products are more likely to be successfully developed or can be commercialized under terms that are more economically attractive;
- a collaborator with marketing and distribution rights to one or more products may not commit sufficient resources to their marketing and distribution;
- collaborators may not properly maintain or defend our intellectual property rights or may use our proprietary information in such a way as to invite litigation that could jeopardize or invalidate our proprietary information or expose us to potential litigation;
- disputes may arise between us and the collaborators that result in the delay or termination of the research, development or commercialization of our product candidates or that result in costly litigation or arbitration that diverts management attention and resources; and
- collaborations may be terminated and, if terminated, may result in a need for additional capital to pursue further development or commercialization of the applicable product candidates.

Collaboration agreements may not lead to development or commercialization of product candidates in the most efficient manner or at all. In addition, there have been a significant number of recent business combinations among large pharmaceutical companies that have resulted in a reduced number of potential future collaborators. If a present or future collaborator of ours were to be involved in a business combination, the continued pursuit and emphasis on our product development or commercialization program could be delayed, diminished or terminated.

If we are not able to establish additional collaborations, we may have to alter our development plans.

Our product development programs and the potential commercialization of our product candidates will require substantial additional cash to fund expenses. For some of our product candidates, we may decide to collaborate with pharmaceutical and biotechnology companies for the development and potential commercialization of those product candidates.

We face significant competition in seeking appropriate collaborators. Collaborations are complex and time-consuming to negotiate and document. We may also be restricted under existing collaboration agreements from entering into agreements on certain terms with other potential collaborators. We may not be able to negotiate collaborations on acceptable terms, or at all. If that were to occur, we may have to curtail the development of a particular product candidate, reduce or delay its development program or one or more of our other development programs, delay its potential commercialization or reduce the scope of our sales or marketing activities, or increase our expenditures and undertake development or commercialization activities at our own expense. If we elect to increase our expenditures to fund development or commercialization activities on our own, we may need to obtain additional capital, which may not be available to us on acceptable terms or at all. If we do not have sufficient funds, we will not be able to bring our product candidates to market and generate product revenue.

We rely on third parties to conduct our clinical trials, and those third parties may not perform satisfactorily, including failing to meet deadlines for the completion of such trials.

We do not independently conduct clinical trials of our product candidates. We rely on third parties, such as contract research organizations, clinical data management organizations, medical institutions and clinical investigators, to perform this function. Our reliance on these third parties for clinical development activities reduces our control over these activities but does not relieve us of our responsibilities. We remain responsible for ensuring that each of our clinical trials is conducted in accordance with the general investigational plan and protocols for the trial. Moreover, the FDA requires us to comply with standards, commonly referred to as good clinical practices, for conducting, recording and reporting the results of clinical trials to assure that data and reported results are credible and accurate and that the rights, integrity and confidentiality of patients in clinical trials are protected. Furthermore, these third parties may also have relationships with other entities, some of which may be our competitors. If these third parties do not successfully carry out their contractual duties, meet expected deadlines or conduct our clinical trials in accordance with regulatory requirements or our stated protocols, we will not be able to obtain, or may be delayed in obtaining, regulatory approvals for our product candidates and will not be able to, or may be delayed in our efforts to, successfully commercialize our product candidates.

We also rely on other third parties to store and distribute supplies for our clinical trials. Any performance failure on the part of our existing or future distributors could delay clinical development or regulatory approval of our product candidates or commercialization of our products, producing additional losses and depriving us of potential product revenue.

Risks related to the manufacturing of our product candidates

We have limited experience in manufacturing our product candidates. We will need to upgrade and expand our manufacturing facility and augment our manufacturing personnel and processes in order to meet our business plans. If we fail to do so, we may not have sufficient drug product to meet our clinical development and commercial requirements.

We have a manufacturing facility located at our corporate headquarters in Cambridge, Massachusetts. We manufacture drug substance at this facility that we use for research and development purposes and for clinical trials of our product candidates. We do not have experience in manufacturing products at commercial scale. Our current facility may not be sufficient to permit manufacturing of our antibody product candidates for Phase 3 clinical trials or commercial sale. In order to meet our business plan, which contemplates our internally manufacturing drug substance for most of our clinical trials and, over the long-term, for a significant portion of our commercial requirements, we will need to upgrade and expand our manufacturing facilities, add manufacturing personnel and ensure that validated processes are consistently implemented in our facilities. The upgrade and expansion of our facilities will require additional regulatory approvals. In addition, it will be costly and time-consuming to expand our facilities and recruit necessary additional personnel. If we are unable to expand our manufacturing facilities in compliance with regulatory requirements or to hire additional necessary manufacturing personnel, we may encounter delays or additional costs in achieving our research, development and commercialization objectives, including in obtaining regulatory approvals of our product candidates, which could materially damage our business and financial position.

If our sole clinical manufacturing facility is damaged or destroyed or production at this facility is otherwise interrupted, our business and prospects would be negatively affected.

If the manufacturing facility at our corporate headquarters or the equipment in it is damaged or destroyed, we may not be able to quickly or inexpensively replace our manufacturing capacity or replace it at all. In the event of a temporary or protracted loss of this facility or equipment, we might not be able to transfer manufacturing to a third party. Even if we could transfer manufacturing to a third party, the shift would likely be expensive and time-consuming, particularly since the new facility would need to comply with the necessary regulatory requirements and we would need FDA approval before selling any products manufactured at that facility. Such an event could delay our clinical trials or, if our product candidates are approved by the FDA, reduce our product sales.

Currently, we maintain insurance coverage against damage to our property and equipment and to cover business interruption and research and development restoration expenses. If we have underestimated our insurance needs with respect to an interruption in our clinical manufacturing of our product candidates, we may not be able to cover our losses.

Any other interruption of production at our manufacturing facility also could damage our business. For example, in 2009, we experienced a viral contamination at this facility that required that we shut the facility entirely for decontamination. Because of this contamination, the FDA placed a partial clinical hold on our MM-121 IND until we submitted supporting documentation to the FDA regarding our decontamination procedures. Although we were able to resolve this issue, with the FDA lifting the partial clinical hold in April 2010, other companies

have experienced similar contamination problems, and we could experience a similar problem in the future that is more difficult to resolve and could lead to a clinical hold.

We expect to continue to contract with third parties for at least some aspects of the production of our product candidates for clinical trials and for our products if they are approved for marketing. This increases the risk that we will not have sufficient quantities of our product candidates or products or such quantities at an acceptable cost, which could delay, prevent or impair our development or commercialization efforts.

We currently rely on third party manufacturers for some aspects of the production of our product candidates for preclinical testing and clinical trials, including fill-finish and labeling activities. In addition, while we believe that our existing manufacturing facilities, or additional facilities that we will be able to build, will be sufficient to meet our requirements for manufacturing a significant portion of drug substance for our research and development activities, we may need to rely on third party manufacturers for some of these requirements, particularly later stage clinical trials of our antibody product candidates, and, at least in the near term, for commercial supply of any product candidates for which we obtain marketing approval.

We do not have any agreements with third party manufacturers for the clinical or commercial supply of any of our product candidates, and we may be unable to conclude such agreements or to do so on acceptable terms. Reliance on third party manufacturers entails additional risks, including:

- reliance on the third party for regulatory compliance and quality assurance;
- the possible breach of the manufacturing agreement by the third party; and
- the possible termination or nonrenewal of the agreement by the third party at a time that is costly or inconvenient for us.

Third party manufacturers may not be able to comply with cGMP or Quality System Regulation, or QSR, or similar regulatory requirements outside the United States. Our failure, or the failure of our third party manufacturers, to comply with applicable regulations could result in sanctions being imposed on us, including fines, injunctions, civil penalties, delays, suspension or withdrawal of approvals, license revocation, seizures or recalls of products, operating restrictions and criminal prosecutions, any of which could significantly and adversely affect supplies of our products.

Any products that we may develop may compete with other product candidates and products for access to manufacturing facilities. There are a limited number of manufacturers that operate under cGMP or QSR regulations and that might be capable of manufacturing for us.

We currently rely on single suppliers for the resins, media and filters that we use for our manufacturing process. We purchase these materials from our suppliers on a purchase order basis and do not have long-term supply agreements in place. Any performance failure or refusal to supply on the part of our existing or future suppliers could delay clinical development, marketing approval or commercialization of our products. If our current suppliers cannot perform as agreed, we may be required to replace one or more of these suppliers. Although we believe that there are a number of potential long-term replacements to each

supplier, we may incur added costs and delays in identifying and qualifying any such replacements.

We likely will rely upon third party manufacturers to provide us with necessary reagents and instruments to develop, test and manufacture our *in vitro* companion diagnostics. Currently, many reagents are marketed as Research Use Only, or RUO, products under FDA regulations. In June 2011, the FDA issued a draft guidance that outlined the FDA's intention to impose additional restrictions on the provision of RUO products. If this guidance is finalized, we may experience difficulty securing the reagents that we need.

Our potential future dependence upon others for the manufacture of our product candidates may adversely affect our future profit margins and our ability to commercialize any products that receive regulatory approval on a timely and competitive basis.

One of our fill-finish contractors received a warning letter from the FDA, which impacted our clinical trials of MM-121 and MM-111.

Recently, a third party contractor that we have used to fill and package both MM-121 and MM-111 experienced FDA inspection issues with its quality control processes that resulted in a formal warning letter from the FDA. Following a review by Sanofi and us, some MM-121 was pulled from clinical trial sites and replaced with MM-121 that was filled by a different contractor. This restocking is complete and resulted in a few patients missing one or two doses of MM-121. Sanofi has since requested that we assume financial responsibility for the MM-121 material that was pulled from clinical trial sites. We have disputed Sanofi's request and are currently following the dispute resolution provisions of our collaboration and license agreement. If the executive officers appointed by Sanofi and us are unable to resolve the request, then Sanofi may request that we submit the matter to binding arbitration. In the event that binding arbitration is pursued, and we are found financially responsible for the MM-121 material that was pulled from clinical trial sites, we may be required to reimburse Sanofi. We estimate that the potential payment range for this reimbursement may be between $0 and $4.8 million.

The MM-111 that is currently being used in our clinical trials was also filled and packaged by this same contractor. The FDA recently inquired about the effect of this contractor's quality issues on MM-111 clinical trial materials. Following our response to the FDA's inquiry, the FDA requested in January 2012 that we obtain new consents from any patients currently enrolled in our ongoing Phase 1 clinical trials of MM-111 in connection with continued use in these trials of MM-111 material filled and packaged by this contractor. In addition, the FDA placed a partial clinical hold on these ongoing clinical trials, which restricts our ability to enroll new patients in these trials, until MM-111 material filled and packaged by a new third party contractor that we have engaged is available. Replacement MM-111 material filled and packaged by our new third party contractor has been shipped to clinical trial sites.

Although we believe that we have addressed the concerns of the FDA with respect to the clinical trial material filled and packaged by our former third party contractor, it is possible that the FDA could make additional inquiries that could further impact our clinical trials of MM-121 or MM-111.

Risks related to our intellectual property

If we fail to comply with our obligations in our intellectual property licenses with third parties, we could lose license rights that are important to our business.

We are a party to a number of intellectual property license agreements with third parties, including with respect to MM-398, MM-121 and MM-111, and expect to enter into additional license agreements in the future. Our existing license agreements impose, and we expect that our future license agreements will impose, various diligence, milestone payment, royalty, insurance and other obligations on us. If we fail to comply with these obligations, our licensors may have the right to terminate these agreements, in which event we might not be able to develop and market any product that is covered by these agreements. Termination of these licenses or reduction or elimination of our licensed rights may result in our having to negotiate new or reinstated licenses with less favorable terms. The occurrence of such events could materially harm our business.

If we are unable to obtain and maintain patent protection for our technology and products, or if our licensors are unable to obtain and maintain patent protection for the technology or products that we license from them, our competitors could develop and commercialize technology and products similar or identical to ours, and our ability to successfully commercialize our technology and products may be adversely affected.

Our success depends in large part on our and our licensors' ability to obtain and maintain patent protection in the United States and other countries with respect to our proprietary technology and products. In some circumstances, we may not have the right to control the preparation, filing and prosecution of patent applications, or to maintain the patents, covering technology or products that we license from third parties. Therefore, we cannot be certain that these patents and applications will be prosecuted and enforced in a manner consistent with the best interests of our business. In addition, if third parties who license patents to us fail to maintain such patents, or lose rights to those patents, the rights we have licensed may be reduced or eliminated.

We have sought to protect our proprietary position by filing patent applications in the United States and abroad related to our novel technologies and products that are important to our business. This process is expensive and time-consuming, and we may not be able to file and prosecute all necessary or desirable patent applications at a reasonable cost or in a timely manner. It is also possible that we will fail to identify patentable aspects of our research and development output before it is too late to obtain patent protection. Under our collaboration agreement with Sanofi, we are obligated, at our expense, to use commercially reasonable efforts to file and prosecute patent applications, and maintain patents, covering MM-121 in specified jurisdictions, and these patent rights are licensed to Sanofi.

The patent position of biotechnology and pharmaceutical companies generally is highly uncertain, involves complex legal and factual questions and has in recent years been the subject of much litigation. As a result, the issuance, scope, validity, enforceability and commercial value of our and our licensors' patent rights are highly uncertain. Our and our licensors' pending and future patent applications may not result in patents being issued which protect our technology or products or which effectively prevent others from commercializing competitive technologies and products. Changes in either the patent laws or interpretation of

the patent laws in the United States and other countries may diminish the value of our patents or narrow the scope of our patent protection. The laws of foreign countries may not protect our rights to the same extent as the laws of the United States. Publications of discoveries in the scientific literature often lag behind the actual discoveries, and patent applications in the United States and other jurisdictions are typically not published until 18 months after filing, or in some cases not at all. Therefore, we cannot be certain that we or our licensors were the first to make the inventions claimed in our owned and licensed patents or pending patent applications, or that we or our licensors were the first to file for patent protection of such inventions. Assuming the other requirements for patentability are met, currently, in the United States, the first to make the claimed invention is entitled to the patent, while outside the United States, the first to file a patent application is entitled to the patent. In 2013, under the recently enacted America Invents Act, the United States will be moving to a first to file system. We may become involved in opposition or interference proceedings challenging our patent rights or the patent rights of others. An adverse determination in any such proceeding could reduce the scope of, or invalidate, our patent rights, allow third parties to commercialize our technology or products and compete directly with us, without payment to us, or result in our inability to manufacture or commercialize products without infringing third party patent rights.

Even if our owned and licensed patent applications issue as patents, they may not issue in a form that will provide us with any meaningful protection, prevent competitors from competing with us or otherwise provide us with any competitive advantage. Our competitors may be able to circumvent our owned or licensed patents by developing similar or alternative technologies or products in a non-infringing manner. The issuance of a patent is not conclusive as to its scope, validity or enforceability, and our owned and licensed patents may be challenged in the courts or patent offices in the United States and abroad. Such challenges may result in patent claims being narrowed, invalidated or held unenforceable, which could limit our ability to stop or prevent us from stopping others from using or commercializing similar or identical technology and products, or limit the duration of the patent protection of our technology and products. Given the amount of time required for the development, testing and regulatory review of new product candidates, patents protecting such candidates might expire before or shortly after such candidates are commercialized. As a result, our owned and licensed patent portfolio may not provide us with sufficient rights to exclude others from commercializing products similar or identical to ours.

We may become involved in lawsuits to protect or enforce our patents, which could be expensive, time-consuming and unsuccessful.

Competitors may infringe our patents. To counter infringement or unauthorized use, we may be required to file infringement claims, which can be expensive and time-consuming. In addition, in an infringement proceeding, a court may decide that a patent of ours is invalid or unenforceable, or may refuse to stop the other party from using the technology at issue on the grounds that our patents do not cover the technology in question. An adverse result in any litigation proceeding could put one or more of our patents at risk of being invalidated or interpreted narrowly. Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation.

Third parties may initiate legal proceedings alleging that we are infringing their intellectual property rights, the outcome of which would be uncertain and could have a material adverse effect on the success of our business.

Our commercial success depends upon our ability and the ability of our collaborators to develop, manufacture, market and sell our product candidates and use our proprietary technologies without infringing the proprietary rights of third parties. We may become party to, or threatened with, future adversarial proceedings or litigation regarding intellectual property rights with respect to our products and technology, including interference proceedings before the U.S. Patent and Trademark Office. Third parties may assert infringement claims against us based on existing patents or patents that may be granted in the future. If we are found to infringe a third party's intellectual property rights, we could be required to obtain a license from such third party to continue developing and marketing our products and technology. However, we may not be able to obtain any required license on commercially reasonable terms or at all. Even if we were able to obtain a license, it could be non-exclusive, thereby giving our competitors access to the same technologies licensed to us. We could be forced, including by court order, to cease commercializing the infringing technology or product. In addition, we could be found liable for monetary damages. A finding of infringement could prevent us from commercializing our product candidates or force us to cease some of our business operations, which could materially harm our business. Claims that we have misappropriated the confidential information or trade secrets of third parties can have a similar negative impact on our business.

For example, we are aware of issued U.S. patents held by Genentech, Inc., or Genentech, broadly covering methods of producing certain types of recombinant antibodies and related compositions for antibody production that may be relevant to our development and commercialization of MM-121, MM-302 and MM-151. These patents expire in 2018. Genentech has asserted infringement claims against several pharmaceutical and biotechnology companies based on these patents. If these patents were determined to be valid and cover our product candidates, we would need to obtain a license to the patented technology, which may cause us to incur licensing related costs. However, a license to these patents may not be available on commercially reasonable terms, or at all. Our failure to obtain a license to these patents could delay or prevent our development and commercialization of our product candidates in the United States.

We may be subject to claims that our employees have wrongfully used or disclosed alleged trade secrets of their former employers.

Many of our employees were previously employed at universities or other biotechnology or pharmaceutical companies, including our competitors or potential competitors. Although we try to ensure that our employees do not use the proprietary information or know-how of others in their work for us, we may be subject to claims that we or these employees have used or disclosed intellectual property, including trade secrets or other proprietary information, of any such employee's former employer. Litigation may be necessary to defend against these claims. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management.

We are currently engaged in three ongoing opposition proceedings to European patents in the European Patent Office. If we are not successful in these proceedings, we may not be able to commercialize some of our product candidates without infringing patents held by third parties.

We are currently engaged in three ongoing opposition proceedings to European patents in the European Patent Office to narrow or invalidate the claims of patents owned by third parties. For more information, see "Business—Legal proceedings." We have obtained favorable interim decisions in all three oppositions. Two of these decisions are now under appeal, and the third may be appealed. The ultimate outcome of all three oppositions remains uncertain. If we are not ultimately successful in these proceedings, and the issued claims of the patents we are opposing were determined to be valid and construed to cover MM-121 or MM-111, we may not be able to commercialize MM-121 or MM-111 in some or all European countries without infringing such patents. If we infringe a valid claim of these patents, we would need to obtain a license to the patented technology, which may cause us to incur licensing-related costs. For example, under our collaboration agreement with Sanofi, we are obligated to pay all licensing costs for specified third party patent rights that we or Sanofi may in the future license for the development and commercialization of MM-121, including the patent rights that are the subject of two of these opposition proceedings. However, a license to the patents that are the subject of these opposition proceedings may not be available on commercially reasonable terms or at all. As a result, we could be liable for monetary damages or we may be forced to delay, suspend, forego or cease commercializing these product candidates in some or all countries in Europe if we were found to infringe a valid claim of these patents. In addition, even if we are ultimately successful in these European opposition proceedings, such results would be limited to our activities in Europe.

We are also aware of issued or pending counterparts to some of these European patents in the United States that may be relevant to our development and commercialization of MM-121. If these patents were determined to be valid and construed to cover MM-121, our development and commercialization of MM-121 in the United States could be delayed or prevented.

Intellectual property litigation could cause us to spend substantial resources and distract our personnel from their normal responsibilities.

Even if resolved in our favor, litigation or other legal proceedings relating to intellectual property claims may cause us to incur significant expenses, and could distract our technical and management personnel from their normal responsibilities. In addition, there could be public announcements of the results of hearings, motions or other interim proceedings or developments and if securities analysts or investors perceive these results to be negative, it could have a substantial adverse effect on the price of our common stock. Such litigation or proceedings could substantially increase our operating losses and reduce our resources available for development activities. We may not have sufficient financial or other resources to adequately conduct such litigation or proceedings. Some of our competitors may be able to sustain the costs of such litigation or proceedings more effectively than we can because of their substantially greater financial resources. Uncertainties resulting from the initiation and continuation of patent litigation or other proceedings could have a material adverse effect on our ability to compete in the marketplace.

If we are unable to protect the confidentiality of our trade secrets, our business and competitive position would be harmed.

In addition to our patented technology and products, we rely on trade secrets, including unpatented know-how, technology and other proprietary information, to maintain our competitive position. We seek to protect these trade secrets, in part, by entering into non-disclosure and confidentiality agreements with parties that have access to them, such as our employees, corporate collaborators, outside scientific collaborators, sponsored researchers, contract manufacturers, consultants, advisors and other third parties. We also enter into confidentiality and invention or patent assignment agreements with our employees and consultants. In addition, any of these parties may breach the agreements and disclose our proprietary information, and we may not be able to obtain adequate remedies for such breaches. Enforcing a claim that a party illegally disclosed or misappropriated a trade secret is difficult, expensive and time-consuming, and the outcome is unpredictable. In addition, some courts inside and outside the United States are less willing or unwilling to protect trade secrets. If any of our trade secrets were to be lawfully obtained or independently developed by a competitor, we would have no right to prevent them from using that technology or information to compete with us. If any of our trade secrets were to be disclosed to or independently developed by a competitor, our competitive position would be harmed.

Risks related to regulatory approval of our product candidates

If we are not able to obtain required regulatory approvals, we will not be able to commercialize our product candidates, and our ability to generate revenue will be materially impaired.

Our product candidates, including our five most advanced product candidates, and the activities associated with their development and commercialization, including their design, testing, manufacture, safety, efficacy, recordkeeping, labeling, storage, approval, advertising, promotion, sale and distribution, are subject to comprehensive regulation by the FDA and other regulatory agencies in the United States and by comparable authorities in other countries. Failure to obtain regulatory approval for a product candidate will prevent us from commercializing the product candidate. We have not received regulatory approval to market any of our product candidates in any jurisdiction. We have only limited experience in filing and supporting the applications necessary to gain regulatory approvals and expect to rely on third party contract research organizations to assist us in this process. Securing FDA approval requires the submission of extensive preclinical and clinical data and supporting information to the FDA for each therapeutic indication to establish the product candidate's safety and efficacy. Securing FDA approval also requires the submission of information about the product manufacturing process to, and inspection of manufacturing facilities by, the FDA. Our product candidates may not be effective, may be only moderately effective or may prove to have undesirable or unintended side effects, toxicities or other characteristics that may preclude our obtaining regulatory approval or prevent or limit commercial use.

The process of obtaining regulatory approvals is expensive, may take many years if additional clinical trials are required, if approval is obtained at all, and can vary substantially based upon a variety of factors, including the type, complexity and novelty of the product candidates involved. Changes in regulatory approval policies during the development period, changes in or the enactment of additional statutes or regulations, or changes in regulatory review for each

submitted product application, may cause delays in the approval or rejection of an application. The FDA has substantial discretion in the approval process and may refuse to accept any application or may decide that our data is insufficient for approval and require additional preclinical, clinical or other studies. In addition, varying interpretations of the data obtained from preclinical and clinical testing could delay, limit or prevent regulatory approval of a product candidate. Any regulatory approval we ultimately obtain may be limited or subject to restrictions or post-approval commitments that render the approved product not commercially viable.

If we pursue development of a companion diagnostic to identify patients who are likely to benefit from a therapeutic product, failure to obtain approval for the diagnostic may prevent or delay approval of the therapeutic product.

We are attempting to develop companion diagnostics to identify patients who are likely to benefit from our therapeutic product candidates. All of our companion diagnostic candidates are in preclinical development or clinical feasibility testing. We have very limited experience in the development of diagnostics and, even with the help of third parties with greater experience, may fail to obtain the required diagnostic product marketing approval, which could prevent or delay approval of the therapeutic product.

In July 2011, the FDA issued draft guidance that stated that if safe and effective use of a therapeutic depends on an *in vitro* diagnostic, then the FDA generally will not approve the therapeutic unless the FDA approves or clears this "*in vitro* companion diagnostic device" at the same time that the FDA approves the therapeutic. The approval or clearance of the *in vitro* diagnostic most likely will occur through the FDA's Center for Devices and Radiological Health Office of In Vitro Diagnostic Device Evaluation and Safety, or OIVD. It is unclear whether the FDA will finalize this guidance in its current format, or when it will do so. Even if the FDA does finalize the guidance, it is unclear how it will interpret the guidance. Even with the issuance of the draft guidance, the FDA's expectations for *in vitro* companion diagnostics remain unclear in some respects. The FDA's developing expectations will affect our *in vitro* companion diagnostics. In particular, the FDA may limit our ability to use retrospective data, otherwise disagree with our approaches to trial design, biomarker qualification, clinical and analytical validity and clinical utility, or make us repeat aspects of the trial or initiate new trials.

Because our companion diagnostic candidates are at an early stage of development, we have yet to seek a meeting with the FDA to discuss any of our companion diagnostic tests and therefore cannot yet know what the FDA will require for any of these tests. For three of our five most advanced product candidates, MM-121, MM-111 and MM-151, we are attempting to develop an *in vitro* companion diagnostic that will help identify patients likely to benefit from the therapy. Whether the FDA will consider these *in vitro* diagnostics to be "*in vitro* companion diagnostic devices" that require simultaneous approval or clearance with the therapeutics under the draft guidance will depend on whether the FDA views the diagnostics to be essential to the safety and efficacy of these therapeutics.

For our two other most advanced product candidates, MM-398 and MM-302, although we are investigating possible *in vitro* companion diagnostics, we are currently developing *in vivo* companion diagnostics in the form of imaging agents that may help identify patients likely to benefit from the therapy. Imaging agents are regulated as drugs by the FDA's Center for Drug Evaluation and Research and, as such, are generally subject to the regulatory requirements

applicable to other new drug candidates. Although the FDA has not issued guidance with respect to the simultaneous approval of *in vivo* diagnostics and therapeutics, it is possible that the FDA will apply a standard similar to *in vitro* diagnostics.

Based on the FDA's past practice with companion diagnostics, if we are successful in developing a companion diagnostic for any of our five most advanced product candidates, we would expect that FDA approval of an *in vitro* companion diagnostic, and possibly an *in vivo* companion diagnostic, would be required for approval and subsequent commercialization of each such therapeutic product candidate. We are not aware of any currently available diagnostics that, if necessary, would otherwise allow us to proceed with the approval and subsequent commercialization of our product candidates despite a delay in or failure of our attempts to develop companion diagnostics.

If we fail to obtain or maintain orphan drug exclusivity for MM-398, we will have to rely on other rights and protections for this product candidate.

We have obtained orphan drug designation in the United States and orphan medicinal product designation in the European Union for MM-398 for the treatment of pancreatic cancer. In the United States, under the Orphan Drug Act, the FDA may designate a product as an orphan drug if it is a drug intended to treat a rare disease or condition, which is generally defined as a patient population of fewer than 200,000 individuals in the United States.

In the United States, the company that first obtains FDA approval for a designated orphan drug for the specified rare disease or condition receives orphan drug marketing exclusivity for that drug for a period of seven years. This orphan drug exclusivity prevents the FDA from approving another application, including a full new drug application, or NDA, to market the same drug for the same orphan indication, except in limited circumstances. For purposes of small molecule drugs, the FDA defines the term "same drug" to mean a drug that contains the same active molecule and that is intended for the same use as the approved orphan drug. Orphan drug exclusivity may be lost if the FDA determines that the request for designation was materially defective or if the manufacturer is unable to assure sufficient quantity of the drug to meet the needs of patients with the rare disease or condition.

Even if we obtain orphan drug exclusivity for a product, that exclusivity may not effectively protect the product from competition because different drugs can be approved for the same condition. Even after an orphan drug is approved, the FDA can subsequently approve the same drug for the same condition if the FDA concludes that the later drug is clinically superior in that it is shown to be safer, more effective or makes a major contribution to patient care.

The European Medicines Agency, or EMA, grants orphan medicinal product designation to promote the development of products that may offer therapeutic benefits for life-threatening or chronically debilitating conditions affecting not more than five in 10,000 people in the European Union. Orphan medicinal product designation from the EMA provides ten years of marketing exclusivity following drug approval, subject to reduction to six years if the designation criteria are no longer met.

Our therapeutic product candidates for which we intend to seek approval as biological products may face competition sooner than expected.

With the enactment of the Biologics Price Competition and Innovation Act of 2009, or BPCIA, as part of the Health Care and Education Reconciliation Act of 2010, or the Health Care Reform Law, an abbreviated pathway for the approval of biosimilar and interchangeable biological products was created. The new abbreviated regulatory pathway establishes legal authority for the FDA to review and approve biosimilar biologics, including the possible designation of a biosimilar as "interchangeable" based on their similarity to existing brand product. Under the BPCIA, an application for a biosimilar product cannot be approved by the FDA until 12 years after the original branded product was approved under a biologics license application, or BLA. The new law is complex and is only beginning to be interpreted and implemented by the FDA. As a result, its ultimate impact, implementation and meaning is subject to uncertainty. While it is uncertain when any such processes may be fully adopted by the FDA, any such processes could have a material adverse effect on the future commercial prospects for our biological products.

We believe that any of our products approved as a biological product under a BLA should qualify for the 12-year period of exclusivity. However:

- the U.S. Congress could amend the BPCIA to significantly shorten this exclusivity period as proposed by President Obama;
- a potential competitor could seek and obtain approval of its own BLA during our exclusivity period instead of seeking approval of a biosimilar version; and
- the FDA could consider a particular product candidate, such as MM-302, which contains both drug and biological product components, to be a drug subject to review pursuant to an NDA, and therefore eligible for a significantly shorter marketing exclusivity period as provided under the Drug Price Competition and Patent Term Restoration Act of 1984, or the Hatch-Waxman Act.

Moreover, the extent to which a biosimilar, once approved, will be substituted for any one of our reference products in a way that is similar to traditional generic substitution for non-biological products is not yet clear and will depend on a number of marketplace and regulatory factors that are still developing.

Failure to obtain regulatory approval in international jurisdictions would prevent us from marketing our products abroad.

We intend to market our products both within and outside the United States. In particular, we plan to market and sell ourselves any products for which we receive marketing approval in the European Union, rather than relying on third parties for these capabilities. This may increase the risks described below with respect to our compliance with foreign regulations.

In order to market and sell our products in the European Union and many other jurisdictions, we must obtain separate regulatory approvals and comply with numerous and varying regulatory requirements. The approval procedure varies among countries and can involve additional testing. The time required to obtain approval in foreign countries may differ substantially from that required to obtain FDA approval. The regulatory approval process outside the United States generally includes all of the risks associated with obtaining FDA

approval. In addition, in many countries outside the United States, it is required that the product be approved for reimbursement before the product can be approved for sale in that country. We may not obtain approvals from regulatory authorities outside the United States on a timely basis, if at all. Approval by the FDA does not ensure approval by regulatory authorities in other countries or jurisdictions, and approval by one regulatory authority outside the United States does not ensure approval by regulatory authorities in other countries or jurisdictions or by the FDA. We may not be able to file for regulatory approvals and may not receive necessary approvals to commercialize our products in any market.

Any product for which we obtain marketing approval could be subject to restrictions or withdrawal from the market and we may be subject to penalties if we fail to comply with regulatory requirements or if we experience unanticipated problems with our products, when and if any of them are approved.

Any product for which we obtain marketing approval, along with the manufacturing processes, post-approval clinical data, labeling, advertising and promotional activities for such product, will be subject to continual requirements of and review by the FDA and other regulatory authorities. These requirements include submissions of safety and other post-marketing information and reports, registration and listing requirements, cGMP or QSR requirements relating to quality control, quality assurance and corresponding maintenance of records and documents, requirements regarding the distribution of samples to physicians and recordkeeping. Even if regulatory approval of a product is granted, the approval may be subject to limitations on the indicated uses for which the product may be marketed or to the conditions of approval, or contain requirements for costly post-marketing testing and surveillance to monitor the safety or efficacy of the product. Later discovery of previously unknown problems with our products, manufacturers or manufacturing processes, or failure to comply with regulatory requirements, may result in actions such as:

- restrictions on such products, manufacturers or manufacturing processes;
- restrictions on the marketing of a product;
- restrictions on product distribution;
- requirements to conduct post-marketing clinical trials;
- warning or untitled letters;
- withdrawal of the products from the market;
- refusal to approve pending applications or supplements to approved applications that we submit;
- recall of products;
- fines, restitution or disgorgement of profits or revenue;
- suspension or withdrawal of regulatory approvals;
- refusal to permit the import or export of our products;
- product seizure; or

- injunctions or the imposition of civil or criminal penalties.

Our relationships with customers and payors will be subject to applicable anti-kickback, fraud and abuse and other healthcare laws and regulations, which could expose us to criminal sanctions, civil penalties, contractual damages, reputational harm and diminished profits and future earnings.

Healthcare providers, physicians and others play a primary role in the recommendation and prescription of any products for which we obtain marketing approval. Our future arrangements with third party payors and customers may expose us to broadly applicable fraud and abuse and other healthcare laws and regulations that may constrain the business or financial arrangements and relationships through which we market, sell and distribute our products for which we obtain marketing approval. Restrictions under applicable federal and state healthcare laws and regulations, include the following:

- the federal healthcare anti-kickback statute prohibits, among other things, persons from knowingly and willfully soliciting, offering, receiving or providing remuneration, directly or indirectly, in cash or in kind, to induce or reward either the referral of an individual for, or the purchase, order or recommendation of, any good or service, for which payment may be made under federal healthcare programs such as Medicare and Medicaid;

- the federal False Claims Act imposes criminal and civil penalties, including civil whistleblower or qui tam actions, against individuals or entities for knowingly presenting, or causing to be presented, to the federal government, claims for payment that are false or fraudulent or making a false statement to avoid, decrease or conceal an obligation to pay money to the federal government;

- the federal Health Insurance Portability and Accountability Act of 1996, as amended by the Health Information Technology for Economic and Clinical Health Act, imposes criminal and civil liability for executing a scheme to defraud any healthcare benefit program and also imposes obligations, including mandatory contractual terms, with respect to safeguarding the privacy, security and transmission of individually identifiable health information;

- the federal false statements statute prohibits knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false statement in connection with the delivery of or payment for healthcare benefits, items or services;

- the federal transparency requirements under the Health Care Reform Law requires manufacturers of drugs, devices, biologics and medical supplies to report to the Department of Health and Human Services information related to physician payments and other transfers of value and physician ownership and investment interests; and

- analogous state laws and regulations, such as state anti-kickback and false claims laws, may apply to sales or marketing arrangements and claims involving healthcare items or services reimbursed by non-governmental third party payors, including private insurers, and some state laws require pharmaceutical companies to comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government in addition to requiring manufacturers to report information related to payments to physicians and other health care providers or marketing expenditures.

Efforts to ensure that our business arrangements with third parties will comply with applicable healthcare laws and regulations will involve substantial costs. It is possible that governmental authorities will conclude that our business practices may not comply with current or future statutes, regulations or case law involving applicable fraud and abuse or other healthcare laws and regulations. If our operations are found to be in violation of any of these laws or any other governmental regulations that may apply to us, we may be subject to significant civil, criminal and administrative penalties, damages, fines, exclusion from government funded healthcare programs, such as Medicare and Medicaid, and the curtailment or restructuring of our operations. If any of the physicians or other providers or entities with whom we expect to do business with are found to be not in compliance with applicable laws, they may be subject to criminal, civil or administrative sanctions, including exclusions from government funded healthcare programs.

Recently enacted and future legislation may increase the difficulty and cost for us to obtain marketing approval of and commercialize our product candidates and affect the prices we may obtain.

In the United States and some foreign jurisdictions, there have been a number of legislative and regulatory changes and proposed changes regarding the healthcare system that could prevent or delay marketing approval of our product candidates, restrict or regulate post-approval activities and affect our ability to profitably sell any products for which we obtain marketing approval.

In the United States, the Medicare Prescription Drug, Improvement, and Modernization Act of 2003, or the Medicare Modernization Act, changed the way Medicare covers and pays for pharmaceutical products. The legislation expanded Medicare coverage for drug purchases by the elderly and introduced a new reimbursement methodology based on average sales prices for physician administered drugs. In addition, this legislation provided authority for limiting the number of drugs that will be covered in any therapeutic class. Cost reduction initiatives and other provisions of this legislation could decrease the coverage and price that we receive for any approved products. While the Medicare Modernization Act applies only to drug benefits for Medicare beneficiaries, private payors often follow Medicare coverage policy and payment limitations in setting their own reimbursement rates. Therefore, any reduction in reimbursement that results from the Medicare Modernization Act may result in a similar reduction in payments from private payors.

More recently, in March 2010, President Obama signed into law the Health Care Reform Law, a sweeping law intended to broaden access to health insurance, reduce or constrain the growth of healthcare spending, enhance remedies against fraud and abuse, add new transparency requirements for health care and health insurance industries, impose new taxes and fees on the health industry and impose additional health policy reforms. Effective October 1, 2010, the Health Care Reform Law revises the definition of "average manufacturer price" for reporting purposes, which could increase the amount of Medicaid drug rebates to states. Further, the new law imposes a significant annual fee on companies that manufacture or import branded prescription drug products. Substantial new provisions affecting compliance have also been enacted, which may affect our business practices with health care practitioners. We will not know the full effects of the Health Care Reform Law until applicable federal and state agencies issue regulations or guidance under the new law. Although it is too early to determine the effect of the Health Care Reform Law, the new law appears likely to continue the pressure on

pharmaceutical pricing, especially under the Medicare program, and may also increase our regulatory burdens and operating costs.

Legislative and regulatory proposals have been made to expand post-approval requirements and restrict sales and promotional activities for pharmaceutical products. We are not sure whether additional legislative changes will be enacted, or whether the FDA regulations, guidance or interpretations will be changed, or what the impact of such changes on the marketing approvals of our product candidates, if any, may be. In the area of companion diagnostics, FDA officials indicated in 2010 that the agency planned to issue two guidances in this area. The FDA issued one draft guidance in July 2011. The FDA has yet to issue a second draft guidance and may decide not to issue a second draft guidance or finalize the existing draft guidance. The FDA's issuance of a final guidance, or issuance of additional draft guidance, could affect our development of *in vitro* companion diagnostics and the applicable regulatory requirements. In addition, increased scrutiny by the U.S. Congress of the FDA's approval process may significantly delay or prevent marketing approval, as well as subject us to more stringent product labeling and post-marketing testing and other requirements.

Risks related to employee matters and managing growth

Our future success depends on our ability to retain our chief executive officer and other key executives and to attract, retain and motivate qualified personnel.

We are highly dependent on Robert J. Mulroy, our President and Chief Executive Officer, and the other principal members of our executive and scientific teams. Although we have formal employment agreements with each of our executive officers, these agreements do not prevent our executives from terminating their employment with us at any time. We do not maintain "key person" insurance for any of our executives or other employees. The loss of the services of any of these persons could impede the achievement of our research, development and commercialization objectives.

Recruiting and retaining qualified scientific, clinical, manufacturing and sales and marketing personnel will also be critical to our success. We may not be able to attract and retain these personnel on acceptable terms given the competition among numerous pharmaceutical and biotechnology companies for similar personnel. We also experience competition for the hiring of scientific and clinical personnel from universities and research institutions. In addition, we rely on consultants and advisors, including scientific and clinical advisors, to assist us in formulating our research and development and commercialization strategy. Our consultants and advisors may be employed by employers other than us and may have commitments under consulting or advisory contracts with other entities that may limit their availability to us.

We expect to expand our development, regulatory and sales and marketing capabilities, and as a result, we may encounter difficulties in managing our growth, which could disrupt our operations.

We expect to experience significant growth in the number of our employees and the scope of our operations, particularly in the areas of drug development, regulatory affairs and sales and marketing. To manage our anticipated future growth, we must continue to implement and improve our managerial, operational and financial systems, expand our facilities and continue to recruit and train additional qualified personnel. Due to our limited financial resources and

the limited experience of our management team in managing a company with such anticipated growth, we may not be able to effectively manage the expansion of our operations or recruit and train additional qualified personnel. The physical expansion of our operations may lead to significant costs and may divert our management and business development resources. Any inability to manage growth could delay the execution of our business plans or disrupt our operations.

We have entered into and may continue to enter into or seek to enter into business combinations and acquisitions which may be difficult to integrate, disrupt our business, divert management attention or dilute stockholder value.

As part of our business strategy, we may enter into business combinations and acquisitions. Although we acquired Hermes BioSciences, Inc., or Hermes, in October 2009, we have limited experience in making acquisitions. In addition, acquisitions are typically accompanied by a number of risks, including:

- the difficulty of integrating the operations and personnel of the acquired companies;
- the potential disruption of our ongoing business and distraction of management;
- potential unknown liabilities and expenses;
- the failure to achieve the expected benefits of the combination or acquisition;
- the maintenance of acceptable standards, controls, procedures and policies; and
- the impairment of relationships with employees as a result of any integration of new management and other personnel.

If we are not successful in completing acquisitions that we may pursue in the future, we would be required to reevaluate our business strategy and we may have incurred substantial expenses and devoted significant management time and resources in seeking to complete the acquisitions. In addition, with future acquisitions, we could use substantial portions of our available cash as all or a portion of the purchase price. As we did for the acquisition of Hermes, we could also issue additional securities as consideration for these acquisitions, which could cause our stockholders to suffer significant dilution.

Risks related to our common stock and this offering

After this offering, our executive officers, directors and principal stockholders will maintain the ability to control or significantly influence all matters submitted to stockholders for approval.

Upon the closing of this offering, our executive officers, directors and stockholders who owned more than 5% of our outstanding common stock before this offering will, in the aggregate, beneficially own shares representing approximately 32% of our capital stock. As a result, if these stockholders were to choose to act together, they would be able to control or significantly influence all matters submitted to our stockholders for approval, as well as our management and affairs. For example, these persons, if they choose to act together, will control or significantly influence the election of directors and approval of any merger, consolidation or sale of all or substantially all of our assets. This concentration of voting power

could delay or prevent an acquisition of our company on terms that other stockholders may desire.

Provisions in our corporate charter documents and under Delaware law could make an acquisition of us, which may be beneficial to our stockholders, more difficult and may prevent attempts by our stockholders to replace or remove our current management.

Provisions in our corporate charter and our bylaws that will become effective upon the closing of this offering may discourage, delay or prevent a merger, acquisition or other change in control of us that stockholders may consider favorable, including transactions in which you might otherwise receive a premium for your shares. These provisions could also limit the price that investors might be willing to pay in the future for shares of our common stock, thereby depressing the market price of our common stock. In addition, these provisions may frustrate or prevent any attempts by our stockholders to replace or remove our current management by making it more difficult for stockholders to replace members of our board of directors. Because our board of directors is responsible for appointing the members of our management team, these provisions could in turn affect any attempt by our stockholders to replace current members of our management team. Among others, these provisions:

- allow the authorized number of our directors to be changed only by resolution of our board of directors;
- establish advance notice requirements for stockholder proposals that can be acted on at stockholder meetings and nominations to our board of directors;
- require that stockholder actions must be effected at a duly called stockholder meeting and prohibit actions by our stockholders by written consent;
- limit who may call stockholder meetings;
- authorize our board of directors to issue preferred stock without stockholder approval, which could be used to institute a "poison pill" that would work to dilute the stock ownership of a potential hostile acquirer, effectively preventing acquisitions that have not been approved by our board of directors; and
- require the approval of the holders of at least 75% of the votes that all our stockholders would be entitled to cast to amend or repeal certain provisions of our charter or bylaws.

Moreover, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporation Law, which prohibits a person who owns in excess of 15% of our outstanding voting stock from merging or combining with us for a period of three years after the date of the transaction in which the person acquired in excess of 15% of our outstanding voting stock, unless the merger or combination is approved in a prescribed manner.

If you purchase shares of common stock in this offering, you will suffer immediate dilution of your investment.

The initial public offering price of our common stock is substantially higher than the net tangible book value per share of our common stock. Therefore, if you purchase shares of our common stock in this offering, you will pay a price per share that substantially exceeds our net

tangible book value per share after this offering. To the extent outstanding options or warrants are exercised, you will incur further dilution. Based on an assumed initial public offering price of $9.00 per share, which is the midpoint of the price range set forth on the cover page of this prospectus, you will experience immediate dilution of $7.77 per share, representing the difference between our pro forma net tangible book value per share after giving effect to this offering and the assumed initial public offering price. In addition, purchasers of common stock in this offering will have contributed approximately 33% of the aggregate price paid by all purchasers of our stock but will own only approximately 18% of our common stock outstanding after this offering.

An active trading market for our common stock may not develop.

Prior to this offering, there has been no public market for our common stock. The initial public offering price for our common stock will be determined through negotiations with the underwriters. Although we have applied for listing of our common stock on The NASDAQ Global Market, an active trading market for our shares may never develop or be sustained following this offering. If an active market for our common stock does not develop, it may be difficult for you to sell shares you purchase in this offering without depressing the market price for the shares or at all.

If our stock price is volatile, purchasers of our common stock could incur substantial losses.

Our stock price is likely to be volatile. The stock market in general and the market for biotechnology companies in particular have experienced extreme volatility that has often been unrelated to the operating performance of particular companies. As a result of this volatility, investors may not be able to sell their common stock at or above the initial public offering price. The market price for our common stock may be influenced by many factors, including:

- the success of competitive products or technologies;
- results of clinical trials of our product candidates or those of our competitors;
- regulatory or legal developments in the United States and other countries;
- developments or disputes concerning patents or other proprietary rights;
- the recruitment or departure of key personnel;
- variations in our financial results or those of companies that are perceived to be similar to us;
- changes in the structure of healthcare payment systems;
- market conditions in the pharmaceutical and biotechnology sectors and issuance of new or changed securities analysts' reports or recommendations;
- general economic, industry and market conditions; and
- the other factors described in this "Risk factors" section.

We have broad discretion in the use of the net proceeds from this offering and may not use them effectively.

We will use approximately $4.3 million of the net proceeds from this offering to pay accrued dividends on our series B convertible preferred stock. Our management will have broad discretion in the application of the balance of the net proceeds from this offering and could spend the proceeds in ways that do not improve our results of operations or enhance the value of our common stock. The failure by our management to apply these funds effectively could result in financial losses that could have a material adverse effect on our business, cause the price of our common stock to decline and delay the development of our product candidates. Pending their use, we may invest the net proceeds from this offering in a manner that does not produce income or that loses value.

Because we do not anticipate paying any cash dividends on our common stock in the foreseeable future, capital appreciation, if any, will be your sole source of gain.

We have never declared or paid cash dividends on our common stock. We currently intend to retain all of our future earnings, if any, to finance the growth and development of our business. In addition, the terms of existing or any future debt agreements may preclude us from paying dividends. As a result, capital appreciation, if any, of our common stock will be your sole source of gain for the foreseeable future.

A significant portion of our total outstanding shares are restricted from immediate resale but may be sold into the market in the near future. This could cause the market price of our common stock to drop significantly, even if our business is doing well.

Sales of a substantial number of shares of our common stock in the public market could occur at any time. These sales, or the perception in the market that the holders of a large number of shares intend to sell shares, could reduce the market price of our common stock. After this offering, we will have outstanding 94,756,679 shares of common stock based on the number of shares outstanding as of December 31, 2011. This includes the shares that we are selling in this offering, which may be resold in the public market immediately without restriction, unless purchased by our affiliates. Of the remaining shares, 78,090,012 shares are currently restricted as a result of securities laws or lock-up agreements but will be able to be sold after the offering as described in the "Shares eligible for future sale" section of this prospectus. Moreover, after this offering, holders of an aggregate of up to 69,197,426 shares of our common stock, including shares of our common stock issuable upon exercise of outstanding warrants, will have rights, subject to some conditions, to require us to file registration statements covering their shares or to include their shares in registration statements that we may file for ourselves or other stockholders. We also intend to register all shares of common stock that we may issue under our equity compensation plans. Once we register these shares, they can be freely sold in the public market upon issuance, subject to volume limitations applicable to affiliates and the lock-up agreements described in the "Underwriting" section of this prospectus.

Special note regarding forward-looking statements

This prospectus contains forward-looking statements that involve substantial risks and uncertainties. All statements, other than statements of historical facts, contained in this prospectus, including statements regarding our strategy, future operations, future financial position, future revenues, projected costs, prospects, plans and objectives of management, are forward-looking statements. The words "anticipate," "believe," "estimate," "expect," "intend," "may," "plan," "predict," "project," "target," "potential," "will," "would," "could," "should," "continue" and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words.

The forward-looking statements in this prospectus include, among other things, statements about:

- our plans to develop and commercialize our most advanced product candidates and companion diagnostics;
- our ongoing and planned discovery programs, preclinical studies and clinical trials;
- our collaboration with Sanofi related to MM-121;
- our ability to establish and maintain additional collaborations;
- the timing of and our ability to obtain and maintain regulatory approvals for our product candidates;
- the rate and degree of market acceptance and clinical utility of our products;
- our intellectual property position;
- our commercialization, marketing and manufacturing capabilities and strategy;
- the potential advantages of our Network Biology approach to drug research and development;
- the potential use of our Network Biology approach in fields other than oncology; and
- our estimates regarding expenses, future revenues, capital requirements and needs for additional financing.

We may not actually achieve the plans, intentions or expectations disclosed in our forward-looking statements, and you should not place undue reliance on our forward-looking statements. Actual results or events could differ materially from the plans, intentions and expectations disclosed in the forward-looking statements we make. We have included important factors in the cautionary statements included in this prospectus, particularly in the "Risk factors" section, that we believe could cause actual results or events to differ materially from the forward-looking statements that we make. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, joint ventures or investments we may make.

You should read this prospectus and the documents that we reference in this prospectus and have filed as exhibits to the registration statement of which this prospectus is a part completely and with the understanding that our actual future results may be materially different from what we expect. We do not assume any obligation to update any forward-looking statements.

Use of proceeds

We estimate that the net proceeds from our issuance and sale of 16,666,667 shares of our common stock in this offering will be approximately $137.9 million, assuming an initial public offering price of $9.00 per share, which is the midpoint of the price range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us but prior to the payment of accrued dividends on our series B convertible preferred stock. If the underwriters exercise their over-allotment option in full, we estimate that the net proceeds from this offering will be approximately $158.9 million.

A $1.00 increase (decrease) in the assumed initial public offering price of $9.00 per share would increase (decrease) the net proceeds from this offering by approximately $15.6 million, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same and after deducting the estimated underwriting discounts and commissions.

As of September 30, 2011, we had cash and cash equivalents of approximately $59.2 million. We will use approximately $4.3 million of the net proceeds from this offering to pay accrued dividends on our series B convertible preferred stock. We currently estimate that we will use the balance of the net proceeds from this offering, together with our cash and cash equivalents as of September 30, 2011, as follows:

- approximately $40.0 million to $50.0 million to fund our ongoing clinical program for MM-398, including approximately $17.0 million to $22.0 million of external costs for our Phase 3 clinical trial in metastatic pancreatic cancer, and to seek marketing approval and begin commercialization activities for MM-398 in the United States;
- approximately $25.0 million to $35.0 million to fund our ongoing clinical program for MM-111;
- approximately $20.0 million to $30.0 million to fund our ongoing clinical program for MM-302;
- approximately $15.0 million to $25.0 million to fund our ongoing clinical program for MM-151;
- approximately $45.0 million to $60.0 million to fund other research and development efforts, including beginning human clinical trials for new compounds; and
- the balance, if any, to fund working capital, capital expenditures and other general corporate purposes, which may include the acquisition or licensing of other products, businesses or technologies.

This expected use of the net proceeds from this offering and our existing cash and cash equivalents represents our intentions based upon our current plans and business conditions. The amounts and timing of our actual expenditures may vary significantly depending on numerous factors, including the progress of our development and commercialization efforts, the status of and results from clinical trials, as well as any collaborations that we may enter into with third parties for our product candidates, and any unforeseen cash needs. As a result,

our management will retain broad discretion over the allocation of the net proceeds from this offering. We have no current understandings, agreements or commitments for any material acquisitions or licenses of any products, businesses or technologies.

Based on our planned use of the net proceeds from this offering and our existing cash and cash equivalents described above, we expect that such funds will be sufficient to enable us to complete the Phase 3 clinical trial of MM-398 in metastatic pancreatic cancer and, if the results of this Phase 3 clinical trial are favorable, to seek marketing approval and begin commercialization activities for MM-398 in the United States. However, it is possible that we will not achieve the progress that we expect because the actual costs and timing of development, particularly clinical trials, are difficult to predict, subject to substantial risks and delays and often vary depending on the particular indication and development strategy. Sanofi is responsible for all development and manufacturing costs under our collaboration for the development and commercialization of MM-121. We do not expect that the net proceeds from this offering and our existing cash and cash equivalents will be sufficient to enable us to fund the completion of development of any of our other product candidates.

Pending our use of the net proceeds from this offering, we intend to invest the net proceeds in a variety of capital preservation investments, including short-term, investment grade, interest bearing instruments and U.S. government securities.

Dividend policy

We have never declared or paid cash dividends on our common stock. We currently intend to retain all of our future earnings, if any, to finance the growth and development of our business. We do not intend to pay cash dividends to holders of our common stock in the foreseeable future.

Capitalization

The following table sets forth our cash and cash equivalents and capitalization as of September 30, 2011:

- on an actual basis;
- on a pro forma basis to give effect to:
    - the automatic conversion of all outstanding shares of our preferred stock into an aggregate of 66,254,763 shares of our common stock upon the closing of this offering;
    - the reclassification of convertible preferred stock warrant liability to common stock warrants for warrants to purchase our preferred stock that will automatically become warrants to purchase an aggregate of 303,176 shares of our common stock upon the closing of this offering; and
    - the accrual of series B convertible preferred stock dividends of approximately $4,263,000; and
- on a pro forma as adjusted basis to give further effect to:
    - our issuance and sale of 16,666,667 shares of our common stock in this offering at an assumed initial public offering price of $9.00 per share, which is the midpoint of the price range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us; and
    - our use of approximately $4,263,000 of the net proceeds from this offering to pay accrued dividends on our series B convertible preferred stock.

Our capitalization following the closing of this offering will be adjusted based on the actual initial public offering price and other terms of this offering determined at pricing. You should read this table together with our consolidated financial statements and the related notes appearing at the end of this prospectus and the "Management's discussion and analysis of financial condition and results of operations" section of this prospectus.

As of September 30, 2011 (in thousands, except par values amounts)	Actual	Pro forma	Pro forma as adjusted
		(unaudited)	
Cash and cash equivalents	$ 59,232	$ 59,232	$ 192,869
Convertible preferred stock warrants liability	$ 1,394	$ —	$ —
Accrued dividends	—	4,263	—
Non-controlling Interest	$ 679	$ 679	$ 679
Convertible preferred stock, $0.01 par value per share:			
Series B convertible preferred stock: 6,000 shares authorized, 3,874 shares issued and outstanding, actual; no shares authorized, issued or outstanding, pro forma and pro forma as adjusted	14,046	—	—
Series C convertible preferred stock: 15,100 shares authorized, 14,423 shares issued and outstanding, actual; no shares authorized, issued or outstanding, pro forma and pro forma as adjusted	24,454	—	—
Series D convertible preferred stock: 11,500 shares authorized, 8,086 shares issued and outstanding, actual; no shares authorized, issued or outstanding, pro forma and pro forma as adjusted	28,267	—	—
Series E convertible preferred stock: 15,000 shares authorized, 14,991 shares issued and outstanding, actual; no shares authorized, issued or outstanding, pro forma and pro forma as adjusted	64,531	—	—
Series F convertible preferred stock: 15,680 shares authorized, 11,776 shares issued and outstanding, actual; no shares authorized, issued or outstanding, pro forma and pro forma as adjusted	59,973	—	—
Series G convertible preferred stock: 11,000 shares authorized, 11,000 shares issued and outstanding, actual; no shares authorized, issued or outstanding, pro forma and pro forma as adjusted	76,949	—	—
Total convertible preferred stock	268,220	—	—
Stockholders' deficit:			
Common stock, $0.01 par value per share: 138,500 shares authorized, 11,414 shares issued and outstanding, actual; 200,000 shares authorized, 77,669 shares issued and outstanding, pro forma; and 200,000 shares authorized, 94,336 shares issued and outstanding, pro forma as adjusted	114	777	943
Additional paid-in capital	51,452	314,746	452,480
Common stock warrants	6,445	7,839	7,839
Accumulated deficit	(332,723)	(332,723)	(332,723)
Total stockholders' (deficit) equity	(274,712)	(9,361)	128,539
Total capitalization	$ (5,813)	$ (8,682)	$ 129,218

A $1.00 increase (decrease) in the assumed initial public offering price of $9.00 per share would increase (decrease) each of cash and cash equivalents, additional paid-in capital, total stockholders' (deficit) equity and total capitalization on a pro forma as adjusted basis by approximately $15.6 million, assuming that the number of shares offered by us, as set forth on

the cover page of this prospectus, remains the same and after deducting estimated underwriting discounts and commissions.

The table above does not include:

- 17,521,906 shares of our common stock issuable upon the exercise of stock options outstanding as of September 30, 2011 at a weighted average exercise price of $2.48 per share;
- 1,051,560 additional shares of our common stock available for future issuance as of September 30, 2011 under our 2008 stock incentive plan;
- 3,500,000 additional shares of our common stock available for future issuance, as of the closing of this offering, under our 2011 stock incentive plan;
- 1,500,000 additional shares of our common stock available for future issuance, as of the closing of this offering, under our 2011 employee stock purchase plan; and
- 3,240,225 shares of our common stock issuable upon the exercise of warrants outstanding as of September 30, 2011 at a weighted average exercise price of $2.98 per share.

Dilution

If you invest in our common stock in this offering, your ownership interest will be diluted immediately to the extent of the difference between the public offering price per share of our common stock and the pro forma net tangible book value per share of our common stock after this offering.

Our historical net tangible book value as of September 30, 2011 was $(19.0) million, or $(1.66) per share of our common stock. Historical net tangible book value per share represents the amount of our total tangible assets less total liabilities, divided by the number of shares of our common stock outstanding.

Our pro forma net tangible book value as of September 30, 2011 was $(21.9) million, or $(0.28) per share of our common stock. Pro forma net tangible book value per share represents the amount of our total tangible assets less our total liabilities, divided by the pro forma number of shares of our common stock outstanding after giving effect to the automatic conversion of all outstanding shares of our preferred stock into an aggregate of 66,254,763 shares of our common stock upon the closing of this offering, the reclassification of convertible preferred stock warrant liability to common stock warrants for warrants to purchase our preferred stock that will automatically become warrants to purchase an aggregate of 303,176 shares of our common stock upon the closing of this offering and the accrual of series B convertible preferred stock dividends of approximately $4,263,000.

After giving effect to our issuance and sale of 16,666,667 shares of our common stock in this offering at an assumed initial public offering price of $9.00 per share, which is the midpoint of the price range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us, and our use of approximately $4,263,000 of the net proceeds from this offering to pay accrued dividends on our series B convertible preferred stock, our pro forma net tangible book value as of September 30, 2011 would have been $116.0 million, or $1.23 per share. This represents an immediate increase in pro forma net tangible book value per share of $1.51 to existing stockholders and immediate dilution of $7.77 in pro forma net tangible book value per share to new investors purchasing common stock in this offering.

Dilution per share to new investors is determined by subtracting pro forma net tangible book value per share after this offering from the initial public offering price per share paid by new investors. The following table illustrates this dilution on a per share basis:

Assumed initial public offering price per share		$9.00
Historical net tangible book value per share as of September 30, 2011	$(1.66)	
Increase attributable to the conversion of outstanding preferred stock, reclassification of preferred stock warrants and payment of accrued dividends	1.38	
Pro forma net tangible book value per share as of September 30, 2011	(0.28)	
Increase in net tangible book value per share attributable to new investors	1.51	
Pro forma net tangible book value per share after this offering		1.23
Dilution per share to new investors		$7.77

A $1.00 increase (decrease) in the assumed initial public offering price of $9.00 per share would increase (decrease) our pro forma net tangible book value by approximately $15.6 million, our pro forma net tangible book value per share by approximately $0.17 and dilution per share to new investors by approximately $0.83, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same and after deducting estimated underwriting discounts and commissions.

If the underwriters exercise their over-allotment option or if any additional shares are issued in connection with outstanding options or warrants, you will experience further dilution.

The following table summarizes, on a pro forma basis as of September 30, 2011, the total number of shares purchased from us, the total consideration paid, or to be paid, and the average price per share paid, or to be paid, by existing stockholders and by new investors in this offering at an assumed initial public offering price of $9.00 per share, which is the midpoint of the price range set forth on the cover page of this prospectus, before deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. As the table shows, new investors purchasing shares in this offering will pay an average price per share substantially higher than our existing stockholders paid.

	Shares purchased		Total consideration		Average price per share
	Number	Percent	Amount	Percent	
Existing stockholders	77,668,812	82%	$304,789,663	67%	$3.92
New investors	16,666,667	18	150,000,003	33	9.00
Total	94,335,479	100%	$454,789,666	100%	

A $1.00 increase (decrease) in the assumed initial public offering price of $9.00 per share would increase (decrease) the total consideration paid by new investors by $16.7 million and increase (decrease) the percentage of total consideration paid by new investors by approximately 2%, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same.

The table above is based on actual shares outstanding as of September 30, 2011 and 66,254,763 additional shares of our common stock issuable upon the automatic conversion of all outstanding shares of our preferred stock upon the closing of this offering.

The table above excludes:

- 17,521,906 shares of our common stock issuable upon the exercise of stock options outstanding as of September 30, 2011 at a weighted average exercise price of $2.48 per share;
- 1,051,560 additional shares of our common stock available for future issuance as of September 30, 2011 under our 2008 stock incentive plan;
- 3,500,000 additional shares of our common stock available for future issuance, as of the closing of this offering, under our 2011 stock incentive plan;
- 1,500,000 additional shares of our common stock available for future issuance, as of the closing of this offering, under our 2011 employee stock purchase plan; and

- 3,240,225 shares of our common stock issuable upon the exercise of warrants outstanding as of September 30, 2011 at a weighted average exercise price of $2.98 per share.

If the underwriters exercise their over-allotment option in full, the following will occur:

- the percentage of shares of our common stock held by existing stockholders will decrease to approximately 80% of the total number of shares of our common stock outstanding after this offering; and

- the number of shares of our common stock held by new investors will increase to 19,166,667, or approximately 20% of the total number of shares of our common stock outstanding after this offering.

Selected consolidated financial data

You should read the following selected consolidated financial data together with our consolidated financial statements and the related notes appearing at the end of this prospectus and the "Management's discussion and analysis of financial condition and results of operations" section of this prospectus. We have derived the consolidated statements of operations data for the years ended December 31, 2008, 2009 and 2010 and the consolidated balance sheet data as of December 31, 2009 and 2010 from our audited consolidated financial statements included in this prospectus. We have derived the consolidated statements of operations data for the years ended December 31, 2006 and 2007 and the consolidated balance sheet data as of December 31, 2006, 2007 and 2008 from our audited consolidated financial statements not included in this prospectus. We have derived the consolidated statements of operations data for the nine months ended September 30, 2010 and 2011 and the consolidated balance sheet data as of September 30, 2011 from our unaudited consolidated financial statements included in this prospectus. The unaudited consolidated financial data include, in the opinion of our management, all adjustments, consisting only of normal recurring adjustments, that are necessary for a fair statement of our financial position and results of operations for these periods. Our historical results for any prior period are not necessarily indicative of results to be expected in any future period, and our results for any interim period are not necessarily indicative of results to be expected for a full fiscal year.

(in thousands, except per share amounts)	Year ended December 31,					Nine months ended September 30,	
	2006	2007	2008	2009(1)	2010(2)	2010(2)	2011(2)
						(unaudited)	
Consolidated statement of operations							
Research and development revenues	$ 94	$ 344	$ 365	$ 2,148	$ 20,305	$ 13,996	$ 21,638
Operating expenses:							
Research and development	21,047	26,109	34,528	37,658	58,278	41,860	73,101
General and administrative	5,597	6,482	8,836	12,178	11,381	8,555	11,239
Contingent consideration	—	—	—	—	(178)	37	—
Total operating expenses	26,644	32,591	43,364	49,836	69,481	50,452	84,340
Loss from operations	(26,550)	(32,247)	(42,999)	(47,688)	(49,176)	(36,456)	(62,702)
Other income and expenses:							
Interest income	2,778	2,305	1,243	81	74	54	51
Interest expense	(1,223)	(1,710)	(4,403)	(4,909)	(3,726)	(3,638)	(12)
Other, net	(183)	(37)	607	41	2,669	12	1,208
Net loss before income taxes and non-controlling interest	(25,178)	(31,689)	(45,552)	(52,475)	(50,159)	(40,028)	(61,455)
Benefit from income taxes	—	—	—	3,402	—	—	—
Net loss before non-controlling interest	(25,178)	(31,689)	(45,552)	(49,073)	(50,159)	(40,028)	(61,455)
Less net loss attributable to non-controlling interest	—	—	—	—	(55)	(19)	(348)
Net loss attributable to Merrimack Pharmaceuticals, Inc.	(25,178)	(31,689)	(45,552)	(49,073)	(50,104)	(40,009)	(61,107)
Net loss per share available to common stockholders—basic and diluted(3)	$ (4.84)	$ (6.01)	$ (8.17)	$ (7.28)	$ (5.57)	$ (3.94)	$ (5.92)
Weighted-average common shares used in computing net loss per share available to common stockholders—basic and diluted	6,147	6,177	6,199	7,387	10,994	10,970	11,292
Pro forma net loss per share available to common stockholders—basic and diluted (unaudited)(4)					$ (0.87)		$ (0.81)
Weighted-average common shares used in computing pro forma net loss per share available to common stockholders—basic and diluted (unaudited)(5)					57,718		74,152

(1) In 2009, we acquired Hermes BioSciences, Inc. See Note 6 to our consolidated financial statements.

(2) In 2010 and 2011, we consolidated Silver Creek Pharmaceuticals, Inc. for financial reporting purposes.

(3) The numerator in the calculation of net loss per share available to common stockholders—basic and diluted includes unaccreted dividends on our convertible preferred stock.

(4) The numerator in the calculation of pro forma net loss per share available to common stockholders—basic and diluted has been adjusted to remove gains and losses resulting from re-measurement of the preferred stock warrant liabilities.

(5) Weighed-average common shares used in computing pro forma net loss per share available to common stockholders—basic and diluted is calculated assuming the automatic conversion of all outstanding shares of our preferred stock into an aggregate of 66,254,763 shares of our common stock upon the closing of this offering and adjusted to reflect additional shares of common stock related to preferred stock dividends of approximately $4,263,000.

(in thousands)	As of December 31, 2006	2007	2008	2009	2010	As of September 30, 2011 (unaudited)
Consolidated balance sheet data						
Cash and cash equivalents	$ 19,887	$ 40,286	$ 44,974	$ 58,387	$ 30,713	$ 59,232
Total assets	61,400	67,312	50,867	82,156	57,577	89,252
Deferred revenue	—	—	—	60,937	73,782	75,516
Convertible preferred stock warrants liability	1,061	1,082	568	578	652	1,394
Total liabilities	12,277	45,996	72,596	141,645	85,257	95,065
Non-controlling interest	—	—	—	—	1,027	679
Convertible preferred stock	130,280	132,739	132,739	131,273	191,257	268,220
Total stockholders deficit	$ (81,157)	$ (111,423)	$ (154,468)	$ (190,762)	$ (219,964)	$ (274,712)

Management's discussion and analysis of financial condition and results of operations

You should read the following discussion and analysis of our financial condition and results of operations together with our consolidated financial statements and the related notes appearing at the end of this prospectus. Some of the information contained in this discussion and analysis or set forth elsewhere in this prospectus, including information with respect to our plans and strategy for our business and related financings, includes forward-looking statements that involve risks and uncertainties. You should read the "Risk factors" section of this prospectus for a discussion of important factors that could cause actual results to differ materially from the results described in or implied by the forward-looking statements contained in the following discussion and analysis.

Overview

We are a biopharmaceutical company discovering, developing and preparing to commercialize innovative medicines consisting of novel therapeutics paired with companion diagnostics. Our mission is to provide patients, physicians and the healthcare system with the medicines, tools and information to transform the approach to care from one based on the identification and treatment of symptoms to one focused on the diagnosis and treatment of illness through a more precise mechanistic understanding of disease. We seek to accomplish our mission by applying our proprietary systems-based approach to biomedical research, which we call Network Biology. Our initial focus is in the field of oncology. We have five programs in clinical development. In our most advanced program, we are conducting a pivotal Phase 3 clinical trial.

We have devoted substantially all of our resources to our drug discovery and development efforts, including advancing our Network Biology approach, conducting clinical trials for our product candidates, protecting our intellectual property and providing general and administrative support for these operations. We have not generated any revenue from product sales and, to date, have financed our operations primarily through private placements of our convertible preferred stock, collaborations and, to a lesser extent, through government grants, the monetization of tax credits and equipment lease financings. Through September 30, 2011, we have received $268.2 million from the sale of convertible preferred stock and warrants and $112.6 million of upfront license fees, milestone payments, reimbursement of research and development costs and manufacturing services and other payments from our collaborations. We expect that the net proceeds from this offering, together with our existing cash and cash equivalents, anticipated interest income and anticipated milestone payments and research and development and manufacturing funding under our collaboration with Sanofi related to MM-121, will enable us to fund our operating expenses and capital expenditure requirements through at least the end of 2013.

We have never been profitable and, as of September 30, 2011, we had an accumulated deficit of $332.7 million. Our net loss was $61.5 million for the nine months ended September 30, 2011, $50.2 million for the year ended December 31, 2010, $49.1 million for the year ended December 31, 2009 and $45.6 million for the year ended December 31, 2008. We expect to continue to incur significant expenses and increasing operating losses for at least the next several years. We expect our research and development expenses to increase in connection with our ongoing activities, particularly as we continue the research, development and clinical trials

of our product candidates, including multiple simultaneous clinical trials for certain product candidates, some of which we expect will be entering late stage clinical development. In addition, subject to obtaining regulatory approval of any of our product candidates, we expect to incur significant commercialization expenses for product sales, marketing, manufacturing and distribution. We will need substantial additional funding to support the continuation of our operating activities. Until such time, if ever, as we can generate substantial product revenues, we expect to finance our cash needs through a combination of equity offerings, debt financings, collaborations, strategic alliances, licensing arrangements and other marketing and distribution arrangements. We may be unable to raise capital when needed or on attractive terms, which would force us to delay, limit, reduce or terminate our research and development programs or commercialization efforts. We will need to generate significant revenues to achieve profitability, and we may never do so.

Strategic partnerships, licenses and collaborations

Sanofi

In September 2009, we entered into a license and collaboration with Sanofi for the development and commercialization of MM-121. Under this agreement, we granted Sanofi an exclusive, royalty-bearing, worldwide right and license to develop and commercialize MM-121 in exchange for payment by Sanofi of an upfront license fee of $60.0 million, up to $410.0 million in potential development and regulatory milestone payments, of which we have already received $20.0 million, up to $60.0 million in potential sales milestone payments and tiered, escalating royalties beginning in the sub-teen double digits based on net sales of MM-121 in the United States and beginning in the high single digits based on net sales of MM-121 outside the United States. We have the option to co-promote and commercialize MM-121 in the United States and the right, but not the obligation, to participate in the development of MM-121 through Phase 2 proof of concept trials, which we are currently conducting. If we co-promote MM-121 in the United States, we will be responsible for paying our sales force costs and a specified percentage of direct medical affairs, marketing and promotion costs for MM-121 in the United States and will be eligible to receive tiered, escalating royalties beginning in the high teens based on net sales of MM-121 in the United States. We are also entitled to an increase in the royalty rate if a diagnostic product is actually used with MM-121 in the treatment of solid tumor indications. Sanofi is responsible for all development and manufacturing costs for MM-121. Although Sanofi will ultimately be responsible for manufacturing MM-121 under the agreement, we are currently manufacturing MM-121 for use in ongoing clinical trials. Sanofi will assume responsibility for all manufacturing of MM-121 at such time as material is needed for Phase 3 clinical trials. Sanofi reimburses us for internal time at a designated full-time equivalent rate per year and reimburses us for direct costs and services related to the development and manufacturing of MM-121.

The timing of cash received from Sanofi differs from revenue recognized for financial statement purposes. We recognize revenue for development services as incurred and recognize revenue for the upfront payment, milestone payments and manufacturing services using the contingency-adjusted performance model over the expected development period, which is currently estimated to be 12 years from the effective date of our agreement with Sanofi. During the years ended December 31, 2009 and 2010, and the nine months ended

September 30, 2010 and 2011, we recognized revenue based on the following components of the Sanofi agreement:

(in thousands)	Year ended December 31, 2009	Year ended December 31, 2010	Nine months ended September 30, 2010	Nine months ended September 30, 2011
Upfront payment	$ 694	$ 5,000	$ 3,750	$ 3,750
Milestone payment	—	949	741	625
Development services	1,410	13,279	8,642	15,976
Manufacturing services and other	—	630	477	1,214
Total	**$ 2,104**	**$ 19,858**	**$ 13,610**	**$ 21,565**

GTC Biotherapeutics, Inc.

During 2008 and 2009, our product candidate MM-093 failed to achieve the primary endpoint in Phase 2 clinical trials for rheumatoid arthritis, psoriasis and uveitis. In July 2009, we entered into a license agreement with GTC Biotherapeutics, Inc., or GTC, for the development and commercialization of MM-093. Under this agreement, we granted GTC an exclusive worldwide license to research, develop, manufacture and commercialize MM-093 for the treatment of autoimmune diseases in exchange for GTC returning approximately 662,000 shares of our series C convertible preferred stock. In addition, we are eligible to receive from GTC potential development milestone payments of up to $52.5 million, sales milestone payments of up to $8.0 million and tiered royalties based on a percentage of net sales of MM-093 ranging from the mid-single digits to the low double digits. GTC is responsible for all development and commercialization costs for MM-093. We assigned a fair value of $1.5 million for the shares returned to us and are recognizing this as revenue over the expected development term, which is currently estimated to be 19 years from the effective date of our agreement with GTC. We have not received any milestone or royalty payments from GTC.

During the years ended December 31, 2009 and 2010, and the nine months ended September 30, 2010 and 2011, we recognized revenue based on the following component of the GTC agreement:

(in thousands)	Year ended December 31, 2009	Year ended December 31, 2010	Nine months ended September 30, 2010	Nine months ended September 30, 2011
Upfront consideration	$ 37	$ 76	$ 57	$ 57

Silver Creek Pharmaceuticals, Inc.

We have established a subsidiary named Silver Creek Pharmaceuticals, Inc., or Silver Creek. Silver Creek's mission is to apply our Network Biology approach to the discovery and development of innovative therapeutics in the field of regenerative medicine. In August 2010, we acquired 12,000,000 shares of Silver Creek's series A convertible preferred stock in exchange for our grant to Silver Creek of various exclusive and non-exclusive technology licenses. In August and December 2010, Silver Creek issued an aggregate of 4,189,904 additional shares of series A convertible preferred stock at a price per share of $1.00 to other investors for an

aggregate purchase price of approximately $4,165,000, net of issuance costs. As of December 31, 2010 and September 30, 2011, we owned approximately 74% of the outstanding capital stock of Silver Creek and consolidated Silver Creek for financial reporting.

In the future, we may consider forming additional businesses or business units to apply our Network Biology approach to multiple additional disease areas outside the oncology field. We expect to do so in some cases, as with Silver Creek, through the establishment of separately funded companies.

Financial obligations related to the license and development of MM-398

In September 2005, Hermes BioSciences, Inc., or Hermes, which we acquired in October 2009, entered into a license agreement with PharmaEngine, Inc., or PharmaEngine, under which PharmaEngine received an exclusive license to research, develop, manufacture and commercialize MM-398 in Europe and certain countries in Asia. In May 2011, we entered into a new agreement with PharmaEngine under which we reacquired all previously licensed rights for MM-398, other than rights to commercialize MM-398 in Taiwan. As a result, we now have the exclusive right to commercialize MM-398 in all territories in the world, except for Taiwan, where PharmaEngine has an exclusive commercialization right. Upon entering into the May 2011 agreement with PharmaEngine, we paid PharmaEngine a $10.0 million upfront license fee. In addition, we are required to make a milestone payment of $5.0 million to PharmaEngine in connection with dosing the first patient in our Phase 3 clinical trial of MM-398, which occurred in the first quarter of 2012. We may be required to make up to an aggregate of $75.0 million in additional development and regulatory milestone payments and $130.0 million in additional sales milestone payments to PharmaEngine upon the achievement of specified development, regulatory and annual net sales milestones. PharmaEngine is also entitled to tiered royalties on net sales of MM-398 in Europe and certain countries in Asia. The royalty rates under the agreement range from high single digits up to the low teens as a percentage of our net sales of MM-398 in these territories. Under the May 2011 agreement, we are responsible for all future development costs of MM-398 except those required specifically for regulatory approval in Taiwan. During the nine months ended September 30, 2011, we recognized expense of $10,881,000 under the May 2011 agreement for the reimbursement of development costs paid by us to PharmaEngine.

Our financial obligations under other license and development agreement are summarized below under "—Liquidity and capital resources—Contractual obligations and commitments."

Financial operations overview

Revenues

We have not yet generated any revenue from product sales. All of our revenue to date has been derived from license fees, milestone payments and research, development, manufacturing and other payments received from collaborations, primarily with Sanofi, and grant payments received from the National Cancer Institute. In the future, we may generate revenue from a combination of product sales, license fees, milestone payments and research, development and manufacturing payments from collaborations and royalties from the sales of products developed under licenses of our intellectual property. We expect that any revenue we generate will fluctuate from quarter to quarter as a result of the timing and amount of license fees,

research, development and manufacturing reimbursements, milestone and other payments from collaborations, and the amount and timing of payments that we receive upon the sale of our products, to the extent any are successfully commercialized. We do not expect to generate revenue from product sales until 2014, at the earliest. If we or our collaborators fail to complete the development of our product candidates in a timely manner or obtain regulatory approval for them, our ability to generate future revenue, and our results of operations and financial position, would be materially adversely affected.

Research and development expense

Research and development expenses consist of the costs associated with our research and discovery activities, including investment in our Network Biology approach, conducting preclinical studies and clinical trials, manufacturing development efforts and activities related to regulatory filings. Our research and development expenses consist of:

- employee salaries and related expenses, which include stock compensation and benefits for the personnel involved in our drug discovery and development activities;
- external research and development expenses incurred under agreements with third party contract research organizations and investigative sites;
- manufacturing material expense for in-house manufacturing and third party manufacturing organizations and consultants;
- license fees for and milestone payments related to in-licensed products and technologies; and
- facilities, depreciation and other allocated expenses, which include direct and allocated expenses for rent and maintenance of facilities, depreciation of leasehold improvements and equipment, and laboratory and other supplies.

We expense research and development costs as incurred. Conducting a significant amount of research and development is central to our business model. Product candidates in late stages of clinical development generally have higher development costs than those in earlier stages of clinical development, primarily due to the increased size and duration of late stage clinical trials. We plan to increase our research and development expenses for the foreseeable future as we seek to complete development of our five most advanced product candidates, MM-398, MM-121, MM-111, MM-302 and MM-151, and to further advance our preclinical products and earlier stage research and development projects.

We use our employee and infrastructure resources across multiple research and development programs. We track expenses related to our five most advanced product candidates on a per project basis. Accordingly, we allocate internal employee-related and infrastructure costs, as well as third party costs, to each of these programs. We do not allocate to particular development programs either stock compensation expense or expenses related to preclinical programs. Costs that are not directly attributable to specific clinical programs or early preclinical activities, such as general laboratory supplies, wages related to shared laboratory services, travel and employee training and development are not allocated and are considered general research and discovery expenses.

The following table summarizes our principal product development programs, including the related stages of development for each product candidate in development and the research

and development expenses allocated to each clinical product candidate. Prior to May 2011, our collaborator, PharmaEngine, led the clinical development of MM-398 with minimal investment by us.

(in thousands)	Indication	Current phase of development	Year ended December 31, 2008	2009	2010	Nine months ended September 30, 2010	2011
MM-398	Cancer	Phase 3	$ —	$ —	$ 163	$ 157	$ 15,196
MM-121	Cancer	Phase 2	5,968	12,328	18,014	11,476	20,671
MM-111	Cancer	Phase 1/Phase 2 planned	8,814	7,462	15,938	13,324	7,425
MM-302	Cancer	Phase 1	—	940	4,974	3,600	3,867
MM-151	Cancer	Phase 1	1,542	3,960	2,452	1,658	8,568
MM-093	Autoimmune	Outlicensed	9,319	432	6	5	1
Other preclinical			3,054	5,149	8,926	6,023	9,275
General research and discovery			4,466	5,445	5,019	3,697	5,444
Stock compensation			1,365	1,942	2,786	1,920	2,654
Total research and development expense			$ 34,528	$ 37,658	$ 58,278	$ 41,860	$ 73,101

The successful development of our clinical and preclinical product candidates is highly uncertain. At this time, other than as discussed below, we cannot reasonably estimate the nature, timing or costs of the efforts that will be necessary to complete the remainder of the development of any of our preclinical or clinical product candidates or the period, if any, in which material net cash inflows from these product candidates may commence. This is due to the numerous risks and uncertainties associated with developing drugs, including the uncertainty of:

- the scope, rate of progress and expense of our ongoing, as well as any additional, clinical trials and other research and development activities;
- the potential benefits of our product candidates over other therapies;
- our ability to market, commercialize and achieve market acceptance for any of our product candidates that we are developing or may develop in the future;
- future clinical trial results;
- the terms and timing of regulatory approvals; and
- the expense of filing, prosecuting, defending and enforcing any patent claims and other intellectual property rights.

A change in the outcome of any of these variables with respect to the development of a product candidate could mean a significant change in the costs and timing associated with the development of that product candidate. For example, if the FDA or another regulatory authority were to require us to conduct clinical trials beyond those which we currently anticipate will be required for the completion of clinical development of a product candidate or if we experience significant delays in enrollment in any of our clinical trials, we could be required to expend significant additional financial resources and time on the completion of clinical development.

MM-398

MM-398 is currently being evaluated in a Phase 2 clinical trial in pancreatic cancer and in a pivotal Phase 3 clinical trial as a therapy in metastatic pancreatic cancer for patients who have failed treatment with gemcitabine. Our current estimate for the external costs associated with completing the Phase 3 clinical trial is between $17.0 million and $22.0 million. In May 2011, we made an upfront license payment of $10.0 million to PharmaEngine. We are required to make a milestone payment of $5.0 million to PharmaEngine in connection with dosing the first patient in our Phase 3 trial, which occurred in the first quarter of 2012. We may be required to make up to an aggregate of $75.0 million in additional development and regulatory milestone payments and $130.0 million in additional sales milestone payments to PharmaEngine upon the achievement of specified development, regulatory and annual net sales milestones. PharmaEngine is also entitled to tiered royalties based on net sales of MM-398 in Europe and certain countries in Asia. The royalty rates range from high single digits up to the low teens as a percentage of our net sales of MM-398 in these territories. We also expect to initiate Phase 2 clinical trials of MM-398 in other indications over the next 12 months. In addition, several investigator sponsored trials are ongoing in which the majority of the total clinical trial costs are paid by the investigators. Investigator sponsored trials include a Phase 2 clinical trial in colorectal cancer, a Phase 1 clinical trial in colorectal cancer and a Phase 1 clinical trial in glioma.

MM-121

We have entered into a license and collaboration agreement related to MM-121 with Sanofi. Under the terms of the agreement, we are responsible for leading clinical development through Phase 2 proof of concept trials for each indication. Although Sanofi will ultimately be responsible for manufacturing MM-121 under the license and collaboration agreement, we are currently manufacturing MM-121 for use in ongoing clinical trials. Sanofi will assume responsibility for all manufacturing of MM-121 at such time as material is needed for Phase 3 clinical trials. All expenses related to manufacturing are required to be reimbursed by Sanofi. Sanofi pays a portion of the estimated manufacturing campaign costs upfront and the remainder during and upon completion of the manufacturing campaign in accordance with an agreed upon budget. We separately record revenue and expenses on a gross basis under this arrangement. Sanofi is responsible for all development and manufacturing costs of MM-121. We are currently conducting four Phase 2 clinical trials and four Phase 1 clinical trials of MM-121 in multiple cancer types. During the third quarter of 2010, we received a $10.0 million milestone payment from Sanofi for initiating a proof of concept Phase 2 clinical trial of MM-121 in breast cancer. During the fourth quarter of 2011, we received a $10.0 million milestone payment from Sanofi for initiating a proof of concept Phase 2 clinical trial of MM-121 in non-small cell lung cancer. Based on the current joint development plan under this collaboration, we anticipate that we will trigger an additional $5.0 million milestone payment from Sanofi in the first quarter of 2012.

MM-111

We are currently conducting three Phase 1 clinical trials of MM-111 in multiple cancer types.

MM-302

We are currently conducting one Phase 1 clinical trial of MM-302 in breast cancer.

MM-151

We are currently conducting one Phase 1 clinical trial of MM-151 in solid tumors.

General and administrative expense

General and administrative expense consists primarily of salaries and other related costs for personnel, including stock-based compensation expenses and benefits, in our executive, legal, intellectual property, business development, finance, purchasing, accounting, information technology, corporate communications, investor relations and human resources departments. Other general and administrative expenses include employee training and development, board of directors costs, depreciation, insurance expenses, facility-related costs not otherwise included in research and development expense, and professional fees for legal services, including patent-related expenses, and accounting and information technology services. We expect that general and administrative expense will increase in future periods in proportion to increases in research and development and as a result of increased payroll, expanded infrastructure, increased consulting, legal, accounting and investor relations expenses associated with being a public company and costs incurred to seek collaborations with respect to any of our product candidates.

Interest income and interest expense

Interest income consists of interest earned on our cash and cash equivalents and short-term investments. Interest expense consists of expense incurred to finance equipment, office furniture and fixtures and noncash interest expense recognized on proceeds received from series F convertible preferred stock investors.

As more fully described in Note 13 to our consolidated financial statements appearing at the end of this prospectus, in July 2010, in connection with a review of our corporate records, we determined that we may not have obtained all of the required stockholder approvals to amend our articles of organization to authorize shares of series F convertible preferred stock that we agreed to issue in November 2007 and April 2008. As a result, in October 2010, we conducted an exchange offer in which we provided investors to whom we had agreed to issue and sell shares of series F convertible preferred stock in 2007 and 2008 with the opportunity to acquire shares of properly authorized series F convertible preferred stock. All of the holders of shares of series F convertible preferred stock accepted our offer and received new, properly authorized shares of series F convertible preferred stock. We recorded series F proceeds received in advance of the exchange offer as a short term liability and recognized noncash imputed interest expense for financial statement purposes of $4,064,000 for the year ended December 31, 2008, $4,805,000 for the year ended December 31, 2009, $3,673,000 for the year ended December 31, 2010 and $3,594,000 for the nine months ended September 30, 2010, which we collectively refer to as the series F amount. Upon completion of the exchanges of series F convertible preferred stock in October 2010, the series F amount was relieved and we recorded the initial investment of $5.10 per share as convertible preferred stock and the accrued noncash interest expense of $12,974,000 as additional paid-in capital.

Other income (expense)

Other income and other expense primarily consist of gains and losses on the change in value and time to expiration of preferred stock warrants, the recognition of federal and state sponsored tax incentives and other one-time income or expense-related items.

Critical accounting policies and significant judgments and estimates

Our management's discussion and analysis of our financial condition and results of operations is based on our consolidated financial statements, which we have prepared in accordance with generally accepted accounting principles in the United States. The preparation of these consolidated financial statements requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements, as well as the reported revenues and expenses during the reporting periods. We evaluate our estimates and judgments on an ongoing basis. Estimates include revenue recognition, useful lives with respect to long-lived assets and intangibles, valuation of stock options, convertible preferred stock warrants, contingent consideration, accrued expenses, intangible assets, goodwill, in-process research and development and tax valuation reserves. We base our estimates on historical experience and on various other factors that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying value of assets and liabilities that are not readily apparent from other sources. Our actual results may differ from these estimates under different assumptions or conditions.

While our significant accounting policies are more fully described in Note 2 to our consolidated financial statements appearing at the end of this prospectus, we believe that the following accounting policies are the most critical to aid you in fully understanding and evaluating our financial condition and results of operations.

Revenue recognition

We enter into biopharmaceutical product development agreements with collaborators for the research and development of therapeutic and diagnostic products. The terms of these agreements may include nonrefundable signing and licensing fees, funding for research, development and manufacturing, milestone payments and royalties on any product sales derived from collaborations. We assess these multiple elements in accordance with the Financial Accounting Standards Board, or FASB, Accounting Standards Codification 605, *Revenue Recognition*, in order to determine whether particular components of the arrangement represent separate units of accounting.

We recognize upfront license payments as revenue upon delivery of the license only if the license has stand-alone value and the fair value of the undelivered performance obligations can be determined. If the fair value of the undelivered performance obligations can be determined, such obligations are accounted for separately as the obligations are fulfilled. If the license is considered to either not have stand-alone value or have stand-alone value but the fair value of any of the undelivered performance obligations cannot be determined, the arrangement is accounted for as a single unit of accounting and the license payments and payments for performance obligations are recognized as revenue over the estimated period of when the performance obligations are performed.

Whenever we determine that an arrangement should be accounted for as a single unit of accounting, we must determine the period over which the performance obligations will be performed and revenue will be recognized. If we cannot reasonably estimate the timing and the level of effort to complete our performance obligations under the arrangement, then we recognize revenue under the arrangement on a straight-line basis over the period that we expect to complete our performance obligations.

Our collaboration agreements may include additional payments upon the achievement of performance-based milestones. As milestones are achieved, a portion of the milestone payment, equal to the percentage of the total time that we have performed the performance obligations to date over the total estimated time to complete the performance obligations, multiplied by the amount of the milestone payment, is recognized as revenue upon achievement of such milestone. The remaining portion of the milestone will be recognized over the remaining performance period. Milestones that are tied to regulatory approval are not considered probable of being achieved until such approval is received. Milestones tied to counterparty performance are not included in our revenue model until the performance conditions are met.

To date, we have not received any royalty payments or recognized any royalty revenue. We will recognize royalty revenue upon the sale of the related products, provided we have no remaining performance obligations under the arrangement.

We record deferred revenue when payments are received in advance of the culmination of the earnings process. This revenue is recognized in future periods when the applicable revenue recognition criteria have been met.

We recognize grant revenues as we perform the underling research and development activities or, if applicable, when we meet the related preclinical, clinical or regulatory milestones and collectability and the amount to be received is not assured.

Accrued expenses

As part of the process of preparing financial statements, we are required to estimate accrued expenses. This process involves identifying services that have been performed on our behalf and estimating the level of services performed and the associated costs incurred for such services where we have not yet been invoiced or otherwise notified of actual cost. We record these estimates in our consolidated financial statements as of each balance sheet date. Examples of estimated accrued expenses include:

- fees due to contract research organizations in connection with preclinical and toxicology studies and clinical trials;
- fees paid to investigative sites in connection with clinical trials; and
- professional service fees.

In accruing service fees, we estimate the time period over which services will be provided and the level of effort in each period. If the actual timing of the provision of services or the level of effort varies from the estimate, we will adjust the accrual accordingly. In the event that we do not identify costs that have been incurred or we under or overestimate the level of services performed or the costs of such services, our actual expenses could differ from such estimates. The date on which some services commence, the level of services performed on or before a given date and the cost of such services are often subjective determinations. We make estimates based upon the facts and circumstances known to us at the time and in accordance with generally accepted accounting principles in the United States. There have been no material changes in estimates for the periods presented.

Contingencies

We manufacture MM-121 under a license and collaboration agreement with Sanofi. Under this agreement, Sanofi reimburses us for direct costs incurred in manufacturing. During 2009 and 2010, we utilized a third party contractor to perform fill-finish manufacturing services. This third party contractor experienced FDA inspection issues with its quality control process that resulted in a formal warning letter from the FDA. Following a review by Sanofi and us, some MM-121 was pulled from clinical trial sites and replaced with MM-121 that was filled by a different contractor. Sanofi has requested that we assume financial responsibility for the MM-121 material that was pulled from clinical trial sites. We have disputed Sanofi's request and are currently following the dispute resolution provisions of our license and collaboration agreement. If the executive officers appointed by Sanofi and us are unable to resolve the request, then Sanofi may request we submit the matter to binding arbitration. In the event that binding arbitration is pursued and we are found financially responsible for the MM-121 material that was pulled from clinical trial sites, we may be required to reimburse Sanofi. The arbitration process is inherently uncertain, and we cannot guarantee that the outcome of arbitration, if it were to occur, would be favorable for us. We do not believe that a loss related to this matter is probable. Accordingly, no accrual related to this matter has been recorded as of September 30, 2011. We estimate that the potential payment range for this reimbursement may be between $0 and $4.8 million. Based on the revenue recognition model for manufacturing services under the license and collaboration agreement, we estimate that a potential reimbursement of between $0 and $4.8 million would result in a reduction of revenue of between $0 and $0.8 million in the accompanying consolidated statement of operations in the period.

Stock-based compensation

We account for stock-based compensation by measuring and recognizing compensation expense for all stock-based awards made to employees, including stock options, based on the estimated grant date fair values. For employees, we use the straight-line method to allocate compensation expense to reporting periods over each optionee's requisite service period, which is generally the vesting period. For non-employees, we record awards at fair value, periodically remeasure awards to reflect the current fair value at each reporting period, and recognize expense over the related service period. When applicable, we account for these equity instruments based on the fair value of the consideration received or the fair value of the equity instrument issued, whichever is more reliably measurable.

We estimate the fair value of stock-based awards to employees and non-employees using the Black-Scholes option valuation model. Determining the fair value of stock-based awards requires the use of highly subjective assumptions, including volatility, the calculation of expected term, risk free interest rate and the fair value of the underlying common stock on the date of grant, among other inputs. The assumptions used in determining the fair value of stock-based awards represent our best estimates, which involve inherent uncertainties and the application of judgment. As a result, if factors change, and different assumptions are used, our level of stock-based compensation could be materially different in the future.

The expected volatility rate that we use to value stock option grants is based on historical volatilities of a peer group of similar companies whose share prices are publicly available. The peer group includes companies in the pharmaceutical and biotechnology industries in a similar stage of development, with a comparable market capitalization or a similar clinical focus.

Because we do not have a sufficient history to estimate the expected term, we use the simplified method for estimating the expected term. Under this approach, the weighted-average expected life is presumed to be the average of the vesting term and the contractual term of the option for each tranche. The risk-free interest rate assumption was based on zero coupon U.S. treasury instruments that had terms consistent with the expected term of the stock option grants.

We recognize compensation expense for only the portion of options that are expected to vest. Accordingly, expected future forfeiture rates of stock options have been estimated based on our historical forfeiture rate, as adjusted for known trends. Forfeitures are estimated at the time of grant. If actual forfeiture rates vary from historical rates and estimates, additional adjustments to compensation expense may be required in future periods.

The following table sets forth information with respect to stock options granted from January 1, 2008 to November 2, 2011:

Date of issuance	Number of shares	Exercise price per share	Per share estimated fair value of common stock	Per share weighted average estimated fair value of options
May 5, 2008	344,400	$ 3.32	$ 3.32	$ 2.09
September 22, 2008	2,386,950	1.81	1.81	1.10
January 30, 2009	184,200	1.81	1.81	1.14
February 10, 2009	175,000	1.81	1.81	1.14
April 29, 2009	12,000	1.81	1.81	1.15
June 9, 2009	85,000	1.81	1.81	1.17
June 23, 2009	22,400	1.81	1.81	1.16
November 5, 2009	3,567,055	2.12	2.12	1.39
November 11, 2009	164,500	2.12	2.12	1.41
December 7, 2009	28,475	2.12	2.12	1.41
February 1, 2010	460,000	2.12	2.12	1.44
February 9, 2010	68,475	2.12	2.12	1.44
May 12, 2010	348,500	2.12	2.12	1.40
August 24, 2010	20,000	2.69	2.69	1.74
August 25, 2010	93,400	2.69	2.69	1.74
October 15, 2010	1,523,428	2.69	2.69	1.72
December 9, 2010	60,000	2.69	2.69	1.64
December 15, 2010	59,907	2.69	2.69	1.76
December 22, 2010	350,000	2.69	2.69	1.74
May 3, 2011	1,967,368	5.54	5.54	3.57
August 2, 2011	67,100	6.37	6.37	4.09
November 2, 2011	315,000	6.78	6.78	4.28

The per share estimated fair value of common stock in the table above represents the determination by our board of directors of the fair value of our common stock as of the date of grant, taking into consideration various objective and subjective factors, including the conclusions, if applicable, of contemporaneous valuations of our common stock as discussed

below. We computed the per share weighted average estimated fair value for stock option grants based on the Black-Scholes option valuation model.

Historically, we have granted stock options at exercise prices equal to the estimated fair value of our common stock. Due to the absence of an active market for our common stock, the fair value for purposes of determining the exercise price for stock option grants was determined by our board of directors, with the assistance and upon the recommendation of management, in good faith based on a number of objective and subjective factors including:

- the prices of our convertible preferred stock sold to or exchanged between outside investors in arm's length transactions, and the rights, preferences and privileges of the convertible preferred stock as compared to those of our common stock, including the liquidation preferences of the convertible preferred stock;
- our results of operations, financial position and the status of research and development efforts, including clinical trial data for the various compounds under development;
- the composition of, and changes to, our management team and board of directors;
- the lack of liquidity of our common stock as a private company;
- the material risks related to our business;
- achievement of enterprise milestones, including results of clinical trials and entering into collaboration and license agreements;
- the market performance of publicly traded companies in the life sciences and biotechnology sectors, and recently completed mergers and acquisitions of companies comparable to us;
- external market conditions affecting the life sciences and biotechnology industry sectors;
- the likelihood of achieving a liquidity event for the holders of our common stock and stock options, such as an initial public offering, given prevailing market conditions; and
- contemporaneous valuations prepared in accordance with methodologies outlined in the American Institute of Certified Public Accountants Practice Aid, *Valuation of Privately-Held-Company Equity Securities Issued as Compensation,* or the Practice Aid.

Based on these factors, our board of directors granted options at exercise prices that increased from $2.12 per share in 2010 up to $6.78 per share in 2011.

In determining the exercise prices of the options set forth in the table above granted in 2010 and 2011, our board of directors considered the most recent contemporaneous valuations of our common stock, which were prepared by an external consultant as of October 6, 2009, August 24, 2010, March 31, 2011, July 31, 2011 and October 17, 2011, and based its determination in part on the analyses summarized below.

For the options listed above granted in 2010 and 2011, we used the market approach, specifically the guideline public company and the guideline transaction methods, to estimate the enterprise value of our company by comparing it to similar publicly traded companies and acquisition transactions. In addition, the valuations considered the prices paid for our preferred stock in recent arm's length market financing transactions, most notably, transactions in August 2010 in which one of our preferred stockholders sold shares to several unrelated third parties and our series G convertible preferred stock financing completed in April 2011. Given the

complex capital structure of our company, it was also necessary to allocate the aggregate equity value to the various classes of our outstanding capital stock, including several series of convertible preferred stock and our common stock.

We used the probability-weighted expected return method to allocate the enterprise values to the common stock. Under this method, the value of the common stock is estimated based upon an analysis of future values for our company assuming various investment outcomes, the timing of which is based, in part, on the plans of our board of directors and management. Under this approach, share value is derived from the probability-weighted present value of expected future investment returns, considering each of the possible outcomes available to us, as well as the economic and control rights of each share class. The fair value of our common stock was estimated using a probability-weighted analysis of the present value of the returns afforded to common stockholders under several future stockholder exit or liquidity event scenarios, either through (1) an initial public offering, or IPO; (2) a trade sale of our company at a premium to cumulative amounts invested by preferred stock investors; or (3) a trade sale of our company at a value below the cumulative liquidation preference of the preferred stockholders.

The individual stockholder exit or liquidity scenarios considered in each analysis depended on the specific facts and circumstances, both internal and external, present as of each valuation date. For the October 6, 2009 valuation, we considered the following significant events:

- In September 2009, we entered into a license and collaboration agreement with Sanofi for the co-development and commercialization of MM-121, which included an upfront $60.0 million license fee, future clinical development and sales milestone payments and future royalty payments, depending on the success of MM-121. The agreement also provided that Sanofi would reimburse us for all direct development and manufacturing costs incurred in connection with MM-121.

- In October 2009, we completed the acquisition of Hermes, through which we expanded our discovery capabilities into the area of targeted liposomes and added the MM-398 development program.

As a result, in October 2009, we utilized the probability-weighted expected return method, and the exit events considered included one short-term IPO scenario, one long-term IPO scenario, two separate trade sale scenarios at premiums to the cumulative liquidation preference of the preferred stockholders and a fifth scenario presuming a sale below the aggregate convertible preferred stock liquidation preference.

Subsequently, in January 2011, we received positive Phase 2 clinical results for MM-398 in both pancreatic and gastric cancer indications. As a result of the positive data from these trials, the continued progress of our MM-121 and MM-111 clinical programs, the filing of an IND for MM-302 and the further expansion of our preclinical development pipeline, beginning with the March 31, 2011 valuation and continuing through the October 17, 2011 valuation, a third low-case IPO scenario was added and the sale below the aggregate convertible preferred stock liquidation preference was removed. This third low-case IPO scenario was added to better reflect the expectations of our board of directors and management with respect to the potential liquidity outcomes for our company as of the valuation date considering, in part, the number of compounds in our clinical development pipeline and the anticipated level of future funding necessary to initiate multiple Phase 2/3 clinical trials for two or more of these development programs simultaneously.

The future values of our common stock in the IPO scenarios and the trade sale scenarios were estimated by application of the market approach based on certain key assumptions, including the following:

- expected pre-money IPO valuations from recently completed initial public offerings;
- estimated third party trade sale values based on recent transactions involving biotechnology or biopharmaceutical companies; and
- expected dates for a future IPO or trade sale of our company.

For the sale above the preferred stock liquidation preference scenario, the future common stock value was estimated based on certain assumptions, including the estimated aggregate enterprise value that could be attained through such a sale and the estimated expected date of the future sale. The present values of our common stock under each scenario were then calculated by applying a risk-adjusted discount rate and then probability-weighting those present values based on our estimate of the relative probability of each scenario.

Finally, the estimated fair value of our common stock was reduced by a discount for lack of marketability. The discount for lack of marketability was analyzed based on the restrictive factors inherent in privately held common stock. Among other considerations, the determination of an appropriate discount for lack of marketability, was based in part on a put-option model that considers variables such as time to liquidity, volatility and the risk-free rate. Based on these analyses and consideration of liquidity restrictions, discounts for lack of marketability ranging from 7.5% to 5.0% were applied, depending on the presumed timing of the exit event.

Stock option grants from February 1, 2010 to May 12, 2010

Our board of directors granted stock options on February 1, 2010, February 9, 2010 and May 12, 2010, with each having an exercise price of $2.12 per share. In addition to the objective and subjective factors discussed above, our board of directors also considered input from management and the valuation as of October 6, 2009. Management determined that no significant events or other circumstances had occurred between October 6, 2009 and May 12, 2010 that would indicate there was a change in the fair value of our common stock during that period. The specific facts and circumstances considered by our board of directors for the October 6, 2009 valuation included the following:

- execution of a license and collaboration agreement with Sanofi for the development and commercialization of MM-121 in September 2009, as described above;
- completion of the acquisition of Hermes in October 2009, expanding our discovery capabilities into the area of targeted liposomes, including the MM-398 development program;
- filing of an IND for MM-111;
- out-licensing of MM-093 to GTC; and
- continued dislocation in the public and private capital markets resulting from weakness in macroeconomic conditions and the global credit and liquidity crisis.

In the October 6, 2009 valuation, the short-term IPO scenario assumed a liquidity event in July 2010 and the long-term IPO scenario assumed an exit event in October 2011. In applying the market approach under both IPO scenarios, it was assumed that all development programs, including MM-121 and MM-111, would continue to advance in the clinic through the time of an exit event. The guideline public company method as described in the Practice Aid was used to apply the market approach to both IPO scenarios. Market data on pre-money IPO valuations for biotechnology companies that went public in the period from 2005 to 2008 was analyzed under this method. From this set of data, a narrower sub-set of comparable companies was selected which had product candidates in various stages of drug development ranging from discovery stage to Phase 3 clinical trials. The selected enterprise values for the short-term IPO scenario and the long-term IPO scenario were at or above the high-end of the observed range of the IPO market data based on consideration of our Network Biology approach, the collaboration agreement with Sanofi, the recently completed Hermes acquisition and progress made in our ongoing development programs.

In applying the market approach to estimate our aggregate future enterprise values under the base-case and high-case trade sale scenarios, the high-case scenario assumed all development programs, including MM-121 and MM-111, would advance in the clinic until the time of a trade sale, while the base-case scenario assumed one or more program would experience a clinical delay or setback prior to an exit event. In both trade sale scenarios, the liquidity event was assumed to occur in October 2012. In applying the market approach to the trade sale scenarios, the guideline transaction method was utilized. Under this method, sale transactions of similar private biotechnology companies were analyzed. The values utilized were supported by published transaction values between 2006 and 2008 involving comparable companies with product candidates in various stages of drug development, ranging from discovery stage to Phase 3 clinical trials. In estimating our enterprise value, consideration was given to those transactions for companies that were in a comparable stage of development as we were expected to be in as of October 2012. The selected enterprise value for the base-case scenario was based on consideration of the median of the comparable transaction values, and the selected enterprise value used in the high-case scenario was based on consideration of comparable transaction values between third quartile and the maximum of the observed range.

In the sale at a price below liquidation preference scenario, a sale of our existing research and intellectual property was assumed as of October 2012, at a value that would not allow preferred stockholders to realize their full liquidation preference. The fair value of our common stock under this exit scenario was determined by reducing the total estimated enterprise value by the liquidation preferences of convertible preferred shares, all of which would receive more value based on their liquidation preferences plus accrued dividends, as opposed to converting to common stock.

Under all the exit scenarios considered in the probability-weighted expected return method, the fair value of our common stock was calculated using the estimated future enterprise valuations, a risk-adjusted discount rate of 30.0% based on the inherent risk of a hypothetical investment in our common stock, and a discount for lack of marketability which ranged between 5.0% in the short-term IPO scenario to 7.5% in all other assumed liquidity events. The risk-adjusted discount rate was based on consideration of the weighted average cost of capital for comparable biotechnology companies adjusted for company specific risk factors, the

venture capital rates of return detailed in the Practice Aid, and an analysis of other quantitative and qualitative factors considered pertinent to estimating the discount rate.

In the October 6, 2009 valuation, probability weightings of 20.0% were used for the short-term and long-term IPO scenarios, 30.0% and 10.0% were used for the base-case and high-case trade sale scenarios, respectively, and 20.0% was used for the sale at a price below liquidation preference scenario. The probability weightings assigned to the respective exit scenarios were primarily based on consideration of our various drug development programs, industry clinical success rates, our expected near-term and long-term funding requirements, and an assessment of the current financing and biotechnology industry environments at the time of the valuation. The resulting value, which represented the estimated fair value of our common stock as of October 6, 2009, was $2.12 per share.

Stock option grants from August 24, 2010 to December 22, 2010

Our board of directors granted stock options on August 24, 2010, August 25, 2010, October 15, 2010, December 9, 2010, December 15, 2010 and December 22, 2010, with each having an exercise price of $2.69 per share. In addition to the objective and subjective factors discussed above, our board of directors also considered input from management and the valuation as of August 24, 2010. The increase in share value from the October 6, 2009 valuation was primarily attributable to increases in the selected enterprise values in the long-term IPO and the base-case trade sale scenarios and a decrease in the probability weighting assigned to the sale at a price below liquidation preference scenario. The specific facts and circumstances considered by our board of directors in assessing these key valuation assumptions included the following:

- transactions in August 2010 in which one of our preferred stock investors sold shares of series B, series C and series D convertible preferred stock to several unrelated third parties in arm's length transactions;

- initiation in July 2010 of a randomized, double blind Phase 2 clinical trial of MM-121 in combination with exemestane (Aromasin) in breast cancer patients; and

- difficult conditions in the IPO and merger and acquisition markets, which resulted in an extension of the assumed timing for a liquidity event in all of the scenarios considered in the probability-weighted expected return method.

In applying the market approach to estimate our future enterprise values under the IPO exit scenarios, as described previously, it was assumed that a liquidity event would occur in November 2011 in the short-term scenario and in August 2012 in the long-term scenario. The valuation methodologies and underlying assumptions utilized to apply the market approach under the IPO liquidity scenarios were consistent with those employed in the October 6, 2009 valuation. Given our development pipeline, which included three clinical programs (MM-398, MM-121 and MM-111) and four additional compounds in various stages of preclinical development (MM-302, MM-151, MM-141 and MM-131) as of the valuation date, the selected enterprise value in the short-term scenario was based on the pre-money IPO market data for transactions between the third quartile and the maximum of the observed range. The selected aggregate enterprise value in the long-term scenario was based on consideration of the high-end of the observed range of transaction values and assumed our three most advanced

development projects (MM-398, MM-121 and MM-111) would continue their positive clinical progression.

In applying the market approach to estimate our aggregate future enterprise values under the two trade sale scenarios, as described previously, it was assumed that a liquidity event would occur in August 2013 for the base-case scenario and in February 2013 for the high-case scenario. The valuation methodologies and underlying assumptions utilized to apply the market approach under the trade-sale scenarios were consistent with those employed in the October 6, 2009 valuation. The selected enterprise value utilized in the base-case scenario considered the median of the observed range of comparable transaction values. The selected enterprise value for the high-case scenario was based on the comparable transaction values between the third quartile and the high-end of the observed range. We assumed we would make significant progress and achieve certain key milestones with respect to our development pipeline by the time a trade sale was consummated, including assumptions that our three most advanced development projects (MM-398, MM-121 and MM-111) would continue their positive clinical progression, one or more additional compounds would enter Phase 1/2 trials, including MM-302, and several other compounds would near Phase 1 trials (MM-151, MM-141 and MM-131).

In the sale at a price below liquidation preference scenario, a sale of our existing research and intellectual property was assumed as of August 2013, at a value that would not allow the preferred stockholders to realize their full liquidation preference. The valuation methodologies and underlying assumptions utilized in this scenario were consistent with those employed as of October 6, 2010.

Under all the exit scenarios considered in the probability-weighted expected return method, the fair value of our common stock was calculated using the estimated future enterprise valuations, a risk-adjusted discount rate of 30.0% based on the inherent risk of a hypothetical investment in our common stock, and a discount for lack of marketability which ranged between 5.0% in the short-term IPO scenario to 7.5% in all other assumed liquidity events. The risk-adjusted discount rate was based on consideration of the weighted average cost of capital for comparable biotechnology companies adjusted for company specific risk factors, the venture capital rates of return detailed in the Practice Aid, and an analysis of other quantitative and qualitative factors considered pertinent to estimating the discount rate.

In the August 24, 2010 valuation, probability weightings of 20.0% were used for the short-term and long-term IPO scenarios, respectively, 10.0% and 35.0% were used for the high-case and base-case trade sale scenarios, respectively, and 15.0% was used for the sale below liquidation preference scenario. The probability weightings assigned to the respective exit scenarios were primarily based on consideration of our various drug development programs, industry clinical success rates, our expected near-term and long-term funding requirements, and an assessment of the current financing and biotechnology industry environments at the time of the valuation. The resulting value, which represented the estimated fair value of our common stock as of August 24, 2010, was $2.69 per share. Management determined that no significant events or other circumstances had occurred between August 24, 2010 and December 22, 2010 that would indicate there was a change in the fair value of our common stock during that period.

Stock option grants on May 3, 2011

Our board of directors granted stock options on May 3, 2011 with an exercise price of $5.54 per share. In addition to the objective and subjective factors discussed above, our board of directors also considered input from management and the valuation as of March 31, 2011. The increase in share value from the August 24, 2010 valuation was primarily attributable to increases in the selected enterprise values in the long-term IPO, short-term IPO and high-case trade sale scenarios, a decrease in estimated time until a liquidity event in each of the exit scenarios and the addition of a third low-case IPO scenario and the elimination of the sale at a price below liquidation preference scenario. The specific facts and circumstances considered by our board of directors in assessing these key valuation assumptions included the following:

- positive results in January 2011 indicating that MM-398 met its primary endpoint in a Phase 2 clinical trial for patients with metastatic pancreatic cancer who had failed prior treatment with gemcitabine;
- positive Phase 2 clinical trial results in January 2011 for MM-398 as a second line therapy for patients with gastric or gastroesophageal junction adenocarcinoma;
- completion of a series G convertible preferred stock financing on April 6, 2011 in which we sold 11.0 million shares at $7.00 per share for aggregate proceeds of approximately $77.0 million;
- execution of a term sheet with PharmaEngine in February 2011 and determination by management as of the valuation date of a high likelihood that a final agreement would be executed under which we would reacquire the major Asia and Europe country rights to commercialize and market MM-398;
- filing of an IND in February 2011 for MM-302; and
- positive equity market conditions and performance for publicly traded biotechnology and biopharmaceutical companies.

The market approach was used to estimate our aggregate future enterprise values under three separate IPO scenarios, as described previously. The short-term scenario assumed a liquidity event in December 2011, the long-term scenario assumed a liquidity event in June 2012, and the low-case IPO scenario assumed a liquidity event in September 2012. The valuation methodologies and underlying assumptions utilized to apply the market approach under the short-term and long-term IPO liquidity scenarios were consistent with those employed in the August 24, 2010 valuation. The selected future enterprise value in the short-term IPO scenario was at the high end of the observed range of IPO market data based on consideration of the recent series G convertible preferred stock financing at $7.00 per share and our development pipeline as of the valuation date, which included:

- MM-398, positive Phase 2 data announced in January 2011;
- MM-121, in Phase 2 development;
- MM-111, in Phase 1 development;
- MM-302, IND filed in February 2011;
- MM-151, in advanced preclinical development; and

- three additional compounds in the discovery phase, MM-310, MM-141 and MM-131.

The future enterprise value selected in the long-term IPO scenario was above the high-end of the range of IPO market data and was based on the considerations listed above, and the assumption that clinical progress would be made in multiple development programs between the assumed short-term IPO and long-term IPO liquidity dates. The selected future enterprise value in the low-case IPO scenario was based on consideration of the IPO market data between the third quartile and the high-end of the range and assumed a clinical set-back or delay in one or more of our three clinical development programs.

In applying the market approach to estimate our aggregate future enterprise values under the two trade sale scenarios, as described previously, it was assumed that a liquidity event would occur in June 2013 for the base-case scenario, and in December 2012 for the high-case scenario. The valuation methodologies and underlying assumptions utilized to apply the market approach under the trade-sale scenarios were consistent with those employed in the August 24, 2010 valuation. The selected enterprise value for the base-case was based on consideration of the median of the observed range of comparable transaction values. The selected enterprise value for the high-case sale scenario was based on consideration of the high-end of the observed range of comparable transaction values.

Based on consideration of our development pipeline and the Network Biology approach, the March 31, 2011 valuation did not include a sale at a price below the liquidation preference scenario.

Under all the scenarios considered in the probability-weighted expected return method, the fair value of our common stock was calculated using the expected future enterprise valuations, a risk-adjusted discount rate of 25.0% based on the inherent risk of a hypothetical investment in our common stock, and a discount for lack of marketability of 5.0% in all of the assumed liquidity scenarios. The risk-adjusted discount rate was based on consideration of the weighted average cost of capital for comparable biotechnology companies adjusted for company specific risk factors, the venture capital rates of return detailed in the Practice Aid, and an analysis of other quantitative and qualitative factors considered pertinent to estimating the discount rate.

In the March 31, 2011 valuation, probability weightings of 30.0%, 20.0% and 10.0% were used for the short-term, long-term and low-case IPO scenarios, respectively, and 15.0% and 25.0% were used for the high-case and base-case trade sale scenarios, respectively. The probability weightings assigned to the respective exit scenarios were primarily based on consideration of our various drug development programs, industry clinical success rates, our expected near-term and long-term funding requirements, and an assessment of the current financing and biotechnology industry environments at the time of the valuation. The resulting value, which represented the estimated fair value of our common stock as of March 31, 2011, was $5.54 per share. Management determined that no significant events or other circumstances that had not been taken into consideration in the March 31, 2011 valuation had occurred between March 31, 2011 and May 3, 2011 that would indicate there was a change in the fair value of our common stock during that period.

Stock option grants on August 2, 2011

Our board of directors granted stock options on August 2, 2011 with an exercise price of $6.37 per share. In addition to the objective and subjective factors discussed above, our board of directors also considered input from management and the valuation as of July 31, 2011. The increase in share value from the March 31, 2011 valuation was primarily attributable to a decrease in the estimated time until a liquidity event in each of the exit scenarios and the increase in probability of an IPO compared to a trade sale when estimating the probability of each potential future liquidity event. The specific facts and circumstances considered by our board of directors in assessing these key valuation assumptions included the following:

- filing a registration statement for an IPO with the Securities and Exchange Commission, or SEC, on July 8, 2011;
- dosing the first patient in July 2011 in our MM-302 Phase 1 clinical trial;
- filing of an IND in July 2011 for MM-151; and
- receipt of orphan drug status in July 2011 for MM-398 for the treatment of pancreatic cancer.

The market approach was used to estimate our aggregate future enterprise values under three separate IPO scenarios, as described previously. The short-term scenario assumed a liquidity event in November 2011, the long-term scenario assumed a liquidity event in June 2012, and the low-case IPO scenario assumed a liquidity event in September 2012. The valuation methodologies and underlying assumptions utilized to apply the market approach under all scenarios were consistent with those employed in the March 31, 2011 valuation.

Under all the scenarios considered in the probability-weighted expected return method, the fair value of our common stock was calculated using the expected future enterprise valuations, a risk-adjusted discount rate of 25.0% based on the inherent risk of a hypothetical investment in our common stock, and a discount for lack of marketability of 5.0% in all of the assumed liquidity scenarios. The risk-adjusted discount rate was based on consideration of the weighted average cost of capital for comparable biotechnology companies adjusted for company specific risk factors, the venture capital rates of return detailed in the Practice Aid, and an analysis of other quantitative and qualitative factors considered pertinent to estimating the discount rate.

In the July 31, 2011 valuation, probability weightings of 40.0%, 20.0% and 20.0% were used for the short-term, long-term and low-case IPO scenarios, respectively, and 10.0% and 10.0% were used for the high-case and base-case trade sale scenarios, respectively. The probability weightings assigned to the respective exit scenarios were primarily based on consideration of our various drug development programs, industry clinical success rates, our expected near-term and long-term funding requirements, and an assessment of the current financing and biotechnology industry environments at the time of the valuation. The resulting value, which represented the estimated fair value of our common stock as of July 31, 2011, was $6.37 per share. Management determined that no significant events or other circumstances that had not been taken into consideration in the July 31, 2011 valuation had occurred between July 31, 2011 and August 2, 2011 that would indicate there was a change in the fair value of our common stock during that period.

Stock option grants on November 2, 2011

Our board of directors granted stock options on November 2, 2011 with an exercise price of $6.78 per share. In addition to the objective and subjective factors discussed above, our board of directors also considered input from management and the valuation as of October 17, 2011. The increase in share value from the July 31, 2011 valuation was directly attributable to a decrease in the estimated time until a liquidity event in each of the exit scenarios. The decrease in the estimated time until a liquidity event corresponded to the time elapsed from July 31, 2011 to November 2, 2011. No other material assumptions changed from the July 31, 2011 valuation to the October 17, 2011 valuation. Management determined that no significant events or other circumstances that had not been taken into consideration in the October 17, 2011 valuation had occurred between October 17, 2011 and November 2, 2011 that would indicate there was a change in the fair value of our common stock during that period.

There are significant judgments and estimates inherent in the determination of these valuations. These judgments and estimates include assumptions regarding our future performance; the time to completing an IPO, a trade sale, or other liquidity event; and the timing of and probability of continuing to successfully progress our various drug development candidates toward commercialization, as well as determinations of the appropriate valuation methods. If different assumptions had been applied in the valuations, our stock-based compensation expense, net loss and net loss per share could have been significantly different. While the assumptions used to calculate and account for stock-based compensation awards represents management's best estimates, these estimates involve inherent uncertainties and the application of management's judgment. As a result, if revisions are made to the underlying assumptions and estimates, our stock-based compensation expense could vary significantly from period to period.

On January 13, 2012, we and our underwriters determined the estimated price range for this offering, as set forth on the cover page of this prospectus. The midpoint of the price range is $9.00 per share. In comparison, our estimate of the fair value of our common stock was $6.78 per share as of November 2, 2011. In determining the estimated fair value of $6.78 per share on November 2, 2011, our board of directors considered a contemporaneous valuation of our common stock as of October 17, 2011 prepared by an external consultant. We note that, as is typical in IPOs, the estimated price range for this offering was not derived using a formal determination of fair value, but was determined based upon discussions between us and the underwriters. Among the factors that were considered in setting this range were existing conditions in the public capital markets and the prospects for our company and the industry in which we operate. Specifically, we believe that the difference between the fair value of our common stock as of November 2, 2011 and the midpoint of the estimated price range for this offering is primarily the result of the following factors:

- Historically, and we believe it is reasonable to expect that, the completion of an IPO increases the value of an issuer's common stock as a result of the increase in the liquidity and ability to trade such securities in the public market. In addition, our convertible preferred stock currently has substantial economic rights and preferences over our common stock. The estimated price range for this offering necessarily assumes that the IPO has occurred, a public market for our common stock has been created and that our preferred stock has converted into common stock in connection with the IPO.

- Since November 2, 2011, we have achieved important milestones in the clinical development of our most advanced product candidates and generally continued to advance the development of these product candidates, as described in more detail below, which has had a positive impact on the fair value of our common stock:

    - on November 14, 2011, we dosed the first patient in a Phase 2 clinical trial of MM-121 in non-small cell lung cancer;
    - in December 2011, the FDA notified us that a clinical hold had been released for our IND for MM-151, and in January 2012, we dosed the first patient in a Phase 1 clinical trial of MM-151 in solid tumors;
    - in January 2012, we dosed the first patient in a pivotal Phase 3 clinical trial of MM-398 for the treatment of patients with metastatic pancreatic cancer who have previously failed treatment with gemcitabine; and
    - we generally continued clinical advancement of MM-111, MM-302 and MM-151 in accordance with our overall development plans.

Acquisition

In connection with our acquisition of Hermes, we recorded the assets acquired, liabilities assumed, contractual contingencies and contingent consideration at their fair value on the acquisition date. The purchase price allocation process requires management to make significant estimates and assumptions at the acquisition date, especially with respect to intangible assets and estimated contingent consideration payments.

Although we believe the assumptions and estimates we have made with respect to the Hermes acquisition were reasonable and appropriate, they were based in part on management's judgment and information obtained from the management of the acquired company and are inherently uncertain. Examples of critical estimates in valuing the estimated contingent consideration and certain of the intangible assets we have acquired include the following:

- estimated fair value of the acquisition-related contingent consideration, which was performed using a probability-weighted analysis of future liquidity events;
- future expected cash flows of research and development activities and future expected cash flows from product sales and license agreements; and
- discount rates.

Unanticipated events and circumstances may occur which may affect the accuracy or validity of such assumptions, estimates or actual results. Additionally, any change in the fair value of the acquisition-related contingent consideration subsequent to the acquisition date, including changes from events after the acquisition date, such as changes in our estimate of the probability of certain future liquidity events, will be recognized in earnings in the period of the estimated fair value change. A change in fair value of the acquisition-related contingent consideration could have a material affect on the statement of operations and financial position in the period of the change in estimate.

Results of operations

Comparison of the nine months ended September 30, 2010 and 2011

Nine months ended September 30, (in thousands)	2010	2011
Research and development revenues	$ 13,996	$ 21,638
Research and development expenses	41,860	73,101
General and administrative expenses	8,555	11,239
Contingent consideration	37	—
Loss from operations	(36,456)	(62,702)
Interest income	54	51
Interest expense	(3,638)	(12)
Other income	12	1,208
Net loss before income taxes and non-controlling interest	(40,028)	(61,455)
Benefit from income taxes	—	—
Net loss	$ (40,028)	$ (61,455)

Research and development revenues

Revenues for the nine months ended September 30, 2011 were $21.6 million, compared to $14.0 million for the nine months ended September 30, 2010, an increase of $7.6 million, or 54%. This increase resulted from increased revenues recognized under the collaboration agreement with Sanofi due to increased research and development and manufacturing services.

Research and development expense

Research and development expenses for the nine months ended September 30, 2011 were $73.1 million, compared to $41.9 million for the nine months ended September 30, 2010, an increase of $31.2 million, or 74%. This increase was primarily attributable to:

- $15.0 million of increased MM-398 spending due to a $10.0 million upfront license payment made to PharmaEngine in May 2011 and costs associated with preparing to initiate a Phase 3 clinical trial;
- $9.2 million of increased MM-121 spending due to initiation of two new clinical trials and increased spending on ongoing clinical trials;
- $6.9 million of increased MM-151 spending due to increased toxicology and other preclinical costs;
- $5.0 million of increased spending on preclinical product candidates and other general unallocated research and development primarily due to an increase in the number of preclinical programs;
- $0.7 million of increased stock compensation expense due to increased headcount and the timing of stock option grants; and
- $0.3 million of increased MM-302 spending due to costs associated with initiating a Phase 1 clinical trial.

These increases were partially offset by a decrease of $5.9 million in MM-111 spending due to the timing of clinical and manufacturing costs.

General and administrative expense

General and administrative expenses for the nine months ended September 30, 2011 were $11.2 million, compared to $8.6 million for the nine months ended September 30, 2010, an increase of $2.6 million, or 30%. This increase was primarily attributable to the timing of stock option grants to our directors, the impact of outstanding non-employee stock options, which are marked to market, and increased labor and labor-related costs due to an increase in headcount.

Contingent consideration

Contingent consideration for the nine months ended September 30, 2011 was $0, compared to $37,000 for the nine months ended September 30, 2010. This charge was the result of a change in the estimated fair value of our common stock used to value the contingent consideration liability from the Hermes acquisition.

Interest income

Interest income for the nine months ended September 30, 2011 was $51,000, compared to $54,000 for the nine months ended September 30, 2010, a decrease of $3,000. Interest income was related to interest earned on our money market investments.

Interest expense

Interest expense for the nine months ended September 30, 2011 was $12,000, compared to $3.6 million for the nine months ended September 30, 2010. This decrease was due to lower non-cash interest expense recognized on the series F amount, which was settled in October 2010 and was not present during 2011.

Other income

Other income for the nine months ended September 30, 2011 was $1.2 million, compared to $12,000 for the nine months ended September 30, 2010. This increase was primarily due to the receipt of a $1.8 million cash settlement from a former service provider, partially offset by $0.7 million from the change in the fair value of preferred stock warrants.

Comparison of the years ended December 31, 2009 and 2010

Year ended December 31, (in thousands)	2009	2010
Research and development revenues	$ 2,148	$ 20,305
Research and development expenses	37,658	58,278
General and administrative expenses	12,178	11,381
Contingent consideration	—	(178)
Loss from operations	(47,688)	(49,176)
Interest income	81	74
Interest expense	(4,909)	(3,726)
Other income	41	2,669
Net loss before income taxes and non-controlling interest	(52,475)	(50,159)
Benefit from income taxes	3,402	—
Net loss	$ (49,073)	$ (50,159)

Research and development revenues

Revenues for 2010 were $20.3 million, compared to $2.1 million for 2009, an increase of $18.2 million. This increase resulted from a full year of revenues recognized under the collaboration agreement with Sanofi.

Research and development expense

Research and development expenses for 2010 were $58.3 million, compared to $37.7 million for 2009, an increase of $20.6 million, or 55%. This increase was primarily attributable to:

- $8.5 million of increased MM-111 spending due to initiation of one new clinical trial and increased manufacturing activity;
- $3.4 million of increased spending on preclinical product candidates and other general unallocated research and development due to an increase in the number of preclinical programs;
- $5.7 million of increased MM-121 spending due to initiation of three new clinical trials and increased spending on ongoing clinical trials;
- $4.0 million of increased MM-302 spending due to increased preclinical activities; and
- $0.8 million of increased stock compensation expense due to increased headcount.

These increases were partially offset by the following decreases:

- $0.4 million of MM-093 spending due to out-licensing the program to GTC during 2009; and
- $1.5 million of MM-151 spending due to the timing of toxicology studies and other preclinical activities.

General and administrative expense

General and administrative expenses for 2010 were $11.4 million, compared to $12.2 million for 2009, a decrease of $0.8 million, or 7%. This decrease was primarily attributable to a $2.0 million consulting and banking fee related to the MM-121 license and collaboration agreement with Sanofi in 2009, which was not present in 2010, partially offset by higher legal costs and higher labor and labor-related costs.

Contingent consideration

Contingent consideration for 2010 was a benefit of $0.2 million, compared to $0 in 2009. This benefit was a result of a change in the estimated probability of occurrence of a financing event in the contingent consideration arrangement from the Hermes acquisition.

Interest income

Interest income for each of 2010 and 2009 was $0.1 million. Interest income was related to interest earned on our money market investments.

Interest expense

Interest expense for 2010 was $3.7 million, compared to $4.9 million for 2009, a decrease of $1.2 million, or 24%. This decrease was primarily due to lower non-cash interest expense recognized on the series F amount, which was settled in October 2010.

Other income

Other income for 2010 was $2.7 million, compared to $41,000 for 2009, an increase of $2.7 million. This increase was primarily due to the receipt of a $2.4 million grant awarded under the federal Qualifying Therapeutic Discovery Project program, which was recognized as other income in 2010.

Benefit from income taxes

In 2009, we recognized a benefit from income taxes of $3.4 million upon the release of a tax valuation allowance as a result of the acquisition of Hermes.

Comparison of the years ended December 31, 2008 and 2009

Year ended December 31, **(in thousands)**	**2008**	**2009**
Research and development revenues	$ 365	$ 2,148
Research and development expenses	34,528	37,658
General and administrative expenses	8,836	12,178
Loss from operations	(42,999)	(47,688)
Interest income	1,243	81
Interest expense	(4,403)	(4,909)
Other income	607	41
Net loss before income taxes and non-controlling interest	(45,552)	(52,475)
Benefit from income taxes	—	3,402
Net loss	$ (45,552)	$ (49,073)

Research and development revenues

Revenues for 2009 were $2.1 million, compared to $0.4 million for 2008, an increase of $1.7 million. The increase was primarily due to revenues recognized under the collaboration agreement with Sanofi in 2009, partially offset by revenues recognized from a federal research grant in 2008.

Research and development expense

Research and development expenses for 2009 were $37.7 million, compared to $34.5 million for 2008, an increase of $3.2 million, or 9%. This increase was primarily attributable to:

- $6.4 million of increased MM-121 spending due to increased preclinical spending and spending to prepare for initiation of one new clinical trial;
- $3.1 million of increased spending on preclinical product candidates and other general unallocated research and development due to an increase in the number of preclinical programs;
- $2.4 million of increased MM-151 spending due to increased toxicology and other preclinical costs;
- $0.9 million of increased MM-302 spending due to increased preclinical costs; and
- $0.6 million of increased stock compensation expense due to increased headcount and the timing of grants.

These increases were partially offset by the following decreases:

- $8.9 million of decreased spending on MM-093 due to licensing the program to GTC during 2009; and
- $1.4 million of decreased spending on MM-111 due to the timing of manufacturing campaigns.

General and administrative expense

General and administrative expenses for 2009 were $12.2 million, compared to $8.8 million for 2008, an increase of $3.4 million, or 39%. This increase was primarily attributable to a $2.0 million consulting and banking fee related to the MM-121 license and collaboration agreement with Sanofi and $1.2 million of incremental legal expenses primarily related to the drafting and execution of the MM-121 license and collaboration agreement with Sanofi and the acquisition of Hermes.

Interest income

Interest income for 2009 was $0.1 million, compared to $1.2 million for 2008, a decrease of $1.1 million, or 92%. This decrease was primarily due a lower net investment balance coupled with lower interest rates earned on cash balances and investments. We converted all of our marketable securities to lower risk and lower yielding cash and cash equivalents during the second quarter of 2008.

Interest expense

Interest expense for 2009 was $4.9 million, compared to $4.4 million for 2008, an increase of $0.5 million, or 11%. This increase was primarily due to higher non-cash interest expense recognized on the series F amount.

Other income

Other income for 2009 was $41,000, compared to $0.6 million for 2008, a decrease of $0.6 million. This decrease was primarily due to the change in estimated fair value of preferred stock warrants.

Benefit from income taxes

In 2009, we recognized a benefit from income taxes of $3.4 million upon the release of a tax valuation allowance as a result of the acquisition of Hermes.

Liquidity and capital resources

Sources of liquidity

We have financed our operations to date primarily through private placements of our convertible preferred stock, collaborations and, to a lesser extent, through government grants, the monetization of tax credits and equipment lease financings. Through September 30, 2011, we have received $268.2 million from the sale of convertible preferred stock and warrants and $112.6 million of upfront license fees, milestone payments, reimbursement of research and development costs and manufacturing services and other payments from our collaborations.

As of September 30, 2011, we had consolidated cash and cash equivalents of approximately $59.2 million, of which $2.4 million related to the cash and cash equivalents held by our majority owned subsidiary, Silver Creek, which is consolidated for financial reporting purposes and is designated for the operations of Silver Creek. We primarily invest cash and cash equivalents in money market funds backed by the U.S. treasury and U.S. federal agencies.

During the fourth quarter of 2011, we received a milestone payment of $10.0 million under our license and collaboration agreement with Sanofi. We expect to trigger payment of a $5.0 million milestone under our license and collaboration agreement with Sanofi in the first quarter of 2012.

We are required to make a $5.0 million milestone payment under our license agreement with PharmaEngine and a $1.5 million licensing cost payment under our collaboration agreement with Adimab during the first quarter of 2012.

Cash flows

The following table provides information regarding our cash flows for the years ended December 31, 2008, 2009 and 2010 and the nine months ended September 30, 2010 and 2011.

	Year ended December 31,			Nine months ended September 30,	
(in thousands)	**2008**	**2009**	**2010**	**2010**	**2011**
Cash (used in) provided by operating activities	$ (38,009)	$ 19,055	$ (26,369)	$ (20,390)	$ (46,362)
Cash provided by (used in) investing activities	19,501	(4,851)	(4,900)	(4,397)	(2,460)
Cash provided by (used in) financing activities	23,196	(791)	3,595	2,634	77,341
Net increase (decrease) in cash and cash equivalents	$ 4,688	$ 13,413	$ (27,674)	$ (22,153)	$ 28,519

Operating activities

Cash used in operating activities of $38.0 million during the year ended December 31, 2008 was primarily a result of our $45.6 million net loss coupled with changes in operating assets and liabilities of $0.4 million, partially offset by non-cash items of $8.0 million. Cash provided by operating activities of $19.1 million during the year ended December 31, 2009 was primarily a result of our $49.1 million net loss, partially offset by non-cash items of $7.2 million, changes in operating assets and liabilities of $0.9 million and receipt of $60 million upfront payment under the collaboration agreement with Sanofi. Cash used in operating activities of $26.4 million during the year ended December 31, 2010 was primarily a result of our $50.2 million net loss, partially offset by non-cash items of $11.7 million, changes in operating assets and liabilities of $2.1 million and receipt of $10.0 million milestone payment under the collaboration agreement with Sanofi. Cash used in operating activities of $20.4 million during the nine month period ended September 30, 2010 was primarily a result of our net loss of $40.0 million partially offset by changes in operating assets and liabilities of $10.1 million and non-cash items of $9.5 million. Cash used in operating activities of $46.4 million during the nine month period ended September 30, 2011 was primarily a result of our $61.5 million net loss, partially offset by non-cash items of $9.8 million and changes in operating assets and liabilities of $5.3 million.

Investing activities

Investing activities provided cash of $19.5 million for the year ended December 31, 2008 and used cash of $4.9 million for both the years ended December 31, 2009 and 2010. Investing activities used cash of $4.4 million for the nine month period ended September 30, 2010 and $2.5 million for the nine month period ended September 30, 2011. Cash used in investing activities during 2009, 2010 and both nine month periods ended September 30, 2011 and 2010 was primarily due to the purchase of plant, property and equipment. Cash provided by investing activities of $19.5 million in 2008 was primarily due to proceeds from the sale of investments of $24.7 million, partially offset by purchases of marketable securities of $3.4 million and $1.5 million from the purchase of plant, property and equipment.

Financing activities

Financing activities provided cash of $23.2 million for the year ended December 31, 2008, used cash of $0.8 million for the year ended December 31, 2009, and provided cash of $3.6 million for the year ended December 31, 2010. Financing activities provided cash of $2.6 million for the nine month period ended September 30, 2010 and $77.3 million for the nine month period ended September 30, 2011. Cash provided by financing activities of $23.2 million during 2008 was primarily from proceeds from the series F convertible preferred stock financing of $24.5 million, partially offset by the payment of capital leases of $1.0 million and the payment of long-term debt of $1.0 million. Cash used in financing activities of $0.8 million during 2009 was primarily a result of payment of capital leases of $1.0 million. Cash provided by financing activities of $3.6 million during 2010 was primarily a result of proceeds received by Silver Creek for the issuance of convertible preferred stock of $4.2 million, partially offset by the payment of capital leases of $0.9 million. Cash provided by financing activities of $2.6 million for the nine months ended September 30, 2010 was primarily the result of proceeds received by Silver Creek for the issuance of convertible preferred stock of $3.0 million. Cash provided by financing activities of $77.3 million for the nine months ended September 30, 2011 was primarily a result of $76.9 million of proceeds received from the series G convertible preferred stock financing, net of offering costs.

Funding requirements

We have not completed development of any therapeutic products or companion diagnostics. We expect to continue to incur significant expenses and increasing operating losses for at least the next several years. We anticipate that our expenses will increase substantially as we:

- initiate or continue our clinical trials of our five most advanced product candidates;
- continue the research and development of our other product candidates;
- seek to discover additional product candidates;
- seek regulatory approvals for our product candidates that successfully complete clinical trials;
- establish a sales, marketing and distribution infrastructure and scale up manufacturing capabilities to commercialize products for which we may obtain regulatory approval; and
- add operational, financial and management information systems and personnel, including personnel to support our product development and planned commercialization efforts.

We expect that the net proceeds from this offering, together with our existing cash and cash equivalents, anticipated interest income and anticipated milestone payments and research and development and manufacturing funding under our collaboration with Sanofi related to MM-121, will enable us to fund our operating expenses and capital expenditure requirements through at least the end of 2013. We have based this estimate on assumptions that may prove to be wrong, and we could use our available capital resources sooner than we currently expect. Because of the numerous risks and uncertainties associated with the development and commercialization of our product candidates, and the extent to which we enter into collaborations with third parties to participate in their development and commercialization, we are unable to estimate the amounts of increased capital outlays and operating expenditures

associated with our current and anticipated clinical trials. Our future capital requirements will depend on many factors, including:

- the progress and results of the clinical trials of our five most advanced product candidates;
- the success of our collaborations with Sanofi related to MM-121 and PharmaEngine related to MM-398;
- the scope, progress, results and costs of preclinical development, laboratory testing and clinical trials for our other product candidates;
- the costs, timing and outcome of regulatory review of our product candidates;
- the costs of commercialization activities, including product sales, marketing, manufacturing and distribution;
- the costs of preparing, filing and prosecuting patent applications and maintaining, enforcing and defending intellectual property-related claims;
- the extent to which we acquire or invest in businesses, products and technologies; and
- our ability to establish and maintain additional collaborations on favorable terms, particularly marketing and distribution arrangements for oncology product candidates outside the United States and Europe.

Until such time, if ever, as we can generate substantial product revenues, we expect to finance our cash needs through a combination of equity offerings, debt financings, collaborations, strategic alliances, licensing arrangements and other marketing and distribution arrangements. We do not have any committed external sources of funds, other than our collaboration with Sanofi, which is terminable by Sanofi for convenience upon 180 days' prior written notice. To the extent that we raise additional capital through the sale of equity or convertible debt securities, the ownership interest of our stockholders will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect your rights as a stockholder. Debt financing, if available, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends. If we raise additional funds through marketing and distribution arrangements or other collaborations, strategic alliances or licensing arrangements with third parties, we may have to relinquish valuable rights to our technologies, future revenue streams, research programs or product candidates or to grant licenses on terms that may not be favorable to us. If we are unable to raise additional funds through equity or debt financings when needed, we may be required to delay, limit, reduce or terminate our product development or commercialization efforts or grant rights to develop and market product candidates that we would otherwise prefer to develop and market ourselves.

Contractual obligations and commitments

The following table summarizes our contractual obligations as of September 30, 2011:

(in thousands)	Total	Less than 1 year	1 to 3 years	3 to 5 years	More than 5 years
Capital lease obligations(1)	$ 99	$ 99	$ —	$ —	$ —
Operating lease obligations	7,847	3,467	3,537	843	—
Antibody and technology licensing costs(2)	2,128	1,683	230	215	—
PharmaEngine license and collaboration agreement(3)	5,000	5,000	—	—	—
Total contractual cash obligations	$ 15,074	$ 10,249	$ 3,767	$ 1,058	$ —

(1) Capital lease obligations include obligated interest payments.

(2) Antibody and technology licensing costs include costs related to a collaboration agreement with Adimab LLC for $1.5 million and a €50,000 milestone payment related to an agreement with Selexis SA to be paid in the first quarter of 2012. Antibody and technology licensing costs also include costs under license agreements with The Regents of the University of California, which include annual license maintenance fee payments of $20,000 and $95,000 estimated to be paid from 2012 through 2015 and a minimum annual royalty payment of $100,000 estimated to be paid in 2015. We have not included annual license maintenance fees or minimum royalty payments after September 30, 2015, as we cannot estimate if they will occur.

(3) In May 2011, we entered into an agreement with PharmaEngine under which we reacquired previously licensed rights for MM-398 and made an upfront license payment to PharmaEngine of $10.0 million. We are required to make a $5.0 million milestone payment to PharmaEngine in connection with dosing the first patient in our Phase 3 clinical trial of MM-398, which occurred in the first quarter of 2012. We may be required to make up to an aggregate of $75.0 million in additional development and regulatory milestone payments and $130.0 million in additional sales milestone payments upon the achievement of specified development, regulatory and annual net sales milestones. We cannot estimate if or when these milestone payments will occur. PharmaEngine is also entitled to tiered royalties on net sales of MM-398 in Europe and certain countries in Asia. The royalty rates under the agreement range from high single digits up to the low teens as a percentage of our net sales of MM-398 in these territories. We cannot estimate if or when these royalties will occur.

We are required to pay the holders of series B convertible preferred stock cash dividends of approximately $4.3 million upon the closing of this offering.

Expenditures to contract research organizations represent a significant cost in clinical development. However, our contracts with these research organizations are cancellable at our option upon short notice and do not have cancellation penalties. Therefore, payments to contract research organizations have not been included in the above table.

In January 2010, we received $1.5 million of tax incentives from the Massachusetts Life Sciences Center, or MLSC, an independent agency of the Commonwealth of Massachusetts, which allowed us to monetize approximately $1.4 million of state research and development tax credits. In exchange for these incentives, we pledged to hire 50 employees and to maintain the additional headcount through at least December 31, 2014. Failure to do so could result in our being required to repay a portion of these incentives. This contingent obligation has not been included in the above table as we cannot estimate if or when it will become payable.

In January 2011, we received $1.3 million of tax incentives from the MLSC, which allowed us to monetize approximately $1.2 million of state research and development tax credits. In exchange for these incentives, we pledged to hire 50 employees and to maintain the additional headcount through at least December 31, 2015. Failure to do so could result in our being required to repay these incentives. This contingent obligation has not been included in the above table as we cannot estimate if or when it will become payable.

Other than the specific payments noted in the table and as described above, milestone and royalty payments associated with antibody licensing, manufacturing technology licensing costs and other in-licensed collaboration payments have not been included in the above table as management cannot reasonably estimate if or when they will occur. These arrangements include the following:

- Under a collaboration agreement with Dyax Corp., or Dyax, related to antibody identification and evaluation, we are required to make aggregate development and regulatory milestone payments of up to $16.2 million for therapeutic products and aggregate regulatory milestone payments of up $1.0 million for diagnostic products directed to selected targets. We also are required to pay mid single digit royalties on net sales of licensed products.

- Under license agreements with The Regents of the University of California, we are required to make aggregate development and regulatory milestone payments of up to $1.4 million associated with MM-111 and MM-302 and pay royalties in the low single digits on net sales of licensed products.

- In addition to the amounts included in the table above payable to Adimab LLC, we are required to make aggregate development and regulatory milestone payments of up to $52.5 million related to therapeutic antibody licensing costs associated with MM-151 and pay mid single digit royalties on net sales of licensed products.

- Under a license agreement with the U.S. Public Health Service, a division of the U.S. Department of Health and Human Services, we are required to make aggregate development and regulatory milestone payments of up to $6.0 million, per therapeutic licensed product, related to ErbB3 receptor patents associated with MM-121 and MM-111, and pay royalties in the low single digits on net sales of licensed products. The term of the agreement extends until the expiration of the licensed patent rights, which is 2016.

- Under an agreement with Selexis SA, we are required to make aggregate milestone payments of up to €1.0 million, per licensed product, related to the manufacturing of all of our clinical programs, with the exception MM-398, and royalties of less than one percent on net sales of licensed products.

Milestone and royalty payments that we may be required to make to Dyax, the U.S. Public Health Service and Selexis SA related to MM-121 are fully reimbursed by Sanofi under the terms of our license and collaboration agreement. Sanofi is then entitled to deduct 50% of any amount reimbursed against future royalty payments that Sanofi may be required to make to us.

Off-balance sheet arrangements

We did not have during the periods presented, and we do not currently have, any off-balance sheet arrangements, as defined under SEC rules.

Tax loss carryforwards

As of December 31, 2010, we had federal net operating loss carryforwards of $88.9 million and state net operating loss carryforwards of $54.2 million, which will begin to expire in 2011. As of December 31, 2010, we had federal research and development and investment tax credit

carryforwards of $7.9 million and state research and development and investment tax credit carryforwards of $3.6 million, which also will begin to expire in 2011. Management has evaluated the positive and negative evidence bearing upon the realizability of our deferred tax assets and determined that it is more likely than not we will not recognize the benefits of federal and state deferred tax assets. As a result, we have established a valuation allowance of $81.4 million as of December 31, 2009 and $103.9 million as December 31, 2010. Our ability to use our net operating loss carryforwards and research and development credit carryforwards to offset future taxable income may be subject to a substantial annual limitation under Section 382 of the Internal Revenue Code due to ownership changes that have occurred previously or that could occur in the future. Ownership changes, as defined in Section 382 of the Internal Revenue Code, limit the amount of net operating loss carryforwards and research and development credit carryforwards we can use each year to offset future taxable income and taxes payable. We have not performed a complete study to determine whether an ownership change has occurred or the limit on the future use of our net operating loss carryforwards or research and development credit carryforwards. Any such limitation would reduce our gross deferred tax asset.

Modification of warrants to purchase common stock held by a related party

In August 2010, we modified warrants held by a related party stockholder to purchase 2,596,000 shares of our common stock to extend the expiration dates by four years and increase the exercise prices from $2.12 and $2.47 to $3.00 per share. We valued the modification using a Black-Scholes option valuation model and accounted for the $1,803,000 of incremental value within the equity section of the accompanying balance sheets as a capital transaction.

Recent accounting pronouncements

In October 2009, the FASB issued Accounting Standard Update No. 2009-13, *Multiple Deliverable Revenue Arrangements,* or ASU 2009-13, which amends existing revenue recognition accounting pronouncements for multiple-deliverable revenue arrangements. ASU 2009-13 provides accounting principles and application guidance on whether multiple deliverables exist, how the arrangement should be separated, and the consideration allocated. ASU 2009-13 eliminates the requirement to establish the fair value of undelivered products and services and instead provides for separate revenue recognition based upon management's estimate of the selling price for an undelivered item in circumstances when there is no other means to determine the fair value of that undelivered item. Multiple-deliverable revenue arrangement guidance previously required that the fair value of the undelivered item be the price of the item either sold in a separate transaction between unrelated third parties or the price charged for each item when the item is sold separately by the vendor. This was difficult to determine when the product was not individually sold because of its unique features. Under the previous guidance, if the fair value of all of the elements in the arrangement was not determinable, then revenue was deferred until all of the items were delivered or fair value was determined. ASU 2009-13 was effective prospectively for revenue arrangements entered into or materially modified in fiscal years beginning on or after June 15, 2010. We adopted this standard on a prospective basis on January 1, 2011 with no impact.

In April 2010, the FASB issued Accounting Standard Update No. 2010-17, *Revenue Recognition—Milestone Method,* or ASU 2010-17. ASU 2010-17 provides guidance in applying the milestone method of revenue recognition to research or development arrangements. Under this guidance, companies may recognize revenue contingent upon the achievement of a milestone in its entirety, in the period in which the milestone is achieved, only if the milestone meets all the criteria within the guidance to be considered substantive. ASU 2010-17 is effective on a prospective basis for research and development milestones achieved in fiscal years beginning on or after June 15, 2010. We adopted this standard on a prospective basis on January 1, 2011 with no impact.

In September 2011, the FASB amended the authoritative guidance regarding the testing for goodwill impairment. Under the amendments, an entity has the option to first assess qualitative factors to determine whether the existence of events or circumstances leads to a determination that it is more likely than not that the fair value of a reporting unit is less than its carrying amount. If, after assessing the totality of events or circumstances, an entity determines it is not more likely than not that the fair value reporting of a reporting unit is less than the carrying amount, then performing the two-step impairment test is unnecessary. The changes are effective for annual and interim goodwill impairment tests performed for fiscal years beginning after December 15, 2011, however, early adoption is permitted. We adopted this authoritative guidance on January 1, 2012 with no impact.

Quantitative and qualitative disclosures about market risk

We are exposed to market risk related to changes in interest rates. Our current investment policy is to invest our cash in a variety of financial instruments, principally deposits, securities issued by the U.S. government and its agencies and money market instruments. The goals of our investment policy are preservation of capital, fulfillment of liquidity needs and fiduciary control of cash and investments. We also seek to maximize income from our investments without assuming significant risk.

Our primary exposure to market risk is interest income sensitivity, which is affected by changes in the general level of interest rates, particularly because our investments are in short-term marketable securities. Due to the short-term duration of our investment portfolio and the low risk profile of our investments, an immediate 10.0% change in interest rates would not have a material effect on the fair market value of our portfolio. Accordingly, we would not expect our operating results or cash flows to be affected to any significant degree by the effect of a sudden change in market interest rates on our investment portfolio.

We do not believe that our cash, cash equivalents and available-for-sale investments have significant risk of default or illiquidity. While we believe our cash, cash equivalents and available-for-sale investments do not contain excessive risk, we cannot provide absolute assurance that in the future our investments will not be subject to adverse changes in market value. In addition, we maintain significant amounts of cash and cash equivalents at one or more financial institutions that are in excess of federally insured limits.

Business

Overview

We are a biopharmaceutical company discovering, developing and preparing to commercialize innovative medicines consisting of novel therapeutics paired with companion diagnostics. Our mission is to provide patients, physicians and the healthcare system with the medicines, tools and information to transform the approach to care from one based on the identification and treatment of symptoms to one focused on the diagnosis and treatment of illness through a more precise mechanistic understanding of disease. We seek to accomplish our mission by applying our proprietary systems biology-based approach to biomedical research, which we call Network Biology. Our vision is to apply Network Biology to become a global healthcare enterprise that is founded on leading science and driven to deliver integrated healthcare solutions that improve both the quality of outcomes and the efficiency of care. Our initial focus is in the field of oncology. We have five programs in clinical development. In our most advanced program, we are conducting a pivotal Phase 3 clinical trial.

Network Biology is an interdisciplinary approach to drug discovery and development. It focuses on understanding how the complex molecular interactions that occur within cell signaling pathways, or networks, regulate cell decisions and how network dysfunction leads to disease. Our approach integrates proprietary, dynamic biological data generated in a high-throughput, or rapid and automated, method in which we test multiple biological or chemical parameters using engineering, analytical and modeling expertise. Our capabilities allow us to build computational models of cell biology as a basis for drug discovery, design and predictive development. We apply Network Biology throughout the research and development process, including for target identification, lead compound design and optimization, diagnostic discovery, *in vitro* and *in vivo* predictive development and the design of clinical trial protocols. We believe that drug discovery and development using Network Biology is more efficient and productive than traditional approaches.

We currently have five targeted therapeutic oncology candidates in clinical development. Additionally, we have multiple product candidates in preclinical development and a discovery effort advancing additional candidate medicines. We have tailored each of our five most advanced product candidates to target specific disease mechanisms that our research suggests are common across many solid tumor types. We believe that these product candidates have the potential to address major unmet medical needs.

Our most advanced product candidates are MM-398, MM-121, MM-111, MM-302 and MM-151.

- MM-398 is a novel, stable nanotherapeutic encapsulation, or enclosed sphere carrying an active drug, of the marketed chemotherapy drug irinotecan. MM-398 recently achieved its primary efficacy endpoints in two Phase 2 clinical trials, one in pancreatic cancer patients and one in gastric cancer patients. We are conducting a pivotal Phase 3 clinical trial of MM-398 for the treatment of patients with metastatic pancreatic cancer who have previously failed treatment with the chemotherapy drug gemcitabine. In July 2011, the FDA granted MM-398 orphan drug designation for the treatment of pancreatic cancer. In September 2011, the European Medicines Agency granted MM-398 orphan medicinal product designation for the treatment of pancreatic cancer. We believe that MM-398 has potential uses in a number of

other indications, including colorectal cancer, lung cancer and glioma. There are multiple ongoing Phase 1 and Phase 2 clinical trials of MM-398.

- MM-121 is a fully human monoclonal antibody that targets ErbB3, a cell surface receptor, or protein attached to the cell membrane that mediates communication inside and outside the cell, implicated in cancer. A monoclonal antibody is a type of protein normally produced by cells of the immune system that binds to just one epitope, or chemical structure, on a protein or other structure. Our research suggests that ErbB3 is critical to the growth and survival of tumors and that use of ErbB3 as a resistance mechanism by cancer cells is common across patient populations and tumor types. MM-121 is designed to inhibit cancer growth directly, restore sensitivity to drugs to which a tumor has become resistant and delay the development of resistance by a tumor to other agents. In collaboration with Sanofi, we are conducting a clinical program to test MM-121 in combination with both chemotherapies and other targeted agents across a wide spectrum of solid tumor patient populations, including patients with lung, breast and ovarian cancers.

- MM-111 is a bispecific antibody designed to target cancer cells that are characterized by overexpression of the ErbB2 cell receptor, also referred to as HER2. A bispecific antibody is a type of antibody that is able to bind simultaneously to two distinct proteins or epitopes. Our research suggests that a complex including ErbB2 (HER2) and ErbB3 is a powerful promoter of tumor growth and survival when stimulated by signaling molecules called ligands. MM-111 is designed to uniquely address the signaling from this complex of molecules. We believe that MM-111 is potentially applicable across a broad range of solid tumors. We are conducting multiple Phase 1 clinical trials of MM-111 in monotherapy and combination therapy settings.

- MM-302 is a nanotherapeutic encapsulation of doxorubicin with attached antibodies that target the ErbB2 (HER2) receptor. We designed MM-302 to bind to cancer cells that overexpress ErbB2 (HER2) and thereby release doxorubicin at the site of the tumor. Our goal is for MM-302 to retain the safety profile of liposomal doxorubicin, in particular with respect to cardiac safety, but to have better efficacy in ErbB2 (HER2) positive tumors. We are conducting a Phase 1 clinical trial of MM-302 in patients with advanced ErbB2 (HER2) positive breast cancer.

- MM-151 is an oligoclonal therapeutic consisting of a mixture of three fully human monoclonal antibodies designed to bind to non-overlapping epitopes of the epidermal growth factor receptor, or EGFR. EGFR is also known as ErbB1. An oligoclonal therapeutic is a mixture of two or more distinct monoclonal antibodies. EGFR (ErbB1) has long been recognized as an important drug target in several malignancies, including lung, breast, colon, pancreatic and head and neck cancers. We are conducting a Phase 1 clinical trial of MM-151 in patients with solid tumors.

We are developing *in vitro* and *in vivo* companion diagnostics for use with each of our therapeutic oncology product candidates. We use Network Biology in identifying biomarkers, which are biophysical or biochemical markers of cancer, and developing them into *in vitro* companion diagnostic agents for use with our therapeutic products. The *in vivo* companion diagnostics that we are developing take the form of imaging agents that may help identify patients likely to benefit from our therapeutic products by measuring deposition of our products in the tumor. We believe that companion diagnostics will allow us to improve the

efficiency and productivity of our clinical development and enhance the potential efficacy and pharmacoeconomic benefit of our therapeutics.

Our strategy

Our goal is to build a global healthcare enterprise founded on a leading understanding of complex biology through the use of our Network Biology approach. Key elements of our strategy to achieve this goal are:

- *Strengthen and expand our core Network Biology capabilities.* Network Biology is critical to our ability to explore, model and understand complex biology and is the core of our drug discovery and development efforts. We apply Network Biology across all of our development programs. We intend to increase our investment in the technologies, methods and know-how that comprise our Network Biology capabilities. We also plan to expand the scope of the therapeutic areas and biological processes we explore with Network Biology.

- *Foster an integrated, multidisciplinary model of drug discovery, clinical development, manufacturing and commercialization.* We believe that an integrated, multidisciplinary team approach is essential to our productivity, innovation and retention of knowledge across all of our processes from research through manufacturing. To continue to foster this collaborative environment, we plan to invest in recruiting and retaining top talent and professional development for all of our employees and to focus on establishing and maintaining strong relationships with researchers, physicians and patients. We intend to extend our multidisciplinary team approach into our planned commercial organization and to market our product candidates with the same science and information-based passion with which they are developed.

- *Develop a companion diagnostic for each of our therapeutic oncology product candidates.* We are investing in the development of companion diagnostics to support our therapeutic oncology product candidates so as to guide their use and enhance their benefit for patients and the healthcare system. It is our long-term vision to combine these individual tests into a unified cancer diagnostic that can aid in the prescription of multiple therapeutics and treatment combinations based on the profile of a tumor.

- *Establish sales and marketing capabilities.* We generally expect to retain commercial rights in the United States and Europe for our oncology product candidates, other than MM-121. Subject to receiving marketing approvals, we plan to commence commercialization activities by building a focused sales and marketing organization to establish relationships with the community of oncologists who are the key specialists in treating solid tumors.

Network Biology

Merrimack was founded by a team of scientists from The Massachusetts Institute of Technology and Harvard University seeking to develop a systems biology-based approach to biomedical research. Fundamentally, systems biology is the study of the complex molecular interactions that regulate the cellular decisions that drive the functioning of living organisms. The core of our approach to systems biology is a multidisciplinary and multitechnology capability to build functional and predictive computational models of biological systems, such as cell signaling networks, that allow us to engineer treatments that are directed at the mechanisms of disease.

Network Biology compared to traditional molecular biology

Traditionally, the search for new drugs has been based on the identification of individual molecules in diseased cells that appear to be abnormal relative to individual molecules in healthy cells. Using traditional biomedical research methods, researchers label as "targets" the molecules that appear to be abnormal, typically either in amount, which is commonly referred to as expression, or make-up, which is commonly referred to as mutation status. These researchers then seek to validate a target by creating cells that either lack the target or overexpress the target to verify that the target contributes to the diseased state of the cell. Following positive validation, companies using traditional biomedical research methods then develop drugs to treat the target and test those various drugs in experimental models of the disease. If effective in animal studies that replicate the disease characteristics, these companies then consider the new drug candidate for human clinical testing. Unfortunately, new drug candidates developed with the traditional approach have a very high rate of clinical failure. We believe that the failure of traditional research methods to account for the complexity of biological systems underlying disease has contributed to this high rate of clinical failure. Additionally, we believe that few complex disease states are caused and perpetuated by only one molecular component.

Our view is that traditional research methods for drug discovery are suboptimal. First, they focus on individual molecules as determinants of cell decisions. We believe that the governance of cells is a function of the interactions of many molecules, which is referred to as systems dynamics. Individual molecules are simply contributors to signaling networks that process many parallel signals. We focus on networks because it is the outcome of the network that determines cell behavior. We believe that the overexpression of many molecules in a diseased cell is merely symptomatic of abnormal cell processes, rather than causal. Second, we believe that the focus on individual molecules and their relationship to disease states does not account for the inherent complexity of signaling. Cellular signaling networks often have redundant signaling routes, any one of which can compensate for the other. In addition, networks are replete with feedback loops, or a signaling relationship in which the output of one communication path returns to regulate or affect the input of its own or other communication paths. This complexity often confounds efforts to ascribe specific cellular behavior to one molecule or one signaling relationship. Although a molecule may be involved in a signaling pathway, the degree of its importance depends on its signaling contribution and the state of other contributors in the system. Lastly, traditional biomedical research has focused on one-dimensional measures of a molecule's impact on signaling, such as the increase or decrease in the expression of a protein at a specific time point. We believe that traditional methods fail to recognize the dynamic nature of biology in which the duration and intensity of signaling is essential. Our view is that the duration and the degree of signaling is a more important contributor to cell signaling networks than the expression of a molecule.

Network Biology methods

The goal of Network Biology is to understand how systems dynamics govern cell behavior. The methodology underpinning Network Biology is an integrated, multidisciplinary technology platform that incorporates biology, simulation and mathematics to enable the construction of computational models of cell signaling pathways. To execute Network Biology, we have developed an expertise in generating kinetic data, describing molecular changes or interactions

over time, to illuminate the dynamic interactions that occur within biological systems. Our data sets differ from traditional data sets in that they focus on quantitative measures of signaling, and not qualitative measures of molecular activity and interaction. Our data also focus on time, and not simply intensity, as a critical variable in understanding the impact of a signal.

We initiate our Network Biology discovery efforts by identifying the biological signaling networks that are engaged in a disease state. For example, in order to identify the signaling networks that are used by cancer cells for growth and survival, we perform experiments that we refer to as Critical Network Identification. We conduct these experiments using our expertise in high-density protein array technology to measure the impact of dozens of factors that are thought to cause or promote cancer across many different tumor types. The experimental output identifies which cell signaling networks are activated in response to various stimuli across different disease models. In one such experiment, we studied 54 types of solid tumor cells from the National Cancer Institute's panel of tumor cell lines. This analysis revealed that, while there are many different types of cancer reflecting diverse genetic backgrounds, these cancers rely on a relatively limited number of cell signaling networks for growth and survival.

Once we identify the critical networks, we initiate a program of mapping, measuring and constructing a detailed biochemical model of each individual signaling network for use in drug discovery. We construct our network models using proprietary data sets. We generate our data sets utilizing high-throughput, multiplexed microarray technology or automated, high-throughput biological assays. These experiments are executed over time-courses on cultured cells. Within each cell, at specific time intervals, we simultaneously measure the signaling and interaction status of a large panel of proteins to generate this kinetic data. We then convert the kinetic parameters drawn from the data sets into mathematical equations that describe the relationship between each molecular entity in the network. The individual equations are then assembled into a network model. For example, our model of the ErbB network contains equations that describe the interaction of nearly 700 molecular entities. Once constructed, we then test the model for accuracy in many different and varied experimental settings. We use the model to make predictions of network behavior within a cell under a varied set of experimental conditions. Following this, we test these predictions in actual laboratory experiments and use the data to refine and validate the model.

We believe that our models differ from other models in the industry because of their level of specificity and detail. Models that we have seen in other drug discovery settings often seek to correlate activity from external cellular stimuli directly to disease state. In contrast, we build models that describe each of the individual molecular interactions starting with external stimuli, but continuing with the hundreds of interactions that occur from the cell surface to the nucleus of the cell. In academic settings, this level of detailed molecular interaction modeling is often referred to as biochemical modeling. We believe our accuracy in predicting cell behavior from our models is driven by the precision and details of our approach.

Our models are constructed and validated using internally generated and proprietary data sets. We do not rely on outside databases. The data generated from our Critical Network Identification experiments is also proprietary and generated in-house.

Following the validation of a comprehensive model of a cell signaling network, we are able to use the model for drug discovery. Contrary to traditional methods, our discovery work takes

place *in silico*, or using the model for simulation. One example of our discovery approach is to execute a sensitivity analysis across the entire network to identify drug targets that have the greatest impact on signal transduction in the network. We believe that the best targets are those most involved in signaling, and not necessarily those that are most abnormal, which is more likely a symptom of irregular cell processes.

As one example, we identified MM-121 using our proprietary model of the ErbB signaling network after conducting a sensitivity analysis on its signaling process. Although the ErbB pathway has been extensively targeted by cancer therapeutics, we believe that understanding the relative importance of the different components of the ErbB network is central to identifying an attractive drug target and a therapeutic directed at this target. In this case, we built a computational model of the ErbB signaling network that describes the most potent ErbB receptor ligands, as well as known and novel ErbB inhibitors. We populated the model with proprietary dynamic data that we generated from our Critical Network Identification experiments. The model describes in mathematical equations the dynamic interactions of approximately 700 molecular entities in the network. The model identified ErbB3 as the key node in response to both ErbB3- and EGFR (ErbB1)-binding ligands. We then used this insight to develop MM-121.

Network Biology and patient care

The goal of Network Biology is to deliver better treatments for complex diseases. We use Network Biology to obtain an understanding of the dynamics that govern cell signaling networks and how dysfunction in these networks leads to and perpetuates disease. We believe that Network Biology may provide broader insight into disease and the potential therapeutic alternatives for physicians and patients. In particular, we believe that Network Biology may provide three key benefits:

- stratification of disease by the underlying mechanisms promoting tumor growth and survival;
- novel medicines designed to take into account the complexity of cell signaling networks within a tumor cell; and
- integrated medicines that provide a therapeutic and diagnostic to help guide treatment.

Stratification of disease by the underlying mechanisms promoting tumor growth and survival

To date, much of the study of cancer has focused on tumors characterized by a single, overexpressed receptor or a mutated gene, also known as oncogene-driven cancers. While these types of cancer are relatively easy to discern, we believe that they are actually somewhat rare across solid tumors.

Our research suggests that identifying the cell signaling networks that are used by a patient's tumor will enable more precise mechanistic diagnosis. Based on our research on the mechanisms underlying cancer, we believe that the abnormal growth of tumor cells is due to the development of addictions to one or more signaling networks in response to stressors in the tumor environment. Once a cell has been stressed, its systems begin to compensate, in particular by activating additional growth and survival signaling.

As an example, the results of one of our Critical Network Identification experiments revealed that, while there are many different types of cancer reflecting diverse genetic backgrounds,

these cancers rely on a relatively limited number of cell signaling networks for growth and survival. We believe that developing drugs that effectively inhibit these signaling mechanisms, independent of the type or nature of the stressor, may provide an improved basis of treatment.

Novel medicines designed to take into account the complexity of cell signaling networks within a tumor cell

All cells function by means of signaling networks. Critical signals related to functions, such as growth and survival, are regulated via complex networks of extracellular and intracellular molecular entities that are organized into individual biological pathways. These pathways compete and cooperate with one another to drive particular cellular decisions or outcomes. We use the detailed understanding of the most active signaling networks within a tumor cell that we obtain from Network Biology to guide the design of targeted therapeutics that we believe will intervene and affect the activity of these networks.

As discussed above, a Critical Network Identification screen confirmed that one of these networks, the ErbB pathway, is a significant survival network utilized by tumor cells. This pathway is made up of four receptors: EGFR (ErbB1), ErbB2 (HER2), ErbB3 and ErbB4. Several currently approved therapies are directed at targets in the ErbB pathway. In particular, EGFR (ErbB1) and ErbB2 (HER2) have been the focus of modern pharmaceutical efforts due to their overexpression in many tumor cells relative to their expression in normal tissue. However, using Network Biology to understand the complex signaling dynamics that govern this pathway, our research suggested that ErbB3 is the most sensitive target. This was an unconventional conclusion because, in contrast to EGFR (ErbB1) and ErbB2 (HER2), ErbB3 does not have an active kinase domain, a common drug target. A kinase domain is part of an enzyme-like protein often involved in the activation or deactivation of other proteins. In addition, ErbB3 is not expressed in tumors at levels nearly as high as those seen with EGFR (ErbB1) and ErbB2 (HER2).

Thus, despite being aware of the existence of ErbB3, scientists largely ignored ErbB3 as a drug target prior to our research. In our research, we found that within the ErbB pathway, blocking ErbB3 had the largest impact on inhibiting the survival signal that perpetuates the growth of tumor cells addicted to this network. Our analysis assessed signal transmission and communication, which we believe is a more accurate measure of disease mechanism than simply examining the characteristics of different proteins, such as expression level or mutation status, in isolation.

Integrated medicines that provide a therapeutic and diagnostic to help guide treatment

Using Network Biology, we are incorporating the identification of biomarkers and the development of companion diagnostics into the drug development process. We believe that a companion diagnostic for a therapeutic agent should provide a precise molecular measurement of the nature of the tumor, rather than simply identifying the qualitative overexpression of a protein. We are also of the view that cancer continues to alter its means of growth and survival over time, often in response to the additional stress of drug treatments. As a result, we believe that frequent assessment of patients' cancers during treatment are helpful to gain insight into which resistance mechanism a cancer defers to once treatment has altered the tumor's mechanism of growth and survival.

Ultimately, we intend all of our oncology candidates to be integrated medicines consisting of:

- a therapeutic designed to work in tumors with a specific molecular profile;
- diagnostics that measure the biochemical and biophysical properties that characterize the molecular profiles of tumors; and
- analytical algorithms to translate quantitative diagnostic data into treatment information.

We are currently developing predictive tests for companion diagnostics to identify patient populations who would preferentially respond to our therapeutic product candidates. In our preclinical work, we have used predictive development, which involves modeling and simulation, in an effort to understand and eventually predict how a tumor cell will respond to treatment. For example, in designing our ErbB3 inhibitor, MM-121, we utilized predictive development to understand how blocking signaling through ErbB3 would impact cell growth in several tumor cell lines. We quantitatively measured the expression level of multiple biomarkers to predict the activity of MM-121 in specific xenograft models, which are human tumors that have been implanted in mice. Based on our simulations and biomarker analysis, we were able to successfully and accurately predict response to MM-121 using 20 different xenograft tumor models. We are now actively translating this predictive test into a companion diagnostic that can be paired with MM-121 for human treatment.

Our current diagnostic development efforts are focused on developing assays and algorithms that support a physician's determination of whether an individual therapeutic is appropriate for a given patient population. We intend to develop and commercialize future diagnostics that combine our research understanding across multiple cell signaling networks and in multiple tumors with varying biophysical characteristics to support physician treatment decisions for all classes of cancer therapeutics.

In another example of our application of the Network Biology systems modeling approach, we built a model of the biophysical characteristics of tumors to explore the variables most important to drug activity. The model examined the complex relationship between the pharmacokinetics of a drug and physical characteristics of a tumor, such as the nature of the vascularization, or blood vessel development, supporting a tumor's survival. The analysis demonstrated that the variability of the physical characteristics of the tumor had tremendous impact on the activity of the drug in treating the tumor. The analysis supports the insight of using our nanotherapeutics as a means to localize the activity of a drug by utilizing differences in vascularization between normal tissues and the tumor. Additionally, we attach antibodies to the outside of our nanotherapeutics to promote active transport of the nanotherapeutics into the cell. The model also led directly to our efforts to use our nanoliposome technology to diagnose the biophysical characteristics of a tumor as a means of guiding the choice of a therapeutic and the appropriate dose.

We believe that integrated medicines may enable physicians to deliver the right drug to the right set of patients at the right time. If we are successful, we may be able to:

- improve patient outcomes by providing improved therapeutics along with the diagnostic information to guide physician treatment decisions;
- reduce the overall costs of treating and caring for cancer patients; and

- provide a basis for seeking favorable reimbursement of approved drugs from payors because of the benefits to patients.

Network Biology's potential impact on the drug development process

In addition to improving patient care, we believe that Network Biology can increase the productivity of biomedical research, increase the probability of approval for new drugs and produce more precisely targeted therapeutics. We believe that our therapeutic oncology product candidates will have a greater probability of success than product candidates based on conventional drug development because Network Biology provides us with:

- a multidisciplinary, integrated approach to understanding complex biology;
- simulation and modeling capabilities that aid in the efficiency and productivity of development; and
- the capability to design and build a broad range of therapeutic product candidates without being limited to a particular drug design technology or target class.

A multidisciplinary, integrated approach to understanding complex biology

Network Biology incorporates biology, modeling, simulation and mathematics, which we use to build computational models of cell signaling pathways. This requires a focus on new types of data to understand the dynamic interactions that occur within biological systems. This biological data must be quantitative, kinetic and multiplexed to capture the breadth and depth of the parallel and often redundant signaling processes that occur within cells. We also use this approach to construct computational models that explain biophysical distribution of drugs, pharmacokinetics, which is the process by which a drug is absorbed, distributed and metabolized by the body, and pharmacodynamics, which is the biochemical and physiological effect of the drug on the body. Using our robust quantitative understanding of the complexity of cell signaling, we design drugs and drug combinations that we believe will effectively inhibit tumor growth and survival.

Simulation and modeling capabilities that aid in the efficiency and productivity of development

We believe that Network Biology improves our decision making throughout the research and development process by providing our scientists with tools to simulate hypotheses in computer models and then test these hypotheses in preclinical and clinical settings. This process provides a comprehensive view of the biological system that we are addressing and facilitates knowledge retention throughout the project. For example, as is the industry standard, preclinical development of our therapeutic product candidates includes testing our drugs in xenograft tumor models. However, our ability to model cell signaling pathways allows us to choose which xenograft tumor models we believe will be well suited for a particular program, as we did for both MM-121 and MM-111.

Another example of our use of simulation capabilities to identify novel biology and design a therapy is our product candidate MM-151. MM-151 is an oligoclonal antibody mixture directed at inhibiting EGFR (ErbB1) signaling. EGFR (ErbB1) is one of four cell surface receptors in the ErbB network. EGFR (ErbB1) is overexpressed in several types of solid tumors, including lung and colorectal cancer. Currently, there are several approved products that target EGFR (ErbB1).

Unfortunately, these therapies are limited in their efficacy because they have relatively low response rates in patients who overexpress EGFR (ErbB1). Further, even when they are effective, tumors often develop resistance. Our model of the ErbB network revealed that current drugs failed to account for a high degree of signal amplification downstream of EGFR (ErbB1). Only tumors with low amplification, even when EGFR (ErbB1) was overexpressed, were impacted by the current therapies. Moreover, we noted that the current therapies were only effective at blocking signaling when initiated by low affinity ligands that bind to EGFR (ErbB1). Noting the importance of understanding amplification and the role of high affinity ligands as a potential escape route for tumors, we sought to develop a comprehensive EGFR (ErbB1) inhibitor. Using the model, we identified key specifications of an optimal inhibitor and set about engineering MM-151.

We believe that our simulation and modeling capabilities enable us to:

- assess our product candidates within a broad range of biological conditions so that we can make informed judgments as to which indications to pursue;
- based on these judgments, select appropriate preclinical tests for the cost-effective and expeditious development of our product candidates; and
- initiate clinical development programs that are based on hypotheses validated in the preclinical setting.

The capability to design and build a broad range of therapeutic product candidates without being limited to a particular drug design technology or target class

We apply the insights about cell signaling dynamics that we gain from our Network Biology approach across a range of therapeutic technologies to design product candidates that we believe can be efficiently delivered to the selected molecular target. We believe that the best drugs for the oncology indications that are the initial focus of our business are targeted therapies that, in contrast with conventional chemotherapies, are highly selective for the molecular mechanisms that we are seeking to affect and, therefore, offer the potential for significant efficacy and safety benefits.

The breadth of our therapeutic design capabilities is shown by the five different designs of our five most advanced product candidates. These product candidates consist of a nanotherapeutic, a monoclonal antibody, a bispecific antibody designed to simultaneously bind to two different target cell surface receptors, an antibody-targeted nanotherapeutic and an oligoclonal antibody consisting of a mixture of three different antibodies. Each of these product candidates is designed with specific characteristics that we believe are well suited for the type of disease mechanism that we are targeting.

Application of Network Biology beyond cancer

We believe that our Network Biology approach is applicable to a broad range of therapeutic areas beyond cancer, including bone and joint conditions, infectious disease, inflammation, central nervous system disease and other areas of medicine with high unmet needs. While we may pursue some of these disease areas directly ourselves, because of the potential of very broad applicability of our Network Biology approach, our plan is to pursue many or all of these other areas through collaborations, licenses and other arrangements with third parties. As an

example, in 2010, we established Silver Creek Pharmaceuticals, Inc., or Silver Creek, to apply our Network Biology approach to the research, development and commercialization of pharmaceuticals in the regenerative medicine field. Silver Creek is now a majority-owned subsidiary of ours with the minority equity held by third party investors.

Our most advanced product candidates

The following table summarizes key information about our five most advanced therapeutic product candidates. All of these product candidates are designed for intravenous administration.

Program	Indication	Stage of development	Commercial rights
MM-398 (nanotherapeutic encapsulation of irinotecan)	Monotherapy in pancreatic	Phase 3 ongoing	Merrimack worldwide, except Taiwan
	MM-398 plus 5-FU and leucovorin in colorectal	Phase 2 ongoing	
	Monotherapy in colorectal	Phase 1 ongoing	
	Monotherapy in gastric	Phase 2 complete	
	Monotherapy in glioma	Phase 1 ongoing	
MM-121 (ErbB3 targeted monoclonal antibody)	MM-121 plus exemestane in hormone-sensitive breast	Phase 2 ongoing	Sanofi worldwide; Merrimack holds option to co-promote in United States
	MM-121 plus erlotinib in non-small cell lung	Phase 2 ongoing	
	Neoadjuvant MM-121 plus paclitaxel in ErbB2 (HER2) negative breast	Phase 2 ongoing	
	MM-121 plus paclitaxel in platinum resistant/refractory advanced ovarian	Phase 2 ongoing	
	MM-121 plus paclitaxel in ErbB2 (HER2) negative breast, ovarian and other gynecological	Phase 1 ongoing	
	MM-121 plus cetuximab and irinotecan in solid tumors	Phase 1 ongoing	
	MM-121 plus multiple anti-cancer therapies in solid tumors	Phase 1 ongoing	
	Solid tumors, monotherapy	Phase 1 ongoing	

Program	Indication	Stage of development	Commercial rights
MM-111 (ErbB3 and ErbB2 (HER2) targeted bispecific antibody)	MM-111 plus trastuzumab and paclitaxel in ErbB2 (HER2) positive breast	Phase 2 planned	Merrimack worldwide
	MM-111 plus lapatinib and letrozole in hormone receptor positive, ErbB2 (HER2) positive breast	Phase 2 planned	
	Monotherapy in ErbB2 (HER2) positive indications	Phase 1 ongoing	
	MM-111 plus trastuzumab in ErbB2 (HER2) positive breast	Phase 1 ongoing	
	Multi-arm combination therapy safety trial	Phase 1 ongoing	
MM-302 (ErbB2 (HER2) targeted nanotherapeutic encapsulation of doxorubicin)	Monotherapy in ErbB2 (HER2) positive breast	Phase 1 ongoing	Merrimack worldwide
MM-151 (EGFR (ErbB1) targeted oligoclonal antibody)	Monotherapy safety trial	Phase 1 ongoing	Merrimack worldwide

We are developing companion diagnostics for each of the above therapeutic candidates. We plan to file an Investigational Device Exemption, or IDE, with the FDA prior to initiating clinical trials of each of our *in vitro* companion diagnostics to validate their prospective use.

Cancer

The initial focus of our business is to apply our Network Biology approach to the development of therapeutics and companion diagnostics for the treatment of solid tumor cancers. Cancer is the second most common cause of death in the United States, exceeded only by heart disease. In the United States, cancer accounts for almost one of every four deaths. The National Institutes of Health estimates that the direct medical cost of cancer of all types, including solid tumors, in the United States in 2010 was more than $100 billion.

Solid tumor market

The following table sets forth information about the solid tumor cancers for which we are developing therapeutic product candidates and companion diagnostics. The U.S. annual incidence and five year relative survival rates are based on information from the American Cancer Society in 2011. Relative survival compares survival among cancer patients to that of people not diagnosed with cancer who are of the same age, race and sex. It represents the percentage of cancer patients who are alive after a designated time period relative to persons without cancer.

Tumor type	U.S. annual incidence	Five year relative survival rate	Selected marketed therapies
Pancreatic	44,030	6%	gemcitabine (Gemzar); erlotinib (Tarceva)
Colorectal	141,210	65%	oxaliplatin (Eloxatin); irinotecan (Camptosar); bevacizumab (Avastin); cetuximab (Erbitux); panitumumab (Vectibix)
Gastric	21,520	26%	capecitabine (Xeloda); trastuzumab (Herceptin)
Brain and other nervous system cancers	22,340	36%	temozolomide (Temodar); carmustine (BiCNU); polifeprosan 20 with carmustine implant (Gliadel); bevacizumab (Avastin)
Breast	230,480	89%	trastuzumab (Herceptin); docetaxel (Taxotere); paclitaxel (Taxol, Abraxane); capecitabine (Xeloda); anastrazole (Arimidex); letrozole (Femara); exemestane (Aromasin)
Lung and bronchus	221,130	16%	docetaxel (Taxotere); gemcitabine (Gemzar); pemetrexed (Alimta); gefitinib (Iressa); erlotinib (Tarceva); bevacizumab (Avastin); paclitaxel (Taxol)
Ovarian	21,990	46%	liposomal doxorubicin (Doxil)

In addition to the marketed therapies listed above, there are many generic chemotherapies and regimens commonly used to treat these cancers. Although the various marketed therapies and regimens provide benefits to some patients when given as monotherapies or in combination with other therapies, each has efficacy and adverse event limitations and none of them are successful in treating all patients. The level of morbidity and mortality from these cancers remains high.

Outcome measures

There are a number of standard efficacy endpoints that clinicians use to measure outcomes for clinical trials for cancer therapies. The following are explanations of the meanings of the various efficacy endpoints that we are using in our ongoing and planned clinical trials for our product candidates, as described in more detail below:

- Overall survival (OS): survival from the initiation of treatment.
- Complete response (CR): disappearance of all target lesions and non-target lesions.

- Pathologic complete response (pCR): complete response as determined by a pathologist and defined by the absence of any cancer cells in the tumor sample.
- Partial response (PR): overall tumor regression based on a decrease of at least 30% in the sum of measured tumor diameters with no new tumors.
- Progression free survival (PFS): time to tumor progression from the initiation of treatment based on an increase of at least 20% in the sum of measured tumor diameters with no new tumors.
- Progressive disease (PD): growth of at least 20% in the size of the tumor or spread of the tumor since beginning of treatment.
- Stable disease (SD): neither sufficient decrease in tumor size to qualify for partial response (PR) nor sufficient increase in tumor size to qualify for progressive disease (PD).
- Objective response rate (ORR): complete response (CR) rate plus partial response (PR) rate.
- Disease control rate (DCR): complete response (CR) rate plus partial response (PR) rate plus stable disease (SD) rate for a specified period of time, also known as clinical benefit rate.
- Duration of response: amount of time a patient shows an objective tumor response.

Adverse event grading

Clinicians typically classify adverse events observed in clinical trials of cancer therapies based on a standard grading system as follows:

- Grade 1—mild.
- Grade 2—moderate.
- Grade 3—severe.
- Grade 4—potentially life-threatening or disabling.
- Grade 5—death.

MM-398

Overview

MM-398 is a novel, stable nanotherapeutic encapsulation of the marketed chemotherapy drug irinotecan. MM-398 recently achieved its primary efficacy endpoints in two Phase 2 clinical trials, one in pancreatic cancer patients and one in gastric cancer patients. We are conducting a pivotal Phase 3 clinical trial of MM-398 for the treatment of patients with metastatic pancreatic cancer who have previously failed treatment with the chemotherapy drug gemcitabine (Gemzar). In July 2011, the FDA granted MM-398 orphan drug designation for the treatment of pancreatic cancer. In September 2011, the European Medicines Agency granted MM-398 orphan medicinal product designation for the treatment of pancreatic cancer. We are simultaneously working to develop an imaging agent that can be used as a companion diagnostic to identify the patient population likely to respond to treatment with MM-398. We plan to develop MM-398 for a range of other solid tumor indications, including colorectal cancer, lung cancer and glioma.

Gemcitabine is the current standard of care in the first-line treatment of metastatic pancreatic cancer. Multiple studies of gemcitabine published in peer reviewed medical journals in the first-line setting for this indication have shown median overall survival (OS) in the range of five to seven months, with median progression free survival (PFS) of two to four months and 12-month survival of approximately 20%.

There are currently no approved treatments for gemcitabine refractory metastatic pancreatic cancer, nor is there a consensus on standard of care treatment for such patients. A limited amount of data suggest that, absent additional therapies, metastatic pancreatic cancer patients who are refractory to gemcitabine on average can expect to live approximately two months. These patients currently receive chemotherapy combinations, usually containing one or more of gemcitabine, capecitabine (Xeloda), oxaliplatin (Eloxatin), fluorouracil, or 5-FU, or leucovorin.

There are a number of agents currently being tested in combination regimens as both first-line and second-line therapy for metastatic pancreatic cancer. In a recent Phase 3 clinical trial in first-line metastatic pancreatic cancer comparing gemcitabine with the regimen known as FOLFIRINOX, which is a combination of oxaliplatin, irinotecan, 5-FU and leucovorin, published in *The New England Journal of Medicine*, patients dosed with FOLFIRINOX showed a statistically significant increase in objective response rate (ORR) and overall survival (OS) compared to patients dosed with gemcitabine. However, the results in this trial suggested FOLFIRINOX is most appropriate for patients with good performance status, or general well-being, because of adverse events observed in the FOLFIRINOX group. Patients dosed with FOLFIRINOX showed statistically significant increases in grade 3 and grade 4 adverse events, including neutropenia, febrile neutropenia, thrombocytopenia, diarrhea and sensory neuropathy, compared to patients dosed with gemcitabine.

Design and potential advantages of MM-398

MM-398 is designed to stably retain and protect irinotecan while in circulation in the body and enable efficient accumulation of the drug in solid tumors. Our nanotherapeutics consist of lipidic particles, which are enclosed spheres of lipid membranes, and are designed to encapsulate active drug payloads. The encapsulated active agent of MM-398, irinotecan, is a well known and widely used chemotherapy. Irinotecan is a pro-drug of SN-38. SN-38 potently arrests cell growth by inhibiting topoisomerase 1, an enzyme involved in cell replication. Typically, free irinotecan is metabolized in the liver into SN-38, and from there SN-38 circulates throughout the body. Dosing with irinotecan, as with other chemotherapies, is limited by severe adverse effects that, in turn, limit efficacy. In addition, as with other chemotherapies, the efficacy of irinotecan is limited by tumor resistance mechanisms.

We believe that the nanotherapeutic encapsulation of irinotecan yields a number of favorable attributes that will lead to increased efficacy and fewer adverse events in comparison with free irinotecan.

- We believe that the encapsulation technology prevents the premature metabolism of the active drug and thereby reduces systemic exposure and increases the amount of active drug available to be delivered at the tumor site.

- The specific size and stability characteristics of MM-398 are designed to enable the preferential deposition of the drug within tumors relative to normal tissue. Specifically, we believe that, as a nanotherapeutic, MM-398 is able to utilize the enhanced permeability and retention, or EPR, effect to selectively enter, and subsequently be trapped in, tumors with leaky vasculature.

- MM-398 is designed for the irinotecan inside the molecule to be converted into SN-38 locally by tumor-resident macrophages, rather than being converted in the liver, as occurs with free irinotecan. We believe that MM-398 utilizes tumor macrophages to both break down the

nanotherapeutic and convert the irinotecan into SN-38 in the local tumor environment, thereby preventing tissues surrounding the tumor from blocking the access of SN-38 to the tumor, as occurs with traditional chemotherapies. Overall, the design of MM-398 is intended to increase the local concentration of active drug so as to improve its anti-tumor effects, especially for hard to treat tumors.

Clinical development of MM-398

We are pursuing two approaches in the ongoing clinical development of MM-398:

- *Replace irinotecan.* The FDA approved irinotecan as Camptosar in 1994 for use in colorectal cancer. Before losing patent coverage, worldwide sales of Camptosar exceeded $1.0 billion annually. In clinical practice, irinotecan is currently used as a monotherapy or combination therapy in multiple cancer indications, including pancreatic, colorectal, lung, ovarian, stomach, breast, leukemia, lymphoma and cervical cancers. One of our clinical development strategies is to replace the use of irinotecan with MM-398 by demonstrating that MM-398 has favorable efficacy and safety characteristics compared to irinotecan.

- *Expand into new indications.* Chemotherapies are widely used in the treatment of cancer in the neoadjuvant setting, in which the goal of treatment is to reduce the size of a tumor so that it can be completely removed by surgery or other means, through late stage cancer treatment. The use of chemotherapies is limited by severe adverse effects that, in turn, limit their efficacy. Our second clinical development strategy is to expand the use of MM-398 into indications for which irinotecan is currently not being used by demonstrating that MM-398 has favorable efficacy and safety characteristics compared to the current standard of care.

Prior to May 2011, our collaborator, PharmaEngine, Inc. or PharmaEngine, led the clinical development of MM-398 under the designation PEP02. In May 2011, we entered into an agreement with PharmaEngine through which we now hold the development and commercialization rights to MM-398 worldwide, other than in Taiwan. As a result, we expect that we or third party investigator sponsors will conduct all future clinical trials of MM-398, including the Phase 3 clinical trial of MM-398 for the treatment of metastatic pancreatic cancer.

Pancreatic cancer

Phase 3 clinical trial

We are conducting a randomized, open label, controlled, pivotal Phase 3 clinical trial of MM-398 in patients with metastatic pancreatic cancer who have previously failed treatment with gemcitabine. The trial is designed to compare the efficacy of MM-398 against the combination of 5-FU and leucovorin, which is one of the drug combinations that clinicians use to treat patients with metastatic pancreatic cancer who have failed treatment with gemcitabine. Patients will generally receive 120 mg/m^2 of MM-398 every three weeks. We expect this trial to enroll approximately 270 patients at approximately 90 sites in North America, South America, Europe, Asia and Africa. The primary efficacy endpoint of this trial is a statistically significant difference in overall survival (OS) between MM-398 and the combination of 5-FU and leucovorin, and the secondary endpoints include objective response rate (ORR) and progression free survival (PFS).

Phase 2 clinical trial

MM-398 is currently being evaluated in an open label, single arm Phase 2 clinical trial in 40 patients with metastatic pancreatic cancer who had previously failed treatment with gemcitabine. Patients receive 120 mg/m^2 of MM-398 every three weeks. This trial is being conducted at three sites, two in Taiwan and a third at the University of California, San Francisco, and has completed enrollment. The trial is being conducted by PharmaEngine. As of May 31, 2011, a total of seven patients in this trial were still alive and two of these patients were still undergoing treatment with MM-398.

The primary efficacy endpoint of this trial is the three month survival rate. The hypothesis of the clinical trial was that absent further therapies, 40% of these patients would survive three months. Success in the MM-398 Phase 2 clinical trial was defined as achieving a three month survival rate of 65%. The trial was successful as 75% of patients survived three months or longer. The secondary efficacy endpoints in this trial were objective response rate (ORR), progression free survival (PFS) and overall survival (OS). The objective response rate (ORR) was 7.5%, with three patients achieving a partial response (PR). The median progression free survival (PFS) was 9.6 weeks, and median overall survival (OS) was 22.4 weeks.

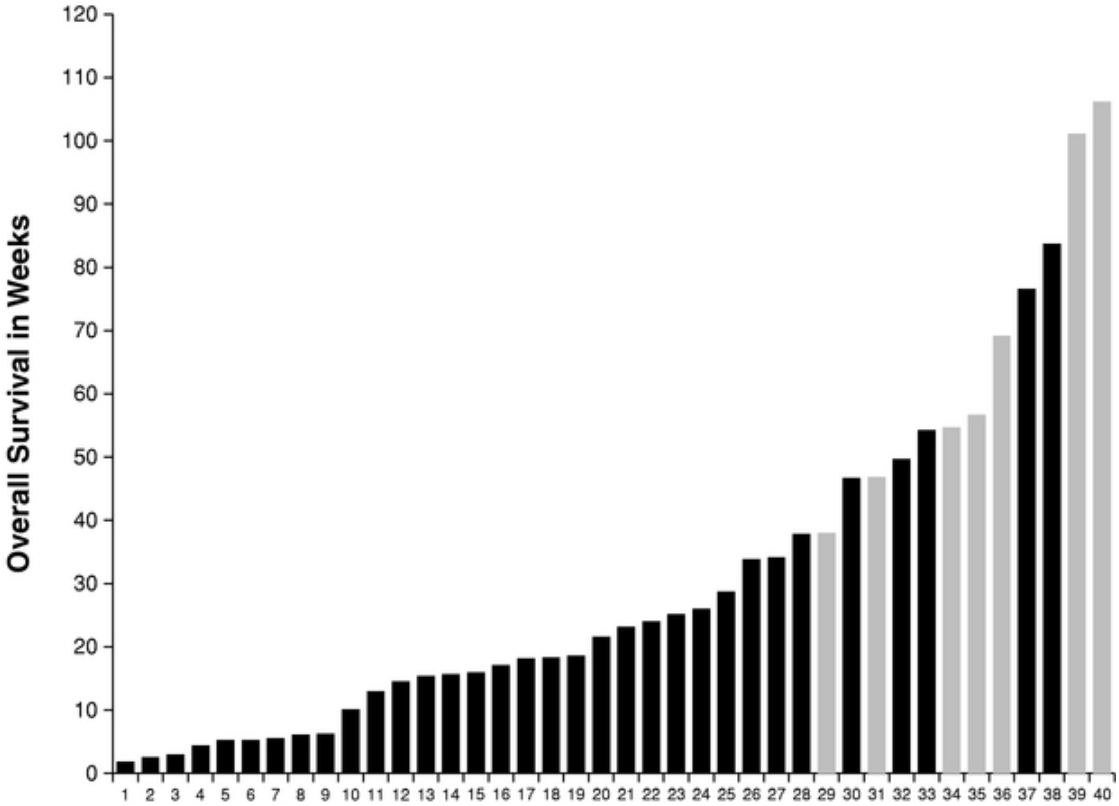
The trial had the following additional key highlights as of May 31, 2011:

- As shown in the waterfall plot below, 16 patients survived longer than six months and eight of those patients, or 20% overall, survived for greater than one year. In addition, two patients remained alive who had not yet reached the one year time point. Since May 31, 2011, both of these patients reached the one year time point, for a 25% one year survival rate. Gemcitabine was approved as a first-line treatment for pancreatic cancer based on a one year survival rate of 18%.

- Initially, one of the eight patients who survived one year had a tumor that was not able to be surgically removed. However, while receiving treatment with MM-398, the tumor shrank sufficiently that the patient could undergo surgery, and the tumor was surgically removed. As of May 31, 2011, this patient was still alive.

- Three patients achieved a partial response (PR) and 16 patients had stable disease (SD) at six weeks, resulting in a disease control rate (DCR) at six weeks of 47.5%.

The chart below shows the overall survival (OS) of each patient in this trial as of May 31, 2011. Each bar represents a different patient, and the height of the bar represents how long that patient survived. The black bars represent patients who have died, while the gray bars represent those who were still alive as of May 31, 2011.



The following table summarizes the grade 3 and grade 4 adverse events observed in this trial.

Adverse event	Patients (n = 40)
Neutropenia	12 (30.0%)
Leucopenia	9 (22.5%)
Anemia	6 (15.0%)
Diarrhea	3 (7.5%)
Fatigue	3 (7.5%)
Nausea	2 (5.0%)
Vomiting	2 (5.0%)
Thrombocytopenia	2 (5.0%)

Colorectal cancer

Phase 2 clinical trial

MM-398 is currently being evaluated in a randomized, open label Phase 2 clinical trial to compare the efficacy of FUPEP, which is a regimen of 5-FU, leucovorin and MM-398, to FOLFIRI, which is a regimen of 5-FU, leucovorin and irinotecan. The trial protocol calls for enrollment of

88 patients with second-line metastatic colorectal cancer. We are currently recruiting patients at approximately five sites in France. As of December 31, 2011, the trial had enrolled 16 patients. The primary efficacy endpoint of this trial is objective response rate (ORR). Secondary endpoints include progression free survival (PFS) and overall survival (OS). GERCOR, a cooperative research group of physicians based in France, is conducting this trial.

Phase 1 clinical trial

MM-398 is currently being evaluated in an open label, dose escalation Phase 1 clinical trial of MM-398 in patients with colorectal cancer who have previously failed treatment with the chemotherapy drug oxaliplatin. The trial has enrolled 18 patients, and recruitment is complete. The purpose of this trial is to assess safety and determine the maximum tolerated dose. The National Institute of Cancer Research, National Health Research Institutes in Taiwan is conducting this trial. MM-398 has been well tolerated at doses of 80 mg/m^2, 90 mg/m^2 and 100 mg/m^2 every two weeks in this trial. In addition, preliminary signs of anti-tumor activity were observed.

Gastric cancer

Phase 2 clinical trial

MM-398 was recently evaluated in a randomized, blinded Phase 2 clinical trial comparing the efficacy of MM-398 to each of irinotecan and docetaxel (Taxotere) in 132 patients with metastatic gastric or gastroesophageal junction adenocarcinoma who had failed one previous therapy. The patients were randomized into three groups of 44 patients each. Patients were dosed at 22 sites in six countries in Europe and Asia. Patients were randomized to receive 120 mg/m^2 of MM-398 every three weeks, 300 mg/m^2 of irinotecan every three weeks or 75 mg/m^2 of docetaxel every three weeks.

The primary efficacy endpoint of this trial was objective response rate (ORR). Success was prospectively defined as five or more patients in an arm achieving a complete or partial response. MM-398 (six patients) and docetaxel (seven patients) met the primary endpoint, but free irinotecan did not. The secondary efficacy endpoints were disease control rate (DCR), progression free survival (PFS) and overall survival (OS). The following table summarizes the efficacy data for this trial.

Response	MM-398 (n=44)	Irinotecan (n=44)	Docetaxel (n=44)
ORR	6 (13.6%)	3 (6.8%)	7 (15.9%)
DCR at six weeks	27 (61.4%)	27 (61.4%)	24 (54.6%)
Median PFS (days)	81	79.5	82
Median OS (days)	218	235	219

The following tables summarize the grade 3 and grade 4 adverse events observed in this trial.

Adverse event	MM-398 (n=44)	Irinotecan (n=44)	Docetaxel (n=44)
Hematological			
Neutropenia	5 (11.4%)	7 (15.9%)	7 (15.9%)
Febrile Neutropenia	3 (6.8%)	5 (11.3%)	2 (4.6%)
Anemia	2 (4.5%)	2 (4.5%)	3 (6.8%)
Thrombocytopenia	1 (2.3%)	1 (2.3%)	0 (0.0%)
Non-hematological			
Diarrhea	12 (27.3%)	8 (18.2%)	1 (2.3%)
Nausea	5 (11.4%)	2 (4.6%)	0 (0.0%)
Vomiting	2 (4.6%)	6 (13.6%)	3 (6.8%)
Anorexia	3 (6.8%)	3 (6.8%)	0 (0.0%)
Fatigue	2 (4.6%)	1 (2.3%)	1 (2.3%)

In addition to the data shown above, we performed a subgroup analysis on the MM-398 group based on the two different dose levels that patients received. 39 of the 44 patients who received MM-398 were treated at 120 mg/m^2. The remaining five patients were treated at 150 mg/m^2. As summarized in the following table, patients at the higher dose showed better outcomes with respect to both the primary and secondary endpoints.

Response	Dose 120 mg/m^2 (n=39)	Dose 150 mg/m^2 (n=5)	Total (n=44)
ORR	3 (7.7%)	3 (60.0%)	6 (13.6%)
DCR	22 (56.4%)	5 (100.0%)	27 (61.4%)
Median PFS (days)	77	181	81
Median OS (days)	181	235	218

The following table summarizes the grade 3 and grade 4 adverse events observed in these subgroups.

Adverse event	Dose 120 mg/m^2 (n=39)	Dose 150 mg/m^2 (n=5)	Total (n=44)
Hematological			
Neutropenia	5 (12.8%)	0 (0.0%)	5 (11.4%)
Febrile Neutropenia	3 (7.7%)	0 (0.0%)	3 (6.8%)
Anemia	0 (0.0%)	2 (40.0%)	2 (4.5%)
Thrombocytopenia	0 (0/0%)	1 (20.0%)	1 (2.3%)
Non-hematological			
Diarrhea	11 (28.2%)	1 (20.0%)	12 (27.3%)
Nausea	5 (12.8%)	0 (0.0%)	5 (11.4%)
Vomiting	2 (5.1%)	0 (0.0%)	2 (4.6%)
Anorexia	3 (7.7%)	0 (0.0%)	3 (6.8%)
Fatigue	2 (5.1%)	0 (0.0%)	2 (4.6%)

Initial Phase 1 clinical trials

Several additional Phase 1 clinical trials of MM-398 have been conducted or are ongoing to evaluate safety and determine dosing for Phase 2 clinical trials of MM-398. Key findings from these trials include the following:

- In a multi-center, open label dose escalation trial of MM-398 as a monotherapy at 60 mg/m^2, 120 mg/m^2 and 180 mg/m^2 every three weeks in 11 patients with advanced solid tumors, MM-398 exhibited a sustained release profile and longer circulation time in the blood than free irinotecan, based on a comparison of pharmacokinetic data from this trial and the product label for irinotecan. In addition, systemic exposure to irinotecan released by MM-398 was negligible across the range of doses tested, indicating that most MM-398 was present as the encapsulated form in the plasma and that leakage of irinotecan was minimal during circulation.

- In a multi-center, open label dose escalation trial of MM-398 at 60 mg/m^2, 80 mg/m^2, 100 mg/m^2 and 120 mg/m^2 every three weeks in combination with 5-FU and leucovorin in 16 advanced solid tumor patients, MM-398 exhibited a longer circulation time in the blood than free irinotecan, based on a comparison of pharmacokinetic data from this trial and the product label for irinotecan.

- In an ongoing investigator sponsored, open label, dose escalation Phase 1 clinical trial of MM-398 in patients with glioma being conducted at the University of California, San Francisco, MM-398 has been well tolerated at doses of up to 180 mg/m^2 every three weeks by patients within a subgroup defined by the presence of a specific genetic marker of irinotecan metabolism.

Companion diagnostic development

We believe that deposition of MM-398 in the tumor is important to efficacy. We are developing an *in vivo* liposome-based imaging agent to measure deposition in the tumor in an effort to exclude those patients whose tumors are unlikely to respond to MM-398 treatment. We are currently evaluating in preclinical testing nanotherapeutic formulations of various agents imaged by PET scan and other modalities to assess the potential for measuring significant deposition. We are also investigating functional *in vitro* biomarkers that we believe may be predictive of efficacy in poorly vascularized tumors, such as pancreatic cancer.

MM-121

Overview

MM-121 is a fully human monoclonal antibody that targets the ErbB3 cell surface receptor. We are currently evaluating MM-121 in multiple Phase 1 and Phase 2 clinical trials in combination with chemotherapies and other targeted therapies. We believe that MM-121 was the first ErbB3 inhibitor to enter clinical development. We are developing a companion diagnostic based on a five biomarker assay to determine whether a tumor is dependent on ErbB3 signaling and amenable to treatment with MM-121. We are testing this assay in our ongoing MM-121 clinical trial program. We have established a worldwide collaboration with Sanofi for the development and commercialization of MM-121. We are developing MM-121 for a wide range of solid tumor indications, including lung, ovarian and breast cancers.

Design and potential advantages of MM-121

We identified the importance of ErbB3 through Network Biology. Our research recognized the previously unappreciated role of ErbB3 as being critical in combinatorial ligand-induced activation of the ErbB pathway, which can lead to tumor cell growth and survival.

In designing MM-121, we:

- generated a human antibody antagonist as opposed to another type of therapeutic because the ErbB3 receptor does not have an active kinase domain and therefore ErbB3 signaling cannot be blocked by a small molecule kinase inhibitor;
- generated a human antibody that binds to a specific portion of the ErbB3 molecule so as to block the binding of ErbB3's activating ligand, known as heregulin, and inhibit growth and survival signaling;
- designed the antibody to inhibit ErbB3-induced activation by ligands other than heregulin by blocking the ability of ErbB3 to pair with other receptors and become activated by them;
- designed MM-121 to cause the ErbB3 receptor to be internalized into the tumor cell so that it is no longer available for the signaling process that can drive cancer growth and survival; and
- designed MM-121 as a specific type of antibody, called an IgG2, that minimizes immune activation that can cause off-target adverse events.

Based on the central role of ErbB3 in cancer growth and survival, we believe that MM-121 potentially is applicable to a broad range of tumors, including lung, prostate, breast, ovarian and pancreatic cancers. Our preliminary study of several hundred tumors suggests that MM-121 may be able to target ErbB3 signaling occurring in 30% or more of cancer patients with these types of tumors.

Our research suggests that ErbB3 is associated with the development of resistance to other therapies. Therefore, we believe that MM-121 may be especially effective when given in combination with chemotherapies and other targeted therapies and potentially offers the following advantages compared to existing therapies:

- the ability to synergistically or additively attack tumor growth, based on our preclinical research involving a broad range of combination therapies;
- the ability to delay the development of resistance to other agents, based on our research demonstrating that ErbB3 signaling is upregulated in response to treatment with other therapies; and
- the ability to restore sensitivity to drugs, based on analyses of MM-121 in several cell types and xenograft models that are resistant to targeted therapies or chemotherapies.

Clinical development of MM-121

We and Sanofi are conducting a broad clinical program to test MM-121 in combination with a range of other therapies across a wide spectrum of solid tumor patient populations. The goal of this program is to explore the effect and efficacy of MM-121 in combination with other targeted ErbB agents, such as erlotinib (Tarceva), and chemotherapies, such as paclitaxel (Taxol).

We plan to assess whether efficacy is improved by measuring the ability of various MM-121 combinations to enhance anti-tumor activity or to delay resistance or restore sensitivity to the other therapies.

Phase 2 clinical trial of MM-121 in combination with exemestane for hormone-sensitive breast cancer

We are currently conducting a randomized, double blind Phase 2 clinical trial to compare the efficacy of MM-121 in combination with exemestane (Aromasin) to exemestane alone. Exemestane is a widely used aromatase inhibitor for the treatment of breast cancer. Aromatase is an enzyme implicated in breast cancer. The trial protocol calls for enrollment of 130 postmenopausal women with metastatic hormone-sensitive breast cancer who have tested negative for overexpression of ErbB2 (HER2) and who have previously failed treatment with an aromatase inhibitor or other anti-estrogen therapy. We are conducting this trial at multiple sites in North America and Europe. The primary efficacy endpoint of this trial is progression free survival (PFS). Secondary endpoints are overall survival (OS), objective response rate (ORR), duration of response and disease control rate (DCR).

Phase 1/2 clinical trial of MM-121 in combination with erlotinib for non-small cell lung cancer

We are currently conducting a Phase 1/2 clinical trial of MM-121 in patients with metastatic non-small cell lung cancer, or NSCLC. The Phase 1 portion of the trial is an open label, dose escalation study in which successive groups of patients will be enrolled. The purpose of the Phase 1 portion of the trial is to assess the safety of MM-121 in combination with erlotinib and determine the optimal dose and dosing schedule of this combination for the Phase 2 portion of the trial. Erlotinib is a marketed small molecule directed at EGFR (ErbB1). Enrollment in the Phase 1 portion of the trial is complete.

We are also currently conducting the Phase 2 portion of the trial, which involves testing three separate hypotheses in three different populations of NSCLC patients, at multiple sites in North America, Europe and Asia. The Phase 2 portion of the trial is an open label study in which we plan to enroll approximately 229 patients in parallel across the three different patient populations. The primary efficacy endpoint of the Phase 2 portion of the trial is progression free survival (PFS). The three populations of NSCLC patients to be included in the study are:

- Group A: patients whose tumors do not have an EGFR (ErbB1) activating mutation, whose cancer has recurred or progressed following at least one chemotherapy-containing regimen and who have not received prior EGFR (ERbB1) targeted therapy will be randomized to receive either MM-121 in combination with erlotinib or erlotinib alone;

- Group B: patients whose tumors have an EGFR (ErbB1) activating mutation and who have not received prior EGFR (ErbB1) targeted therapy will be randomized to receive either MM-121 in combination with erlotinib or erlotinib alone; and

- Group C: patients whose tumors had responded to EGFR (ErbB1) targeted therapy and subsequently acquired resistance will receive MM-121 in combination with erlotinib.

Phase 2 clinical trial of neoadjuvant MM-121 in combination with paclitaxel for ErbB2 (HER2) negative breast cancer

We are currently conducting a randomized, open label Phase 2 clinical trial of neoadjuvant MM-121 in combination with paclitaxel, an established chemotherapy, in patients with ErbB2 (HER2) negative breast cancer. We expect to enroll patients in this trial at approximately 35 to 40 sites in North America. The primary efficacy endpoint of this trial is pathologic complete response (pCR) rate at time of surgery. We expect this trial to enroll approximately 200 patients in parallel across the following two populations of neoadjuvant ErbB2 (HER2) negative breast cancer patients:

- Group A: patients whose tumors are estrogen receptor, or ER, positive and ErbB2 (HER2) negative and have not undergone prior treatment or surgery; and

- Group B: patients whose tumors are ER negative, ErbB2 (HER2) negative and progesterone receptor negative, often referred to as triple negative breast cancer, and have not undergone prior treatment or surgery.

Each population of patients is being randomized at a two to one ratio to receive either MM-121 in combination with paclitaxel or paclitaxel alone. Following treatment, patients will receive standard treatment with doxorubicin and cyclophosphamide, two marketed chemotherapies, and monitored until the surgical resection.

Phase 2 clinical trial of MM-121 in combination with paclitaxel for platinum resistant or refractory advanced ovarian cancer

We are currently screening patients and preparing to dose the first patient in a randomized, open label Phase 2 clinical trial of MM-121 in combination with paclitaxel in patients with advanced ovarian cancer who are resistant or refractory to treatment with platinum-based chemotherapies, which are frequently used to treat ovarian cancer. We expect this trial to enroll up to 210 patients at multiple sites in North America and Europe. The primary efficacy endpoint of this trial is progression free survival (PFS). The secondary endpoints include overall survival (OS), objective response rate (ORR) and duration of response.

Phase 1 clinical trial of MM-121 in combination with paclitaxel for ErbB2 (HER2) negative breast cancer and gynecological cancers

We are currently conducting an open label, dose escalation Phase 1 clinical trial of MM-121 in combination with paclitaxel in patients with the following cancers:

- advanced ovarian and other gynecological cancers; or

- metastatic ErbB2 (HER2) negative breast cancer.

We are conducting this trial at multiple sites in the United States. The purpose of the trial is to assess the safety of MM-121 in combination with paclitaxel, determine the recommended dose for a subsequent Phase 2 clinical trial and evaluate the potential utility of the predictive biomarkers for MM-121. There are two cohorts of patients in this trial who receive different loading and ongoing doses of MM-121 during the trial.

Phase 1 clinical trial of MM-121 in combination with cetuximab and irinotecan for multiple solid tumor types

We are currently conducting an open label, dose escalation Phase 1 clinical trial of MM-121 in combination with cetuximab and irinotecan in patients with the following cancers:

- advanced colorectal cancer;
- squamous cell head and neck cancer;
- non-small cell lung cancer;
- triple negative breast cancer; or
- other types of solid tumors that depend on EGFR (ErbB1) activity.

We are conducting this trial at multiple sites in the United States. The purpose of the trial is to assess the safety and pharmacokinetics of MM-121 in combination with cetuximab and MM-121 in combination with cetuximab and irinotecan.

Phase 1 clinical trial of MM-121 in combination with multiple anti-cancer therapies for advanced solid tumor types

We are currently conducting an open label, dose escalation Phase 1 clinical trial of MM-121 in combination with one of multiple standard anti-cancer therapies. We are conducting this trial at multiple sites in North America and the European Union. The purpose of this trial is to evaluate the safety and pharmacokinetics of MM-121 in patients with advanced solid tumors when administered in combination with each separate anti-cancer therapy.

Phase 1 clinical trial

We have completed an open label, dose escalation Phase 1 clinical trial of MM-121 in 25 patients with advanced tumors that were refractory to other treatments. The purpose of this trial was to study the safety and pharmacokinetic properties, determine the maximum tolerated dose and evaluate the effect of MM-121 on tumor growth. There were six successive cohorts of three to six patients each in this trial. Each cohort received different weekly doses of MM-121 that increased after each cohort. In the last cohort, a dosing regimen known as a loading dose regimen was tested in which the first dose received was higher than subsequent weekly dosing. We did not identify a maximum tolerated dose in this trial.

We are currently enrolling 20 to 30 patients in an open label, expansion cohort of this trial to further characterize safety and explore clinical biomarkers. Patients in the expansion cohort are biopsied before and after dosing. This trial is focused on enrolling patients with ErbB2 (HER2) negative breast cancer, ovarian cancer and other tumor types in which the ErbB3 pathway may play an important role. As of December 31, 2010, we had enrolled 13 patients in this expansion

cohort. The following table summarizes the grade 3 and grade 4 adverse events observed in the dose escalation and expansion phases of this trial as of December 31, 2010.

Adverse event	Patients (n = 38)
Fatigue	4 (10.5%)
Nausea	1 (2.6%)
Vomiting	1 (2.6%)

In the dose escalation portion of this trial, five of 25 patients (20%) achieved a clinical benefit, as demonstrated by stable disease (SD), partial response (PR) or complete response (CR). In the expansion portion of this trial, four of 13 patients (29%) enrolled as of December 31, 2010 had stable disease (SD) for eight weeks or longer.

Planned clinical trials

We plan to initiate additional clinical trials of MM-121 in a range of other solid tumor indications both as a monotherapy and in combination with other treatments.

Preclinical development of MM-121

We have conducted a comprehensive program of preclinical testing of MM-121, including several *in vitro* analyses and *in vivo* xenograft studies. Key findings from this preclinical program include the following:

- Administration of MM-121 resulted in dose-dependent growth inhibition in a broad range of cancer xenograft models, including those of lung, ovarian, breast, prostate and renal cancer.

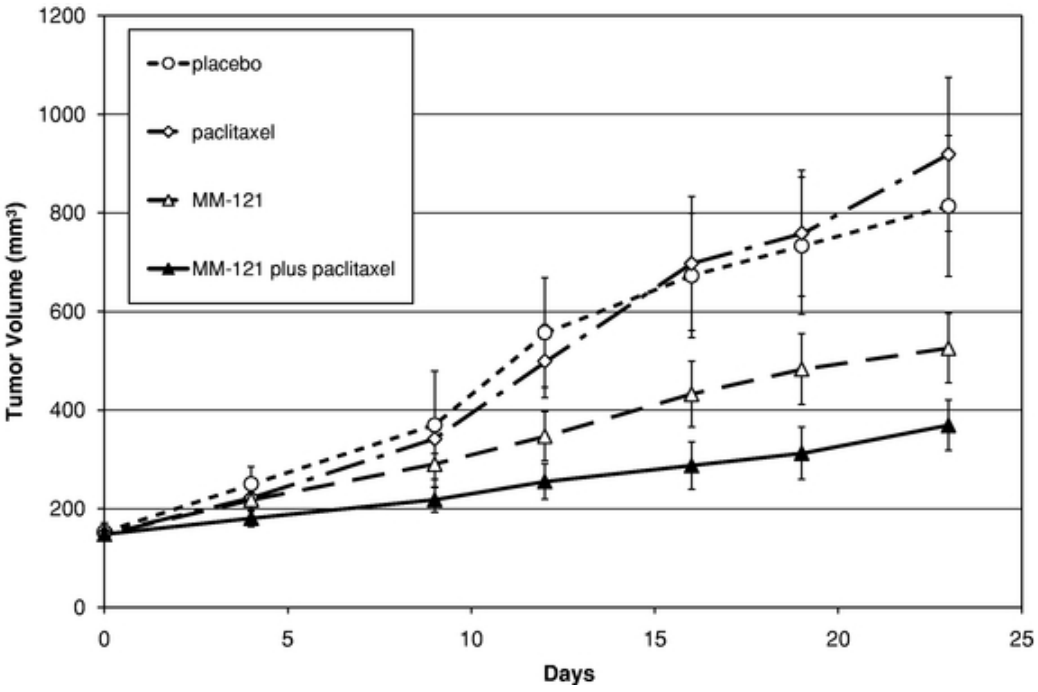
- MM-121 demonstrated synergistic or additive effects when combined with a number of other therapies, including both chemotherapies and other targeted therapies, as reflected in the graphs below.

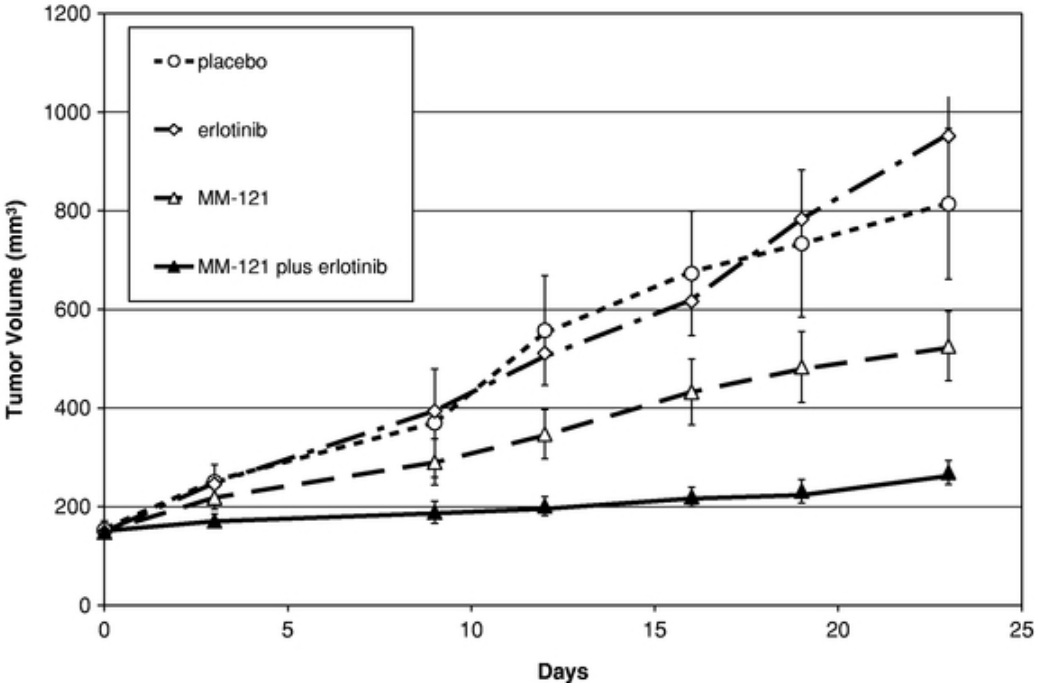
The figures below show the ability of MM-121 in preclinical testing to restore sensitivity to both chemotherapies and other targeted therapies and to achieve a synergistic improvement in activity when used in combination with those therapies. The figures summarize experiments in which we implanted human tumor cells into mice and measured how the growth of tumors was affected over time in response to different treatment regimens.

In the first figure, mice were implanted with A549 human lung cancer cells, and the tumors were allowed to grow. Seven mice in each of four groups were then treated with placebo, paclitaxel, MM-121 or a combination of MM-121 and paclitaxel. The A549 lung cancer tumors are generally resistant to treatment with paclitaxel, which is confirmed by the lack of activity demonstrated by treatment with paclitaxel alone. Treatment with MM-121 inhibited growth of the tumors. Importantly, when MM-121 and paclitaxel were administered in combination, there was an additional inhibition of xenograft growth, indicating that treatment with MM-121 sensitized the xenograft to treatment with paclitaxel and resulted in a synergistic inhibition of the growth of the xenograft.

In the second figure, a similar experiment was conducted in A549 human lung cancer cells. Seven mice in each of four groups were implanted with A549 cells, and the tumors were allowed to grow. Mice were then treated with placebo, erlotinib, MM-121 or a combination of

MM-121 and erlotinib. The A549 lung cancer tumors are also generally resistant to treatment with erlotinib, which is confirmed by the lack of activity demonstrated by treatment with erlotinib alone. Treatment with MM-121 inhibited growth of the tumors. Importantly, when MM-121 and erlotinib were administered in combination, there was an additional inhibition of xenograft growth, indicating that treatment with MM-121 sensitized the xenograft to treatment with erlotinib and resulted in a synergistic inhibition of the growth of the tumors.





Companion diagnostic development

Using our Network Biology approach, we derived a predictive biomarker profile that identifies tumors that are responsive to MM-121 in animal models. This test measures the levels of five proteins involved in the ErbB pathway and predicts the activated state of ErbB3 and, therefore, the potential responsiveness of the tumor to MM-121 based on those levels. Using this approach, we have been able to successfully predict whether a tumor in a preclinical xenograft study will respond to MM-121. We now plan to investigate whether and at what levels these biomarkers can predict MM-121 response in human tumor samples. As part of our ongoing clinical development of MM-121, we are taking biopsies from patients in order to measure levels of biomarkers in the tumors treated with MM-121.

MM-111

Overview

MM-111 is a bispecific antibody designed to target cancer cells that overexpress the ErbB2 (HER2) cell surface receptor, which are also referred to as ErbB2 (HER2) positive, in order to inhibit ErbB3 cell growth signaling. Bispecific antibodies are antibodies designed to simultaneously bind to two different target cell surface proteins or receptors. In the case of MM-111, these targets are the ErbB2 (HER2) receptor and the ErbB3 receptor. We are currently evaluating MM-111 in three Phase 1 clinical trials. We are working to develop a companion diagnostic based on a multiple biomarker assay to identify patient populations likely to respond to treatment with MM-111. This diagnostic is in preclinical development. We are developing MM-111 for a wide range of solid tumors, including breast, gastric, ovarian and bladder cancers.

Design and potential advantages of MM-111

MM-111 is designed to inhibit growth and survival signaling through ErbB3 in cancer cells characterized by high levels of ErbB2 (HER2). The complex of ErbB2, ErbB3 and its ligand, heregulin, promotes tumor growth in ErbB2 (HER2) positive cancer cells. MM-111 consists of a targeting arm that binds to ErbB2 (HER2) and a therapeutic arm that binds to ErbB3. The ErbB3 arm is designed to disrupt the ErbB2/ErbB3/heregulin complex and therefore inhibit tumor cell growth and survival.

Based on our preclinical research, we believe that MM-111 may offer the following advantages compared to existing treatments:

- In patients with ErbB2 (HER2) positive cancers, we believe that the bispecific design of MM-111 more effectively inhibits ErbB3 than combinations of separate ErbB2 (HER2) and ErbB3 targeted antibodies. Multiple published studies indicate that the affinity of heregulin for the ErbB2/ErbB3 receptor complex on ErbB2 (HER2) positive tumor cells is very high. Our research suggests that this makes it difficult to inhibit signaling with single drugs or combinations. MM-111 is designed to utilize an ErbB2 (HER2) targeting arm to greatly increase the local concentration of the ErbB3 therapeutic arm on the surface of ErbB2 (HER2) positive tumor cells, thus enabling the molecule to disrupt the high affinity complex and inhibit signaling.

- We believe that MM-111 may be particularly effective in combination with both ErbB2 (HER2) targeted and conventional chemotherapies, as MM-111 may be able to enhance

anti-tumor activity, delay the development of resistance to other agents and restore sensitivity to drugs to which a tumor has become resistant.

- In breast cancer and additional tumor types, such as gastric and ovarian cancer, we believe that MM-111 may be effective in patients whose tumors express ErbB2 (HER2) at lower levels than those needed for currently marketed ErbB2 (HER2) targeted agents that inhibit the ErbB2 (HER2) receptor directly.

- We believe that MM-111 will have a more favorable safety profile than currently marketed ErbB2 (HER2) targeting agents because it is not designed to block ErbB2 (HER2) cell signaling, which is associated with cardiac adverse events.

Clinical development of MM-111

We have initiated a clinical program to evaluate MM-111 as a monotherapy and in combination with trastuzumab, with and without conventional chemotherapy, across traditional ErbB2 (HER2) positive solid tumors. We are evaluating MM-111 for the treatment of breast and gastric cancer, for which ErbB2 (HER2) directed agents are currently approved, in addition to ErbB2 (HER2) positive solid tumors for which there are no approved therapies, such as bladder cancer.

The goal of this program is to evaluate the added benefit of combining MM-111 with targeted ErbB2 (HER2) agents, such as trastuzumab (Herceptin) and lapatinib (Tykerb), and conventional chemotherapies, such as paclitaxel, capecitabine and cisplatin. We plan to assess whether clinical benefit is improved by evaluating the ability of MM-111 to delay resistance or restore the sensitivity of other therapeutics. We have designed this clinical program to provide us with information about MM-111 for use in treating both traditional ErbB2 (HER2) positive cancers and solid tumors in which lower levels of ErbB2 (HER2) expression is known to occur but for which ErbB2 (HER2) directed agents are not currently clinically used.

We are currently planning a number of Phase 2 clinical trials of MM-111, including MM-111 in combination with trastuzumab and paclitaxel in advanced ErbB2 (HER2) positive breast cancer and MM-111 in combination with lapatinib and letrozole in advanced metastatic hormone receptor positive, ErbB2 (HER2) positive breast cancer. Subject to completing our ongoing Phase 1 clinical trials of MM-111, we plan to initiate both of these Phase 2 clinical trials in 2012.

We are also currently conducting three Phase 1 clinical trials of MM-111 as described below. Based on data from these Phase 1 clinical trials, we expect to identify the recommended combinations of therapies and doses for additional future Phase 2 clinical development of MM-111 in ErbB2 (HER2) positive cancers.

Phase 1 clinical trial of MM-111 in advanced, refractory ErbB2 (HER2) positive cancers

We are currently conducting an open label, dose escalation Phase 1 clinical trial of MM-111 in patients with ErbB2 (HER2) positive solid tumors. The trial protocol calls for enrollment of patients with any solid tumor type. We are conducting this trial at approximately four sites in the United States. The purpose of this trial is to assess the safety and clinical activity of MM-111 and evaluate other exploratory endpoints.

We have designed the trial to determine the maximum tolerated dose or the maximum feasible dose of MM-111, and any dose limiting adverse events. We also designed the trial to assess objective response rate (ORR) and progression free survival (PFS). As of December 31, 2011, we had enrolled and dosed 19 patients in this trial.

Phase 1 clinical trial of MM-111 in combination with trastuzumab for advanced refractory ErbB2 (HER2) positive breast cancer

We are currently conducting an open label, dose escalation Phase 1 clinical trial of MM-111 in patients with ErbB2 (HER2) positive breast cancer. The purpose of the trial is to assess the safety of MM-111 in combination with trastuzumab and determine the optimal dose and dosing schedule of this combination. Trastuzumab is an approved therapy directed at ErbB2 (HER2) positive cancer cells. We are conducting this trial at approximately three sites in the United States. We plan to enroll up to 24 patients in the trial. As of December 31, 2011, we had enrolled and dosed 15 patients in this trial.

Phase 1 clinical trial of MM-111 in combination with multiple treatments for ErbB2 (HER2) positive solid tumors

We are conducting an open label, dose escalation Phase 1 clinical trial of MM-111 in patients with advanced ErbB2 (HER2) positive solid tumors. The trial protocol calls for enrollment of up to approximately 36 patients. We are conducting this trial at approximately 14 sites in the United States. The purpose of the trial is to determine the maximum tolerated dose and any dose limiting adverse events of MM-111 in combination with multiple treatment regimens. The trial includes four combination therapies with MM-111:

- cisplatin, capecitibane and trastuzumab;
- lapatinib and trastuzumab;
- lapatinib and letrozole at the discretion of the investigator in hormone receptor positive patients; and
- paclitaxel and trastuzumab.

This trial also will assess the pharmacokinetics of MM-111 with each combination, safety and tolerability of each combination and the anti-tumor activity of each combination as indicated by objective response rate (ORR), duration of response and progression free survival (PFS). Exploratory endpoints include an analysis of serum and tissue markers and their correlation with anti-tumor activity. As of December 31, 2011, we had enrolled and dosed 29 patients in this trial.

Preclinical development of MM-111

We have conducted a comprehensive program of preclinical testing of MM-111, including several *in vitro* analyses and *in vivo* xenograft studies. Key findings from this preclinical program include the following:

- MM-111 was active in several ErbB2 (HER2) positive xenograft models, including breast, lung and gastric cancer. Tumor size was reduced in all tumor types.
- In cell-based and animal model tests, the anti-proliferative activity of MM-111 resulted in a tumor shrinkage that positively correlated with ErbB2 (HER2) expression levels. MM-111 had

a synergistic effect on the inhibition of tumor growth in a breast cancer xenograft model when combined with trastuzumab or lapatinib. We believe these data suggest a potential benefit of adding MM-111 to existing agents that target ErbB2 (HER2) and have marginal activity as monotherapies in ErbB2 (HER2) positive disease.

- In cell-based and animal model tests, the combination of MM-111 with anti-estrogen therapy showed superior activity to either drug as a monotherapy, indicating the potential for a combination of MM-111 with endocrine therapies to overcome acquired resistance to endocrine therapies in ER positive, ErbB2 (HER2) positive breast cancer patients. For example, in an estrogen-stimulated, estrogen positive and ErbB2 (HER2) positive breast cancer cell assay, MM-111 as a monotherapy showed growth inhibitory effects similar to the anti-estrogen drugs tamoxifen and fulvestrant. In the presence of heregulin, MM-111 maintained its growth inhibitory activity. In contrast, the inhibitory effect of tamoxifen and fulvestrant was diminished in the presence of heregulin. This suggests that activation of ErbB3 may confer tumor cell resistance to anti-estrogen therapies.

Companion diagnostic development

We are working to develop a diagnostic tool that will allow rapid identification of patients likely to respond to treatment with MM-111 based on their expression levels of ErbB2 (HER2), ErbB3, heregulin and other factors that we anticipate identifying from ongoing clinical trials. Our goal is to develop a diagnostic tool that offers significant improvement over the qualitative tests that are currently used to identify potentially responsive patients based on ErbB2 (HER2) overexpression alone.

The current focus of this program is the development of quantitative assays to assess ErbB2 (HER2), ErbB3 and heregulin levels in archived and pretreatment patient biopsies from our clinical trials to generate data to support our biomarker hypotheses. We are also evaluating other potential biomarkers through collaborative work with a third party.

MM-302

Overview

MM-302 is a nanotherapeutic encapsulation of doxorubicin with attached antibodies that target ErbB2 (HER2). We are conducting a Phase 1 clinical trial of MM-302 in patients with advanced ErbB2 (HER2) positive breast cancer. We are designing a companion diagnostic for MM-302 to predict which patients have tumors that will exhibit high uptake of MM-302. We are initially pursuing development of MM-302 as a therapy for metastatic breast cancer that is refractory to other therapies. We also plan to pursue the use of MM-302 as an earlier line of therapy in the adjuvant setting, which means use in conjunction with radiotherapy or surgery, and the neoadjuvant setting. In addition, we plan to pursue the use of MM-302 as a therapy for other ErbB2 (HER2) positive tumors.

Doxorubicin is a marketed chemotherapy that is a member of the anthracycline class of chemotherapies. The addition of anthracyclines to the treatment of both solid and liquid tumors has historically improved outcomes for patients. Specifically, anthracyclines have served as the backbone of breast cancer therapy for decades. Free doxorubicin is currently approved and used in adjuvant and neoadjuvant breast cancer alone and in combination with other chemotherapies and targeted agents. Consistent clinical benefit has been observed with

anthracycline-based regimens in breast cancer. However, significant adverse events, including acute and chronic heart dysfunction, have limited their use.

Liposomal doxorubicin, marketed as Doxil, is currently approved and used in ovarian cancer and multiple myeloma. Although liposomal doxorubicin exhibits a better cardiac adverse event profile than free doxorubicin, its use also has been limited by hand-foot syndrome, which is an adverse event that produces redness and peeling on the hands and feet. In addition, the incremental efficacy benefits of liposomal doxorubicin compared with free doxorubicin are not clear, with direct comparisons between the two therapies in some tumor subtypes demonstrating equivocal results. In a pivotal clinical trial of women with breast cancer, liposomal doxorubicin was no more effective than free doxorubicin.

Design and potential advantages of MM-302

We designed MM-302 to bind to cancer cells that overexpress ErbB2 (HER2) and thereby release doxorubicin at the site of the tumor. Our goal is for MM-302 to retain the safety profile of liposomal doxorubicin, in particular with respect to cardiac safety, but to have better efficacy in ErbB2 (HER2) positive tumors.

We believe that MM-302 may offer the following advantages in comparison with free doxorubicin and liposomal doxorubicin:

- MM-302 is designed to utilize nanotherapeutic encapsulation to protect the heart from cardiac adverse events associated with free doxorubicin.
- The specific size and stability characteristics of MM-302 are designed to enable the preferential deposition of the drug within tumors relative to normal tissue. Specifically, we believe that, as a nanotherapeutic, MM-302 is able to utilize the EPR effect to selectively enter, and subsequently be trapped in, tumors with leaky vasculature.
- MM-302 is designed with attached antibodies so as to use the ErbB2 (HER2) receptor as a binding mechanism to induce the internalization of the nanotherapeutic encapsulated drug particle, and thereby provide drug delivery directly into the cell and increase the potential efficacy of doxorubicin.
- MM-302 is designed with an ErbB2 (HER2) antibody that binds to but does not shut down the signaling activity of ErbB2 (HER2). We believe that this will minimize the severity and frequency of adverse events associated with suppressing ErbB2 (HER2) and allow for more clinical benefit for patients with lower levels of ErbB2 (HER2) than is provided by current ErbB2 (HER2) directed treatments.
- MM-302 may provide anti-tumor benefit for patients who have failed other ErbB2 (HER2) targeted therapies, but who have not been exposed to anthracyclines.
- Based on our preclinical research, we believe that MM-302 may synergize effectively in combination with a number of approved therapies, such as trastuzumab and possibly lapatinib, chemotherapy, hormonal therapy and our own drugs, MM-111 and MM-121. The current concerns about the severity and frequency of adverse events associated with doxorubicin and liposomal doxorubicin prevent them from being used in many combination regimens.

Clinical development of MM-302

We have two key strategies for the clinical development of MM-302:

- *Replace doxorubicin in ErbB2-positive settings.* Doxorubicin remains a widely used chemotherapy drug notwithstanding concerns of adverse events, particularly cardiac adverse events. One of our clinical development strategies is to replace the use of doxorubicin with MM-302 by demonstrating that MM-302 has favorable efficacy and safety compared to doxorubicin.

- *Expand into indications where anthracyclines are no longer used.* We believe that there is the potential to expand MM-302 into indications, such as late-line therapy, where anthracyclines are viewed as effective but are not used due to safety concerns. If we are able to demonstrate that MM-302 has a favorable safety profile compared to doxorubicin, we believe that we can expand into these settings.

Phase 1 clinical trial in breast cancer

We are conducting an open label, dose escalation Phase 1 clinical trial of MM-302. The trial protocol calls for enrollment of between 18 and 36 patients with advanced ErbB2 (HER2) positive breast cancer. We are conducting this trial at approximately four sites in the United States. The purpose of this trial is to assess the safety of MM-302 and identify the maximum tolerated dose. We are planning an expansion cohort to follow the dose escalation portion of this trial. As of December 31, 2011, we had enrolled and dosed seven patients in this trial.

Preclinical development of MM-302

We have conducted a comprehensive program of preclinical testing of MM-302, including several *in vitro* analyses and *in vivo* xenograft studies. Key findings from this preclinical program include the following:

- In studies of human heart muscle cells known as cardiomyocytes, MM-302 did not measurably impact ErbB2 (HER2) signaling, which we believe suggests a potential for low cardiac adverse event occurrence in the clinic.

- In multiple cell culture experiments, MM-302 bound with and was internalized into ErbB2-expressing cells more effectively than liposomal doxorubicin.

- MM-302 demonstrated measurable activity in cultured cells expressing a lower level of ErbB2 (HER2) receptors than are indicated for treatment with currently marketed therapies.

- In multiple xenograft experiments, MM-302 was significantly more potent than free doxorubicin in inhibiting tumor growth.

With respect to the safety of MM-302, we conducted two single dose toxicity studies of MM-302 in rats and monkeys. We dosed the animals at four dose levels for one hour by intravenous infusion followed by a 28-day observation period. In each dose group, at least 87% of all administered doxorubicin remained encapsulated while in the plasma, which we believe limits distribution to the heart and other non-target tissue. At 28 days following the dosing period, we observed no microscopic signs of cardiac damage in either rats or monkeys.

Companion diagnostic development

We are conducting preclinical research on a companion diagnostic for MM-302 that will help to determine which patients will derive benefits from the drug alone or in combination with other therapies, while experiencing a satisfactory safety profile. This research is focused on:

- Developing an *in vivo* liposome-based imaging agent to measure deposition in the tumor in an effort to exclude those patients whose tumors are unlikely to respond to MM-302 treatment. We are currently evaluating in preclinical testing nanotherapeutic formulations of various agents imaged by PET scan and other modalities to assess the potential for measuring significant deposition.

- Assessing the association of ErbB2 (HER2) levels, measured *in vitro*, with how much MM-302 can bind and enter cells. As part of these efforts, we may incorporate inclusion and exclusion criteria into our Phase 1 clinical trials of MM-302 to enrich our study population with patients who we believe are likely to benefit from MM-302, including those with high ErbB2 (HER2) expression.

MM-151

Overview

MM-151 is an oligoclonal therapeutic consisting of a mixture of three fully human monoclonal antibodies designed to bind to non-overlapping regions, or epitopes, of the EGFR (ErbB1) receptor. EGFR (ErbB1) has long been recognized as an important drug target in several malignancies, including lung, breast, colon, pancreatic and head and neck cancers. We are conducting a Phase 1 clinical trial of MM-151 in patients with solid tumors. We are focusing our diagnostic efforts for MM-151 on the identification of key biomarkers that will indicate which patient populations are likely to benefit from MM-151 treatment. We plan to develop MM-151 for a range of solid tumor indications, including colorectal, head and neck, lung, breast and pancreatic cancers.

Design and potential advantages

We believe that MM-151 may offer the following advantages over other EGFR (ErbB1) inhibitors:

- MM-151 is designed to block the signal amplification that our research suggests occurs in the EGFR (ErbB1) pathway. We believe that binding to multiple epitopes of EGFR (ErbB1) may result in superior signal inhibition compared to currently marketed EGFR (ErbB1) therapies, which only bind to one epitope.

- MM-151 is designed to inhibit the signaling that results from the binding of a full range of EGFR (ErbB1) ligands. In contrast, currently marketed therapies block the signaling of only a subset of these ligands. As a result, we believe that a broader patient population may derive clinical benefit from MM-151 than from currently marketed therapies.

- Tumors treated with marketed monoclonal antibodies directed at EGFR (ErbB1), such as cetuximab (Erbitux) and panitumumab (Vectibix), often develop resistance to these therapies. We hypothesize that this resistance results from the production by the tumor of a different type of ligand that binds to EGFR (ErbB1). Because MM-151 is designed to block a full range

of EGFR (ErbB1) ligands, we believe that MM-151 may be able to delay or prevent the development of resistance more effectively than these existing therapies.

- In preclinical models, MM-151 inhibited tumor cell growth of mutated lung cancer cell lines with acquired resistance to erlotinib. As a result, we believe that MM-151 may provide a longer duration of response than small molecules, such as erlotinib, that target mutated EGFR (ErbB1).

Clinical development of MM-151

We have two key strategies related to the clinical development of MM-151:

- *Replace EGFR (ErbB1) therapies.* The FDA approved the EGFR (ErbB1) therapy erlotinib in lung and pancreatic cancer and cetuximab in colon and head and neck cancer. In clinical practice, erlotinib is used as a monotherapy or combination therapy in multiple cancer indications, including NSCLC, colorectal cancer, breast cancer and head and neck cancer. One of our clinical development strategies is to replace the use of erlotinib with MM-151 by demonstrating that MM-151 has better efficacy and comparable safety.

- *Expand the EGFR (ErbB1) market using Network Biology.* Based on Network Biology insights, we believe that current EGFR (ErbB1) therapies are not being used in indications in which patients would benefit from them. Our second clinical development strategy is to expand the use of MM-151 into indications in which targeted EGFR (ErbB1) therapies are not currently approved, but which our preclinical research indicates should contain patients who will respond to these therapies. Potential indications include lung cancer, for which there is no currently approved targeted antibody therapy, and triple negative breast cancer, for which there is no currently approved EGFR (ErbB1) targeted therapy.

Phase 1 clinical trial in solid tumors

We are conducting an open label, dose escalation Phase 1 clinical trial of MM-151 in patients with solid tumors, with a focus on colorectal cancer, NSCLC and triple negative breast cancer. The purpose of this trial is to assess the initial safety and tolerability of escalating doses of MM-151 in a small set of patients, including a determination of the maximum tolerated dose and any dose limiting adverse events. We also will assess pharmacokinetics, immunogenicity and the response to treatment after the administration of MM-151 based on objective response rate (ORR).

We also plan to conduct expansion studies as part of this Phase 1 clinical trial to determine the response of proteins, such as the known ligands of EGFR (ErbB1) that we predict will be affected by MM-151.

Preclinical development of MM-151

We have conducted a comprehensive program of preclinical testing of MM-151, including several *in vitro* analyses and *in vivo* xenograft studies. Key findings of this preclinical program include the following:

- In *in vitro* experiments, MM-151 exhibited near complete inhibition of EGFR (ErbB1)-induced signaling in a dose-dependent manner. Subsequent *in vitro* studies confirmed that each of the three antibodies comprising MM-151 bound to EGFR (ErbB1) with differential avidity and affinity.

- In *in vitro* experiments, the inhibitory effects of MM-151 on signaling and proliferation were more profound than those of cetuximab, as evidenced by the virtually complete inhibition of signaling by MM-151 compared to the partial inhibition of signaling with cetuximab.

- MM-151 reduced tumor cell growth in multiple xenograft models, including lung, triple negative breast and prostate cancers. Furthermore, MM-151 exhibited better activity than cetuximab at reducing cell growth in triple negative breast and lung cancer models with acquired resistance to erlotinib.

We conducted toxicokinetic studies to support the use of MM-151 in clinical trials, including a four week repeat dosing study of MM-151 in rats and monkeys to assess safety parameters. The animals were dosed for one hour by intravenous infusion once a week for four weeks followed by a 28-day observation period. Adverse events associated with intravenous MM-151 administration were similar to other monoclonal EGFR (ErbB1) inhibitors, including primarily dermatologic and gastrointestinal events, which have largely been manageable in clinical practice.

Companion diagnostic development

We are focusing our diagnostic efforts for MM-151 on the identification of key biomarkers that will indicate which patient populations are likely to benefit from MM-151 treatment. Our goal is to be able to identify patient populations who will respond to MM-151 and who may be unresponsive to other EGFR (ErbB1) inhibitors. This program is in preclinical development.

Preclinical product candidates

We are developing our preclinical product candidates for a range of solid tumor indications. Our most advanced preclinical candidates are MM-141, MM-310 and MM-131.

- MM-141 is a bispecific antibody designed to inhibit signaling mediated through the insulin growth factor 1 receptor, or IGF-1R, by targeting IGF-1R and ErbB3. We plan to file an investigational new drug application, or IND, for MM-141 in 2012.

- MM-310 is a targeted nanotherapeutic. We plan to file an IND for MM-310 in 2013.

- MM-131 is a multispecific antibody. We are pursuing further preclinical development of MM-131.

MM-141 and MM-131 are the first candidates in our pipeline to target multiple growth factors that are co-utilized for growth by a cancer cell. We expect that this approach may increase tumor response and limit the development of resistance that is often observed with growth factor and kinase inhibitors.

Therapeutic design capabilities

We apply the insights about cell signaling dynamics that we gain from Network Biology across a range of therapeutic technologies to design drug candidates that we believe can be efficiently delivered to the selected molecular target. We believe that the best therapies for the oncology indications that we are pursuing are targeted therapies that, in contrast with conventional chemotherapies, are highly selective for the molecular mechanisms that we are seeking to affect and, as a result, offer the potential for significant efficacy and safety benefits.

Human monoclonal antibodies

Human monoclonal antibodies are a key component of many of our targeted therapies based on their range of favorable attributes, including their significant target specificity and avidity relative to small molecules and their well understood pharmacokinetic properties. We have designed antibodies for use as stand-alone therapeutics and have incorporated antibodies into other therapeutics, such as targeted nanotherapeutics, as targeting or docking agents. We work with several antibody formats, including the following:

- Fully human recombinant monoclonal antibodies and fragments of fully human recombinant monoclonal antibodies that include the antibody binding domain. Monoclonal antibodies and antibody fragments are proteins that bind specifically to one defined site on a cell surface protein or receptor.

- Bispecific antibody formats, which are comprised of two or more antibodies or antibody fragments linked to a common scaffold molecule to produce a single molecule that specifically binds to two epitopes on two target cell surface proteins or receptors.

- Oligoclonal antibody mixtures, which are comprised of defined ratios of two or more recombinant human monoclonal antibodies that target two or more distinct epitopes on a single cell surface protein or receptor.

Nanotherapeutics

Our nanotherapeutics are lipidic particles, carefully constructed on a nanoscale, to encapsulate active drug payloads. Nanoscale objects typically, though not exclusively, have dimensions on the order of 100 nanometers or smaller. We believe that nanotherapeutics offer the following potentially favorable attributes:

- The uniform sizing of our nanotherapeutics is intended to enable targeting and preferential deposition within tumors by taking advantage of the EPR effect.

- We formulate our nanotherapeutics to minimize the leakage of active drug payload out of the particle before the nanotherapeutic has reached the tumor, with the goal of limiting systemic exposure, and the associated occurrence of adverse events, and maximizing the amount of active drug that reaches the target.

- Encapsulation is designed to protect the active drug payload as it passes through the circulation and organs of the body, such as the liver, preventing premature clearance or metabolism of the active drug, and thereby extend the pharmacokinetic profile and enable more convenient dosing regimens.

- We can efficiently create targeted nanotherapeutics using our technical expertise and know-how that enable insertion of targeting agents, such as antibodies, into our nanotherapeutics.

- We can customize our nanotherapeutics for use with a variety of drug payloads, including chemotherapies, cytotoxics and nucleic acids, such as siRNA and genes.

Manufacturing

We manufacture drug substance for use in our clinical trials and research and development efforts for all of our therapeutic product candidates using current good manufacturing practices, or cGMP, at our 4,000 square foot multi-product facility located at our corporate headquarters in Cambridge, Massachusetts. We have the capabilities to manufacture monoclonal antibodies, bispecific antibodies, nanotherapeutics and antibody-targeted nanotherapeutics.

Our manufacturing facility:

- is comprised of four independent clean rooms;
- includes three 1,000 liter single-use bioreactors; and
- has capacity to produce approximately 50 kilograms of antibodies per year.

As of December 31, 2011, we employed approximately 56 employees in manufacturing activities.

We believe that our strategic investment in manufacturing capabilities allows us to advance product candidates at a more rapid pace and with more flexibility than a contract manufacturer, produce drug substance in a cost-effective manner while retaining control over the process and prioritize the timing of internal programs.

Our manufacturing capabilities encompass the full manufacturing process through quality control and quality assurance and are integrated with our project teams from discovery through development. This structure enables us to efficiently transfer research stage lead molecules into manufacturing. We have designed our manufacturing facility and processes to provide maximum flexibility and rapid changeover for the manufacture of different product candidates. We outsource fill-finish, packaging, labeling and shipping.

In 2010 and early 2011, a third party contractor that we have used to fill and package both MM-121 and MM-111 experienced FDA inspection issues with its quality control processes that resulted in a formal warning letter from the FDA. Following a review by Sanofi and us, some MM-121 was withdrawn from clinical trial sites and replaced with MM-121 that was filled by a different contractor. This restocking is complete and only resulted in a few patients missing one or two doses of MM-121. The FDA requested in January 2012 that we obtain new consents from any patients currently enrolled in our ongoing Phase 1 clinical trials of MM-111 in connection with continued use in these trials of MM-111 material filled and packaged by this contractor. In addition, the FDA placed a partial clinical hold on these ongoing clinical trials, which restricts our ability to enroll new patients in these trials, until MM-111 material filled and packaged by a new third party contractor that we have engaged is available. Replacement MM-111 material filled and packaged by our new third party contractor has been shipped to clinical trial sites.

We manufacture our antibody and nanotherapeutic product candidates using readily available raw materials and well established manufacturing procedures. We produce antibodies in bioreactors using Chinese hamster ovary cells that have been genetically engineered to secrete our antibody. We then purify the antibodies using industry standard methods, which include affinity chromatography and ultrafiltration operations. We produce nanotherapeutics using high pressure filter extrusion of a mixture of cholesterol and lipids. We then load the nanoliposomes with active pharmaceutical ingredient using a proprietary process.

We have optimized the Phase 2 production process of MM-398 and produced material for our Phase 3 clinical trial at our manufacturing facility. We have conducted comparability characterization analyses between PharmaEngine's Phase 2 material and our material that we produced for our Phase 3 clinical trial. We filed a chemistry manufacturing and controls amendment, or CMC amendment, with the FDA in October 2011, and we intend to use the MM-398 product that we manufactured for our Phase 3 clinical trial.

We believe that we can scale our manufacturing processes to support our clinical development programs and the potential commercialization of our product candidates. If any of our product candidates are approved for marketing by the FDA, we intend to oversee the manufacturing of these products, other than MM-121, which Sanofi will manufacture under the terms of our collaboration agreement.

For our antibody product candidates, we intend to continue to manufacture drug substance for preclinical testing and Phase 1 and Phase 2 clinical development at our current facility. Our long term plan is to establish our own facilities for manufacturing antibody drug substance for Phase 3 clinical development and commercial sale. Pending our establishment of these facilities, we expect to transfer Phase 3 and commercial antibody manufacturing to a contract manufacturing organization. For our nanotherapeutic product candidates, we intend to continue to manufacture drug substance for preclinical testing and all stages of clinical development and initially manufacture drug substance for commercial sale at our current facility.

We are developing and testing diagnostic assays for predictive biomarkers in an internal laboratory under Good Clinical Laboratory Practices. Upon completion of the development of the diagnostic tests, we plan to evaluate external as well as internal options for manufacturing and commercialization of the tests.

Organizational measures

Our objective is to discover, develop and commercialize innovative medicines that transform patient care. We believe that building an organization that fosters and sustains innovation is important to providing long-term value for our investors. Therefore, we plan to continue to invest and develop our innovation capabilities as we research and develop novel medicines.

We also believe that part of our task as effective stewards of our investors' capital is to provide transparent information to our investors on the components of our work that ultimately determine our ability to meet our objectives. We believe that our financial performance in creating innovative medicines is a function in part of four performance indicators. Accordingly, we intend to report on our progress against the following key metrics:

- *Organizational health.* We believe that our employees are our key asset. In order for our employees to be productive, we need to support their efforts with an effective work environment, competitive compensation that rewards their creation of stockholder value and leading opportunities for personal and professional development.

- *Collaboration networks.* We believe that networks are not only the key drivers of biology, but essential to innovation and research and development productivity. We believe innovation requires the fertilization of different fields and perspectives. We strive to create information networks internally and collaborations externally.

- *Research and development productivity.* We believe that Network Biology has the potential to create transformative medicines and alter the productivity of research and development. Our goals are to achieve a superior success rate in our clinical trials and establish overall resource productivity that is best in class.

- *The health and economic outcomes of our products.* Our goal is to create integrated medicines that not only provide the best medical outcome, but also improve the overall efficiency of care. We intend to assess the impact of our products relative to standard of care both in terms of health and economic benefits.

Sales and marketing

As our lead product candidates are still in clinical development, we have not yet established a sales, marketing or product distribution infrastructure. We generally expect to retain commercial rights in the United States and Europe for our oncology product candidates, other than MM-121, for which we receive marketing approvals. We believe that it is possible to access these markets through a focused, specialized field force.

Subject to receiving marketing approvals, we expect to commence commercialization activities by building a focused sales and marketing organization for MM-398. This could form the basis of the sales and marketing organization that we will use to sell our other products, subject to receiving marketing approval. We believe that such an organization will be able to address the community of oncologists who are the key specialists in treating solid tumors, including the lung, breast, ovarian, pancreatic, colorectal and head and neck cancers for which our product candidates are being developed. Outside the United States and Europe, we expect to enter into distribution and other marketing arrangements with third parties for any of our product candidates that obtain marketing approval.

We also plan to build a marketing and sales management organization to create and implement marketing strategies for any products that we market through our own sales organization and to oversee and support our sales force. The responsibilities of the marketing organization would include developing educational initiatives with respect to approved products and establishing relationships with thought leaders in relevant fields of medicine.

We plan to tightly integrate the marketing of our therapeutics and companion diagnostics. As we expect to pair various types of diagnostics with our therapeutics, it is likely that the sales and marketing tactics and business model employed for our various diagnostics may differ from one another.

Competition

The biotechnology and pharmaceutical industries are characterized by rapidly advancing technologies, intense competition and a strong emphasis on proprietary products. While we believe that our Network Biology technologies, integrated research, clinical and manufacturing capabilities, development experience and scientific knowledge provide us with competitive advantages, we face potential competition from many different sources, including major pharmaceutical, specialty pharmaceutical and biotechnology companies, academic institutions and governmental agencies and public and private research institutions. Any product candidates that we successfully develop and commercialize will compete with existing therapies and new therapies that may become available in the future.

Many of our competitors may have significantly greater financial resources and expertise in research and development, manufacturing, preclinical testing, conducting clinical trials, obtaining regulatory approvals and marketing approved products than we do. Mergers and

acquisitions in the pharmaceutical, biotechnology and diagnostic industries may result in even more resources being concentrated among a smaller number of our competitors. These competitors also compete with us in recruiting and retaining qualified scientific and management personnel and establishing clinical trial sites and patient registration for clinical trials, as well as in acquiring technologies complementary to, or necessary for, our programs. Smaller or early stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies.

The key competitive factors affecting the success of all of our product candidates, if approved, are likely to be their efficacy, safety, convenience, price, the effectiveness of companion diagnostics in guiding the use of related therapeutics, the level of generic competition and the availability of reimbursement from government and other third party payors.

Our commercial opportunity could be reduced or eliminated if our competitors develop and commercialize products that are safer, more effective, have fewer or less severe side effects, are more convenient or are less expensive than any products that we may develop. Our competitors also may obtain FDA or other regulatory approval for their products more rapidly than we may obtain approval for ours. In addition, our ability to compete may be affected because in many cases insurers or other third party payors seek to encourage the use of generic products. There are many generic products currently on the market for the indications that we are pursuing, and additional products are expected to become available on a generic basis over the coming years. If our therapeutic product candidates are approved, we expect that they will be priced at a significant premium over competitive generic products.

The most common methods of treating patients with cancer are surgery, radiation and drug therapy, including chemotherapy and targeted drug therapy. As discussed under "—Cancer—Solid tumor market," there are a variety of available drug therapies marketed for solid tumors. In many cases, these drugs are administered in combination to enhance efficacy. Some of these drugs are branded and subject to patent protection, and others are available on a generic basis, including the active ingredients in MM-398 and MM-302. Many of these approved drugs are well established therapies and are widely accepted by physicians, patients and third party payors. In general, although there has been considerable progress over the past few decades in the treatment of solid tumors and the currently marketed therapies provide benefits to many patients, these therapies all are limited to some extent in their efficacy and frequency of adverse events, and none of them are successful in treating all patients. As a result, the level of morbidity and mortality from solid tumor cancers remains high.

In addition to the marketed therapies highlighted under "—Cancer—Solid tumor market," there are also a number of products in late stage clinical development to treat solid tumors. These products in development may provide efficacy, safety, convenience and other benefits that are not provided by currently marketed therapies. As a result, they may provide significant competition for any of our product candidates for which we obtain market approval.

Collaboration and license agreements

We are party to a number of collaboration agreements for the development and commercialization of our product candidates and license agreements under which we license patents, patent applications and other intellectual property. We consider the following collaboration and license agreements to be material to our business.

Sanofi

In September 2009, after MM-121 entered Phase 1 clinical development, we entered into a license and collaboration agreement with Sanofi for the development and commercialization of MM-121. Under the agreement, we granted Sanofi an exclusive, worldwide, royalty-bearing right and license, with the right to grant sublicenses, under our patent rights and know-how to develop and commercialize the monoclonal antibody MM-121 and an MM-121 companion diagnostic. We retained the right, but not the obligation, to participate in clinical development of MM-121 through Phase 2 proof of concept for each indication and final decision making authority over the conduct of the trials that we conduct, subject to our having the necessary capabilities and resources to conduct those trials and subject to the trials we conduct having been approved by Sanofi as part of the global development plan for MM-121. Sanofi is responsible for using commercially reasonable efforts thereafter to develop, obtain regulatory approvals for and, following regulatory approval, commercialize MM-121 and a companion diagnostic in each of the United States, Europe and Japan. We also retained an option to co-promote MM-121 in the United States.

Under the agreement, Sanofi paid us a non-refundable upfront license fee of $60 million. Sanofi is also responsible for all development and manufacturing costs under the collaboration. In addition, we could receive under the agreement up to an aggregate of $410 million from Sanofi upon the achievement of specified development and regulatory milestones and an additional $60 million based on the achievement of specified sales milestones. We have received $20 million to date based on our achievement of two clinical milestones. Under the agreement, we are entitled to tiered, escalating royalties beginning in the sub-teen double digits based on net sales of MM-121 in the United States and beginning in the high single digits based on net sales of MM-121 outside the Unites States. In general, Sanofi's obligation to pay us royalties continues on a product-by-product and country-by-country basis until the latest of the expiration of the patent rights covering the product in such country, the expiration of all data and regulatory exclusivity applicable to the product in such country or ten years after the first commercial sale of the product in such country. If we co-promote MM-121 in the United States, we will be responsible for paying our sales force costs and a specified percentage of direct medical affairs, marketing and promotion costs for MM-121 in the United States and will be eligible to receive tiered, escalating royalties beginning in the high teens based on net sales of MM-121 in the United States. We are also entitled to an increase in the royalty rate on a product-by-product and country-by-country basis if a diagnostic product is actually used in the treatment of solid tumor indications with a particular therapeutic product.

Under the agreement, we are obligated to pay all licensing costs for specified third party patent rights that we or Sanofi may in the future license for the development and commercialization of MM-121. The third party patent rights for which we are required to pay all licensing costs consist of the patent rights that are the subject of two European Patent Office opposition proceedings and related counterparts worldwide. See "—Legal proceedings" for more information. We share the licensing costs for other third party patent rights that we or Sanofi have licensed or may in the future license for the development and commercialization of MM-121 through specified deductions that Sanofi is permitted to take against the royalties Sanofi pays to us. The third party patent rights for which we share the costs with Sanofi include rights that we have licensed from Dyax Corp., or Dyax, the U.S. Public Health Service and Selexis SA, as described in more detail below.

A joint steering committee comprised of an equal number of representatives from each of Sanofi and us is responsible for reviewing and approving the global development plan for MM-121, including all budgets relating to development activities we conduct, and overseeing the parties' development and commercialization activities with respect to MM-121. The joint steering committee also oversees a joint development committee responsible for overseeing the progress of the development program. In general, Sanofi has final decision making authority over matters on which the joint steering committee deadlocks, following escalation to designated executive officer representatives of the parties, with the exception of our retained decision making authority over the conduct of clinical trials that that we conduct in accordance with the global development plan. If necessary and at a time to be mutually agreed by the parties, we and Sanofi have agreed to form a commercialization committee, also to be overseen by the joint steering committee, that will be responsible for overseeing co-promotion activities in the United States and serving as a forum for communication between the parties regarding worldwide commercialization matters for MM-121.

Sanofi has agreed that, subject to limited exceptions, until the second anniversary of the closing of this offering, neither Sanofi nor any of its affiliates will (1) effect or seek, initiate, offer or propose to effect, or cause or participate in any way, advise or assist any other person to effect or seek, initiate, offer or propose to effect or cause or participate in, any acquisition of any of our securities or assets, any tender or exchange offer, merger, consolidation or other business combination involving us, any recapitalization, restructuring, liquidation, dissolution or other extraordinary transaction with respect to us or any solicitation of proxies or consents to vote any of our voting securities; (2) form, join or in any way participate in a group with respect to any of our securities; (3) otherwise act, alone or in concert with others, to seek to control or influence our management, board of directors or policies, except as contemplated by our collaboration agreement; (4) take any action which would reasonably be expected to force us to make a public announcement regarding the foregoing; or (5) enter into any agreements, discussions or arrangements with any third party with respect to any of the foregoing.

If not terminated earlier, the agreement will expire upon expiration of all royalty and other payment obligations of Sanofi under the agreement. Either party may terminate the agreement in the event of an uncured material breach by the other party. Sanofi also may terminate the agreement for its convenience upon 180 days' prior written notice. In addition, we may terminate the agreement if Sanofi challenges or supports any challenge of our licensed patent rights.

PharmaEngine

In May 2011, we entered into an assignment, sublicense and collaboration agreement with PharmaEngine. Under the agreement, PharmaEngine assigned to us its rights and obligations under a 2005 agreement with Hermes BioSciences, Inc., or Hermes, to develop and commercialize MM-398 in Europe and certain countries in Asia. Through our acquisition of Hermes in 2009, we hold the rights to MM-398 in North America and the rest of the world. PharmaEngine also granted to us an exclusive right and license, with the right to sublicense, under PharmaEngine technology and rights to develop and commercialize MM-398 worldwide outside of Taiwan. We granted to PharmaEngine a paid-up, royalty free, exclusive right and license under our technology and rights to develop and commercialize MM-398 in Taiwan.

Under the agreement, we paid PharmaEngine a $10 million upfront license fee. In addition, PharmaEngine is eligible to receive up to an aggregate of $210 million from us upon the achievement of specified development, regulatory and annual net sales milestones. Under the agreement, PharmaEngine is entitled to tiered royalties based on net sales of MM-398 in Europe and certain countries in Asia. The royalty rates under the agreement range from high single digits up to the low teens as a percentage of our net sales of MM-398 in these territories. Our obligation to pay royalties to PharmaEngine continues on a country-by-country basis until the later of ten years after the first commercial sale of MM-398 in such country and May 2, 2024. We are responsible for the development and commercialization, and all related costs and expenses, of MM-398 in all countries except Taiwan, where PharmaEngine retains the right to develop and commercialize MM-398 at its expense. Each party has agreed to use commercially reasonable efforts to develop, in accordance with a development plan, and commercialize MM-398 in its respective territory. We also have diligence obligations to initiate a Phase 3 clinical trial of MM-398 in two different solid tumor indications within timeframes specified in the agreement.

Three executive committees were formed under the agreement, each comprised of an equal number of representatives from each party. The steering committee is responsible for reviewing and approving changes to the development plan, providing overall strategic direction with respect to development of MM-398 under the development plan and overseeing other committees. The steering committee is also responsible for resolving any disputes arising under the agreement at the steering committee or that are referred to it by any of the other committees. If a matter is unresolved by the steering committee, it may be referred for resolution to executive officers from both companies. We have final decision making authority on any such matter not resolved by the executive officers that relates to the worldwide development of MM-398 or commercialization of MM-398 outside of Taiwan. The development committee is responsible for recommending to the steering committee changes to the development plan and overseeing the progress of the development program and monitoring the parties' compliance with their respective obligations under the development plan. The manufacturing committee is responsible for overseeing and advising on the preclinical and clinical manufacture of MM-398 and overseeing the transfer of manufacturing responsibility from PharmaEngine to us.

Upon expiration of all royalty and other payment obligations due to PharmaEngine under this agreement on a country-by-country basis, the licenses granted under the agreement will be deemed to be perpetual, fully paid-up and irrevocable with respect to the licensed product in such country. Either party may terminate the agreement in the event of an uncured material breach by the other party. In addition, at any time after May 2013, we may terminate the agreement for convenience upon 90 days' prior written notice. If PharmaEngine terminates this agreement in its entirety or with respect to Europe or the Asian territories because of our material breach, or if we terminate the agreement for convenience with respect to Europe or the Asian territories, then we are required to grant PharmaEngine a license under our technology and rights with respect to MM-398 in Europe or the Asian territories, as applicable, and PharmaEngine is required to pay us single-digit royalties for net sales of MM-398 in such territories.

Dyax

In January 2007, we entered into an amended and restated collaboration agreement with Dyax, which superseded a prior collaboration agreement with Dyax that we entered into in December 2005. Under this collaboration agreement, Dyax uses its proprietary phage display technology to identify antibodies that bind to targets of interest to us as therapeutics or diagnostics. Further, Dyax has granted to us a worldwide, non-exclusive, royalty free right to use and make any and all of the antibodies identified by Dyax for certain research purposes. In order to clinically develop or commercialize any such antibody, however, we must obtain an additional product license from Dyax on a target-by-target basis. We have the option to obtain one or more product licenses on terms set forth in the collaboration agreement, subject to limitations on the availability of each such product license under an agreement between Dyax and Cambridge Antibody Technologies, which has merged with MedImmune, LLC and is now owned by AstraZeneca PLC.

As consideration for the grant of the initial research license, we paid Dyax a research fee based on the total estimated full time equivalent researchers that were required to conduct the research plan and a fee for achieving certain technical milestones. If we elect to obtain a product license with respect to any therapeutic or diagnostic target, we are required to pay to Dyax an additional upfront license fee for the applicable antibody. We also will be required to make additional maximum aggregate development and regulatory milestone payments of $16.2 million for therapeutic products and maximum aggregate regulatory milestone payments of $1.0 million for diagnostic products directed to selected targets. In addition, Dyax is entitled to mid single digit royalties based on net sales of products covered by any product license that we obtain from Dyax. Our obligation to pay royalties to Dyax continues on a product-by-product and country-by-country basis until the later of a specified number of years after the first commercial sale of the product in such country and the expiration of the patent rights covering the product in such country. MM-121 was identified under this agreement, and we have obtained a target license from Dyax by exercising our product license option and paying the applicable license fee. We are obligated to use commercially reasonable efforts to develop and commercialize the antibodies for which we obtain a commercial license.

This agreement will remain in effect, unless terminated earlier, for so long as we or any of our affiliates or sublicensees continue to develop or commercialize products that remain royalty-bearing under the agreement. Either party may terminate the agreement in the event of an uncured material breach by the other party. We also may terminate the agreement in its entirety or on a product-by-product basis at any time upon 90 days' prior written notice.

Adimab

In November 2009, we entered into a collaboration agreement with Adimab LLC, or Adimab, to allow us to evaluate the utility of using antibodies identified during the collaboration as therapeutics or diagnostics. Under the agreement, Adimab granted to us a worldwide, non-exclusive, royalty free right to use materials provided by Adimab to perform non-clinical research during the evaluation term. Adimab also granted to us an option to obtain the assignment of specified patent rights claiming the selected antibodies and a license under Adimab's background patent rights and know-how for the development and commercialization of the antibodies.

As partial consideration for the research license grant, we paid Adimab a technology access fee at the time of grant, research fees based on the total estimated full time equivalent researchers that were required to conduct the research plan and a fee for achieving certain technical milestones. We have exercised our assignment and license option by paying Adimab a fee of $1.0 million. In addition, we are required to pay Adimab up to an aggregate of $13.5 million per therapeutic area, for the first four therapeutic areas, upon achievement of specified development and regulatory milestones and up to an aggregate of $500,000 per diagnostic product upon the achievement of specified regulatory milestones. In addition, Adimab is entitled to mid single digit royalty payments based on net sales of therapeutic products and diagnostic products arising from the collaboration. Our obligation to pay royalties to Adimab continues on a product-by-product and country-by-country basis until the later of a specified number of years after the first commercial sale of the product in such country and the expiration of the patent rights covering the product in such country, provided that the royalty term will not extend beyond a specified number of years after the first commercial sale of the product in such country. We are obligated to use commercially reasonable efforts to develop and commercialize at least one product that incorporates the antibodies for which we exercised our assignment and license option in each of the United States, Europe and Japan. MM-151 was generated under this agreement.

The term of the agreement expires on a country-by-country basis on the earliest date after which no payments are due to Adimab, unless earlier terminated. Either party may terminate the agreement in the event of an uncured material breach by the other party. In addition, we may terminate the agreement at any time upon 90 days' prior written notice.

University of California

2005 agreement

In March 2005, we entered into a license agreement with The Regents of the University of California, or the Regents. Under the agreement, the Regents granted to us a royalty-bearing right and license in the United States and other countries where the Regents have the right to grant the license under certain patent rights and rights in biological materials to develop and commercialize products for therapeutic or diagnostic use in humans that are covered by the licensed patents. Licensed products under this agreement include MM-111. This license is exclusive with respect to certain patents, including some relevant to MM-111, and non-exclusive with respect to other patents and biological materials. The agreement requires that we diligently pursue the development, manufacture and commercialization of licensed products. In addition, we are required to meet specific development, regulatory and commercialization milestones within timeframes specified in the agreement. We have sole responsibility for the development and commercialization of products under the licensed technology. However, the agreement provides that the Regents may require us to sublicense our exclusive rights for the application or use of licensed products covered by any exclusively licensed technology that we are not currently pursuing.

We are required to pay to the Regents an annual license maintenance fee of between $20,000 and $30,000 until the first commercial sale of a licensed product and are responsible for all development costs. In addition, we are required to pay to the Regents up to an aggregate of $725,000 per therapeutic product, other than the second therapeutic product, for which we are responsible for up to an aggregate of $906,250, based on the achievement of specified development and regulatory milestones. The Regents are also entitled to royalties in the low

single digits based on net sales of products covered by the licensed technology. A minimum annual royalty is due to the Regents commencing in the earlier of the year of the first commercial sale of a licensed product or 2015. The minimum annual royalty increases from $100,000 in the first year it is payable to $500,000 in the fifth year and thereafter for the life of the patents. If we sublicense the rights granted to us under the licensed technology to a third party, then we are also obligated to pay to the Regents a portion of the sublicensing income related to the licensed technology.

If not terminated earlier, this agreement terminates upon the later of nine years from the market introduction of the last licensed product that contains the licensed biological materials or the expiration of all patent rights licensed under this agreement. At such time, we will have a perpetual, fully paid, world-wide, non-exclusive license. The Regents may terminate the agreement in the event of an uncured material breach by us. We may terminate the agreement on a country-by-country basis at any time upon 60 days' prior written notice.

2000 agreement

In November 2000, we entered into a separate exclusive license agreement with the Regents. Under the agreement, the Regents granted us a royalty-bearing world-wide right and license under certain patent rights for the development and commercialization of products that are covered by the licensed patent rights, including MM-302. The agreement requires that we diligently pursue the development, manufacture and commercialization of licensed products. In addition, we are required to meet specified development, regulatory and commercialization milestones within timeframes specified in the agreement. We have the sole responsibility for the development and commercialization of products under the licensed technology.

We are required to pay to the Regents an annual license maintenance fee of $95,000 until the first commercial sale of a licensed product. We also are responsible for all development costs and have agreed to spend a minimum of $150,000 per year for such costs. In addition, we are responsible for up to an aggregate of $700,000 per product upon the achievement of specified development and regulatory milestones. The Regents are also entitled to royalties in the low single digits based on net sales of products covered by the licensed technology. If we sublicense the rights granted to us under the licensed technology to a third party, then we are also obligated to pay to the Regents a portion of the sublicensing income related to the licensed technology.

If not terminated earlier, this agreement terminates upon the expiration or abandonment of all patents licensed under this agreement. The Regents may terminate the agreement in the event of an uncured material breach by us. We may terminate the agreement on a country-by-country basis at any time upon 60 days' prior written notice.

U.S. Public Health Service

In February 2008, we entered into a commercial license with the U.S. Public Health Service, a division of the U.S. Department of Health and Human Services, for non-exclusive rights in the United States to patents related to ErbB3 and ErbB3 antibodies associated with MM-121 and MM-111. Under the agreement, we are required to make aggregate development and regulatory milestone payments of up to $6.0 million, per therapeutic licensed product, and pay low single digit royalties on net sales of licensed products. The term of the agreement extends until the expiration of the licensed patent rights, which is 2016.

Selexis

In June 2008, we entered into a commercial license with Selexis SA for non-exclusive rights to technology for use in the manufacture of certain biologic products, including each of our five most advanced product candidates, other than MM-398. Under this agreement, we are required to make aggregate milestone payments of up to €1.0 million, per licensed product, and pay royalties of less than one percent on net sales of licensed products. The obligation to pay royalties with respect to each product sold in a country continues until the expiration of the patent rights covering the product in such country.

Intellectual property

We aggressively strive to protect the proprietary technology that we believe is important to our business, including seeking and maintaining patents intended to cover our products and compositions, their methods of use and processes for their manufacture, as well as our diagnostic and drug discovery technologies and any other inventions that are commercially important to the development of our business. We also rely on trade secrets to protect aspects of our business that are not amenable to, or that we do not consider appropriate for, patent protection, such as our proprietary network modeling programs and large scale protein and liposome production methods.

Our success will significantly depend on our ability to obtain and maintain patent and other proprietary protection for commercially important technology, inventions and know-how related to our business, defend and enforce our patents, preserve the confidentiality of our trade secrets and operate without infringing the valid and enforceable patents and proprietary rights of third parties. We also rely on know-how, continuing technological innovation and in-licensing opportunities to develop and maintain our proprietary position.

We seek to obtain domestic and international patent protection, and endeavor to promptly file patent applications for new commercially valuable inventions once the experimental data necessary for an application become available. We generally file international applications under the Patent Cooperation Treaty, or PCT, within one year after the filing of a U.S. provisional application.

As of December 31, 2011, we owned 16 issued U.S. patents, two issued patents in Europe and 10 issued patents in other jurisdictions, as well as 30 pending U.S. provisional and non-provisional patent applications and 141 pending foreign patent applications in Europe and 42 other jurisdictions. As of December 31, 2011, we also co-owned eight pending U.S. provisional patent applications with Sanofi, as well as one U.S. non-provisional and one PCT application with Silver Creek. As of December 31, 2011, we had licenses to 37 U.S. patents and 8 pending U.S. patent applications, as well as numerous foreign counterparts to many of these patents and patent applications. Of these licensed patents and patent applications, we license the majority on an exclusive basis, with the rest licensed non-exclusively to us. The exclusive licenses are, in some cases, limited to certain technical fields, for example for medical and diagnostic purposes.

The patent portfolios for our five most advanced product candidates as of December 31, 2011 are summarized below.

MM-398

Our MM-398 patent portfolio is wholly owned by us and includes two pending U.S. patent applications covering the composition of and methods of making and using MM-398. On January 4, 2012, a notice of allowance was issued for one of the U.S. patent applications allowing claims that cover the composition of MM-398. Accompanying the notice was an indication that the patent issuing from this allowed application would receive a patent term adjustment that would extend the term of the patent for at least 806 days, such that, once issued, the patent would not expire before July 2027. The other pending U.S. application, if issued, will expire in 2025. Related international patent applications have issued or been allowed in three countries and are pending in Europe and a number of other countries. These international patents and patent applications, if issued, are also due to expire in 2025.

MM-121

Our MM-121 patent portfolio is wholly owned by us, with the exception of eight pending U.S. provisional method of use patent applications that are eligible for worldwide filing and that may be used to establish non-provisional applications, are co-owned with Sanofi and, if issued, will expire in 2032, and one family of U.S. patents broadly covering anti-ErbB3 antibodies, the last of which will expire in 2016. We license this one family of U.S. patents non-exclusively from the U.S. Public Health Service, a division of the U.S. Department of Health and Human Services. This portfolio includes a U.S. composition of matter patent that will expire in 2028, two related pending U.S. patent applications that, if issued, will expire in 2028 and related international patent applications pending in 24 countries and Europe, which, if issued, will expire in 2028. Pending method of use and diagnostic patents in this portfolio also include two PCT applications that, if issued, will expire in 2031, two U.S. applications and related pending foreign applications in Europe and 38 other jurisdictions that, if issued, will expire in 2029, and three pending U.S. provisional applications that are eligible for worldwide filing and that may be used to establish non-provisional applications that, if issued, will expire in 2032.

MM-111

Our MM-111 patent portfolio includes two wholly owned, pending U.S. patent applications covering the composition of, and method of use and diagnostics for, MM-111 that, if issued, will expire in 2029. The portfolio also includes three provisional U.S. applications that may be used to establish non-provisional applications that if issued, will expire in 2032, and two related PCT applications. For two of these three provisional U.S. applications, we intend to submit a single consolidated worldwide filing. This portfolio also includes 19 related patent applications pending in Europe and a number of other jurisdictions that, if issued, will expire in 2028 or 2029.

In addition, this portfolio includes the following patents licensed from the Regents:

- an exclusively licensed family of patents that will expire in 2023, including an issued U.S. composition of matter patent, a pending European divisional application, an issued European composition of matter patent application that is eligible for validation in all European Patent Organization countries and applications pending in a number of other countries; and

- a non-exclusively licensed family of patents that will expire in 2016, including a granted European composition of matter patent, a pending European divisional application and two applications pending in Canada.

MM-302

Our MM-302 patent portfolio includes one wholly owned PCT dosage and administration patent application that may be used to establish non-provisional applications that, if issued, will expire in 2031. This portfolio also includes the following exclusively licensed issued U.S. patents:

- five composition of matter patents that will expire between 2014 and 2019; and
- one method of use patent that will expire in 2019.

In addition, this portfolio includes the following exclusively licensed European patents:

- a composition of matter patent that will expire in 2019;
- a composition of matter and method patent that will expire in 2019; and
- a composition of matter patent that will expire in 2014.

Our MM-302 patent portfolio further includes one exclusively licensed composition of matter application that is pending in the United States that, if issued, will expire in 2017, as well as several foreign composition of matter patents and patent applications that expire or, if issued, will expire between 2014 and 2017.

All of the licensed patents and patent applications related to MM-302 are licensed from the Regents.

MM-151

Our MM-151 portfolio is wholly owned. This portfolio consists of three provisional patent applications that are eligible for worldwide filing and that may be used to establish non-provisional applications, which, if issued, will expire in 2032. These provisional applications cover compositions, methods of use and diagnostics related to MM-151. For two of these three provisional applications, we intend to submit one consolidated worldwide filing. This portfolio also consists of one pending U.S. composition of matter and method of use patent application and one closely related pending PCT application that remains eligible for worldwide filing, each of which, if issued, will expire in 2031.

The term of individual patents depends upon the legal term for patents in the countries in which they are obtained. In most countries, including the United States, the patent term is 20 years from the earliest filing date of a non-provisional patent application. In the United States, a patent's term may be lengthened by patent term adjustment, which compensates a patentee for administrative delays by the U.S. Patent and Trademark Office in examining and granting a patent, or may be shortened if a patent is terminally disclaimed over an earlier filed patent. The term of a patent that covers a drug, biological product or medical device approved pursuant to a pre-market approval, or PMA, may also be eligible for patent term extension when FDA approval is granted, provided statutory and regulatory requirements are met. The length of the patent term extension is related to the length of time the drug is under regulatory review while the patent is in force. The Drug Price Competition and Patent Term Restoration Act of 1984, or the Hatch-Waxman Act, permits a patent term extension of up to five years beyond the expiration date set for the patent. Patent extension cannot extend the remaining term of a patent beyond a total of 14 years from the date of product approval, only one patent applicable to each regulatory review period may be granted an extension and only those claims reading on the approved drug are extended. Similar provisions are available in

Europe and other foreign jurisdictions to extend the term of a patent that covers an approved drug. In the future, if and when our product candidates receive approval by the FDA or foreign regulatory authorities, we expect to apply for patent term extensions on issued patents covering those products, depending upon the length of the clinical trials for each drug and other factors, including those involved in the filing of a biologics license application, or BLA, or a new drug application, or NDA.

We are currently engaged in three ongoing opposition proceedings to European patents in the European Patent Office to narrow or invalidate the claims of patents owned by third parties. For more information, see "—Legal proceedings." We have obtained favorable interim decisions in all three oppositions. Two of these decisions are now under appeal, and the third may be appealed. The ultimate outcome of all three oppositions remains uncertain. We are also aware of issued or pending counterparts to some of these European patents in the United States that may be relevant to our development and commercialization of MM-121. In addition, we are aware of issued U.S. patents held by Genentech, Inc., or Genentech, broadly covering methods of producing certain types of recombinant antibodies and related compositions for antibody production that may be relevant to our development and commercialization of MM-121, MM-302 and MM-151.

We rely, in some circumstances, on trade secrets to protect our technology. However, trade secrets can be difficult to protect. We seek to protect our proprietary technology and processes, in part, by confidentiality agreements with our employees, consultants, scientific advisors and contractors. We also seek to preserve the integrity and confidentiality of our data and trade secrets by maintaining physical security of our premises and physical and electronic security of our information technology systems. While we have confidence in these individuals, organizations and systems, agreements or security measures may be breached, and we may not have adequate remedies for any breach. In addition, our trade secrets may otherwise become known or be independently discovered by competitors. To the extent that our consultants, contractors or collaborators use intellectual property owned by others in their work for us, disputes may arise as to the rights in related or resulting know-how and inventions.

Silver Creek

In August 2010, we acquired 12,000,000 shares of series A convertible preferred stock of Silver Creek, a newly formed company, in exchange for our grant to Silver Creek of technology licenses. We granted to Silver Creek a royalty free license under certain antibody growth factor patent rights to develop and commercialize products covered by the licensed patent rights. This license is exclusive to Silver Creek for therapeutic or diagnostic use in humans for the promotion of organ regeneration and co-exclusive with us for all other uses. We also granted to Silver Creek royalty free, non-exclusive licenses under certain patent rights and know-how to use certain of our technologies for research and development purposes. Either party may terminate the agreement in the event of an uncured material breach by the other party.

In August and December 2010, Silver Creek issued and sold an aggregate of 4,189,904 additional shares of its series A convertible preferred stock at a price per share of $1.00 to other investors for an aggregate purchase price of $4,189,904. As of December 31, 2011, we owned approximately 74% of the outstanding capital stock of Silver Creek, making Silver Creek a majority owned subsidiary of ours.

Silver Creek's mission is to apply our Network Biology approach to the discovery and development of innovative therapeutics in the field of regenerative medicine. In the future, we may consider forming additional businesses or business units to apply our Network Biology approach to multiple additional disease areas outside the oncology field. We expect to do so in some cases, as with Silver Creek, through the establishment of separately funded companies.

Government regulation

Government authorities in the United States, at the federal, state and local level, and in other countries extensively regulate, among other things, the research, development, testing, manufacture, including any manufacturing changes, packaging, storage, recordkeeping, labeling, advertising, promotion, distribution, marketing, post-approval monitoring and reporting, import and export of pharmaceutical products, biological products and medical devices, such as those we are developing.

United States drug and biological product approval process

In the United States, the FDA regulates drugs and biological products under the Federal Food, Drug, and Cosmetic Act, or FDCA, the Public Health Service Act, or PHSA, and implementing regulations. The process of obtaining regulatory approvals and the subsequent compliance with appropriate federal, state, local and foreign statutes and regulations requires the expenditure of substantial time and financial resources. Failure to comply with the applicable United States requirements at any time during the product development process, approval process or after approval, may subject an applicant to a variety of administrative or judicial sanctions, such as the FDA's refusal to approve pending applications, withdrawal of an approval, imposition of a clinical hold, issuance of warning letters, product recalls, product seizures, total or partial suspension of production or distribution injunctions, fines, refusals of government contracts, restitution, disgorgement of profits or civil or criminal penalties.

The process required by the FDA before a drug or biological product may be marketed in the United States generally involves the following:

- completion of preclinical laboratory tests, animal studies and formulation studies in compliance with the FDA's good laboratory practice, or GLP, regulations;
- submission to the FDA of an IND, which must become effective before human clinical trials may begin;
- approval by an independent institutional review board, or IRB, at each clinical site before each trial may be initiated;
- performance of adequate and well-controlled human clinical trials in accordance with good clinical practices, or GCP, to establish the safety and efficacy of the proposed drug or biological product for each indication;
- submission to the FDA of an NDA or BLA;
- satisfactory completion of an FDA advisory committee review, if applicable;
- satisfactory completion of an FDA inspection of the manufacturing facility or facilities at which the product is produced to assess compliance with cGMP requirements and to assure

that the facilities, methods and controls are adequate to preserve the drug's identity, strength, quality and purity; and

- FDA review and approval of the NDA or BLA.

We expect that all of our product candidates, other than MM-398, will be subject to review as biological products under BLA standards. We expect that MM-398 will be subject to review as a drug under NDA standards. MM-302 contains both drug and biological components. We believe that this combination product will be subject to review as a biological product pursuant to a BLA. However, it is possible that the FDA could consider MM-302 subject to review pursuant to an NDA.

Preclinical studies

Preclinical studies include laboratory evaluation of product chemistry and formulation, as well as *in vitro* and animal studies to assess the potential for adverse events and in some cases to establish a rationale for therapeutic use. The conduct of preclinical studies is subject to federal regulations and requirements, including GLP regulations. An IND sponsor must submit the results of the preclinical tests, together with manufacturing information, analytical data, any available clinical data or literature and plans for clinical studies, among other things, to the FDA as part of an IND. Some long-term preclinical testing, such as animal tests of reproductive adverse events and carcinogenicity, may continue after the IND is submitted. An IND automatically becomes effective 30 days after receipt by the FDA, unless before that time the FDA raises concerns or questions related to one or more proposed clinical trials and places the trial on clinical hold. In such a case, the IND sponsor and the FDA must resolve any outstanding concerns before the clinical trial can begin. As a result, submission of an IND may not result in the FDA allowing clinical trials to commence.

Clinical trials

Clinical trials involve the administration of the investigational new drug to human subjects under the supervision of qualified investigators in accordance with GCP requirements, which include, among other things, the requirement that all research subjects provide their informed consent in writing before their participation in any clinical trial. Clinical trials are conducted under written study protocols detailing, among other things, the objectives of the study, the parameters to be used in monitoring safety and the effectiveness criteria to be evaluated. A protocol for each clinical trial and any subsequent protocol amendments must be submitted to the FDA as part of the IND. In addition, an IRB at each institution participating in the clinical trial must review and approve the plan for any clinical trial before it commences at that institution, and the IRB must conduct continuing review and reapprove the study at least annually. The IRB must review and approve, among other things, the study protocol and informed consent information to be provided to study subjects. An IRB must operate in compliance with FDA regulations. Information about certain clinical trials must be submitted within specific timeframes to the National Institutes of Health for public dissemination on their ClinicalTrials.gov website.

Human clinical trials are typically conducted in three sequential phases, which may overlap or be combined:

- *Phase 1:* The drug or biological product is initially introduced into healthy human subjects or patients with the target disease or condition and tested for safety, dosage tolerance, absorption, metabolism, distribution, excretion and, if possible, to gain an early indication of its effectiveness.

- *Phase 2:* The drug or biological product is administered to a limited patient population to identify possible adverse effects and safety risks, to preliminarily evaluate the efficacy of the product for specific targeted diseases and to determine dosage tolerance and optimal dosage.

- *Phase 3:* The drug or biological product is administered to an expanded patient population in adequate and well-controlled clinical trials to generate sufficient data to statistically confirm the efficacy and safety of the product for approval, to establish the overall risk-benefit profile of the product and to provide adequate information for the labeling of the product.

Progress reports detailing the results of the clinical trials must be submitted at least annually to the FDA and more frequently if serious adverse events occur. Phase 1, Phase 2 and Phase 3 clinical trials may not be completed successfully within any specified period, or at all. Furthermore, the FDA or the sponsor may suspend or terminate a clinical trial at any time on various grounds, including a finding that the research subjects are being exposed to an unacceptable health risk. Similarly, an IRB can suspend or terminate approval of a clinical trial at its institution if the clinical trial is not being conducted in accordance with the IRB's requirements or if the drug has been associated with unexpected serious harm to patients.

Marketing approval

Assuming successful completion of the required clinical testing, the results of the preclinical and clinical studies, together with detailed information relating to the product's chemistry, manufacture, controls and proposed labeling, among other things, are submitted to the FDA as part of an NDA or BLA requesting approval to market the product for one or more indications. Under federal law, the submission of most NDAs and BLAs is additionally subject to a substantial application user fee, currently exceeding $1.5 million, and the sponsor of an approved NDA or BLA are also subject to annual product and establishment user fees, currently exceeding $86,000 per product and $497,000 per establishment. These fees are typically increased annually.

The FDA conducts a preliminary review of all NDAs and BLAs within the first 60 days after submission before accepting them for filing to determine whether they are sufficiently complete to permit substantive review. The FDA may request additional information rather than accept an NDA or BLA for filing. In this event, the application must be resubmitted with the additional information. The resubmitted application is also subject to review before the FDA accepts it for filing. Once the submission is accepted for filing, the FDA begins an in-depth substantive review. The FDA has agreed to specified performance goals in the review of NDAs and BLAs. Most such applications for non-priority products are reviewed within ten months, and most applications for priority review products, that is, drugs and biologics that the FDA determines represent a significant improvement over existing therapy, are reviewed in six

months. We expect the FDA to amend each of these goals to extend them by two months for applications received after September 2012. The review process may be extended by the FDA for three additional months to consider certain information or clarification regarding information already provided in the submission. The FDA may also refer applications for novel drugs or biological products or products that present difficult questions of safety or efficacy to an advisory committee, typically a panel that includes clinicians and other experts, for review, evaluation and a recommendation as to whether the application should be approved. The FDA is not bound by the recommendations of an advisory committee, but it considers such recommendations carefully when making decisions.

Before approving an NDA or BLA, the FDA typically will inspect the facility or facilities where the product is manufactured. The FDA will not approve an application unless it determines that the manufacturing processes and facilities are in compliance with cGMP requirements and adequate to assure consistent production of the product within required specifications. In addition, before approving an NDA or BLA, the FDA will typically inspect one or more clinical sites to assure compliance with GCP and integrity of the clinical data submitted.

The testing and approval process requires substantial time, effort and financial resources, and each may take many years to complete. Data obtained from clinical activities are not always conclusive and may be susceptible to varying interpretations, which could delay, limit or prevent regulatory approval. The FDA may not grant approval on a timely basis, or at all. We may encounter difficulties or unanticipated costs in our efforts to develop our product candidates and secure necessary governmental approvals, which could delay or preclude us from marketing our products.

After the FDA's evaluation of the NDA or BLA and inspection of the manufacturing facilities, the FDA may issue an approval letter or a complete response letter. An approval letter authorizes commercial marketing of the drug or biological product with specific prescribing information for specific indications. A complete response letter generally outlines the deficiencies in the submission and may require substantial additional testing or information in order for the FDA to reconsider the application. If and when those deficiencies have been addressed to the FDA's satisfaction in a resubmission of the NDA, the FDA will issue an approval letter. The FDA has committed to reviewing such resubmissions in two or six months depending on the type of information included. Even with submission of this additional information, the FDA ultimately may decide that the application does not satisfy the regulatory criteria for approval.

Even if the FDA approves a product, it may limit the approved indications for use for the product, require that contraindications, warnings or precautions be included in the product labeling, require that post-approval studies, including Phase 4 clinical trials, be conducted to further assess a drug's safety after approval, require testing and surveillance programs to monitor the product after commercialization, or impose other conditions, including distribution restrictions or other risk management mechanisms, which can materially affect the potential market and profitability of the product. The FDA may prevent or limit further marketing of a product based on the results of post-market studies or surveillance programs. After approval, some types of changes to the approved product, such as adding new indications, manufacturing changes and additional labeling claims, are subject to further testing requirements and FDA review and approval.

Fast track designation

The FDA is required to facilitate the development and expedite the review of drugs and biologics that are intended for the treatment of a serious or life-threatening condition for which there is no effective treatment and which demonstrate the potential to address unmet medical needs for the condition. Under the fast track program, the sponsor of a new drug or biologic candidate may request the FDA to designate the product for a specific indication as a fast track product concurrent with or after the filing of the IND for the product candidate. The FDA must determine if the product candidate qualifies for fast track designation within 60 days after receipt of the sponsor's request.

In addition to other benefits, such as the ability to use surrogate endpoints and have greater interactions with the FDA, the FDA may initiate review of sections of a fast track product's NDA or BLA before the application is complete. This rolling review is available if the applicant provides and the FDA approves a schedule for the submission of the remaining information and the applicant pays applicable user fees. However, the FDA's time period goal for reviewing a fast track application does not begin until the last section of the NDA or BLA is submitted. In addition, the fast track designation may be withdrawn by the FDA if the FDA believes that the designation is no longer supported by data emerging in the clinical trial process.

Priority review

Under FDA policies, a product candidate may be eligible for priority review, or review within a six-month time frame from the time a complete application is accepted for filing. Products regulated by the FDA's Center for Drug Evaluation and Research, or CDER, are eligible for priority review if they provide a significant improvement compared to marketed products in the treatment, diagnosis or prevention of a disease. Products regulated by the FDA's Center for Biologics Evaluation and Research are eligible for priority review if they provide a significant improvement in the safety or effectiveness of the treatment, diagnosis or prevention of a serious or life-threatening disease. A fast track designated product candidate would ordinarily meet the FDA's criteria for priority review.

Accelerated approval

Under the FDA's accelerated approval regulations, the FDA may approve a drug or biologic for a serious or life-threatening illness that provides meaningful therapeutic benefit to patients over existing treatments based upon a surrogate endpoint that is reasonably likely to predict clinical benefit. In clinical trials, a surrogate endpoint is a measurement of laboratory or clinical signs of a disease or condition that substitutes for a direct measurement of how a patient feels, functions or survives. Surrogate endpoints can often be measured more easily or more rapidly than clinical endpoints. A product candidate approved on this basis is subject to rigorous post-marketing compliance requirements, including the completion of Phase 4 or post-approval clinical trials to confirm the effect on the clinical endpoint. Failure to conduct required post-approval studies, or confirm a clinical benefit during post-marketing studies, would allow the FDA to withdraw the drug from the market on an expedited basis. All promotional materials for drug candidates approved under accelerated regulations are subject to prior review by the FDA.

Orphan drugs

Under the Orphan Drug Act, the FDA may grant orphan drug designation to drugs or biologics intended to treat a rare disease or condition, which is generally defined as a disease or condition that affects fewer than 200,000 individuals in the United States. Orphan drug designation must be requested before submitting an NDA or BLA. After the FDA grants orphan drug designation, the generic identity of the drug or biologic and its potential orphan use are disclosed publicly by the FDA. Orphan drug designation does not convey any advantage in, or shorten the duration of, the regulatory review and approval process. The first NDA or BLA applicant to receive FDA approval for a particular active ingredient to treat a particular disease with FDA orphan drug designation is entitled to a seven-year exclusive marketing period in the United States for that product, for that indication. During the seven-year exclusivity period, the FDA may not approve any other applications to market the same drug or biologic for the same orphan indication, except in limited circumstances, such as a showing of clinical superiority to the product with orphan drug exclusivity in that it is shown to be safer, more effective or makes a major contribution to patient care. Orphan drug exclusivity does not prevent the FDA from approving a different drug or biologic for the same disease or condition, or the same drug or biologic for a different disease or condition. Among the other benefits of orphan drug designation are tax credits for certain research and a waiver of the NDA or BLA application user fee.

Pediatric information

Under the Pediatric Research Equity Act of 2003, as amended and reauthorized by the Food and Drug Administration Amendments Act of 2007, or the FDAAA, an NDA, BLA or supplement to an NDA or BLA must contain data that are adequate to assess the safety and effectiveness of the drug or biological product for the claimed indications in all relevant pediatric subpopulations, and to support dosing and administration for each pediatric subpopulation for which the product is safe and effective. The FDA may, on its own initiative or at the request of the applicant, grant deferrals for submission of some or all pediatric data until after approval of the product for use in adults, or full or partial waivers from the pediatric data requirements. Unless otherwise required by regulation, the pediatric data requirements do not apply to products with orphan drug designation.

The Hatch-Waxman Act

Abbreviated new drug applications

In seeking approval for a drug through an NDA, applicants are required to list with the FDA each patent with claims that cover the applicant's product. Upon approval of a drug, each of the patents listed in the application for the drug is then published in the FDA's Approved Drug Products with Therapeutic Equivalence Evaluations, commonly known as the Orange Book. Drugs listed in the Orange Book can, in turn, be cited by potential competitors in support of approval of an abbreviated new drug application, or ANDA. Generally, an ANDA provides for marketing of a drug product that has the same active ingredients in the same strengths and dosage form as the listed drug and has been shown through bioequivalence testing to be therapeutically equivalent to the listed drug. ANDA applicants are not required to conduct or submit results of preclinical or clinical tests to prove the safety or effectiveness of their drug product, other than the requirement for bioequivalence testing. Drugs approved in this way are commonly referred to as "generic equivalents" to the listed drug, and can often be substituted by pharmacists under prescriptions written for the original listed drug.

The ANDA applicant is required to certify to the FDA concerning any patents listed for the approved product in the FDA's Orange Book. Specifically, the applicant must certify that:

- the required patent information has not been filed;
- the listed patent has expired;
- the listed patent has not expired, but will expire on a particular date and approval is sought after patent expiration; or
- the listed patent is invalid or will not be infringed by the new product.

A certification that the new product will not infringe the already approved product's listed patents or that such patents are invalid is called a Paragraph IV certification. If the applicant does not challenge the listed patents, the ANDA application will not be approved until all the listed patents claiming the referenced product have expired.

If the ANDA applicant has provided a Paragraph IV certification to the FDA, the applicant must also send notice of the Paragraph IV certification to the NDA and patent holders once the ANDA has been accepted for filing by the FDA. The NDA and patent holders may then initiate a patent infringement lawsuit in response to the notice of the Paragraph IV certification. The filing of a patent infringement lawsuit within 45 days after the receipt of a Paragraph IV certification automatically prevents the FDA from approving the ANDA until the earlier of 30 months, expiration of the patent, settlement of the lawsuit or a decision in the infringement case that is favorable to the ANDA applicant.

The ANDA also will not be approved until any applicable non-patent exclusivity, such as exclusivity for obtaining approval of a new chemical entity, listed in the Orange Book for the referenced product has expired. Federal law provides a period of five years following approval of a drug containing no previously approved active ingredients during which ANDAs for generic versions of those drugs cannot be submitted unless the submission contains a Paragraph IV challenge to a listed patent, in which case the submission may be made four years following the original product approval. Federal law provides for a period of three years of exclusivity following approval of a listed drug that contains previously approved active ingredients but is approved in a new dosage form, route of administration or combination, or for a new use, the approval of which was required to be supported by new clinical trials conducted by or for the sponsor, during which the FDA cannot grant effective approval of an ANDA based on that listed drug. Under the Best Pharmaceuticals for Children Act, federal law also provides that periods of patent and non-patent marketing exclusivity listed in the Orange Book for a drug may be extended by six months if the NDA sponsor conducts pediatric studies identified by the FDA in a written request. For written requests issued by the FDA after September 27, 2007, the date of enactment of the FDAAA, the FDA must grant pediatric exclusivity no later than nine months prior to the date of expiration of patent or non-patent exclusivity in order for the six-month pediatric extension to apply to that exclusivity period.

Section 505(b)(2) new drug applications

Most drug products obtain FDA marketing approval pursuant to an NDA or an ANDA. A third alternative is a special type of NDA, commonly referred to as a Section 505(b)(2) NDA, which enables the applicant to rely, in part, on the FDA's previous approval of a similar product, or published literature, in support of its application.

505(b)(2) NDAs often provide an alternate path to FDA approval for new or improved formulations or new uses of previously approved products. Section 505(b)(2) permits the filing of an NDA where at least some of the information required for approval comes from studies not conducted by or for the applicant and for which the applicant has not obtained a right of reference. If the 505(b)(2) applicant can establish that reliance on the FDA's previous approval is scientifically appropriate, it may eliminate the need to conduct certain preclinical or clinical studies of the new product. The FDA may also require companies to perform additional studies or measurements to support the change from the approved product. The FDA may then approve the new product candidate for all or some of the label indications for which the referenced product has been approved, as well as for any new indication sought by the Section 505(b)(2) applicant.

To the extent that the Section 505(b)(2) applicant is relying on studies conducted for an already approved product, the applicant is required to certify to the FDA concerning any patents listed for the approved product in the Orange Book to the same extent that an ANDA applicant would. As a result, approval of a 505(b)(2) NDA can be stalled until all the listed patents claiming the referenced product have expired, until any non-patent exclusivity, such as exclusivity for obtaining approval of a new chemical entity, listed in the Orange Book for the referenced product has expired, and, in the case of a Paragraph IV certification and subsequent patent infringement suit, until the earlier of 30 months, settlement of the lawsuit or a decision in the infringement case that is favorable to the Section 505(b)(2) applicant.

Combination products

The FDA regulates combinations of products that cross FDA centers, such as biologic, drug or medical device components that are physically, chemically or otherwise combined into a single entity, as a combination product. The FDA center with primary jurisdiction for the combination product will take the lead in the premarket review of the product using that center's marketing application for submission purposes, with the other center consulting or collaborating with the lead center.

The FDA's Office of Combination Products, or OCP, determines which center will have primary jurisdiction for the combination product based on the combination product's "primary mode of action." A mode of action is the means by which a product achieves an intended therapeutic effect or action. The primary mode of action is the mode of action that provides the most important therapeutic action of the combination product, or the mode of action expected to make the greatest contribution to the overall intended therapeutic effects of the combination product.

Often it is difficult for the OCP to determine with reasonable certainty the most important therapeutic action of the combination product. In those difficult cases, the OCP will consider consistency with other combination products raising similar types of safety and effectiveness questions, or which center has the most expertise to evaluate the most significant safety and effectiveness questions raised by the combination product.

A sponsor may use a voluntary formal process, known as a Request for Designation, when the product classification is unclear or in dispute, to obtain a binding decision as to which center will regulate the combination product. If the sponsor objects to that decision, it may request that the agency reconsider that decision.

Biosimilars law

The Biologics Price Competition and Innovation Act of 2009, or BPCIA, amended the PHSA to create a new licensure framework for biosimilar products, which could ultimately subject our biological products to competition. Under the BPCIA, a manufacturer may submit an application for licensure of a biologic product that is "biosimilar to" or "interchangeable with" a referenced, branded biologic product. Previously, there had been no licensure pathway for such biosimilar or interchangeable products. For purposes of the BPCIA, a reference product is defined as the single biological product licensed under a full BLA against which a biological product is evaluated in an application submitted under a follow-on BLA.

The BPCIA also created a 12-year period of reference product exclusivity, which can be extended to $12^{1}/_{2}$ years with pediatric exclusivity. The 12-year exclusivity period begins on the date of first licensure of the reference product under the PHSA and during which the licensure of a follow-on application for a biosimilar or interchangeable product cannot be made effective. During the first four years (or four and one-half years with pediatric exclusivity) of the 12-year period, an application for a biosimilar or interchangeable version of the reference product cannot be submitted to the FDA. Under a budget proposal President Obama submitted to Congress in 2011, beginning in 2012, reference product exclusivity would decrease from 12 to seven years. Congress has not yet enacted, but could move to enact, such a decrease in the reference product exclusivity period.

The BPCIA includes limits on obtaining 12-year reference product exclusivity for certain changes or modifications to the reference product. A separate 12-year reference product exclusivity period does not apply to:

- a BLA supplement for the product that is the reference product;
- a subsequent BLA filed by the same reference product sponsor or manufacturer (or a licensor, predecessor in interest, or other related entity) for a change (not including a modification to the structure of the biological product) that results in a new indication, route of administration, dosing schedule, dosage form, delivery system, delivery device or strength; or
- a modification to the structure of the biological product that does not result in a change in safety, purity or potency.

The FDA has not yet issued proposed regulations setting forth its interpretation of the BPCIA's exclusivity provisions and it is unclear when the FDA will do so.

In addition to creating a 12-year period of reference product exclusivity, the BPCIA clarifies the interaction of that exclusivity with orphan drug exclusivity, such that the licensure of a biosimilar or interchangeable version of a reference product that was designated and approved as an orphan drug may only occur after the later of the expiration of any applicable seven-year orphan drug exclusivity or the 12-year reference product exclusivity (or seven and one-half years and $12^{1}/_{2}$ years with pediatric exclusivity).

Like pediatric exclusivity applicable to drug products approved under the FDCA, pediatric exclusivity applicable to biological reference products is subject to an exception. Pediatric exclusivity will not apply to either the 12-year reference product or the seven-year orphan drug exclusivity periods if the FDA determines later than nine months prior to the expiration of such period that the study reports a BLA sponsor submitted in response to a written request for pediatric studies met the terms of that request.

Our investigational biological products, if approved, could be considered reference products entitled to 12-year exclusivity. Even if our products are considered to be reference products eligible for exclusivity, another company could market a competing version of any of our biological products if the FDA approves a full BLA for such product containing the sponsor's own preclinical data and data from adequate and well-controlled clinical trials to demonstrate the safety, purity and potency of their product.

The BPCIA also sets forth a complex mechanism for resolving patent disputes that involves a step-wise exchange of information prior to the initiation of a patent infringement lawsuit against a biosimilar or interchangeable product sponsor. Unlike the Hatch-Waxman Act, the BPCIA provides no automatic stay on approval of a biosimilar or interchangeable product application.

Overview of FDA regulation of companion diagnostics

We are developing *in vitro* and *in vivo* companion diagnostics for use in selecting the patients that we believe will respond to our cancer therapeutics.

FDA officials have indicated that the agency intends to publish two draft guidances that together, when finalized, would address issues critical to developing *in vitro* companion diagnostics, such as biomarker qualification, establishing clinical validity, the use of retrospective data, the appropriate patient population and when the FDA will require that the device and the drug be approved simultaneously. The draft guidance issued in July 2011 states that if safe and effective use of a therapeutic depends on an *in vitro* diagnostic, then the FDA generally will require approval or clearance of the diagnostic at the same time that the FDA approves the therapeutic. The FDA has yet to issue further guidance, and it is unclear whether it will do so, or what the scope would be.

The FDA previously has required *in vitro* companion diagnostics intended to select the patients who will respond to the cancer treatment to obtain PMA, simultaneously with approval of the drug or licensure of the biologic. Based on the draft guidance, and the FDA's past treatment of companion diagnostics, we believe that the FDA will require one or more of our *in vitro* companion diagnostics to obtain PMA for our companion diagnostics to identify patient populations suitable for our cancer therapies, such as the *in vitro* companion diagnostic for MM-121. The review of these *in vitro* companion diagnostics in conjunction with the review of our cancer treatments involves coordination of review by CDER and by the FDA's Center for Devices and Radiological Health Office of In Vitro Diagnostics Device Evaluation and Safety.

Our *in vivo* companion diagnostics, which are in the form of imaging agents, are regulated as drugs by CDER and, as such, are generally subject to the regulatory requirements applicable to other new drug candidates.

PMA approval pathway

A medical device, including an *in vitro* diagnostic, or IVD, to be commercially distributed in the United States must receive either 510(k) clearance or PMA approval from the FDA prior to marketing. Devices deemed by the FDA to pose the greatest risk, such as life-sustaining, life supporting or implantable devices, or devices deemed not substantially equivalent to a previously 510(k) cleared device or a preamendment class III device for which PMA applications have not been called, are placed in Class III requiring PMA approval. The PMA approval pathway requires proof of the safety and effectiveness of the device to the FDA's satisfaction. The PMA approval pathway generally takes from one to three years or even longer from submission of the application.

A PMA application for an IVD must provide extensive preclinical and clinical trial data. Preclinical data for an IVD includes many different tests, including how reproducible the results are when the same sample is tested multiple times by multiple users at multiple laboratories. The clinical data need to establish that the test is sufficiently safe, effective and reliable in the intended use population. In addition, the FDA must be convinced that a device has clinical utility, meaning that an IVD provides information that is clinically meaningful. A biomarker's clinical significance may be obvious, or the applicant may be able to rely upon published literature or submit data to show clinical utility.

A PMA application also must provide information about the device and its components regarding, among other things, device design, manufacturing and labeling. The sponsor must pay an application fee.

As part of the PMA review, the FDA will typically inspect the manufacturer's facilities for compliance with Quality System Regulation, or QSR, requirements, which impose elaborate testing, control, documentation and other quality assurance procedures.

Upon submission, the FDA determines if the PMA application is sufficiently complete to permit a substantive review, and, if so, the FDA accepts the application for filing. The FDA then commences an in-depth review of the PMA application. The entire process typically takes one to three years, but may take longer. The review time is often significantly extended as a result of the FDA asking for more information or clarification of information already provided. The FDA also may respond with a not approvable determination based on deficiencies in the application and require additional clinical trials that are often expensive and time-consuming and can substantially delay approval.

During the review period, an FDA advisory committee, typically a panel of clinicians, likely will be convened to review the application and recommend to the FDA whether, or upon what conditions, the device should be approved. Although the FDA is not bound by the advisory panel decision, the panel's recommendation is important to the FDA's overall decision making process.

If the FDA's evaluation of the PMA application is favorable, the FDA typically issues an approvable letter requiring the applicant's agreement to specific conditions, such as changes in labeling, or specific additional information, such as submission of final labeling, in order to secure final approval of the PMA. If the FDA concludes that the applicable criteria have been met, the FDA will issue a PMA for the approved indications, which can be more limited than those originally sought by the manufacturer. The PMA can include post-approval conditions

that the FDA believes necessary to ensure the safety and effectiveness of the device, including, among other things, restrictions on labeling, promotion, sale and distribution. Failure to comply with the conditions of approval can result in material adverse enforcement action, including the loss or withdrawal of the approval.

Even after approval of a PMA, a new PMA or PMA supplement may be required in the event of a modification to the device, its labeling or its manufacturing process. Supplements to a PMA often require the submission of the same type of information required for an original PMA, except that the supplement is generally limited to the information needed to support the proposed change from the product covered by the original PMA.

Clinical trials

A clinical trial is almost always required to support a PMA application. In some cases, one or more smaller Investigational Device Exemption, or IDE, studies may precede a pivotal clinical trial intended to demonstrate the safety and efficacy of the investigational device.

All clinical studies of investigational devices must be conducted in compliance with the FDA's requirements. If an investigational device could pose a significant risk to patients pursuant to FDA regulations, the FDA must approve an IDE application prior to initiation of investigational use. IVD trials usually do not require an IDE, as the FDA does not judge them to be a significant risk because the results do not affect the patients in the study. However, for a trial where the IVD result directs the therapeutic care of patients with cancer, we believe that the FDA would consider the investigation to present significant risk.

An IDE application must be supported by appropriate data, such as laboratory test results, showing that it is safe to test the device in humans and that the testing protocol is scientifically sound. The FDA typically grants IDE approval for a specified number of patients. A nonsignificant risk device does not require FDA approval of an IDE. Both significant risk and nonsignificant risk investigational devices require approval from IRBs at the study centers where the device will be used.

During the trial, the sponsor must comply with the FDA's IDE requirements for investigator selection, trial monitoring, reporting and record keeping. The investigators must obtain patient informed consent, rigorously follow the investigational plan and study protocol, control the disposition of investigational devices and comply with all reporting and record keeping requirements. Prior to granting PMA approval, the FDA typically inspects the records relating to the conduct of the study and the clinical data supporting the PMA application for compliance with applicable requirements.

Although the QSR does not fully apply to investigational devices, the requirement for controls on design and development does apply. The sponsor also must manufacture the investigational device in conformity with the quality controls described in the IDE application and any conditions of IDE approval that the FDA may impose with respect to manufacturing.

Post-market

After a device is on the market, numerous regulatory requirements apply. These requirements include: the QSR, labeling regulations, the FDA's general prohibition against promoting products for unapproved or "off label" uses, the Medical Device Reporting regulation, which requires that manufacturers report to the FDA if their device may have caused or contributed

to a death or serious injury or malfunctioned in a way that would likely cause or contribute to a death or serious injury if it were to recur, and the Reports of Corrections and Removals regulation, which requires manufacturers to report recalls and field actions to the FDA if initiated to reduce a risk to health posed by the device or to remedy a violation of the FDCA.

The FDA enforces these requirements by inspection and market surveillance. If the FDA finds a violation, it can institute a wide variety of enforcement actions, ranging from a public warning letter to more severe sanctions such as: fines, injunctions and civil penalties; recall or seizure of products; operating restrictions, partial suspension or total shutdown of production; refusing requests for PMA approval of new products; withdrawing PMA approvals already granted; and criminal prosecution.

Other regulatory requirements

Any drug or biological products manufactured or distributed by us pursuant to FDA approvals are subject to pervasive and continuing regulation by the FDA, including, among other things, requirements relating to recordkeeping, periodic reporting, product sampling and distribution, advertising and promotion and reporting of adverse experiences with the product. After approval, most changes to the approved product, such as adding new indications or other labeling claims are subject to prior FDA review and approval.

The FDA may impose a number of post-approval requirements as a condition of approval of an NDA or BLA. For example, the FDA may require post-marketing testing, including phase 4 clinical trials, and surveillance to further assess and monitor the product's safety and effectiveness after commercialization. Regulatory approval of oncology products often requires that patients in clinical trials be followed for long periods to determine the overall survival benefit of the drug or biologic.

In addition, drug and biologic manufacturers and other entities involved in the manufacture and distribution of approved drugs and biological products are required to register their establishments with the FDA and state agencies, and are subject to periodic unannounced inspections by the FDA and these state agencies for compliance with cGMP requirements. Changes to the manufacturing process are strictly regulated and often require prior FDA approval before being implemented. FDA regulations also require investigation and correction of any deviations from cGMP and impose reporting and documentation requirements upon us and any third party manufacturers that we may decide to use. Accordingly, manufacturers must continue to expend time, money and effort in the areas of production and quality control to maintain cGMP compliance.

Once an approval is granted, the FDA may withdraw the approval if compliance with regulatory requirements and standards is not maintained or if problems occur after the product reaches the market. Later discovery of previously unknown problems with a product, including adverse events of unanticipated severity or frequency, or with manufacturing processes, or failure to comply with regulatory requirements, may result in revisions to the approved labeling to add new safety information, imposition of post-market studies or clinical trials to assess new safety risks or imposition of distribution or other restrictions under a Risk Evaluation and Mitigation Strategy program. Other potential consequences include, among other things:

- restrictions on the marketing or manufacturing of the product, complete withdrawal of the product from the market or product recalls;

- fines, warning letters or holds on post-approval clinical trials;
- refusal of the FDA to approve pending applications or supplements to approved applications, or suspension or revocation of product license approvals;
- product seizure or detention, or refusal to permit the import or export of products; or
- consent decrees, injunctions or the imposition of civil or criminal penalties.

The FDA strictly regulates marketing, labeling, advertising and promotion of products that are placed on the market. Drugs and biologics may be promoted only for the approved indications and in accordance with the provisions of the approved label. The FDA and other agencies actively enforce the laws and regulations prohibiting the promotion of off label uses, and a company that is found to have improperly promoted off label uses may be subject to significant liability.

Additional provisions

Anti-kickback and false claims laws

In addition to FDA restrictions on marketing of pharmaceutical products, several other types of state and federal laws have been applied to restrict certain marketing practices in the pharmaceutical industry in recent years. These laws include anti-kickback statutes and false claims statutes. The federal healthcare program anti-kickback statute prohibits, among other things, knowingly and willfully offering, paying, soliciting or receiving remuneration to induce or in return for purchasing, leasing, ordering or arranging for the purchase, lease or order of any healthcare item or service reimbursable under Medicare, Medicaid or other federally financed healthcare programs. This statute has been interpreted to apply to arrangements between pharmaceutical manufacturers on the one hand and prescribers, purchasers and formulary managers on the other. Violations of the anti-kickback statute are punishable by imprisonment, criminal fines, civil monetary penalties and exclusion from participation in federal healthcare programs. Although there are a number of statutory exemptions and regulatory safe harbors protecting certain common activities from prosecution or other regulatory sanctions, the exemptions and safe harbors are drawn narrowly, and practices that involve remuneration intended to induce prescribing, purchases or recommendations may be subject to scrutiny if they do not qualify for an exemption or safe harbor.

Federal false claims laws prohibit any person from knowingly presenting, or causing to be presented, a false claim for payment to the federal government, or knowingly making, or causing to be made, a false statement to have a false claim paid. Recently, several pharmaceutical and other healthcare companies have been prosecuted under these laws for allegedly inflating drug prices they report to pricing services, which in turn were used by the government to set Medicare and Medicaid reimbursement rates, and for allegedly providing free product to customers with the expectation that the customers would bill federal programs for the product. In addition, certain marketing practices, including off-label promotion, may also violate false claims laws. The majority of states also have statutes or regulations similar to the federal anti-kickback law and false claims laws, which apply to items and services reimbursed under Medicaid and other state programs, or, in several states, apply regardless of the payor.

Physician drug samples

As part of the sales and marketing process, pharmaceutical companies frequently provide samples of approved drugs to physicians. The Prescription Drug Marketing Act, or the PDMA, imposes requirements and limitations upon the provision of drug samples to physicians, as well as prohibits states from licensing distributors of prescription drugs unless the state licensing program meets certain federal guidelines that include minimum standards for storage, handling and record keeping. In addition, the PDMA sets forth civil and criminal penalties for violations.

Foreign regulation

In order to market any product outside of the United States, we would need to comply with numerous and varying regulatory requirements of other countries regarding safety and efficacy and governing, among other things, clinical trials, marketing authorization, commercial sales and distribution of our products. Whether or not we obtain FDA approval for a product, we would need to obtain the necessary approvals by the comparable regulatory authorities of foreign countries before we can commence clinical trials or marketing of the product in those countries. The approval process varies from country to country and can involve additional product testing and additional administrative review periods. The time required to obtain approval in other countries might differ from and be longer than that required to obtain FDA approval. Regulatory approval in one country does not ensure regulatory approval in another, but a failure or delay in obtaining regulatory approval in one country may negatively impact the regulatory process in others.

To date, other than applying for and being granted orphan medicinal product designation in the European Union for MM-398 for the treatment of pancreatic cancer, we have not initiated any discussions with the European Medicines Agency or any other foreign regulatory authorities with respect to seeking regulatory approval for any of our products in Europe or in any other country outside the United States.

The European Medicines Agency, or EMA, grants orphan medicinal product designation to promote the development of products that may offer therapeutic benefits for life-threatening or chronically debilitating conditions affecting not more than five in 10,000 people in the European Union. In addition, orphan medicinal product designation can be granted if the drug is intended for a life threatening, seriously debilitating or serious and chronic condition and without incentives it is unlikely that sales of the drug in the European Union would be sufficient to justify developing the drug. Orphan medicinal product designation is only available if there is no other satisfactory method approved in the European Union of diagnosing, preventing or treating the condition, or if such a method exists, the proposed orphan medicinal product will be of significant benefit to patients. Orphan medicinal product designation provides opportunities for free protocol assistance and fee reductions for access to the centralized regulatory procedures. Orphan medicinal product designation also provides ten years of market exclusivity following drug approval. The exclusivity period may be reduced to six years if the designation criteria are no longer met, including where it is shown that the product is sufficiently profitable not to justify maintenance of market exclusivity.

New legislation and regulations

From time to time, legislation is drafted, introduced and passed in Congress that could significantly change the statutory provisions governing the testing, approval, manufacturing

and marketing of products regulated by the FDA. For example, the FDAAA and the BPCIA discussed above were enacted in 2007 and 2010, respectively. In addition to new legislation, FDA regulations and policies are often revised or interpreted by the agency in ways that may significantly affect our business and our products. It is impossible to predict whether further legislative changes will be enacted or whether FDA regulations, guidance, policies or interpretations changed or what the effect of such changes, if any, may be.

Pharmaceutical coverage, pricing and reimbursement

Significant uncertainty exists as to the coverage and reimbursement status of any drug products for which we obtain regulatory approval. Sales of any of our product candidates, if approved, will depend, in part, on the extent to which the costs of the products will be covered by third party payors, including government health programs such as Medicare and Medicaid, commercial health insurers and managed care organizations. The process for determining whether a payor will provide coverage for a drug product may be separate from the process for setting the price or reimbursement rate that the payor will pay for the drug product once coverage is approved. Third party payors may limit coverage to specific drug products on an approved list, or formulary, which might not include all of the approved drugs for a particular indication.

In order to secure coverage and reimbursement for any product that might be approved for sale, we may need to conduct expensive pharmacoeconomic studies in order to demonstrate the medical necessity and cost-effectiveness of the product, in addition to the costs required to obtain FDA or other comparable regulatory approvals. Our product candidates may not be considered medically necessary or cost-effective. A payor's decision to provide coverage for a drug product does not imply that an adequate reimbursement rate will be approved. Third party reimbursement may not be sufficient to enable us to maintain price levels high enough to realize an appropriate return on our investment in product development.

The containment of healthcare costs has become a priority of federal, state and foreign governments, and the prices of drugs have been a focus in this effort. Third party payors are increasingly challenging the prices charged for medical products and services and examining the medical necessity and cost-effectiveness of medical products and services, in addition to their safety and efficacy. If these third party payors do not consider our products to be cost-effective compared to other available therapies, they may not cover our products after approval as a benefit under their plans or, if they do, the level of payment may not be sufficient to allow us to sell our products at a profit. The U.S. government, state legislatures and foreign governments have shown significant interest in implementing cost containment programs to limit the growth of government-paid health care costs, including price controls, restrictions on reimbursement and requirements for substitution of generic products for branded prescription drugs. Adoption of such controls and measures, and tightening of restrictive policies in jurisdictions with existing controls and measures, could limit payments for pharmaceuticals such as the drug candidates that we are developing and could adversely affect our net revenue and results.

Pricing and reimbursement schemes vary widely from country to country. Some countries provide that drug products may be marketed only after a reimbursement price has been agreed. Some countries may require the completion of additional studies that compare the cost-effectiveness of a particular product candidate to currently available therapies. For

example, the European Union provides options for its member states to restrict the range of drug products for which their national health insurance systems provide reimbursement and to control the prices of medicinal products for human use. European Union member states may approve a specific price for a drug product or may instead adopt a system of direct or indirect controls on the profitability of the company placing the drug product on the market. Other member states allow companies to fix their own prices for drug products, but monitor and control company profits. The downward pressure on health care costs in general, particularly prescription drugs, has become very intense. As a result, increasingly high barriers are being erected to the entry of new products. In addition, in some countries, cross-border imports from low-priced markets exert competitive pressure that may reduce pricing within a country. There can be no assurance that any country that has price controls or reimbursement limitations for drug products will allow favorable reimbursement and pricing arrangements for any of our products.

The marketability of any products for which we receive regulatory approval for commercial sale may suffer if the government and third party payors fail to provide adequate coverage and reimbursement. In addition, an increasing emphasis on managed care in the United States has increased and we expect will continue to increase the pressure on drug pricing. Coverage policies, third party reimbursement rates and drug pricing regulation may change at any time. In particular, the Patient Protection and Affordable Care Act was enacted in the United States in March 2010 and contains provisions that may reduce the profitability of drug products, including, for example, increased rebates for drugs sold to Medicaid programs, extension of Medicaid rebates to Medicaid managed care plans, mandatory discounts for certain Medicare Part D beneficiaries and annual fees based on pharmaceutical companies' share of sales to federal health care programs. Even if favorable coverage and reimbursement status is attained for one or more products for which we receive regulatory approval, less favorable coverage policies and reimbursement rates may be implemented in the future.

Employees

As of December 31, 2011, we had 211 full-time employees, including a total of 77 employees with M.D. or Ph.D. degrees. Of these full-time employees, 176 employees are engaged in research, development and manufacturing. None of our employees is represented by a labor union or covered by collective bargaining agreements. We consider our relationship with our employees to be good.

Facilities

Our principal facilities consist of approximately 77,000 square feet of research, manufacturing and office space located at One Kendall Square in Cambridge, Massachusetts. The lease on approximately 33,000 square feet of this space expires in April 2015. The lease on the remaining approximately 44,000 square feet of this space expires in April 2013, subject to our option to extend the lease for two individual one year terms to either April 2014 or April 2015. At the expiration of our lease in 2015, we retain an option to renew the lease on all of our current space for an additional five years.

The facilities of our Silver Creek subsidiary consist of approximately 1,715 square feet of research and office space located in San Francisco, California. The lease on this space expires in September 2012, subject to an option to extend the lease for six additional months.

Legal proceedings

We are currently engaged in three ongoing opposition proceedings to European patents in the European Patent Office to narrow or invalidate the claims of patents owned by third parties. We have obtained favorable interim decisions in all three oppositions. Two of these decisions are now under appeal, and the third may be appealed. The ultimate outcome of all three oppositions remains uncertain.

We filed our notice of opposition in the first proceeding, opposing a patent (EP 0896586) held by Genentech, in July 2007 on the grounds of added matter, insufficient disclosure, lack of novelty and lack of inventive step. Amgen and U3 Pharma also opposed the Genentech patent. If the issued claims of the Genentech patent were determined to be valid and construed to cover MM-121 or MM-111, our development and commercialization of these product candidates in Europe could be delayed or prevented. In August 2009, the European Patent Office issued a written decision rejecting several sets of Genentech's claims and upholding the patent solely on the basis of a further set of claims that we believe will not restrict the development or commercialization of MM-121 or MM-111. All parties have appealed this decision. Pending the outcome of the appeal proceedings, the original issued claims of the Genentech patent remain in effect. Each party has submitted written statements regarding the appeal to the European Patent Office. No date has been set for a hearing for the appeal.

We filed our notice of opposition in the second proceeding, opposing a patent (EP 1187634) held by Zensun (Shanghai) Science and Technology Ltd., or Zensun, in September 2008 on the grounds of added matter, insufficient disclosure, lack of novelty and lack of inventive step. If the issued claims of the Zensun patent were determined to be valid and construed to cover MM-111, our development and commercialization of MM-111 in Europe could be delayed or prevented. In August 2010, the European Patent Office issued a written decision revoking Zensun's patent. Zensun has appealed this decision. Pending the outcome of this appeal, the original issued claims of the Zensun patent remain in effect. Each party has submitted written statements regarding the appeal to the European Patent Office. No date has been set for a hearing for the appeal.

We filed our notice of opposition in the third proceeding, opposing a patent (EP 1414494) held by Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V., or Max-Planck, in December 2009 on the grounds of added matter, insufficient disclosure, lack of novelty and lack of inventive step. A number of other pharmaceutical companies are also opposing the Max-Planck patent. If the issued claims of the Max-Planck patent were determined to be valid and construed to cover MM-121, our development and commercialization of MM-121 in Europe could be delayed or prevented. In February 2011, the European Patent Office issued a favorable preliminary, non-binding opinion indicating that Max-Planck does not currently have any valid sets of claims on file with respect to this patent. A hearing for this opposition was scheduled for November 2011. However, in October 2011, Max-Planck withdrew its request for a hearing and requested that the opposition instead continue in writing. In December 2011, the European Patent Office issued a written decision revoking Max-Planck's patent. Max-Planck may appeal this decision.

We are not currently a party to any other material legal proceedings.

Management

The following table sets forth the name, age and position of each of our executive officers and directors as of December 31, 2011.

Name	Age	Position
Robert J. Mulroy(4)	47	President, Chief Executive Officer and Director
Fazal R. Khan, Ph.D.	62	Senior Vice President of Manufacturing
William M. McClements	48	Senior Vice President of Corporate Operations
Ulrik B. Nielsen, Ph.D.	39	Senior Vice President and Chief Scientific Officer
Clet M. Niyikiza, Ph.D.	53	Executive Vice President of Development
Edward J. Stewart	41	Senior Vice President and President, Merrimack Healthcare Solutions
William A. Sullivan	40	Chief Financial Officer and Treasurer
Gary L. Crocker(2)(4)	60	Chairman of the Board of Directors
James van B. Dresser(1)	70	Director
Gordon J. Fehr(1)(3)	78	Director
Robert C. Gay, Ph.D.(2)	60	Director
Walter M. Lovenberg, Ph.D.(3)	77	Director
Sarah E. Nash(1)	58	Director
Michael E. Porter, Ph.D.(4)	64	Director
Anthony J. Sinskey, Sc.D.(3)	71	Director

(1) Member of the audit committee.

(2) Member of the corporate governance and nominating committee.

(3) Member of the organization and compensation committee.

(4) Member of the executive committee.

Robert J. Mulroy has served as our President and Chief Executive Officer and a member of our board of directors since May 1999. Prior to joining us, Mr. Mulroy worked as a management consultant in the pharmaceutical and healthcare industries. Mr. Mulroy has also worked as a consultant in the field of international development and has served as an advisor to multiple start-up companies in the biotechnology industry. Mr. Mulroy holds a master's degree in public and private management from Yale University and a B.A. from Stanford University. We believe that Mr. Mulroy is qualified to serve on our board of directors because of his extensive executive leadership experience, many years of service as one of our directors and our President and Chief Executive Officer and extensive knowledge of our company and industry.

Fazal R. Khan, Ph.D. has served as our Senior Vice President of Manufacturing since April 2006. Prior to joining us, Dr. Khan served as Vice President of Manufacturing for Cellective Therapeutics, Inc., Vice President of Manufacturing Operations at Human Genome Sciences and Director of Biopharmaceuticals Development and Manufacturing at Hoffmann-LaRoche, Inc. Dr. Khan holds a Ph.D. and an M.S. in biochemistry and a B.S. in biology from Aligarh University in India.

William M. McClements has served as our Senior Vice President of Corporate Operations since September 2011. Previously, Mr. McClements served as Chief Human Resources Officer of Integreon Managed Solutions, Inc., a global research and business services company, from May 2010 to September 2011. Prior to that, Mr. McClements served as Chief Operating Officer and a partner at Monitor Group, a global strategic advisory firm, where he worked from 1987 to May 2010. From September 2009 to March 2010, Mr. McClements also served as Acting President of Be the Change Inc., a non-profit focused on creating national issue-based campaigns. Mr. McClements holds an M.B.A. from Harvard University and a B.A. from Williams College.

Ulrik B. Nielsen, Ph.D. has served as our Senior Vice President and Chief Scientific Officer since March 2009. Dr. Nielsen has also served as President and Chief Executive Officer and as a member of the board of directors of Silver Creek Pharmaceuticals, Inc., since July 2010. Dr. Nielsen was one of our co-founders and has been leading our research and drug discovery since March 2002, first as our Director of Research from March 2002 to December 2004 and then as our Vice President of Research from January 2005 to February 2009. Prior to joining us, Dr. Nielsen was a post-doctoral fellow at The Massachusetts Institute of Technology, or MIT, where he researched the interface among biology, engineering and computational biology. Dr. Nielsen holds a Ph.D. in molecular biology and an M.S. in biochemistry from the University of Copenhagen.

Clet M. Niyikiza, Ph.D. has served as our Executive Vice President of Development since February 2010. Dr. Niyikiza served as our Senior Vice President of Product Development from July 2009 to February 2010. Previously, Dr. Niyikiza served as Vice President and Medicine Development Leader at GlaxoSmithKline, overseeing product development and global anti-cancer medicine development strategy, from 2005 to July 2009. Prior to that, Dr. Niyikiza held multiple high level positions at Eli Lilly and Company, where he ultimately led the oncology translational and applied genomics research division. Dr. Niyikiza holds a Ph.D. in mathematical sciences and an M.A. in mathematics from Indiana University.

Edward J. Stewart has served as our Senior Vice President and President, Merrimack Healthcare Solutions, since December 2011. Mr. Stewart served as our Director of Business Development from August 2001 to July 2006, as our Senior Director of Business Development from August 2006 to July 2007, as our Vice President of Business Development from July 2007 to March 2009 and as our Senior Vice President of Business Development from March 2009 to December 2011. Mr. Stewart began his career at KPMG Peat Marwick LLP in the life sciences strategy consulting group. Mr. Stewart holds an M.B.A. from the Johnson Graduate School of Management at Cornell University and a B.S. in biology from Bates College.

William A. Sullivan has served as our Chief Financial Officer since May 2011 and our Treasurer since February 2010. Mr. Sullivan served as our Controller from November 2007 to February 2010 and our Vice President of Finance from February 2010 to May 2011. Previously, Mr. Sullivan served as Corporate Controller of Vette Corp., a thermal management solutions company, from October 2004 to November 2007. Mr. Sullivan began his career at Arthur Andersen LLP, where he obtained his certified public accountant license. Mr. Sullivan holds an M.B.A. and an M.S. in accounting from Northeastern University's Graduate School of Professional Accounting and a B.A. in economics from Williams College.

Gary L. Crocker has served as a member of our board of directors since 2004 and as chairman of our board of directors since 2005. Mr. Crocker is President, Manager and Chairman of

Crocker Ventures, LLC, a privately-held life science investment firm funding differentiated technologies in the areas of biotechnology and medical devices. Mr. Crocker has held senior executive positions or served on the board of directors of several privately-held life science companies, including as chairman of the board of ARUP Laboratories, co-founder and director of Theratech, Inc., President and Chief Executive Officer, founder and member of the board of directors of Research Medical, Inc. and as a member of the board of directors of Interleuken Genetics, Inc., The Med-Design Corporation and LineaGen Genetics, LLC. Mr. Crocker served as a member of the board of the Federal Reserve Branch of San Francisco from 1999 to 2007. Mr. Crocker also serves as a member of the board of directors of Sorenson Legacy Foundation. Mr. Crocker holds an M.B.A. and a B.S. in economics from Harvard University. We believe that Mr. Crocker is qualified to serve on our board of directors due to his experience in the life sciences industry as an entrepreneur, venture capitalist and executive and his service on the boards of directors of a range of public and private companies and government institutions, as well as his ability to provide us with his expertise in diagnostics and therapeutic development.

James van B. Dresser has served as a member of our board of directors since 1999. From 1970 until his retirement in 1997, Mr. Dresser held various consulting and leadership positions at The Boston Consulting Group, including serving as the firm's first Chief Administrative Officer from 1982 to 1997. Mr. Dresser served on the Board of Trustees of Wesleyan University from 1990 until 1993 and again from 1995 until 2009, when he also served as the chairman of the Board of Trustees. Mr. Dresser currently serves as a selectman for the Town of Salisbury, Connecticut. Mr. Dresser holds an M.B.A. from Harvard University, an M.A. from the Fletcher School of Law and Diplomacy at Tufts University and a B.A. from Wesleyan University. We believe that Mr. Dresser is qualified to serve on our board of directors due to his background and experience in business and organizational strategy, both as a consultant for and the chief administrative officer of a global management consulting firm and his prior board service.

Gordon J. Fehr has served as a member of our board of directors since 1999. Mr. Fehr recently retired from the board of directors of the Research Institute of McGill University Health Centers, where he served from 1996 to October 2011. In 1963, Mr. Fehr joined Pfizer Canada, Inc., or Pfizer Canada, as the Assistant to the President of Pfizer Canada and later became Pfizer Canada's Controller and the General Manager of the Chemical Division. In 1972, Mr. Fehr was named Chairman and President of Pfizer Canada, a position he held until his retirement in 1994. Mr. Fehr served as a member of the board of directors of Labopharm, Inc. from 1998 to 2007. Mr. Fehr also served as President and Chairman of the Montreal Board of Trade from 1983 to 1984 and as a member of the board of directors of the Montreal Airport Authority from 1992 to 2002. In addition, Mr. Fehr has served on advisory boards for the National Research Council's Biotechnology Research Institute and the Montreal Center of Innovative Technology, where he was Chairman of the biotechnology committee. Mr. Fehr holds a B.Eng. in chemical engineering from McGill University. We believe that Mr. Fehr is qualified to serve on our board of directors due to his expertise in the commercialization of pharmaceuticals, his leadership and management experience from his service as an executive for a public pharmaceutical company and his knowledge of our business and industry.

Robert C. Gay, Ph.D. has served as a member of our board of directors since 2007. Dr. Gay currently is a Managing Director and the Chief Executive Officer of Huntsman Gay Global Capital, a private equity firm, which he co-founded in 2008. From 2004 to 2007, Dr. Gay served as a Mission President for the Church of Jesus Christ of Latter-day Saints in Ghana. From 1989

to 2004, Dr. Gay was a Managing Director of Bain Capital. Prior to that, Dr. Gay served as an Executive Vice President of General Electric Credit Corporation Capital Markets Group. Dr. Gay serves on the board of directors of The Gymboree Corporation and Sunquest Information Systems, Inc. and serves as vice chairman of the board of directors of ICON Health & Fitness, Inc. Dr. Gay holds a Ph.D. in business economics from Harvard Business School and an A.B. from the University of Utah. We believe that Dr. Gay is qualified to serve on our board of directors due to his educational qualifications and his broad industry experience in business management, financing and development, as well as the unique perspective he brings from the range of executive positions and directorships that he has held and currently holds.

Walter M. Lovenberg, Ph.D. has served as a member of our board of directors since 2000. Dr. Lovenberg is the President of Lovenberg Associates, Inc., a privately-held corporation, a position he has held since 1993 and is also the current acting Chief Executive Officer and a director of Quantum Bio, Inc. Dr. Lovenberg served on the board of directors of OSI Pharmaceuticals, Inc. from 1994 until 2008 and as the chairman of the board of directors of Inflazyme Pharmaceuticals from 1996 until 2006. Dr. Lovenberg served as Executive Vice President and a member of the board of directors of Marion Merrell Dow, Inc. from 1989 until 1993. Dr. Lovenberg served as Chief of the section of Biochemical Pharmacology at the National Institutes of Health from 1968 to 1985. Dr. Lovenberg holds a Ph.D. from the George Washington University School of Medicine and Health Sciences and an M.S. in agricultural biochemistry and a B.S. in agriculture from Rutgers University. We believe that Dr. Lovenberg is qualified to serve on our board of directors due to his expertise and experience in drug discovery, development and management, his experience leading global research and development efforts, and his service on the board of directors at several pharmaceutical companies.

Sarah E. Nash has served as a member of our board of directors since 2006. Ms. Nash also currently serves on the boards of directors of Knoll Inc. and Blackbaud Inc. From 2000 until her retirement in 2005, Ms. Nash served as vice chairman of JPMorgan Chase & Co.'s Investment Bank where she was responsible for the firm's client relationships. Prior to that, Ms. Nash was the Regional Executive and Co-Head of Investment Banking for North America at JPMorgan Chase & Co. Previously, Ms. Nash served on the board of directors of Pathmark Stores, Inc. from 2005 to 2009 and AbitibiBowater from 2010 to 2011. Ms. Nash also serves as a Trustee for the New York-Presbyterian Hospital, a Trustee of Washington and Lee University and on the boards of The New York Historical Society, The New York Restoration Project and the Business Leadership Council of The City University of New York. Ms. Nash holds a B.A. from Vassar College. We believe that Ms. Nash is qualified to serve on our board of directors due to her financial expertise, her experience serving on the boards of other public and private companies and her management background as an executive in the financial services industry.

Michael E. Porter, Ph.D. has served as a member of our board of directors since December 2010 and has been a strategy advisor to us since 1999. Dr. Porter is the Bishop William Lawrence University Professor at Harvard Business School and has been on the faculty at Harvard Business School since 1973. Dr. Porter also serves on the boards of directors of Parametric Technology Corporation and Thermo Fisher Scientific Inc. Dr. Porter has written extensively on healthcare delivery and has worked with leading healthcare providers in multiple countries and with government leaders on healthcare policy issues. Dr. Porter holds a Ph.D. in business economics from Harvard University, an M.B.A. from Harvard Business School and a B.S.E. in aerospace and

mechanical engineering from Princeton University. We believe that Dr. Porter is qualified to serve on our board of directors due to his expertise in corporate strategy, healthcare delivery and the development of companies in the life sciences industry, as well as his experience as an advisor and consultant to many leading companies globally, including a range of healthcare and pharmaceutical companies.

Anthony J. Sinskey, Sc.D. has served as a member of our board of directors since 1999 and is one of our co-founders. Dr. Sinskey is a Professor of Microbiology and Engineering Systems at MIT and a Professor of Health Sciences and Technology at the Harvard-MIT Division of Health Sciences and Technology, and he has been a member of the faculty at MIT since 1968. Dr. Sinskey also holds positions as Co-Director of the Malaysia-MIT Biotechnology Partnership Program and as Faculty Director of the Center for Biomedical Innovation. Dr. Sinskey is a co-founder and a member of the boards of directors of Metabolix, Inc. and Tepha, Inc. and a consultant to several chemical and biotechnology companies. Dr. Sinskey received an Sc.D. from MIT and a B.S. from the University of Illinois, and he was a post-doctoral fellow at the Harvard School of Public Health. We believe that Dr. Sinskey is qualified to serve on our board of directors due to his experience in the startup and development of other pharmaceutical companies, his scientific expertise in the field of biology and his leadership experience gained from serving as a director of several pharmaceutical companies.

Board composition and election of directors

Our board of directors is currently authorized to have nine members.

All of our directors are elected annually for a one-year term until the next annual meeting of stockholders.

Our board of directors has determined that each of our directors, other than Mr. Mulroy, are independent directors, as defined by the applicable NASDAQ Marketplace Rules.

There are no family relationships among any of our directors or executive officers.

Board leadership structure

Our board of directors, upon the recommendation of our corporate governance and nominating committee, has determined that the roles of Chairman of the board and Chief Executive Officer should be separated at the current time. Accordingly, our board has appointed Mr. Crocker, an independent director within the meaning of NASDAQ Marketplace Rules, as the Chairman of the board of directors. Mr. Crocker's duties as Chairman of the board include the following:

- chairing meetings of the board and of the independent directors in executive session;
- meeting with any director who is not adequately performing his or her duties as a member of our board or any committee;
- facilitating communications between other members of our board and the Chief Executive Officer;
- determining the frequency and length of board meetings and recommending when special meetings of our board should be held;

- preparing or approving the agenda for each board meeting; and
- reviewing and, if appropriate, recommending action to be taken with respect to written communications from stockholders submitted to our board.

Our board of directors decided to separate the roles of Chairman and Chief Executive Officer because it believes that a bifurcated leadership structure offers the following benefits:

- increasing the independent oversight of our company and enhancing our board's objective evaluation of our Chief Executive Officer;
- freeing the Chief Executive Officer to focus on company operations instead of board administration;
- providing the Chief Executive Officer with an experienced sounding board;
- providing greater opportunities for communication between stockholders and our board;
- enhancing the independent and objective assessment of risk by our board; and
- providing an independent spokesman for our company.

Board committees

Our board of directors has established an audit committee, a corporate governance and nominating committee, an organization and compensation committee and an executive committee, each of which operates under a charter that has been approved by our board. The composition of each committee will be effective upon the closing of this offering.

Our board of directors has determined that all of the members of the audit committee, the corporate governance and nominating committee and the organization and compensation committee are independent as defined under The NASDAQ Marketplace Rules, including, in the case of all the members of our audit committee, the independence requirements contemplated by Rule 10A-3 under the Securities Exchange Act of 1934, as amended, or the Exchange Act.

Audit committee

The members of our audit committee are Mr. Dresser, Mr. Fehr and Ms. Nash. Ms. Nash chairs the audit committee. Upon the closing of this offering, our audit committee's responsibilities will include:

- appointing, approving the compensation of, and assessing the independence of our registered public accounting firm;
- overseeing the work of our independent registered public accounting firm, including through the receipt and consideration of reports from such firm;
- reviewing and discussing with management and the independent registered public accounting firm our annual and quarterly financial statements and related disclosures;
- monitoring our internal control over financial reporting, disclosure controls and procedures and code of business conduct and ethics;
- overseeing our internal audit function;

- overseeing our risk assessment and risk management policies;
- establishing policies regarding hiring employees from the independent registered public accounting firm and procedures for the receipt and retention of accounting-related complaints and concerns;
- meeting independently with our internal auditing staff, registered public accounting firm and management;
- reviewing and approving or ratifying any related person transactions; and
- preparing the audit committee report required by SEC rules.

All audit and non-audit services, other than *de minimis* non-audit services, to be provided to us by our independent registered public accounting firm must be approved in advance by our audit committee.

Our board of directors has determined that Mr. Fehr is an "audit committee financial expert" as defined in applicable SEC rules. We believe that the composition of our audit committee meets the requirements for independence under the current NASDAQ Marketplace and SEC rules and regulations.

Corporate governance and nominating committee

The members of our corporate governance and nominating committee are Mr. Crocker and Dr. Gay. Dr. Gay chairs the corporate governance and nominating committee. Upon the closing of this offering, our corporate governance and nominating committee's responsibilities will include:

- identifying individuals qualified to become members of our board;
- recommending to our board the persons to be nominated for election as directors and to each of our board's committees;
- reviewing and making recommendations to our board with respect to our board leadership structure;
- developing and recommending to our board corporate governance principles; and
- overseeing an annual evaluation of our board.

Organization and compensation committee

The members of our organization and compensation committee are Mr. Fehr, Dr. Lovenberg and Dr. Sinskey. Mr. Fehr chairs the organization and compensation committee. Upon the closing of this offering, our organization and compensation committee's responsibilities will include:

- annually reviewing and approving corporate goals and objectives relevant to the compensation of our Chief Executive Officer and our other executive officers;
- determining our Chief Executive Officer's compensation;

- reviewing and approving, or making recommendations to our board with respect to, the compensation of our other executive officers;
- overseeing an evaluation of our executive officers;
- overseeing and administering our cash and equity incentive plans;
- reviewing and making recommendations to our board with respect to director compensation;
- reviewing and making recommendations to our board with respect to management succession planning;
- reviewing and discussing annually with management our "Compensation discussion and analysis" disclosure required by SEC rules; and
- preparing the organization and compensation committee report required by SEC rules.

Executive committee

The members of our executive committee are Mr. Crocker, Mr. Mulroy and Dr. Porter. Mr. Crocker chairs the executive committee. Upon the closing of this offering, our executive committee will have, and may exercise, when necessary, all of the authority and powers of our full board of directors during the intervals between meetings of our board, except as limited by Delaware law.

Compensation committee interlocks and insider participation

None of our executive officers serves as a member of the board of directors or compensation committee, or other committee serving an equivalent function, of any other entity that has one or more of its executive officers serving as a member of our board of directors or our organization and compensation committee. None of the members of our organization and compensation committee has ever been our employee.

Executive compensation

Compensation discussion and analysis

Overview

This section discusses the principles underlying our policies and decisions with respect to the compensation of our executive officers and the most important factors relevant to an analysis of these policies and decisions. This section also describes the material elements of compensation awarded to, earned by or paid to each of our named executive officers for 2011. Our "named executive officers" for 2011 are Robert J. Mulroy, our President and Chief Executive Officer, William A. Sullivan, our Chief Financial Officer and Treasurer, and our three other most highly compensated executive officers, Fazal R. Khan, our Senior Vice President of Manufacturing, Ulrik B. Nielsen, our Senior Vice President and Chief Scientific Officer, and Clet M. Niyikiza, our Executive Vice President of Development. In addition, this section provides qualitative information regarding the manner and context in which compensation is awarded to and earned by our executive officers and is intended to place in perspective the data presented in the tables and narrative that follow.

Our organization and compensation committee oversees our policies governing the compensation for our executive officers. In this role, the organization and compensation committee reviews and approves all compensation decisions relating to our named executive officers. Our organization and compensation committee consists of three members of our board of directors, all of whom have extensive experience in our industry and each of whom is an independent director. Our organization and compensation committee uses its judgment and experience and has historically considered the recommendations of our President and Chief Executive Officer when determining the amount and appropriate mix of compensation for each of our executive officers. Specifically, our President and Chief Executive Officer provides input and recommendations, via an annual review of executive performance and otherwise, regarding salary adjustments, the corporate and individual goals used to determine annual performance-based cash bonuses and appropriate equity incentive compensation levels. Historically, our President and Chief Executive Officer has provided input to the organization and compensation committee on his own compensation, but has not had any control over setting the amount or mix of his compensation and is not present when the organization and compensation committee discusses his compensation.

The organization and compensation committee periodically evaluates the need for revisions to our executive compensation program to ensure our program is competitive with the companies with which we compete for executive talent.

Objectives and philosophy of our executive compensation program

The primary objectives of the organization and compensation committee with respect to executive compensation are to:

- attract, retain and motivate experienced and talented executives;
- ensure executive compensation is aligned with our corporate strategies, research and development programs and business goals;

- recognize the individual contributions of executives but foster a shared commitment among executives by aligning their individual goals with our corporate goals;

- promote the achievement of key strategic, development and operational performance measures by linking compensation to the achievement of measurable corporate and individual performance goals; and

- align the interests of our executives with our stockholders by rewarding performance that leads to the creation of stockholder value.

To achieve these objectives, the organization and compensation committee evaluates our executive compensation program with the goal of setting compensation at levels that are justifiable based on each executive's level of experience, performance and responsibility and that the committee believes are competitive with those of other companies in our industry and our region that compete with us for executive talent. In addition, our executive compensation program ties a portion of each executive's overall compensation to the achievement of key corporate and individual goals. We provide a portion of our executive compensation in the form of stock options that vest over time, which we believe helps to retain our executives and aligns their interests with those of our stockholders by allowing them to participate in the longer term success of our company as reflected in the appreciation of our stock price.

Use of compensation consultants and market benchmarking

Our organization and compensation committee considers publicly available compensation data for national and regional companies in the biotechnology industry to help guide its executive compensation decisions at the time of hiring and for subsequent adjustments in compensation. Historically, our organization and compensation committee has also retained the services of Mercer, LLC, or Mercer, an independent compensation consultant, to provide it with additional comparative data on executive compensation practices in our industry and to advise it on our executive compensation program generally. Although the organization and compensation committee considers Mercer's advice and recommendations about our executive compensation program, the organization and compensation committee ultimately makes its own decisions about these matters.

Mercer has in the past, most recently in 2010, provided our organization and compensation committee with comparative data showing where our total compensation and each element of our compensation rated among (1) both public and private companies in the biotechnology and life sciences industry generally, according to compensation data from the 2010 Radford Global Life Sciences Survey, and (2) a peer group of publicly traded companies in the life science industry at a stage of development, market capitalization or size comparable to ours with which the organization and compensation committee believes we compete against for executive talent. The companies included in this peer group in 2010 were:

Achillion Pharmaceuticals, Inc.	Ariad Pharmaceuticals, Inc.	Pharmasset, Inc.
Acorda Therapeutics, Inc.	Micromet, Inc.	Rigel Pharmaceuticals, Inc.
Affymax Inc.	Oculus Innovative Sciences	Targacept, Inc.
Allos Therapeutics, Inc.	Osiris Therapeutics, Inc.	Trubion Pharmaceuticals, Inc.

In addition, in May 2011, Mercer provided our organization and compensation committee with comparative data with respect to severance and change in control benefits among (1) both

public and private companies in general and (2) an updated peer group of publicly traded companies in the life science industry at a stage of development, market capitalization or size comparable to ours with which the organization and compensation committee believes we compete against for executive talent. The companies included in this peer group in 2011 were:

Achillion Pharmaceuticals, Inc.	Exelixis, Inc.	Pharmasset, Inc.
Acorda Therapeutics, Inc.	Ironwood Pharmaceuticals, Inc.	Rigel Pharmaceuticals, Inc.
Allos Therapeutics, Inc.	Micromet, Inc.	Seattle Genetics, Inc.
Ariad Pharmaceuticals, Inc.	Osiris Therapeutics, Inc.	Targacept, Inc.
Aveo Pharmaceuticals, Inc.		

This peer group is subject to further change, and we expect that our organization and compensation committee will continue to periodically review and update the list. The changes made to the peer group between 2010 and 2011 consist of:

- the removal of Affymax Inc. and Oculus Innovative Sciences, which our organization and compensation committee deemed to no longer have market capitalizations similar to ours as a result of our growth;
- the removal of Trubion Pharmaceuticals, Inc., which was acquired in 2010;
- the addition of Aveo Pharmaceuticals, Inc. and Ironwood Pharmaceuticals, Inc., which completed their initial public offerings in 2010; and
- the addition of Exelixis, Inc. and Seattle Genetics, Inc., which our organization and compensation committee deemed to have market capitalizations and oncology pipelines similar to ours.

The peer groups are used for purposes of gathering data to compare against our existing executive compensation practices and for guiding future compensation decisions. Our compensation consultant also makes suggestions for changes to our executive compensation practices based on the data they provide to us as well as compensation trends in our industry. However, although the organization and compensation committee may consider peer group and other industry compensation data and the recommendations of our compensation consultant when making decisions related to executive compensation, to date, it has not made and does not intend to make adjustments to overall executive compensation or any element thereof solely or primarily either to target a specified threshold level of compensation or market benchmark within the peer group, our larger industry or some other group of comparable companies or to act on the recommendations of our compensation consultant.

Annual compensation review process

During the first calendar quarter of each year, we evaluate each executive's performance for the prior year. Our President and Chief Executive Officer, with respect to each executive other than himself, prepares a written evaluation based on his evaluation of the executive and input from others within our company. Our President and Chief Executive Officer also prepares his own self assessment. This process leads to a recommendation by our President and Chief

Executive Officer to the organization and compensation committee with respect to each executive officer, including himself, as to:

- the achievement of stated corporate and individual performance goals;
- the level of contributions made to the general management and guidance of the company;
- the need for salary increases;
- the amount of bonuses to be paid; and
- whether or not stock option awards should be made.

These recommendations are reviewed by the organization and compensation committee and taken into account when it makes a final determination on all such matters.

Components of our executive compensation program

The primary elements of our executive compensation program are:

- base salary;
- annual performance-based cash bonuses;
- equity incentive awards;
- broad-based health and welfare benefits; and
- severance and change in control benefits.

We do not have a formal or informal policy for allocating between long-term and short-term compensation, between cash and non-cash compensation or among different forms of non-cash compensation. Instead, our organization and compensation committee, after reviewing information provided by our compensation consultant, and other relevant data, determines subjectively what it believes to be the appropriate level and mix of the various compensation components. We generally strive to provide our named executive officers with a balance of short-term and long-term incentives to encourage consistently strong performance. Ultimately, the objective in allocating between long-term and currently paid compensation is to ensure adequate base compensation to attract and retain personnel, while providing incentives to maximize long-term value for our company and our stockholders. Therefore, we provide cash compensation in the form of base salary to meet competitive salary norms and reward good performance on an annual basis and in the form of bonus compensation to incent and reward superior performance based on specific annual goals. To further focus our executives on longer-term performance and the creation of stockholder value, we rely upon equity-based awards that vest over a meaningful period of time. In addition, we provide our executives with benefits that are generally available to our salaried employees, including medical, dental, group life insurance, accidental death, dismemberment insurance, long and short term disability insurance, medical and dependent care flexible spending accounts, personal welfare reimbursement stipends and matching contributions in our 401(k) plan. Finally, we offer our executives severance benefits to incentivize them to continue to strive to achieve stockholder value in connection with change in control situations.

Base salary

We use base salaries to recognize the experience, skills, knowledge and responsibilities of our employees, including our executive officers. Base salaries for our named executive officers typically are established through arm's length negotiation at the time the executive is hired, taking into account the position for which the executive is being considered and the executive's qualifications, prior experience and prior salary. None of our executive officers is currently party to an employment agreement that provides for automatic or scheduled increases in base salary. However, on an annual basis, our organization and compensation committee reviews and evaluates, with input from our President and Chief Executive Officer, the need for adjustment of the base salaries of our executives based on changes and expected changes in the scope of an executive's responsibilities, including promotions, the individual contributions made by and performance of the executive during the prior fiscal year, the executive's performance over a period of years, overall labor market conditions, the relative ease or difficulty of replacing the executive with a well-qualified person, our overall growth and development as a company and general salary trends in our industry and among our peer group and where the executive's salary falls in the salary range presented by that data. In making decisions regarding salary increases, we may also draw upon the experience of members of our board of directors with other companies. No formulaic base salary increases are provided to our named executive officers, and we do not target the base salaries of our named executive officers at a specified compensation level within our peer group or other market benchmark.

The following table sets forth the annual base salary for 2010 and 2011 for our named executive officers:

Executive	2010 Base salary(1)	2011 Base salary(1)
Robert J. Mulroy *President and Chief Executive Officer*	$ 432,253	$ 457,330
William A. Sullivan *Chief Financial Officer and Treasurer*	240,000	247,200
Fazal R. Khan *Senior Vice President of Manufacturing*	309,811	319,932
Ulrik B. Nielsen *Senior Vice President and Chief Scientific Officer*	287,370	302,940
Clet M. Niyikiza *Executive Vice President of Development*	329,892	341,651

(1) The adjustments to the 2010 base salaries were effective February 1, 2010 (July 1, 2010 for Mr. Sullivan) and the adjustments to the 2011 base salaries were effective April 1, 2011.

For 2011, the organization and compensation committee determined to adjust the base salaries of each of our named executive officers based on their overall performance in 2010, their increased level of experience and, as a result of our continued growth in our industry, to ensure that their salaries remained competitive with those of similarly situated executives in our peer group.

We expect that, in the first quarter of 2012, the organization and compensation committee will evaluate whether to adjust the base salaries of each named executive officer for 2012.

Annual performance-based cash bonus

We have designed our annual performance-based cash bonus program to emphasize pay-for-performance and to reward our named executive officers for (1) the achievement of specified annual corporate objectives, (2) the achievement of specified annual individual performance objectives and (3) the achievement of specified objectives that support the overall management of the company and the creation of long-term value for our stockholders, which we refer to as the general management contribution. Each executive officer is eligible to receive an annual performance-based cash bonus, which we refer to as an annual cash bonus, in an amount up to a fixed percentage of his base salary, or bonus percentage, and each of the foregoing three elements is weighted equally in determining the percentage of the annual cash bonus that the executive will receive.

The annual corporate objectives component of the annual cash bonus focuses on the achievement of specific research, clinical, regulatory, operational and financial milestones. The corporate objectives are proposed by senior management each year in the company's annual operating plan that is reviewed and approved by our board of directors at its regularly scheduled meeting in the fourth quarter of our fiscal year, with such modifications as the board deems appropriate. The annual individual performance objectives component of the annual cash bonus focuses on contributions made by each individual executive officer within their respective areas of responsibility that facilitate the achievement of our corporate objectives. Each executive officer, including our President and Chief Executive Officer, proposes his own annual individual objectives prior to the start of the company's fiscal year relating to building our long-term capabilities, which are then reviewed and approved by the organization and compensation committee, with such modifications as the committee deems appropriate. Achievement of the corporate and individual objectives is measured on a successful/unsuccessful basis and proportionate achievement of a particular goal is not taken into account. Our organization and compensation committee has the authority to shift both corporate and individual goals to subsequent fiscal years and eliminate them from the current year's bonus calculation if it determines that circumstances that were beyond the control of the executive were the primary cause of a goal being unattainable. The corporate and individual objectives established by our board of directors and the organization and compensation committee are designed to require significant effort and operational success on the part of our executives and our company, but also to be achievable with hard work and dedication.

The general management contribution of each executive officer, including our President and Chief Executive Officer, is evaluated retrospectively by our President and Chief Executive Officer, who reports his findings to the organization and compensation committee. Historically, each executive has been evaluated on his contributions to the following areas:

- the improvement of processes and efficiency;
- the development of human and scientific capacity; and
- the development and management of stakeholders, including partners, collaborators, investigators, stockholders and licensees.

Each executive's contributions are evaluated on a scale of 0 to 3, with 0 meaning that the executive made no contribution, 1 meaning that the executive's contributions were below expectations, 2 meaning that the executive's contributions met expectations and 3 meaning that the executive's contributions exceeded expectations. The executive's scores in each of the categories for the particular year are totaled and the ratio of the executive's score to the maximum number of points that the executive could have earned across all categories is used to determine what portion of this element of the annual cash bonus that the executive will earn. The organization and compensation committee reviews and has the authority to approve the evaluation prepared by our President and Chief Executive Officer or to adjust it in a manner that it sees fit. While this element of the annual cash bonus is inherently subjective in nature, we believe it is important to recognize the contributions made by our executives that do not appear in the operating plan, via objective individual goals or on our financial statements. These contributions may have an impact beyond the current fiscal year, and we believe that giving a partial weighting in the annual cash bonus calculation to these intangible contributions made by an executive is appropriate in light of our long-term goal of developing a motivated workforce and creating stockholder value.

The bonus percentages for each executive are set by the organization and compensation committee. The bonus percentages that are proposed by our organization and compensation committee are derived from peer group data that is adjusted to match the level of qualification and experience of the executive candidate, but are guided by our overarching "team-based" philosophy. Our organization and compensation committee believes that our executive officers should function as a team and that one way to foster a collaborative, team-based environment is to provide for each executive officer to have a similar bonus percentage.

Our organization and compensation committee has authority to, in its sole discretion, adjust the bonus percentage each year in connection with its review of the executive's performance and has authority to allow an executive to receive a bonus payment in excess of his or her annual cash bonus for exceptional performance. Further, our organization and compensation committee reviews the assessment of each executive's performance conducted by the organization and compensation committee with respect to the annual cash bonus and retains the authority, in its sole discretion, to modify the amount of the annual cash bonus above or below the amount recommended by the organization and compensation committee.

2011 bonuses

For 2011, Mr. Mulroy is eligible to receive an annual cash bonus of up to 50% of his 2011 base salary and each of Dr. Khan, Dr. Nielsen, Dr. Niyikiza and Mr. Sullivan are eligible to receive annual cash bonuses of up to 40% of their 2011 base salaries. The bonus percentages for our named executive officers for 2011 are the same as in 2010.

For 2011, the annual corporate objectives, which account for one-third of the annual cash bonus for each of our named executive officers, were as follows:

- advance our five most advanced product candidates in clinical development;
- implement and advance a diagnostic strategy in all clinical stage programs;

- deliver three lead molecules that were designed using Network Biology into preclinical development;
- expand the application and capabilities of Network Biology across therapeutic, diagnostic and technology applications; and
- secure additional funding through financings and business development.

For 2011, the individual goals for each of our named executive officers account for one-third of their annual cash bonus. The individual goals for our named executive officers are primarily related to the corporate goals for which they are most responsible and, to a lesser extent, individual development goals or department specific goals.

Mr. Mulroy's individual objectives for 2011 related to developing a commercial strategy, securing a partner to support our diagnostic efforts, positioning us for additional subsidiaries based on Network Biology, completing a series G convertible preferred stock financing and preparing us for this offering.

Mr. Sullivan's individual objectives for 2011 related to implementing an improved materials control system, preparing our operating plan for 2012, preparing us for this offering and implementing the necessary public company reporting and other structures for after the completion of this offering.

Mr. Khan's individual objectives for 2011 related to completing various manufacturing and process development milestones related to MM-398, MM-121, MM-111, MM-151 and MM-141.

Dr. Nielsen's individual objectives for 2011 related to advancing our preclinical product candidates, overseeing the organizational development and scientific advancement of Silver Creek and extending Network Biology into additional therapeutic fields.

Dr. Niyikiza's individual objectives for 2011 related to the initiation and advancement of clinical trials of MM-398, MM-121, MM-111, MM-302 and MM-151 and gaining the support for our clinical strategies from our clinical advisory group.

We expect that, in the first quarter of 2012, the organization and compensation committee will evaluate the achievement of the 2011 corporate objectives, the achievement of the 2011 individual performance objectives and the general management contribution of each named executive officer for purposes of determining actual bonus amounts for our executive officers for 2011.

The following table sets forth each named executive officer's annual cash bonus eligibility (both as a percentage of annual base salary and in actual dollars). As disclosed above, notwithstanding the annual cash bonus assessment performed by the organization and compensation committee for each executive officer, our organization and compensation committee retains full discretion to adjust each executive officer's annual cash bonus beyond the amount calculated.

Name	2011 Base salary	Annual bonus percentage range	Target cash bonus
Robert J. Mulroy	$ 457,330	0-50%	$ 228,665
William A. Sullivan	247,200	0-40	98,880
Fazal R. Khan	319,932	0-40	127,973
Ulrik B. Nielsen	302,940	0-40	121,176
Clet M. Niyikiza	341,651	0-40	136,660

Equity incentive awards

Our equity award program is the primary vehicle for offering long-term incentives to our executives. While we do not currently have any equity ownership guidelines for our executives, we believe that equity grants provide our executives with a strong link to our long-term performance, create an ownership culture and help to align the interests of our executives and our stockholders. Because our executives profit from stock options only if our stock price increases relative to the stock option's exercise price, we believe stock options provide meaningful incentives to our executives to achieve increases in the value of our stock over time. In addition, the vesting feature of our equity grants contributes to executive retention by providing an incentive to our executives to remain employed by us during the vesting period. Prior to this offering, our executives were eligible to participate in the 2008 stock incentive plan, as amended, or the 2008 plan, and the 1999 stock option plan, as amended, or the 1999 plan. During 2011, all stock options were granted pursuant to the 2008 plan. Following the closing of this offering, our employees and executives will be eligible to receive stock-based awards pursuant to the 2011 stock incentive plan, or the 2011 plan. Under the 2011 plan, executives will be eligible to receive grants of stock options, restricted stock, restricted stock units, stock appreciation rights and other stock-based equity awards at the discretion of our organization and compensation committee.

We use stock options to compensate our named executive officers both in the form of initial grants in connection with the commencement of employment and generally on an annual basis thereafter. Our organization and compensation committee may also make additional discretionary grants, typically in connection with the promotion of an employee, to reward an employee, for retention purposes or for other circumstances recommended by management. Typically, the stock options we grant to our executives vest quarterly over a three year period. Vesting and exercise rights cease shortly after termination of employment except in the case of death or disability. Prior to the exercise of an option, the holder has no rights as a stockholder with respect to the shares subject to such option, including voting rights or the right to receive dividends or dividend equivalents.

In determining the size of the annual stock option grants to our executives, our organization and compensation committee is guided by our overarching team-based philosophy. To help

foster collaboration among our named executive officers, our organization and compensation committee has historically aimed to make equal annual grants of options to each executive officer. In determining the amount of the annual stock option grants, our organization and compensation committee considers recommendations developed by our compensation consultant, including information regarding comparative stock ownership and equity grants received by the executives in our peer group and our industry. In addition, our organization and compensation committee considers our corporate performance, the potential for enhancing the creation of value for our stockholders, the amount of equity previously awarded to the executives and the vesting of such awards.

We have historically granted stock options with exercise prices that are set at no less than the fair market value of shares of our common stock on the date of grant as determined by our organization and compensation committee with the assistance and recommendation of management, in good faith based on a number of objective and subjective factors, including contemplating valuations prepared by an external consultant. The exercise price of all stock options granted after the closing of this offering will be equal to the fair market value of shares of our common stock on the date of grant, which generally will be determined by reference to the closing market price of our common stock on the date of grant. Following this offering, we intend to grant equity awards annually.

2011 grants

In May 2011, as part of our annual grant process and consistent with our team-based approach, our organization and compensation committee granted an option to purchase 50,000 shares of our common stock to each of our named executive officers. In addition, in May 2011, our organization and compensation committee granted an option to purchase an additional 50,000 shares to each of Dr. Khan, Dr. Nielsen and Dr. Niyikiza, reflecting the balance of annual grants that we intended to make in December 2010 but could not grant at that time due to an insufficient number of authorized shares of common stock available for issuance under our 2008 plan. Each of these options vests quarterly over a three year period. The exercise price of each option grant is $5.54, the fair market value of our common stock on the date of grant as determined by our organization and compensation committee.

Benefits and other compensation

We believe that establishing competitive benefit packages for our employees is an important factor in attracting and retaining highly qualified personnel. We maintain broad-based benefits that are provided to all employees, including medical, dental, group life insurance, accidental death, dismemberment insurance, long and short term disability insurance, medical and dependent care flexible spending accounts, personal welfare reimbursement stipends and matching contributions in our 401(k) plan. All of our executives are eligible to participate in all of our employee benefit plans, in each case on the same basis as other employees. Under our 401(k) plan, we are permitted to make discretionary contributions and matching contributions, subject to established limits and a vesting schedule. Currently, we match 50% of employee contributions up to a maximum contribution by us of 3% of the employee's salary. The match vests at 25% per year over four years. We also provide each employee, including our executives, with an annual $1,250 work welfare stipend that can be used to pay for services such as personal professional development, public transportation passes, gym memberships and medical insurance co-pays. Our executives are also entitled to supplemental long-term disability

insurance coverage that is not available to our other employees. We provide a tax-gross up payment to our executives to compensate them for the additional tax cost of receiving this benefit. Consistent with our compensation philosophy, we intend to continue to maintain our current benefits for our named executive officers. The organization and compensation committee in its discretion may revise, amend or add to the named executive officer's benefits and perquisites if it deems it advisable.

In particular circumstances, we sometimes award cash signing bonuses when executives first join us. Such cash signing bonuses typically must be repaid in full if the executive voluntarily terminates employment with us prior to the first anniversary of the date of hire. Whether a signing bonus is paid and the amount of the bonus is determined on a case-by-case basis under the specific hiring circumstances. For example, we will consider paying signing bonuses to compensate for amounts forfeited by an executive upon terminating prior employment, to assist with relocation expenses or to create additional incentive for an executive to join our company in a position where there is high market demand.

Severance and change in control benefits

Pursuant to employment agreements we have entered into with our executives, our executives are entitled to specified benefits in the event of the termination of their employment under specified circumstances, including termination following a change in control of our company. Please refer to "—Employment agreements" for a more detailed discussion of these benefits. We have provided estimates of the value of the severance payments made and other benefits provided to executives under various termination circumstances, under the caption "—Potential payments upon termination or change in control" below.

We believe providing these benefits helps us compete for executive talent. After reviewing the practices of companies represented in the compensation peer group, we believe that our severance and change in control benefits are generally in line with severance packages offered to executives of the companies in our peer group.

We have structured our change in control benefits as "double trigger" benefits. In other words, the change in control does not itself trigger benefits. Rather, benefits are paid only if the employment of the executive is terminated during a specified period after the change in control. We believe a "double trigger" benefit maximizes stockholder value because it prevents an unintended windfall to executives in the event of a friendly change in control, while still providing them appropriate incentives to cooperate in negotiating any change in control in which they believe they may lose their jobs.

Risk considerations in our compensation program

Our organization and compensation committee has reviewed and evaluated the philosophy and standards on which our compensation plans have been developed and implemented across our company. It is our belief that our compensation programs do not encourage inappropriate actions or risk taking by our executive officers. We do not believe that any risks arising from our employee compensation policies and practices are reasonably likely to have a material adverse effect on our company. In addition, we do not believe that the mix and design of the components of our executive compensation program encourage management to assume excessive risks. We believe that our current business process and planning cycle fosters the

behaviors and controls that would mitigate the potential for adverse risk caused by the action of our executives.

We believe that our current business process and planning cycle fosters the following behaviors and controls that mitigate the potential for adverse risk caused by the action of our executives:

- annual establishment of corporate and individual objectives for our performance-based cash bonus programs for our executive officers that are consistent with our annual operating and strategic plans, that are designed to achieve the proper risk/reward balance, and that should not require excessive risk taking to achieve;

- the mix between fixed and variable, annual and long-term and cash and equity compensation are designed to encourage strategies and actions that balance the company's short-term and long-term best interests; and

- stock option awards vest over a period of time, which we believe encourages executives to take a long-term view of our business.

Tax and accounting considerations

Section 162(m) of the Internal Revenue Code of 1986, as amended, which will become applicable to us upon the closing of this offering, subject to certain transition rules, generally disallows a tax deduction for compensation in excess of $1.0 million paid to our chief executive officer, our chief financial officer and our three other most highly paid executive officers (other than our chief executive officer and chief financial officer). Qualifying performance-based compensation is not subject to the deduction limitation if specified requirements are met. We intend to periodically review the potential consequences of Section 162(m) and we generally intend to structure the performance-based portion of our executive compensation, where feasible, to comply with exemptions in Section 162(m) so that the compensation will remain tax deductible to us. However, the organization and compensation committee may, in its judgment, authorize compensation payments that do not comply with the exemptions in Section 162(m) when it believes that such payments are appropriate to attract and retain executive talent and are in the best interests of our stockholders.

We account for equity compensation paid to our employees in accordance with FASB Accounting Standards Codification Topic 718, *Compensation—Stock Compensation*, or ASC 718, which requires us to measure and recognize compensation expense in our financial statements for all stock-based payments based on an estimate of their fair value over the service period of the award. We record cash compensation as an expense at the time the obligation is accrued.

Summary compensation table

The following table sets forth the total compensation awarded to, earned by or paid to our named executive officers during 2010 and 2011.

Name and principal position	Year	Salary ($)	Option awards ($)(1)	Non-equity incentive plan compensation ($)(2)	All other compensation ($)(3)	Total ($)
Robert J. Mulroy(4)	2011	451,886	181,000	—	12,913	645,799
President and Chief Executive Officer	2010	432,253	—	217,776	12,892	662,921
William A. Sullivan	2011	245,400	181,000	—	9,282	435,682
Chief Financial Officer and Treasurer	2010	205,485	260,714	76,800	5,496	548,495
Fazal R. Khan(5)	2011	317,603	362,000	—	11,167	690,770
Senior Vice President of Manufacturing						
Ulrik B. Nielsen	2011	299,334	362,000	—	9,287	670,621
Senior Vice President and Chief Scientific Officer	2010	287,370	334,125	105,596	8,985	736,076
Clet M. Niyikiza	2011	339,163	362,000	—	1,246	702,409
Executive Vice President of Development	2010	329,892	230,852	121,402	2,184	684,330

(1) The amounts in the "Option awards" column reflect the aggregate grant date fair value of stock options granted during the year computed in accordance with the provisions of ASC 718, excluding the impact of estimated forfeitures related to service-based vesting conditions (which in our case were none). The assumptions that we used to calculate these amounts are discussed in Note 16 to our financial statements appearing at the end of this prospectus.

(2) The amounts in the "Non-equity incentive plan compensation" column represent awards to our named executive officers under our annual cash bonus program. Annual bonus compensation for 2011 will be determined and paid in 2012, at which time we will disclose such amounts in a filing under Item 5.02(f) of Form 8-K.

(3) Amounts represent the value of perquisites and other personal benefits, which are further detailed below for 2011.

Name	401(k) Match ($)	Group life and disability insurance premium ($)	Tax gross-ups ($)(a)	Stipend ($)(b)	Total ($)
Robert J. Mulroy	3,345	9,120	448	—	12,913
William A. Sullivan	7,350	234	448	1,250	9,282
Fazal R. Khan	7,350	2,119	448	1,250	11,167
Ulrik B. Nielsen	7,350	239	448	1,250	9,287
Clet M. Niyikiza	—	798	448	—	1,246

(a) Represents the value of the tax gross-up payment provided to executives to compensate them for the additional tax cost of receiving supplemental long-term disability insurance coverage.

(b) Represents the value of the work welfare stipend, described above in "Benefits and other compensation" provided to the executive.

(4) Mr. Mulroy is also a member of our board of directors, but does not receive any additional compensation in his capacity as a director.

(5) Dr. Khan was not a named executive officer for 2010.

Grants of plan-based awards in 2011

The following table sets forth information regarding grants of plan-based awards to our named executive officers during 2011.

Name	Grant date	Estimated future payouts under non-equity incentive plan awards			All other option awards: number of securities underlying options (#)	Exercise or base price of option awards ($/share)(2)	Grant date fair value of option awards ($)(3)
		Threshold ($)	Target ($)(1)	Maximum ($)			
Robert J. Mulroy	5/3/2011	—	228,665	—	—	—	—
	5/3/2011	—	—	—	50,000	5.54	181,000
William A. Sullivan	5/3/2011	—	98,880	—	—	—	—
	5/3/2011	—	—	—	50,000	5.54	181,000
Fazal R. Khan	5/3/2011	—	127,973	—	—	—	—
	5/3/2011	—	—	—	100,000	5.54	362,000
Ulrik B. Nielsen	5/3/2011	—	121,176	—	—	—	—
	5/3/2011	—	—	—	100,000	5.54	362,000
Clet M. Niyikiza	5/3/2011	—	136,660	—	—	—	—
	5/3/2011	—	—	—	100,000	5.54	362,000

(1) The target amounts in the "Estimated future payouts under non-equity incentive plan awards" column represent the amount determined by our organization and compensation committee as the target annual cash bonus payable to each executive officer for 2011. On May 3, 2011, our organization and compensation committee established the annual cash bonus targets for 2011, as a percentage of annual base salary, for each executive officer.

(2) The exercise price per share of each option award is equal to the fair value per share of our common stock on the date of grant as determined by our board of directors.

(3) The amounts in the "Grant date fair value of option awards" column reflect the grant date fair value of option awards granted in 2011 calculated in accordance with ASC 718.

Outstanding equity awards at December 31, 2011

The following table sets forth information regarding outstanding stock options held by our named executive officers as of December 31, 2011.

Name	Number of securities underlying unexercised options exercisable (#)	Number of securities underlying unexercised options unexercisable (#)	Option exercise price ($/share)	Option expiration date
Robert J. Mulroy	75,000	—	2.19	8/2/2012
	50,000	—	2.19	5/8/2013
	158,048	—	1.25	8/30/2014
	141,952	—	1.25	8/30/2014
	25,837	—	1.25	8/3/2015
	224,163	—	1.25	8/3/2015
	43,247	—	1.71	8/3/2015
	456,753	—	1.71	8/3/2015
	52,985	—	2.47	1/23/2017
	97,015	—	2.47	1/23/2017
	26,689	—	2.59	10/4/2017
	248,311	—	2.59	10/4/2017
	581,249	193,751(1)	2.12	11/4/2019
	8,333	41,677(2)	5.54	5/2/2021
William A. Sullivan	75,000	—	2.12	12/4/2017
	16,500	—	2.12	5/4/2018
	35,000	—	1.81	9/21/2018
	45,000	15,000(1)	2.12	11/4/2019
	62,500	87,500(3)	2.69	12/21/2020
	8,333	41,667(2)	5.54	5/2/2021
Fazal R. Khan	150,000	—	1.71	2/24/2016
	23,412	—	2.47	10/3/2016
	11,588	—	2.47	10/3/2016
	21,946	—	2.59	10/4/2017
	93,054	—	2.59	10/4/2017
	262,500	—	1.81	9/21/2018
	135,000	45,000(1)	2.12	11/4/2019
	20,833	29,167(3)	2.69	12/21/2020
	16,666	83,334(2)	5.54	5/2/2021
Ulrik B. Nielsen	4,368	—	2.19	8/2/2012
	10,483	—	2.19	5/8/2013
	150,000	—	1.25	8/30/2014
	82,977	—	1.71	8/3/2015
	17,023	—	1.71	8/3/2015
	48,175	—	2.47	10/3/2016
	26,825	—	2.47	10/3/2016
	53,378	—	2.59	10/4/2017
	146,622	—	2.59	10/4/2017
	250,000	—	1.81	9/21/2018
	135,000	45,000(1)	2.12	11/4/2019
	58,333	41,667(4)	2.12	1/31/2020
	25,000	35,000(3)	2.69	10/14/2020
	20,833	29,167(3)	2.69	12/21/2020
	16,666	83,334(2)	5.54	5/2/2021
Clet M. Niyikiza	133,333	66,667(5)	2.12	11/4/2019
	58,333	41,667(4)	2.12	1/31/2020
	20,833	29,167(3)	2.69	12/21/2020
	16,666	83,334(3)	5.54	5/2/2021

(1) The unvested shares under this option are scheduled to vest in approximately equal quarterly installments through August 1, 2012.

(2) The unvested shares under this option are scheduled to vest in approximately equal quarterly installments through May 1, 2014.

(3) The unvested shares under this option are scheduled to vest in approximately equal quarterly installments through July 1, 2013.

(4) The unvested shares under this option are scheduled to vest in approximately equal quarterly installments through January 1, 2013.

(5) The unvested shares under this option are scheduled to vest in approximately equal quarterly installments through November 1, 2012.

Option exercises and stock vested

The following table sets forth information regarding stock options exercised by our named executive officers during 2011.

	Option awards	
Name	Number of shares acquired on exercise (#)	Value realized on exercise ($)
Robert J. Mulroy	82,481	209,311

None of our named executive officers held any restricted stock that vested in 2011.

Employment agreements

In August and September 2011, we entered into amended and restated employment agreements with each of our executive officers. Each of these agreements provides for an employment term continuing until December 31, 2012, unless earlier terminated in accordance with the agreement. Each agreement renews automatically thereafter for successive one-year terms, unless either we or the executive officer gives notice of non-renewal.

These employment agreements prohibit our executive officers, during the term of employment and any severance period and for a period of one year thereafter, from competing with us and soliciting or hiring our employees. Our executive officers also are bound by the terms of separate non-competition, non-solicitation, non-disclosure and developments agreements.

Pursuant to the terms of these employment agreements, our named executive officers who were serving as executive officers as of December 31, 2011 receive the following base salaries and are eligible for the following bonus percentages.

Name	Annual base salary	Bonus percentage
Robert J. Mulroy	$ 457,330	50%
William A. Sullivan	247,200	40
Fazal R. Khan	319,932	40
Ulrik B. Nielsen	302,940	40
Clet M. Niyikiza	341,651	40

Upon execution and effectiveness of a severance agreement and release of claims, each executive officer is entitled to severance payments if we terminate the executive officer's employment without cause, as defined in the employment agreement, including our decision not to renew the executive officer's term of employment, or the executive officer terminates employment with us for good reason, as defined in the employment agreement.

If an executive officer's employment terminates under these circumstances, in each case prior to a change in control, as defined in the employment agreement, we are obligated for a period of 12 months to pay such executive officer his base salary, pay for coverage for such executive officer under any company sponsored insurance and benefit programs available to our senior management employees and, to the extent allowed by applicable law and the applicable plan documents, continue to provide to such executive officer all company employee benefit plans and arrangements available to our senior management employees. In addition, we would be obligated to pay to each of our executive officers a pro-rata bonus for the portion of the year in which such executive officer was employed by us based on his average annual bonus payments over each of the three years prior to the year of termination, or such lesser period during which such executive officer served as one of our executive officers.

If an executive officer's employment terminates under these circumstances, in each case within 18 months following a change in control, we are obligated to pay such executive officer a lump sum amount equal to 36 months of his base salary plus a bonus equal to three times the average of his annual bonus payments over each of the three years prior to the year of termination, or such lesser period during which such executive officer served as one of our executive officers, accelerate the vesting of all outstanding stock options, restricted stock or other equity awards granted to the executive officer, pay for coverage for such executive officer under any company sponsored insurance and benefit programs available to our senior management employees for a period of 18 months and, to the extent allowed by applicable law and the applicable plan documents, continue to provide to such executive officer all company employee benefit plans and arrangements available to our senior management employees for a period of 18 months.

If we terminate an executive officer's employment due to disability, the executive officer will be eligible to receive a pro-rata bonus for the portion of the year in which such executive officer was employed by us based on his average annual bonus payments over each of the three years prior to the year of termination, or such lesser period during which such executive officer served as one of our executive officers.

Potential payments upon termination or change in control

The following tables set forth information regarding potential payments that each named executive officer who was serving as an executive officer as of December 31, 2011 would have received if the executive officer's employment had terminated as of December 31, 2011 under the circumstances set forth below.

	Termination without cause or for good reason prior to a change in control	
Name	**Cash payment**	**Value of benefits**
Robert J. Mulroy	$ 642,424	$ 22,271
William A. Sullivan	324,000	13,874
Fazal R. Khan	425,381	13,270
Ulrik B. Nielsen	403,700	1,095
Clet M. Niyikiza	452,352	13,270

	Termination without cause or for good reason within 18 months following a change in control		
Name	Cash payment	Value of stock options with accelerated vesting(1)	Value of benefits
Robert J. Mulroy	$ 1,927,273	$ 1,333,007	$ 33,406
William A. Sullivan	972,000	655,325	20,812
Fazal R. Khan	1,276,143	493,644	19,904
Ulrik B. Nielsen	1,211,099	1,001,163	1,643
Clet M. Niyikiza	1,357,056	929,382	19,904

(1) The value of stock options with accelerated vesting represents the value of unvested stock options based on the difference between the exercise price of the options per share and $9.00 per share, which is the midpoint of the price range set forth on the cover page of this prospectus.

	Termination for disability
Name	Cash payment
Robert J. Mulroy	$ 185,094
William A. Sullivan	76,800
Fazal R. Khan	105,449
Ulrik B. Nielsen	100,760
Clet M. Niyikiza	110,701

Pension benefits

We do not maintain any defined benefit pension plans.

Nonqualified deferred compensation

We do not maintain any nonqualified deferred compensation plans.

Stock option and other employee benefit plans

The four equity incentive plans described in this section are the 2011 plan, the 2008 plan, the 1999 plan and the 2011 employee stock purchase plan, or the 2011 ESPP. Prior to this offering, we granted awards to eligible participants under the 1999 plan and the 2008 plan. Following the closing of this offering, we expect to grant awards to eligible participants under the 2011 plan and to grant options to eligible employees under the 2011 ESPP.

2011 stock incentive plan

Our 2011 plan was adopted by our board of directors in August 2011 and approved by our stockholders in October 2011. Our 2011 plan will become effective immediately prior to the closing of this offering. The 2011 plan provides for the grant of incentive stock options, non-qualified stock options, stock appreciation rights, restricted stock awards, restricted stock units and other stock-based awards. Upon effectiveness of the plan, the number of shares of our common stock that will be reserved for issuance under the 2011 plan will be the sum of 3,500,000 shares plus (1) the number of shares of our common stock then available for issuance under the 1999 plan and the 2008 plan, both described below, that remain available for grant immediately prior to the closing of this offering, (2) the number of shares of our common stock

subject to outstanding awards under the 1999 plan and the 2008 plan, both described below, that expire, terminate or are otherwise surrendered, cancelled, forfeited or repurchased by us at their original issuance price pursuant to a contractual repurchase right, in the aggregate up to 18,669,858 shares, and (3) an annual increase, to be added on the first day of each fiscal year beginning in fiscal year 2013 and each subsequent anniversary until the expiration of the 2011 plan, equal to the lowest of (a) 4,500,000 shares of our common stock, (b) 3.5% of the number of shares of our common stock outstanding on the first day of the fiscal year and (c) an amount determined by our board of directors.

Our employees, officers, directors, consultants and advisors are eligible to receive awards under the 2011 plan. However, incentive stock options may only be granted to our employees. The maximum number of shares of our common stock with respect to which awards may be granted to any participant under the 2011 plan is 2,000,000 per calendar year. For purposes of this limit on the maximum number of shares that may be awarded to any participant, the combination of an option in tandem with a stock appreciation right will be treated as a single award.

Pursuant to the terms of the 2011 plan, our board of directors administers the plan and, subject to any limitations in the plan, selects the recipients of awards and determines:

- the number of shares of our common stock covered by options and the dates upon which the options become exercisable;
- the type of options to be granted;
- the duration of options, which may not be in excess of ten years;
- the exercise price of options, which may not be less than the fair market value of our common stock on the date of grant of the options; and
- the number of shares of our common stock subject to any stock appreciation rights, restricted stock awards, restricted stock units or other stock-based awards and the terms and conditions of such awards, including conditions for repurchase, issue price and repurchase price.

Our board of directors has delegated authority to Mr. Mulroy to grant awards under the 2011 plan. Mr. Mulroy has the power to make awards to all of our employees, except himself, any other executive officer, any other employee at or above the director level or its equivalent or any person that our board of directors or our organization and compensation committee designates in writing. Mr. Mulroy is not authorized to grant options for more than 50,000 shares of our common stock to any person in any one year and is not authorized to grant options for more than 1,000,000 shares of our common stock in the aggregate. Mr. Mulroy is required to maintain a list of the options granted pursuant to this authority and report to our organization and compensation committee upon request. The exercise price of such options will be equal to the closing price of our common stock on the second trading day of the month following the month that includes the date of grant.

Upon a merger or other reorganization event, our board of directors may, in its sole discretion, take any one or more of the following actions pursuant to the 2011 plan as to some or all outstanding awards other than restricted stock:

- provide that all outstanding awards shall be assumed, or substantially equivalent awards shall be substituted, by the acquiring or successor corporation (or an affiliate thereof);
- upon written notice to a participant, provide that all of the participant's unexercised awards will terminate immediately prior to the consummation of such reorganization event unless exercised by the participant;
- provide that outstanding awards shall become exercisable, realizable or deliverable, or restrictions applicable to an award shall lapse, in whole or in part, prior to or upon such reorganization event;
- in the event of a reorganization event pursuant to which holders of shares of our common stock will receive a cash payment for each share surrendered in the reorganization event, make or provide for a cash payment to the participants with respect to each award held by a participant equal to (1) the number of shares of common stock subject to the vested portion of the award (after giving effect to any acceleration of vesting that occurs upon or immediately prior to such reorganization event) multiplied by (2) the excess, if any, of the cash payment for each share surrendered in the reorganization event over the exercise, measurement or purchase price of such award and any applicable tax withholdings, in exchange for the termination of such award; and
- provide that, in connection with a liquidation or dissolution, awards shall convert into the right to receive liquidation proceeds.

In the case of certain restricted stock units, no assumption or substitution is permitted, and the restricted stock units will instead be settled in accordance with the terms of the applicable restricted stock unit agreement.

Upon the occurrence of a reorganization event other than a liquidation or dissolution, the repurchase and other rights with respect to outstanding restricted stock will continue for the benefit of the successor company and will, unless the board of directors may otherwise determine, apply to the cash, securities or other property into which shares of our common stock are converted or exchanged pursuant to the reorganization event, unless otherwise provided in the agreement, including any amendment, evidencing the restricted stock award. Upon the occurrence of a reorganization event involving a liquidation or dissolution, all restrictions and conditions on each outstanding restricted stock award will automatically be deemed terminated or satisfied, unless otherwise provided in the agreement evidencing the restricted stock award.

At any time, our board of directors may, in its sole discretion, provide that any award under the 2011 plan will become immediately exercisable in full or in part, free of some or all restrictions or conditions, or otherwise realizable in full or in part.

No award may be granted under the 2011 plan on or after October 3, 2021. Our board of directors may amend, suspend or terminate the 2011 plan at any time, except that stockholder approval will be required to comply with applicable law or stock market requirements.

2008 stock incentive plan

Our 2008 plan was adopted by our board of directors in April 2008 and approved by our stockholders in May 2008. Our 2008 plan was amended in October 2010 and April 2011. Upon the closing of this offering and the effectiveness of our 2011 plan, we do not expect to grant any additional awards under the 2008 plan.

The 2008 plan provides for the grant of incentive stock options, non-statutory stock options, restricted stock awards, restricted stock units and other stock-based awards. The number of shares of our common stock that are reserved for issuance under the 2008 plan is the sum of 7,200,000 shares plus such additional number of shares of our common stock as is equal to the sum of (1) the number of shares of our common stock reserved for issuance under the 1999 plan, described below, that remained available for grant upon the effectiveness of the 2008 plan and (2) the number of shares of our common stock subject to awards granted under the 1999 plan that expire, terminate or are otherwise surrendered, canceled, forfeited or repurchased by us at their original issuance price pursuant to a contractual repurchase right, in the aggregate up to 19,592,788 shares.

Our employees, officers, directors, consultants and advisors are eligible to receive awards under the 2008 plan. However, incentive stock options may only be granted to our employees.

Upon a merger or other reorganization event, our board of directors may, in its sole discretion, take any one or more of the following actions pursuant to the 2008 plan as to some or all outstanding awards other than restricted stock:

- provide that all outstanding awards shall be assumed, or substantially equivalent awards shall be substituted, by the acquiring or successor corporation (or an affiliate thereof);
- upon written notice to a participant, provide that all of the participant's unexercised awards will terminate immediately prior to the consummation of such reorganization event unless exercised by the participant;
- provide that outstanding awards shall become exercisable, realizable or deliverable, or restrictions applicable to an award shall lapse, in whole or in part, prior to or upon such reorganization event;
- in the event of a reorganization event pursuant to which holders of shares of our common stock will receive a cash payment for each share surrendered in the reorganization event, make or provide for a cash payment to the participants with respect to each award held by a participant equal to the excess, if any, of the cash payment for each share surrendered in the reorganization event over the exercise price of such award and any applicable tax withholdings, in exchange for the termination of such award; and
- provide that, in connection with a liquidation or dissolution, awards shall convert into the right to receive liquidation proceeds.

Upon the occurrence of a reorganization event other than a liquidation or dissolution, the repurchase and other rights with respect to outstanding restricted stock will continue for the benefit of the successor company and will, unless the board of directors may otherwise determine, apply to the cash, securities or other property into which shares of our common stock are converted or exchanged pursuant to the reorganization event. Upon the occurrence

of a reorganization event involving a liquidation or dissolution, all restrictions and conditions on each outstanding restricted stock award will automatically be deemed terminated or satisfied, unless otherwise provided in the agreement evidencing the restricted stock award.

At any time, our board of directors may, in its sole discretion, provide that any award under the 2008 plan will become immediately exercisable in full or in part, free of some or all restrictions or conditions, or otherwise realizable in full or in part.

As of December 31, 2011, there were options to purchase an aggregate of 11,192,106 shares of common stock outstanding under the 2008 plan at a weighted average exercise price of $2.91 per share and an aggregate of 52,695 shares of common stock issued upon the exercise of options granted under the 2008 plan. Following effectiveness of our 2011 plan, we will grant no further stock options or other awards under the 2008 plan. However, any shares of common stock reserved for issuance under the 2008 plan that remain available for issuance and any shares of common stock subject to awards under the 2008 plan that expire, terminate, or are otherwise surrendered, canceled, forfeited or repurchased without having been fully exercised or resulting in any common stock being issued shall be available for grant under the 2011 plan up to a specified number of shares.

1999 stock option plan

Our 1999 plan was adopted by our board of directors and approved by our stockholders in May 1999. Our 1999 plan was amended in March 2000, December 2001, December 2003, March 2006 and October 2007. A maximum of 12,600,000 shares of common stock was authorized for issuance under the 1999 plan.

The 1999 plan provides for the grant of incentive stock options and non-statutory stock options. Our officers, employees and consultants were eligible to receive awards under the 1999 plan. However, incentive stock options were only granted to our employees.

In the event of a consolidation or merger, the sale or exchange of all or substantially all of our assets or a reorganization or liquidation, each holder of an option will be entitled to receive, upon exercise of such option, the same shares, securities or property as he would have been entitled to receive upon the occurrence of such exercise if the holder had exercised his option prior to such transaction; provided, however, that in lieu of the foregoing, our board of directors may, in its sole discretion, take any one or more of the following actions pursuant to the 1999 Plan as to some or all outstanding awards:

- upon written notice to a participant, provide that all of the participant's unexercised options will terminate on a date not less than 20 days after the date of such notice unless exercised by the participant; and

- in connection with such written notice to a participant, provide for the acceleration or waiver of any deferred exercise period.

As of December 31, 2011, there were options to purchase an aggregate of 6,424,910 shares of common stock outstanding under the 1999 plan at a weighted average exercise price of $1.96 per share and an aggregate of 1,300,282 shares of common stock issued upon the exercise of options granted under the 1999 plan. After the effective date of the 2008 plan, we granted no additional awards under the 1999 plan and any shares of common stock reserved for issuance under the 1999 plan that remained then available for issuance were available for issuance

under the 2008 plan up to a specified number of shares. Any shares of common stock subject to awards under the 1999 plan that expire, terminate, or are otherwise surrendered, canceled, forfeited or repurchased without having been fully exercised or resulting in any common stock being issued will be available for issuance under the 2011 plan, up to a specified number of shares.

2011 employee stock purchase plan

Our 2011 ESPP was adopted by our board of directors in August 2011 and approved by our stockholders in October 2011. Our 2011 ESPP will become effective upon the closing of this offering. The 2011 ESPP provides eligible employees with the opportunity to purchase up to an aggregate of 1,500,000 shares of our common stock.

All of our employees and all employees of a designated subsidiary, as defined in the 2011 ESPP, are eligible to participate in the 2011 ESPP, subject to limited exceptions set forth in the 2011 ESPP.

However, no employee is eligible to receive an option to purchase shares of our common stock under the 2011 ESPP that would result in the employee owning 5% or more of the total combined voting power or value of our or any of our subsidiary's common stock immediately after the grant of an option under the 2011 ESPP. Additionally, no employee may purchase shares of our common stock with an aggregate value of more than $25,000 per calendar year in which the option is outstanding under the 2011 ESPP, as determined by the value of such shares as of the date the option is granted.

We may make one or more offerings under the 2011 ESPP at such time or times as determined by our board of directors with each offering continuing for a six month period, or plan period. However, our board of directors or a committee appointed by our board of directors may, in its discretion, choose a different plan period of twelve months or less for any offerings made under the 2011 ESPP. Our board of directors has not yet determined when the first plan period under the 2011 ESPP will commence. Payroll deductions made during each plan period will be held in payroll deductions accounts for all participating employees for the purchase of our common stock at the end of each plan period.

On the commencement date of each plan period, we will grant to each eligible employee who is then a participant in the 2011 ESPP an option to purchase shares of our common stock. The employee may authorize up to a maximum of 20% of his or her base pay to be deducted by us during the plan period. Each employee who continues to be a participant in the 2011 ESPP on the last business day of the plan period will be deemed to have exercised the option to the extent of the employee's accumulated payroll deductions, subject to the maximum share ownership limits for the 2011 ESPP. Under the terms of the 2011 ESPP, the option exercise price will be determined by our board of directors or a committee appointed by our board of directors for each plan period. Our board of directors or a committee appointed by our board of directors may set whether the option exercise price will be based on the closing price of our common stock on (1) the first business day of the plan period or (2) the last business day of the plan period, or the lower of such closing prices, provided that the option exercise price will be at least 85% of the applicable closing price. In no event may an employee purchase in any one plan period a number of shares that exceeds the number of shares determined by dividing (1) the product of $2,083 and the number of full months in the plan period by (2) the closing price of a share of our common stock on the commencement date of the plan period.

An employee who is not a participant in the 2011 ESPP on the last day of the plan period is not entitled to exercise any option, and any balance held in the employee's accumulated payroll deduction account will be refunded. An employee's rights under the 2011 ESPP terminate upon voluntary withdrawal from the purchase plan at any time prior to the last business day of the applicable plan period or when the employee ceases employment for any reason, as defined in the 2011 ESPP, before the last business day of the applicable plan period.

In the event of any stock splits, reverse stock splits, stock dividends, recapitalizations, combination of shares, reclassification of shares, spin-offs or other similar events or changes in capitalization, we will be required to make equitable adjustments in connection with the 2011 ESPP to the extent determined by our board of directors or a committee appointed by our board of directors.

Upon a merger or other reorganization event, our board of directors or a committee appointed by our board of directors may take any one or more of the following actions pursuant to the 2011 ESPP as to some or all outstanding options:

- provide that options will be assumed, or substantially equivalent options shall be substituted, by the acquiring or succeeding corporation (or an affiliate thereof);
- upon written notice to employees, provide that all outstanding options will terminate immediately prior to the consummation of such reorganization event and that all such outstanding options will become exercisable to the extent of accumulated payroll deductions as of a date specified by our board of directors or by a committee appointed by our board of directors;
- upon written notice to employees, provide that all outstanding options shall be cancelled as of a date prior to the effective date of such reorganization event and that all accumulated payroll deductions will be returned to participating employees on such date;
- in the event of a reorganization event pursuant to which holders of shares of our common stock will receive a cash payment for each share surrendered in the reorganization event, change the last day of the plan period to be the date of the consummation of the reorganization event and make or provide for a cash payment equal to (1) the acquisition price multiplied by the number of shares of our common stock subject to the participant's option that could be purchased based on the employee's accumulated payroll deductions at such time, minus (2) the aggregate option price of such option;
- provide that, in connection with a liquidation or dissolution, options shall convert into the right to receive liquidation proceeds (net of the option price).

In order to comply with the laws of a foreign jurisdiction, we may grant options to our employees or employees of a designated subsidiary who are citizens or residents of such jurisdiction with terms that are less favorable (but not more favorable) than the terms of options granted under the 2011 ESPP to our employees or employees of a designated subsidiary who are residents of the United States. Notwithstanding the foregoing, our employees or employees of a designated subsidiary who are citizens or residents of a foreign jurisdiction may be excluded from eligibility under the 2011 ESPP if (1) the grant of an option under the 2011 ESPP is prohibited by law in such employees' jurisdiction of residence or

citizenship or (2) compliance with the laws of the foreign jurisdiction would cause the 2011 ESPP to violate the requirements of Section 423 of the Internal Revenue Code.

Our board may from time to time establish one or more subplans under the 2011 ESPP with respect to one or more designated subsidiaries, provided that such subplans comply with Section 423 of the Internal Revenue Code.

Our board of directors may at any time amend or terminate the 2011 ESPP, except that we must obtain stockholder approval for any amendment that requires stockholder approval under Section 423 of the Internal Revenue Code, and our board of directors may not make any amendment that would cause the 2011 ESPP to fail to comply with Section 423 of the Internal Revenue Code. Upon termination of the 2011 ESPP, we will refund any balance held in the payroll deduction accounts of participating employees.

401(k) retirement plan

We maintain a defined contribution employee retirement plan for our employees. Our 401(k) retirement plan, or 401(k) plan, is intended to qualify as a tax-qualified plan under Section 401 of the Internal Revenue Code so that contributions to our 401(k) plan, and income earned on such contributions, are not taxable to participants until withdrawn or distributed from the 401(k) plan. Our 401(k) plan provides that each participant may contribute up to 100% of his or her pre-tax compensation, up to a statutory limit, which is $16,500 for 2011. Participants who are at least 50 years old can also make "catch-up" contributions, which in 2011 may be up to an additional $5,500 above the statutory limit. Under our 401(k) plan, each employee is fully vested in his or her deferred salary contributions. Employee contributions are held and invested by the plan's trustee. Our 401(k) plan also permits us to make discretionary contributions and matching contributions, subject to established limits and a vesting schedule. For 2010, we made an employer matching contribution equal to 50% of employee deferral contributions up to a maximum deferral rate of 3% of compensation.

Director compensation

Compensation for 2011

The following table sets forth information regarding the total compensation awarded to, earned by or paid to each of our current non-employee directors during the year ended December 31, 2011 for their service on our board of directors. The compensation amounts presented in the table below are historical and are not indicative of the amounts we may pay our directors in the future. Robert J. Mulroy, our Chief Executive Officer, has not received and

will not receive any additional compensation for his services as a director. The compensation that we pay to Mr. Mulroy is discussed under "Executive compensation" above.

Name	Fees earned or paid in cash ($)(1)	Option awards ($)(2)	Total ($)
Gary L. Crocker	62,750	224,588	287,338
James van B. Dresser	51,000	179,670	230,670
Gordon J. Fehr	65,500	179,670	245,170
Robert C. Gay, Ph.D.	42,000	179,670	221,670
Walter M. Lovenberg, Ph.D.	51,000	179,670	230,670
Sarah E. Nash	61,000	179,670	240,670
Michael E. Porter, Ph.D.	38,000	84,750	122,750
Anthony J. Sinskey, Sc.D.	50,000	179,670	229,670

(1) Fees earned or paid in cash consist of:

- for Mr. Crocker, $38,000 for serving as chairman of the board, $18,000 for attending board meetings and $6,750 for attending committee meetings;
- for Mr. Dresser, $25,000 as a retainer for board service, $18,000 for attending board meetings and $8,000 for attending committee meetings;
- for Mr. Fehr, $25,000 as a retainer for board service, $18,000 for attending board meetings and $22,500 for attending committee meetings;
- for Dr. Gay, $25,000 as a retainer for board service, $16,000 for attending board meetings and $1,000 for attending committee meetings;
- for Dr. Lovenberg, $25,000 as a retainer for board service, $18,000 for attending board meetings and $8,000 for attending committee meetings;
- for Ms. Nash, $25,000 as a retainer for board service, $16,000 for attending board meetings and $20,000 for attending committee meetings;
- for Mr. Porter, $25,000 as a retainer for board service, $10,000 for attending board meetings and $3,000 for attending committee meetings; and
- for Dr. Sinskey, $25,000 as a retainer for board service, $18,000 for attending board meetings and $7,000 for attending committee meetings.

(2) The amounts in the "Option awards" column reflect the aggregate grant date fair value of stock options granted during the year to directors for their service as directors computed in accordance with the provisions of ASC 718, excluding the impact of estimated forfeitures related to service-based vesting conditions (which in our case were none). The assumptions that we used to calculate these amounts are discussed in Note 16 to our financial statements appearing at the end of this prospectus.
As of December 31, 2011, the aggregate number of shares of our common stock subject to each non-employee director's outstanding option awards was as follows: Mr. Crocker 356,250; Mr. Dresser 248,462; Mr. Fehr 218,462; Dr. Gay 153,000; Dr. Lovenberg 218,462; Ms. Nash 193,000; Dr. Porter 145,000; and Dr. Sinskey 218,462.

Director compensation arrangements

For 2011, each non-employee director, other than the chairman of the board, received an annual retainer for board service of $25,000. The chairman of the board received an annual retainer for board service of $38,000. Our non-employee directors were paid an additional $2,000 for each board meeting that they attended. In addition, the members of each of our four board committees received a fee for each committee meeting that they attended. The chairs of each of our four board committees received an additional fee for each meeting of such committee that they attended. Upon joining our board, non-employee directors receive an initial stock option grant to purchase 60,000 shares of our common stock. Each non-employee director, other than the chairman of the board, was also granted a stock option to purchase 25,000 shares of our common stock. The chairman of the board was granted a stock option to

purchase 31,250 shares of our common stock. We will maintain such cash compensation arrangements for our non-employee directors until the closing of this offering.

In 2011, our non-employee directors also received stock option grants that were intended to be granted during 2010, but were not able to be granted at that time because we did not have a sufficient number of shares of common stock available for grant under the 2008 plan. For their service in 2010, each non-employee director, other than the chairman of the board and Mr. Porter, who joined the board in December 2010, was granted a stock option to purchase 28,000 shares of our common stock. The chairman of the board was granted a stock option to purchase 35,000 shares of our common stock.

Effective upon the closing of this offering, our non-employee directors will be compensated for their services to the board as follows:

- an annual retainer for board service of $25,000 ($47,500 for the chairman of the board);
- a fee of $2,000 for each meeting of the board that each non-employee director attends;
- an annual stock option grant with a grant date fair value of approximately $90,500 (approximately $113,125 for the chairman of the board);
- for members of the audit committee, a fee of $1,700 per meeting of the audit committee that each non-employee director attends ($3,000 per meeting for the chair);
- for members of the organization and compensation committee, a fee of $1,000 per meeting of the organization and compensation committee that each non-employee director attends ($2,500 per meeting for the chair);
- for members of the corporate governance and nominating committee, a fee of $750 per meeting of the corporate governance and nominating committee that each non-employee director attends ($1,000 per meeting for the chair); and
- for members of the executive committee, a fee of $1,000 per meeting of the executive committee that each non-employee director attends ($1,500 per meeting for the chair).

In addition, we have reimbursed, and will continue to reimburse, our non-employee directors for their travel, lodging and other reasonable expenses incurred in attending meetings of our board and committees of our board.

Limitation of liability and indemnification

Our certificate of incorporation, which will become effective upon the closing of this offering, limits the personal liability of directors for breach of fiduciary duty to the maximum extent permitted by the Delaware General Corporation Law and provides that no director will have personal liability to us or to our stockholders for monetary damages for breach of fiduciary duty or other duty as a director. However, these provisions do not eliminate or limit the liability of any of our directors:

- for any breach of the director's duty of loyalty to us or our stockholders;
- for acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law;

- for voting or assenting to unlawful payments of dividends, stock repurchases or other distributions; or
- for any transaction from which the director derived an improper personal benefit.

Any amendment to or repeal of these provisions will not eliminate or reduce the effect of these provisions in respect of any act, omission or claim that occurred or arose prior to such amendment or repeal. If the Delaware General Corporation Law is amended to provide for further limitations on the personal liability of directors of corporations, then the personal liability of our directors will be further limited to the greatest extent permitted by the Delaware General Corporation Law.

In addition, our certificate of incorporation, which will become effective upon the closing of this offering, provides that we must indemnify our directors and officers and we must advance expenses, including attorneys' fees, to our directors and officers in connection with legal proceedings, subject to very limited exceptions.

We maintain a general liability insurance policy that covers certain liabilities of our directors and officers arising out of claims based on acts or omissions in their capacities as directors or officers. In addition, we have entered into indemnification agreements with certain of our directors, and we intend to enter into indemnification agreements with all of our directors and executive officers. These indemnification agreements may require us, among other things, to indemnify each such director for some expenses, including attorneys' fees, judgments, fines and settlement amounts incurred by him in any action or proceeding arising out of his service as one of our directors.

Certain of our non-employee directors may, through their relationships with their employers, be insured and/or indemnified against certain liabilities incurred in their capacity as members of our board of directors.

Insofar as indemnification for liabilities arising under the Securities Act of 1933, as amended, or the Securities Act, may be permitted to directors, executive officers or persons controlling us, in the opinion of the SEC, such indemnification is against public policy as expressed in the Securities Act and is therefore unenforceable.

Rule 10b5-1 plans

Our directors and executive officers may adopt written plans, known as Rule 10b5-1 plans, in which they will contract with a broker to buy or sell shares of our common stock on a periodic basis based upon a pre-set plan or formula. Under a Rule 10b5-1 plan, a broker executes trades pursuant to parameters established by the director or officer when entering into the plan, without further direction from the director or officer. The director or officer may amend or terminate the plan in some circumstances. Our directors and executive officers may also buy or sell additional shares outside of a Rule 10b5-1 plan when they are not in possession of material, nonpublic information.

Transactions with related persons

Since January 1, 2009, we have engaged in the following transactions with our directors, executive officers and holders of more than 5% of our voting securities, and affiliates or immediate family members of our directors, executive officers and holders of more than 5% of our voting securities. We believe that all of these transactions were on terms as favorable as could have been obtained from unrelated third parties.

Series G convertible preferred stock financing

In April 2011, we issued and sold an aggregate of 11,000,000 shares of our series G convertible preferred stock at a price per share of $7.00 for an aggregate purchase price of $77,000,000. The following table sets forth the number of shares of our series G convertible preferred stock that we issued to our directors, executive officers and 5% stockholders and their affiliates and immediate family members.

Name	Shares of series G convertible preferred stock
5% Stockholders:	
Fidelity Investments(1)	5,524,135
Fred Alger Management, Inc.(2)	1,428,570
Directors and executive officers:	
Robert J. Mulroy(3)	82,855
Gary Crocker(4)	483,270
Sarah E. Nash(5)	32,000
Michael E. Porter	28,570

(1) Consists of (i) 1,428,572 shares of series G convertible preferred stock held by Fidelity Mt. Vernon Street Trust: Fidelity Growth Company Fund, (ii) 2,142,858 shares of series G convertible preferred stock held by Fidelity Securities Fund: Fidelity Blue Chip Growth Fund, (iii) 380,800 shares of series G convertible preferred stock held by Fidelity Securities Fund: Fidelity Series Small Cap Opportunities Fund, (iv) 80,373 shares of series G convertible preferred stock held by Fidelity Advisor Series VII: Fidelity Advisor Health Care Fund, (v) 123,883 shares of series G convertible preferred stock held by Fidelity Central Investment Portfolios LLC: Fidelity Health Care Central Fund, (vi) 14,977 shares of series G convertible preferred stock held by Variable Insurance Products Fund IV: Health Care Portfolio, (vii) 391,134 shares of series G convertible preferred stock held by Fidelity Capital Trust: Fidelity Stock Selector Small Cap Fund, (viii) 350,000 shares of series G convertible preferred stock held by Fidelity Select Portfolios: Health Care Portfolio and (ix) 611,538 shares of series G convertible preferred stock held by Fidelity Destiny Portfolios: Fidelity Advisor Capital Development Fund.

Fidelity Management & Research Company, or Fidelity, a wholly-owned subsidiary of FMR LLC, acts as investment adviser for the beneficial owners set forth above, or the funds. Edward C. Johnson 3d, the Chairman of FMR LLC, and his family members, directly or through trust, are parties to a shareholders' agreement and may be deemed, under the Investment Act of 1940, to form a controlling group with respect to FMR LLC and therefore to be persons with the indirect control of Fidelity. Fidelity has the ability to make decisions with respect to the voting and disposition of the shares set forth above, subject to the oversight of the board of trustees (or similar entity) of each fund. The board of trustees of each fund has enacted a policy with respect to the voting of any investment property owned thereby and shares are voted for the funds by Fidelity in accordance with such policies. Under the terms of its management contract with each fund, Fidelity has overall responsibility for directing the investments of the fund in accordance with the fund's investment objective, policies and limitations. Each fund has one or more portfolio managers appointed by and serving at the pleasure of Fidelity who make the decisions with respect to the disposition of the shares.

(2) Consists of (i) 396,775 shares of series G convertible preferred stock held by Alger Capital Appreciation Fund, (ii) 496,510 shares of series G convertible preferred stock held by Alger Capital Appreciation Institutional Fund, (iii) 129,055 shares of series G convertible preferred stock held by Alger Capital Appreciation Portfolio and (iv) 406,230 shares of series G convertible preferred stock held by Alger Spectra Fund. Fred Alger Management, Inc. is the investment advisor of each of the above listed funds and, as such, has sole voting and sole dispositive control over the securities owned by such funds.

(3) Consists of 4,285 shares of series G convertible preferred stock held by Mr. Mulroy's brother, Richard D. Mulroy, Jr., 61,428 shares of series G convertible preferred stock held by Mr. Mulroy's brother, William F. Mulroy, and 17,142 shares of series G convertible preferred stock held by the Mulroy family irrevocable trust, of which Mr. Mulroy's brother, Richard D. Mulroy, Jr. is a trustee, each of whom is deemed to be a person related to us.

(4) Consists of 313,266 shares of series G convertible preferred stock held by Mr. Crocker jointly with his wife, Ann Crocker. In addition, Mr. and Mrs. Crocker, certain members of Mr. Crocker's family, certain trusts established for members of Mr. Crocker's family and certain entities controlled by Mr. Crocker or members of his family are parties to a Shareholder Voting Agreement, dated December 20, 2010, or the Crocker voting agreement, pursuant to which the parties to the agreement have agreed to vote his, her or its shares as directed by Crocker Ventures, LLC. Mr. Crocker is the President, Manager and chairman of Crocker Ventures, LLC and in connection therewith shares voting control over all of the shares subject to the Crocker voting agreement. As a result, in addition to the shares of series G convertible preferred stock held by Mr. and Mrs. Crocker jointly, the 170,004 shares of series G convertible preferred stock held by the parties to the Crocker voting agreement are deemed to be shares held by a person related to us.

(5) Consists of 25,000 shares of series G convertible preferred stock held by Ms. Nash. Ms. Nash's husband, Michael Sylvester, holds 7,000 shares of series G convertible preferred stock. Mr. Sylvester is deemed to be a person related to us.

Series F convertible preferred stock financing and exchange offer

Between November 2007 and April 2008, we agreed to issue an aggregate of 11,775,995 shares of our series F convertible preferred stock at a price per share of $5.10 for an aggregate purchase price of $60,057,575. The following table sets forth the number of shares of our series F convertible preferred stock that we agreed to issue to our directors and 5% stockholders and their affiliates and immediate family members.

Name	Shares of series F convertible preferred stock
5% Stockholders:	
CSFB Next Fund, Inc.	1,960,784
TPG-Axon Partners(1)	1,960,783
Directors:	
Gary Crocker(2)	655,000
Sarah E. Nash(3)	226,665
Michael E. Porter	33,000
James van B. Dresser	4,901

(1) Consists of 1,313,725 shares of series F convertible preferred stock held by TPG-Axon International, L.P. and 647,058 shares of series F convertible preferred stock held by TPG-Axon Partners, LP.

(2) Consists of 41,900 shares of series F convertible preferred stock held by Mr. Crocker jointly with his wife, Ann Crocker. In addition, Mr. and Mrs. Crocker, certain members of Mr. Crocker's family, certain trusts established for members of Mr. Crocker's family and certain entities controlled by Mr. Crocker or members of his family are parties to a Shareholder Voting Agreement, dated December 20, 2010, or the Crocker voting agreement, pursuant to which the parties to the agreement have agreed to vote his, her or its shares as directed by Crocker Ventures, LLC. Mr. Crocker is the President, Manager and Chairman of Crocker Ventures, LLC and in connection therewith shares voting control over all of the shares subject to the Crocker voting agreement. As a result, in addition to the shares of series F convertible preferred stock held by Mr. and Mrs. Crocker jointly, the 613,100 shares of series F convertible preferred stock held by the parties to the Crocker voting agreement are deemed to be shares held by persons related to us.

(3) Consists of 142,610 shares of series F convertible preferred stock held by Ms. Nash. Ms. Nash is also the trustee of the Sarah E. Nash 2009 Grantor Retained Annuity Trust and, as such, has voting and investment control over, and may be deemed the beneficial owner of, 64,448 shares of series F convertible preferred stock held by the Sarah E. Nash 2009 Grantor Retained Annuity Trust. Ms. Nash's husband, Michael Sylvester, holds 19,607 shares of series F convertible preferred stock. Mr. Sylvester is deemed to be a person related to us.

In July 2010, in connection with a review of our corporate records, we determined that we may not have obtained all of the required stockholder approvals to amend our articles of organization to authorize the shares of series F convertible preferred stock that we agreed to issue in 2007 and 2008. As a result, in October 2010, we conducted an exchange offer in which we provided investors to whom we had agreed to issue and sell shares of series F convertible preferred stock in 2007 and 2008 with the opportunity to acquire shares of properly authorized series F convertible preferred stock. All of the holders of shares of series F convertible preferred stock accepted our offer and received new, properly authorized shares of series F convertible

preferred stock. Each such holder received a sub-series of the properly authorized series F convertible preferred stock that is intended to provide the investor with the economic benefit of the accrued dividends to which the investor would be entitled had the properly authorized shares of series F convertible preferred stock been issued on the dates that we originally agreed to do so in 2007 and 2008. In the exchange offer, we issued to our directors and 5% stockholders and their affiliates the same number of shares of properly authorized series F convertible preferred stock as we had agreed to issue and sell to such holders in the series F financing in 2007 and 2008, which amounts are noted in the table above.

Wharton transactions

In June and August 2010, we entered into various agreements with certain individuals and entities associated with Wharton Equity Partners, collectively referred to as Wharton, which at that time owned more than 5% of the outstanding shares of our capital stock. One of our directors at that time, Peter Lewis, is a founder and principal of Wharton Equity Partners. Also at that time, David Eisenberg, the Chief Executive Officer of Wharton Equity Partners, had the right to observe the meetings of our board.

We entered into these agreements in connection with the sale by Wharton of up to all of the shares of our capital stock held by them to purchasers unaffiliated with Wharton. In connection with the contemplated sale, each investor in the funds maintained by Wharton was given the choice by Wharton of either agreeing to sell a pro-rata portion of the shares of our capital stock held in such fund or having a pro-rata portion of such shares distributed to such investor in kind. Wharton then entered into a series of stock purchase agreements with certain entities and individuals affiliated with Fred Alger Management, Inc. and certain other stockholders of ours, pursuant to which Wharton sold to such entities and individuals 1,158,006 shares of our series B convertible preferred stock, 1,207,437 shares of our series C convertible preferred stock and 74,799 shares of our series D convertible preferred stock and distributed to its investors, in kind, 1,712,071 shares of our series B convertible preferred stock, 2,762,917 shares of our series C convertible preferred stock and 449,058 shares of our series D convertible preferred stock.

In connection with Wharton's sale and distribution of its shares of our capital stock, Wharton agreed to take all necessary actions to remove certain of the special rights of the series B convertible preferred stock, which had been negotiated for by Wharton as the majority holder of the series B convertible preferred stock. These rights included the right to designate and have one director elected to our board, the right to designate one individual to observe meetings of our board and rights to vote or act as a separate class with respect to, among other things, significant corporate events and transactions. In addition, Mr. Eisenberg and Mr. Lewis resigned from all positions they held with us.

In connection with these transactions, we entered into a voting and standstill agreement with Wharton and its affiliates, including Mr. Eisenberg and Mr. Lewis, pursuant to which they granted a proxy to the chairman of our board to cause any shares held by Wharton and its affiliates, including Mr. Eisenberg and Mr. Lewis, to be voted in the same proportions as our stockholders who cast votes on the matter in question. In addition, Wharton and its affiliates, including Mr. Eisenberg and Mr. Lewis, also agreed not to (1) sell, assign, transfer or pledge any shares of our capital stock or any interest therein or any securities convertible into or exercisable for shares of our capital stock or any voting rights with respect thereto without our

prior written consent, (2) grant any proxies with respect to any shares of our capital stock or (3) enter into any voting trust or other agreement with respect to the voting of any shares of our capital stock or our other securities. They also agreed not to, without our prior consent or in certain limited situations, acquire or seek to acquire any additional securities of ours, to acquire or license any of our assets, to engage in a merger or other business combination involving us or to act alone or in concert in an effort to seek control of or to influence our management or board. This voting and standstill agreement terminates upon the first to occur of a sale of all or substantially all of our assets, a merger or other acquisition that results in our stockholders prior to the merger or acquisition owning less than 50% of the equity of the surviving corporation or parent entity and the fifth anniversary of the date of the agreement, which is August 2015.

In addition, in connection with the sale of the shares of our capital stock owned by Wharton:

- we extended the exercise period of all options held by Mr. Lewis so that the ability to exercise each such option expires 10 years after its original date of grant, to which we assigned an incremental fair value as a result of the modification of $206,896;
- we consented to a transfer from Mr. Lewis to Mr. Eisenberg of 50% of all options held by Mr. Lewis;
- we extended the exercise period of all warrants previously issued to Wharton to purchase 2,596,000 shares of our common stock for an additional four years and increased the exercise price from $2.12 and $2.47 per share to $3.00 per share, which we valued using a Black-Scholes option valuation model and accounted for the $1,803,000 of incremental value within the equity section of the balance sheet;
- we reimbursed Wharton for an aggregate of $150,000 of its expenses incurred in connection with these transactions; and
- we granted to Mr. Lewis, in respect of his board service, an option to purchase 20,000 shares of common stock at an exercise price of $2.69 per share, the fair value on the date of grant, and with a term of 10 years, with a grant date fair value of $34,796.

Silver Creek

We have established a subsidiary named Silver Creek Pharmaceuticals, Inc., or Silver Creek. Silver Creek's mission is to apply our Network Biology approach to the discovery and development of innovative therapeutics in the field of regenerative medicine. In August 2010, we acquired 12,000,000 shares of series A convertible preferred stock of Silver Creek in exchange for technology licenses. See "Business—Silver Creek" for more information regarding these licenses.

In addition, in August and December 2010, Silver Creek issued and sold an aggregate of 4,189,904 shares of its series A convertible preferred stock at a price per share of $1.00 to other investors for an aggregate purchase price of $4,189,904. 850,000 of such shares of series A convertible preferred stock of Silver Creek were issued and sold to Crocker Ventures LLC, an entity controlled by our director Mr. Crocker.

Registration rights

We are a party to an investor rights agreement with certain holders of our common stock, certain holders of our series B convertible preferred stock, series C convertible preferred stock, series D convertible preferred stock, series E convertible preferred stock, series F convertible preferred stock and series G convertible preferred stock and certain holders of warrants to purchase our common stock, including some of our 5% stockholders and their affiliates and entities affiliated with our directors. In addition, we have agreed to grant to the holder of the warrant to purchase shares of our Series D convertible preferred stock the same registration rights as are provided under the investor rights agreement. The investor rights agreement provides these holders the right, following the completion of this offering, to demand that we file a registration statement or request that their shares be covered by a registration statement that we are otherwise filing. See "Description of capital stock—registration rights" for additional information regarding these registration rights.

Indemnification agreements

Our certificate of incorporation provides that we will indemnify our directors and officers to the fullest extent permitted by Delaware law. In addition, we have entered into indemnification agreements with our directors and executive officers. See "Executive compensation—limitation of liability and indemnification" for additional information regarding these agreements.

Policies and procedures for related person transactions

Our board of directors has adopted written policies and procedures for the review of any transaction, arrangement or relationship in which Merrimack is a participant, the amount involved exceeds $120,000 and one of our executive officers, directors, director nominees or 5% stockholders, or their immediate family members, each of whom we refer to as a "related person," has a direct or indirect material interest.

If a related person proposes to enter into such a transaction, arrangement or relationship, which we refer to as a "related person transaction," the related person must report the proposed related person transaction to our corporate counsel. The policy calls for the proposed related person transaction to be reviewed and, if deemed appropriate, approved by our audit committee. Whenever practicable, the reporting, review and approval will occur prior to entry into the transaction. If advance review and approval is not practicable, the committee will review, and, in its discretion, may ratify the related person transaction. The policy also permits the chairman of the committee to review and, if deemed appropriate, approve proposed related person transactions that arise between committee meetings, subject to ratification by the committee at its next meeting. Any related person transactions that are ongoing in nature will be reviewed annually.

A related person transaction reviewed under the policy will be considered approved or ratified if it is authorized by the committee after full disclosure of the related person's interest in the transaction. As appropriate for the circumstances, the committee will review and consider:

- the related person's interest in the related person transaction;
- the approximate dollar value of the amount involved in the related person transaction;

- the approximate dollar value of the amount of the related person's interest in the transaction without regard to the amount of any profit or loss;
- whether the transaction was undertaken in the ordinary course of our business;
- whether the terms of the transaction are no less favorable to us than terms that could have been reached with an unrelated third party;
- the purpose of, and the potential benefits to us of, the transaction; and
- any other information regarding the related person transaction or the related person in the context of the proposed transaction that would be material to investors in light of the circumstances of the particular transaction.

The committee may approve or ratify the transaction only if the committee determines that, under all of the circumstances, the transaction is in, or is not inconsistent with, Merrimack's best interests. The committee may impose any conditions on the related person transaction that it deems appropriate.

In addition to the transactions that are excluded by the instructions to the SEC's related person transaction disclosure rule, our board of directors has determined that the following transactions do not create a material direct or indirect interest on behalf of related persons and, therefore, are not related person transactions for purposes of this policy:

- interests arising solely from the related person's position as an executive officer of another entity (whether or not the person is also a director of such entity), that is a participant in the transaction, where (a) the related person and all other related persons own in the aggregate less than a 10% equity interest in such entity, (b) the related person and his or her immediate family members are not involved in the negotiation of the terms of the transaction and do not receive any special benefits as a result of the transaction and (c) the amount involved in the transaction equals less than the greater of $200,000 or 5% of the annual gross revenues of the company receiving payment under the transaction; and
- a transaction that is specifically contemplated by provisions of our charter or bylaws.

The policy provides that transactions involving compensation of executive officers shall be reviewed and approved by the organization and compensation committee in the manner specified in its charter.

Principal stockholders

The following table sets forth information with respect to the beneficial ownership of our common stock as of December 31, 2011 by:

- each of our directors;
- each of our named executive officers;
- all of our directors and executive officers as a group; and
- each person, or group of affiliated persons, who is known by us to beneficially own more than 5% of our common stock.

The column entitled "Percentage of shares beneficially owned—before offering" is based on a total of 78,090,012 shares of our common stock outstanding as of December 31, 2011, assuming the automatic conversion of all outstanding shares of our preferred stock into an aggregate of 66,255,529 shares of our common stock upon the closing of this offering. The column entitled "Percentage of shares beneficially owned—after offering" is based on 94,756,679 shares of our common stock to be outstanding after this offering, including the 16,666,667 shares of our common stock that we are selling in this offering, but not including any additional shares issuable upon exercise of outstanding options or warrants.

Beneficial ownership is determined in accordance with the rules and regulations of the SEC and includes voting or investment power with respect to our common stock. Shares of our common stock subject to options that are currently exercisable or exercisable within 60 days after December 31, 2011 are considered outstanding and beneficially owned by the person holding the options or warrants for the purpose of calculating the percentage ownership of that person but not for the purpose of calculating the percentage ownership of any other person. Except as otherwise noted, the persons and entities in this table have sole voting and investing power with respect to all of the shares of our common stock beneficially owned by them, subject to community property laws, where applicable. Except as otherwise set forth below, the address of the beneficial owner is c/o Merrimack Pharmaceuticals, Inc., One Kendall Square, Suite B7201, Cambridge, Massachusetts 02139.

Name and address of beneficial owner	Number of shares beneficially owned	Percentage of shares beneficially owned	
		Before offering	After offering
5% Stockholders:			
Fidelity Investments(1) 82 Devonshire St. Boston, MA 02109	5,524,135	7.07%	5.83%
CSFB Next Fund, Inc.(2) Eleven Madison Avenue New York, NY 10010	4,818,562	6.17	5.09
Fred Alger Management, Inc.(3) 111 Fifth Avenue New York, NY 10003	4,349,368	5.57	4.59
TPG-Axon Partners(4) 888 Seventh Avenue, 38th Floor New York, NY 10019	4,183,005	5.36	4.41
Directors and executive officers:			
Robert J. Mulroy(5)	2,799,568	3.49	2.89
Fazal R. Khan, Ph.D.(6)	747,499	*	*
Ulrik B. Nielsen, Ph.D.(7)	1,318,958	1.67	1.38
Clet M. Niyikiza, Ph.D.(8)	266,664	*	*
William A. Sullivan(9)	258,999	*	*
Gary L. Crocker(10)	3,573,592	4.56	3.76
James van B. Dresser(11)	351,974	*	*
Gordon J. Fehr(12)	381,715	*	*
Robert C. Gay, Ph.D.(13)	789,346	1.01	*
Walter M. Lovenberg, Ph.D.(14)	295,605	*	*
Sarah E. Nash(15)	1,122,494	1.43	1.18
Michael E. Porter, Ph.D.(16)	371,614	*	*
Anthony J. Sinskey, Sc.D.(17)	592,376	*	*
All executive officers and directors as a group (15 persons)(18)	13,391,787	15.78%	13.19%

* Represents beneficial ownership of less than one percent of our outstanding common stock.

(1) Consists of (i) 1,428,572 shares of common stock underlying shares of series G convertible preferred stock held by Fidelity Mt. Vernon Street Trust: Fidelity Growth Company Fund, (ii) 2,142,858 shares of common stock underlying shares of series G convertible preferred stock held by Fidelity Securities Fund: Fidelity Blue Chip Growth Fund, (iii) 380,800 shares of common stock underlying shares of series G convertible preferred stock held by Fidelity Securities Fund: Fidelity Series Small Cap Opportunities Fund, (iv) 80,373 shares of common stock underlying shares of series G convertible preferred stock held by Fidelity Advisor Series VII: Fidelity Advisor Health Care Fund, (v) 123,883 shares of common stock underlying shares of series G convertible preferred stock held by Fidelity Central Investment Portfolios LLC: Fidelity Health Care Central Fund, (vi) 14,977 shares of common stock underlying shares of series G convertible preferred stock held by Variable Insurance Products Fund IV: Health Care Portfolio, (vii) 391,134 shares of common stock underlying shares of series G convertible preferred stock held by Fidelity Capital Trust: Fidelity Stock Selector Small Cap Fund, (viii) 350,000 shares of common stock underlying shares of series G convertible preferred stock held by Fidelity Select Portfolios: Health Care Portfolio and (ix) 611,538 shares of common stock underlying shares of series G convertible preferred stock held by Fidelity Destiny Portfolios: Fidelity Advisor Capital Development Fund.

Fidelity Management & Research Company, or Fidelity, a wholly-owned subsidiary of FMR LLC, acts as investment adviser for the beneficial owners set forth above, or the funds. Edward C. Johnson 3d, the Chairman of FMR LLC, and his family members, directly or through trust, are parties to a shareholders' agreement and may be deemed, under the Investment Act of 1940, to form a controlling group with respect to FMR LLC and therefore to be persons with the indirect control of Fidelity. Fidelity has

the ability to make decisions with respect to the voting and disposition of the shares set forth above, subject to the oversight of the board of trustees (or similar entity) of each fund. The board of trustees of each fund has enacted a policy with respect to the voting of any investment property owned thereby and shares are voted for the funds by Fidelity in accordance with such policies. Under the terms of its management contract with each fund, Fidelity has overall responsibility for directing the investments of the fund in accordance with the fund's investment objective, policies and limitations. Each fund has one or more portfolio managers appointed by and serving at the pleasure of Fidelity who make the decisions with respect to the disposition of the shares.

(2) Consists of (i) 2,857,778 shares of common stock underlying shares of series E convertible preferred stock and (ii) 1,960,784 shares of common stock underlying shares of series F convertible preferred stock.

(3) Consists of (i) 396,775 shares of common stock underlying shares of series G convertible preferred stock held by Alger Capital Appreciation Fund, (ii) 496,510 shares of common stock underlying shares of series G convertible preferred stock held by Alger Capital Appreciation Institutional Fund, (iii) 129,055 shares of common stock underlying shares of series G convertible preferred stock held by Alger Capital Appreciation Portfolio, (iv) 17,984 shares of common stock underlying shares of series B convertible preferred stock and 12,149 shares of common stock underlying shares of series C convertible preferred stock held by Alger Dynamic Opportunities Fund, (v) 6,366 shares of common stock underlying shares of series B convertible preferred stock and 4,300 shares of common stock underlying shares of series C convertible preferred stock held by Alger Dynamic Return Fund, (vi) 268,966 shares of common stock underlying shares of series B convertible preferred stock and 181,700 shares of common stock underlying shares of series C convertible preferred stock held by Alger Health Sciences Fund, (vii) 343,768 shares of common stock underlying shares of series B convertible preferred stock and 232,232 shares of common stock underlying shares of series C convertible preferred stock held by Alger Mid Cap Growth Fund, (viii) 905,574 shares of common stock underlying shares of series B convertible preferred stock and 611,759 shares of common stock underlying shares of series C convertible preferred stock held by Alger Mid Cap Growth Institutional Fund, (ix) 200,531 shares of common stock underlying shares of series B convertible preferred stock and 135,469 shares of common stock underlying shares of series C convertible preferred stock held by Alger Mid Cap Growth Portfolio and (x) 406,230 shares of common stock underlying shares of series G convertible preferred stock held by Alger Spectra Fund. Fred Alger Management, Inc. is the investment advisor of each of the above listed funds and as such has sole voting and sole dispositive control over the securities owned by such funds.

(4) Consists of (i) 1,466,667 shares of common stock underlying shares of series E convertible preferred stock and 1,313,725 shares of common stock underlying shares of series F convertible preferred stock held by TPG-Axon International, L.P. and (ii) 755,555 shares of common stock underlying shares of series E convertible preferred stock and 647,058 shares of common stock underlying shares of series F convertible preferred stock held by TPG-Axon Partners, LP.

(5) Consists of (i) 474,603 shares of common stock, (ii) 40,397 shares of common stock underlying shares of series B convertible preferred stock, (iii) 29,019 shares of common stock underlying shares of series C convertible preferred stock and (iv) 2,193,749 shares of common stock underlying options that are exercisable as of December 31, 2011 or will become exercisable within 60 days after such date. Mr. Mulroy's wife, Jean Mulroy, holds (i) 57,143 shares of common stock underlying shares of series D convertible preferred stock and (ii) 4,657 shares of common stock underlying shares of series E convertible preferred stock. Mr. and Mrs. Mulroy share voting and investment control over the securities held by Mrs. Mulroy and, as a result, Mr. Mulroy may be deemed to be the beneficial owner of the securities held by Mrs. Mulroy.

(6) Consists of 747,499 shares of common stock underlying options that are exercisable as of December 31, 2011 or will become exercisable within 60 days after such date.

(7) Consists of (i) 247,443 shares of common stock and (ii) 1,071,515 shares of common stock underlying options that are exercisable as of December 31, 2011 or will become exercisable within 60 days after such date.

(8) Consists of 266,664 shares of common stock underlying options that are exercisable as of December 31, 2011 or will become exercisable within 60 days after such date.

(9) Consists of 258,999 shares of common stock underlying options that are exercisable as of December 31, 2011 or will become exercisable within 60 days after such date.

(10) Mr. Crocker owns directly 59,863 shares of common stock underlying shares of series C convertible preferred stock. Mr. Crocker also owns jointly with his wife, Ann Crocker, (i) 463,654 shares of common stock underlying shares of series D convertible preferred stock, (ii) 46,676 shares of common stock underlying shares of series E convertible preferred stock, (iii) 41,900 shares of common stock underlying shares of series F convertible preferred stock and (iv) 313,266 shares of common stock underlying shares of Series G convertible preferred stock. In addition, Mr. and Mrs. Crocker, certain members of Mr. Crocker's family, certain trusts established for members of Mr. Crocker's family and certain entities controlled by Mr. Crocker or members of his family are parties to a Shareholder Voting Agreement, dated December 20, 2010, or the Crocker voting agreement, pursuant to which the parties to the agreement have agreed to vote his, her or its shares as directed by Crocker Ventures, LLC. Mr. Crocker is the President, Manager and chairman of Crocker Ventures, LLC and in connection therewith shares voting control over all of the shares subject to the Crocker voting agreement. As a result, in addition to the shares of common stock underlying shares of convertible preferred stock held by Mr. Crocker individually and by Mr. and Mrs. Crocker jointly, Mr. Crocker may be deemed the beneficial owner of (i) 783,838 shares of common stock underlying shares of series C convertible preferred stock, (ii) 215,717 shares of common stock underlying shares of series D convertible preferred stock, (iii) 509,324 shares of common stock underlying shares of series E convertible preferred stock, (iv) 613,100 shares of common stock underlying shares of series F convertible preferred stock and (v) 170,004 shares of common stock underlying shares of series G convertible preferred stock held by the parties to the Crocker voting agreement. The number of shares beneficially owned by Mr. Crocker also includes 356,250 shares of common stock underlying options that have been issued to Mr. Crocker and are exercisable as of December 31, 2011 or will become exercisable within 60 days after such date.

(11) Consists of (i) 87,500 shares of common stock, (ii) 11,111 shares of common stock underlying shares of series E convertible preferred stock, (iii) 4,901 shares of common stock underlying shares of series F convertible preferred stock and (iv) 248,462 shares of common stock underlying options that are exercisable as of December 31, 2011 or will become exercisable within 60 days after such date.

(12) Consists of (i) 141,031 shares of common stock, (ii) 22,222 shares of common stock underlying shares of series E convertible preferred stock and (iii) 218,462 shares of common stock underlying options that are exercisable as of December 31, 2011 or will become exercisable within 60 days after such date.

(13) Includes (i) 175,316 shares of common stock underlying shares of series B convertible preferred stock, (ii) 142,857 shares of common stock underlying shares of series D convertible preferred stock and (iii) 153,000 shares of common stock underlying options that are exercisable as of December 31, 2011 or will become exercisable within 60 days after such date. Dr. Gay is also the trustee of the Robert C. Gay 1998 Family Trust and has voting and investment control over, and may be deemed to be the beneficial owner of, (i) 175,316 shares of common stock underlying shares of series B convertible preferred stock and (ii) 142,857 shares of common stock underlying shares of series D convertible preferred stock held by the Robert C. Gay 1998 Family Trust.

(14) Consists of (i) 70,000 shares of common stock, (ii) 7,143 shares of common stock underlying shares of series D convertible preferred stock and (iii) 218,462 shares of common stock underlying options that are exercisable as of December 31, 2011 or will become exercisable within 60 days after such date.

(15) Includes (i) 44,440 shares of common stock, (ii) 120,161 shares of common stock underlying shares of series C convertible preferred stock, (iii) 28,571 shares of common stock underlying shares of series D convertible preferred stock, (iv) 222,222 shares of common stock underlying shares of series E convertible preferred stock, (v) 142,610 shares of common stock underlying shares of series F convertible preferred stock, (vi) 25,000 shares of common stock underlying shares of series G convertible preferred stock and (vii) 193,000 shares of common stock underlying options that are exercisable as of December 31, 2011 or will become exercisable within 60 days after such date. Ms. Nash is also the trustee of the Sarah E. Nash 2009 Grantor Retained Annuity Trust and, as such, has voting and investment control over, and may be deemed the beneficial owner of, 64,448 shares of common stock underlying shares of Series F convertible preferred stock held by the Sarah E. Nash 2009 Grantor Retained Annuity Trust. Ms. Nash's husband, Michael Sylvester, holds (i) 22,220 shares of common stock, (ii) 30,040 shares of common stock underlying shares of Series C convertible preferred stock, (iii) 14,286 shares of common stock underlying shares of Series D convertible preferred stock, (iv) 188,889 shares of common stock underlying shares of Series E convertible preferred stock, (v) 19,607 shares of common stock underlying shares of series F convertible preferred stock and (vi) 7,000 shares of common stock underlying shares of series G convertible preferred stock. Mr. Sylvester and Ms. Nash share voting and investment control over the securities held by Mr. Sylvester and, as a result, Ms. Nash may be deemed the beneficial owner of the securities held by Mr. Sylvester.

(16) Includes (i) 63,000 shares of common stock, (ii) 56,509 shares of common stock underlying shares of series C convertible preferred stock, (iii) 34,286 shares of common stock underlying shares of series D convertible preferred stock, (iv) 25,000 shares of common stock underlying shares of series E convertible preferred stock, (v) 33,000 shares of common stock underlying shares of series F convertible preferred stock, (vi) 28,570 shares of common stock underlying shares of series G convertible preferred stock and (vii) 131,249 shares of common stock underlying options that are exercisable as December 31, 2011 or will become exercisable within 60 days after such date.

(17) Consists of (i) 237,431 shares of common stock and (ii) 218,462 shares of common stock underlying options that are exercisable as of December 31, 2011 or will become exercisable within 60 dates after such date. Dr. Sinskey also owns jointly with his wife, Chokyun Rha-Sinskey, (i) 36,723 shares of common stock underlying shares of Series B convertible preferred stock and (ii) 18,024 shares of common stock underlying shares of series C convertible preferred stock. Dr. Sinskey is also the trustee of the Anthony J. Sinskey 2010 Grat I and, as such, has voting and investment control over, and may be deemed the beneficial owner of, 81,736 shares of common stock held by the Anthony J. Sinskey 2010 Grat I.

(18) Includes 6,797,156 shares of common stock underlying options that are exercisable as of December 31, 2011 or will become exercisable within 60 days after such date.

Description of capital stock

The following description of our capital stock and provisions of our certificate of incorporation and bylaws are summaries and are qualified by reference to the certificate of incorporation and the bylaws that will be in effect upon the closing of this offering. We have filed copies of these documents with the SEC as exhibits to our registration statement of which this prospectus forms a part. The description of the capital stock reflects changes to our capital structure that will occur upon the closing of this offering.

Upon the closing of this offering, our authorized capital stock will consist of 200,000,000 shares of our common stock, $0.01 par value per share, and 10,000,000 shares of our preferred stock, $0.01 par value per share, all of which preferred stock will be undesignated.

As of December 31, 2011, we had issued and outstanding:

- 11,834,483 shares of our common stock outstanding held by 180 stockholders of record;
- 3,873,448 shares of our series B convertible preferred stock that are convertible into 5,978,468 shares of our common stock;
- 14,423,869 shares of our series C convertible preferred stock that are convertible into 14,423,869 shares of our common stock;
- 8,086,305 shares of our series D convertible preferred stock that are convertible into 8,086,305 shares of our common stock;
- 14,990,892 shares of our series E convertible preferred stock that are convertible into 14,990,892 shares of our common stock;
- 11,775,995 shares of our series F convertible preferred stock that are convertible into 11,775,995 shares of our common stock; and
- 11,000,000 shares of our series G convertible preferred stock that are convertible into 11,000,000 shares of our common stock.

As of December 31, 2011, we also had outstanding:

- options to purchase 17,617,016 shares of our common stock at a weighted average exercise price of $2.56 per share;
- warrants to purchase 2,639,754 shares of our common stock at a weighted average exercise price of $2.98 per share held by 73 persons; and
- a warrant to purchase an aggregate of 302,143 shares of our series D convertible preferred stock at an exercise price of $3.50 per share held by Hercules Technology Growth Capital, Inc.

Upon the closing of this offering:

- all of the outstanding shares of our preferred stock will automatically convert into an aggregate of 66,255,529 shares of our common stock;

- the warrants to purchase an aggregate of 2,639,754 shares of our common stock will remain outstanding and exercisable to purchase shares of our common stock at a weighted average exercise price of $2.98; and

- the warrant to purchase 302,143 shares of our series D convertible preferred stock at an exercise price of $3.50 per share held by Hercules Technology Growth Capital, Inc. will automatically become a warrant to purchase 302,143 shares of our common stock at an exercise price of $3.50 per share.

Common stock

Holders of our common stock are entitled to one vote for each share held on all matters submitted to a vote of stockholders and do not have cumulative voting rights. Each election of directors by our stockholders will be determined by a plurality of the votes cast by the stockholders entitled to vote on the election. In general, except (1) for the election of directors, (2) as described below under "—Super-majority voting," (3) in the future to the extent that we have two or more classes or series of stock outstanding with separate voting rights and (4) as otherwise required by law, any matter to be voted on by our stockholders at any meeting is decided by the vote of the holders of a majority in voting power of the votes cast by the holders of shares of our stock present or represented at the meeting and voting affirmatively or negatively on such matter. Holders of common stock are entitled to receive proportionately any dividends as may be declared by our board of directors, subject to any preferential dividend rights of outstanding preferred stock.

In the event of our liquidation or dissolution, the holders of our common stock are entitled to receive proportionately all assets available for distribution to stockholders after the payment of all debts and other liabilities and subject to the prior rights of any of our outstanding preferred stock. Holders of our common stock have no preemptive, subscription, redemption or conversion rights. The rights, preferences and privileges of holders of our common stock are subject to and may be adversely affected by the rights of the holders of shares of any series of our preferred stock that we may designate and issue in the future.

Preferred stock

Under the terms of our certificate of incorporation, our board of directors is authorized to issue shares of preferred stock in one or more series without stockholder approval. Our board of directors has the discretion to determine the rights, preferences, privileges and restrictions, including voting rights, dividend rights, conversion rights, redemption privileges and liquidation preferences, of each series of preferred stock.

The purpose of authorizing our board of directors to issue preferred stock and determine its rights and preferences is to eliminate delays associated with a stockholder vote on specific issuances. The issuance of preferred stock, while providing flexibility in connection with possible acquisitions, future financings and other corporate purposes, could have the effect of making it more difficult for a third party to acquire, or could discourage a third party from seeking to acquire, a majority of our outstanding voting stock. Upon the closing of this offering, there will be no shares of preferred stock outstanding, and we have no present plans to issue any shares of preferred stock.

Warrants

As of December 31, 2011, we had outstanding warrants to purchase an aggregate of 2,639,754 shares of our common stock at a weighted average exercise price of $2.98 per share held by 73 persons and a warrant to purchase an aggregate of 302,143 shares of our series D convertible preferred stock at an exercise price of $3.50 per share held by Hercules Technology Growth Capital, Inc.

Upon the closing of this offering and after giving effect to the automatic conversion of our preferred stock into common stock:

- the warrants to purchase an aggregate of 2,639,754 shares of our common stock will remain outstanding and exercisable to purchase shares of our common stock and will continue to have a weighted average exercise price of $2.98; and

- the warrant to purchase 302,143 shares of our series D convertible preferred stock at an exercise price of $3.50 per share held by Hercules Technology Growth Capital, Inc. will automatically become a warrant to purchase an aggregate of 302,143 shares of our common stock at an exercise price of $3.50 per share.

The warrants that were exercisable for shares of common stock prior to the closing of this offering, which we refer to as the existing common warrants, require adjustment to the number of shares for which they are exercisable and their exercise prices in the event of any merger, consolidation, reorganization or dissolution of us, the sale of all of our assets or the declaration and payment of a stock dividend by us. All of the existing common warrants provide for cashless exercise. In addition, pursuant to their terms, the existing common warrants to purchase an aggregate of 44,211 shares of common stock held by General Electric Capital Corporation will be automatically exercised as of immediately prior to the expiration date of such warrant if not otherwise exercised prior to the expiration date. The existing common warrants held by General Electric Capital Corporation expire at various times between February 7, 2012 and June 30, 2013. The existing common warrants held by other persons do not automatically exercise immediately prior to their expiration. Such other existing common warrants expire at various times between December 10, 2015 and March 10, 2016.

The warrant to purchase 302,143 shares of our series D convertible preferred stock held by Hercules Technology Growth Capital, Inc also has certain anti-dilution protections and requires adjustment to the number of shares for which it is exercisable and its exercise price in the event of certain mergers or consolidations. This warrant provides for cashless exercise and expires two years after the closing of this offering.

Options

As of December 31, 2011, options to purchase 17,617,016 shares of our common stock at a weighted average exercise price of $2.56 per share were outstanding.

Delaware anti-takeover law and certain charter and bylaws provisions

Delaware law

We are subject to Section 203 of the Delaware General Corporation Law. Subject to certain exceptions, Section 203 prevents a publicly held Delaware corporation from engaging in a

"business combination" with any "interested stockholder" for three years following the date that the person became an interested stockholder, unless either the interested stockholder attained such status with the approval of our board of directors, the business combination is approved by our board of directors and stockholders in a prescribed manner or the interested stockholder acquired at least 85% of our outstanding voting stock in the transaction in which it became an interested stockholder. A "business combination" includes, among other things, a merger or consolidation involving us and the "interested stockholder" and the sale of more than 10% of our assets. In general, an "interested stockholder" is any entity or person beneficially owning 15% or more of our outstanding voting stock and any entity or person affiliated with or controlling or controlled by such entity or person. The restrictions contained in Section 203 are not applicable to any of our existing stockholders that will own 15% or more of our outstanding voting stock upon the closing of this offering.

Stockholder action; special meeting of stockholders; advance notice requirements for stockholder proposals and director nominations

Our certificate of incorporation and our bylaws provide that any action required or permitted to be taken by our stockholders at an annual meeting or special meeting of stockholders may only be taken if it is properly brought before such meeting and may not be taken by written action in lieu of a meeting. Our certificate of incorporation and our bylaws also provide that, except as otherwise required by law, special meetings of the stockholders can only be called by our chairman of the board, our president or chief executive officer or our board of directors. In addition, our bylaws establish an advance notice procedure for stockholder proposals to be brought before an annual meeting of stockholders, including proposed nominations of candidates for election to our board of directors. Stockholders at an annual meeting may only consider proposals or nominations specified in the notice of meeting or brought before the meeting by or at the direction of our board of directors, or by a stockholder of record on the record date for the meeting, who is entitled to vote at the meeting and who has delivered timely written notice in proper form to our secretary of the stockholder's intention to bring such business before the meeting. These provisions could have the effect of delaying until the next stockholder meeting stockholder actions that are favored by the holders of a majority of our outstanding voting securities. These provisions also could discourage a third party from making a tender offer for our common stock, because even if it acquired a majority of our outstanding voting stock, it would be able to take action as a stockholder, such as electing new directors or approving a merger, only at a duly called stockholders meeting and not by written consent.

Super-majority voting

The Delaware General Corporation Law provides generally that the affirmative vote of a majority of the shares entitled to vote on any matter is required to amend a corporation's certificate of incorporation or bylaws, unless a corporation's certificate of incorporation or bylaws, as the case may be, requires a greater percentage. Our bylaws may be amended or repealed by a majority vote of our board of directors or the affirmative vote of the holders of at least 75% of the votes that all our stockholders would be entitled to cast in any annual election of directors. In addition, the affirmative vote of the holders of at least 75% of the votes that all our stockholders would be entitled to cast in any election of directors is required to amend or repeal or to adopt any provisions inconsistent with any of the provisions of our certificate of incorporation described above.

Registration rights

We have entered into a fifth amended and restated investor rights agreement, dated April 6, 2011, which we refer to as the investor rights agreement, with certain holders of shares of our common stock, series B convertible preferred stock, series C convertible preferred stock, series D convertible preferred stock, series E convertible preferred stock, series F convertible preferred stock and series G convertible preferred stock, and certain holders of warrants to purchase our common stock. In addition we have agreed to grant to the holder of the warrant to purchase shares of our series D convertible preferred stock the same registration rights as are provided under the investor rights agreement. Upon the completion of this offering, holders of a total of up to 69,197,426 shares of our common stock as of December 31, 2011, including shares of our common stock issuable upon exercise of outstanding warrants, will have the right to require us to register these shares under the Securities Act under specified circumstances. After registration pursuant to these rights, these shares will become freely tradable without restriction under the Securities Act. If not otherwise exercised, the rights described below will expire five years after the closing of this offering.

Demand registration rights

Beginning six months after the effective date of the registration statement of which this prospectus forms a part, subject to specified limitations set forth in the investor rights agreement, at any time, the holders of at least 20% of the then outstanding shares having rights under the investor rights agreement, which we refer to as registrable shares, including registrable shares of our common stock issuable upon exercise of outstanding warrants, acting together, may demand in writing that we register all or a portion of the registrable shares under the Securities Act so long as the total amount of registrable shares registered have an aggregate offering price of at least $5.0 million (based on the then current market price or fair value). We are not obligated to file a registration statement pursuant to this provision on more than two occasions, and we are not obligated to file a registration statement pursuant to this provision within six months of the effective date of any other registration statement that we may file.

Form S-3 registration rights

In addition, at any time after we become eligible to file a registration statement on Form S-3 under the Securities Act, subject to specified limitations, the holders of at least 10% of the registrable shares, including registrable shares of our common stock issuable upon exercise of outstanding warrants, may demand in writing that we register on Form S-3 all or a portion of the registrable shares so long as the total amount of registrable shares being registered have an aggregate offering price of at least $2.5 million (based on the then current market price). We are not obligated to file a Form S-3 pursuant to this provision on more than two occasions in any 12-month period.

Incidental registration rights

If, at any time after the closing of this offering, we propose to file a registration statement under the Securities Act, other than pursuant to the demand registration rights and Form S-3 registration rights described above, the holders of registrable shares will be entitled to notice of the registration and, subject to specified exceptions, we will be required to use our best

efforts to register all or a portion of any registrable shares then held by them that they request that we register.

In the event that any registration in which the holders of registrable shares participate pursuant to our investor rights agreement is an underwritten public offering, we agree to enter into an underwriting agreement containing customary representation and warranties and covenants, including without limitation customary provisions with respect to indemnification by us of the underwriters of such offering.

In the event that any registration in which the holders of registrable shares participate pursuant to our investor rights agreement is an underwritten public offering, we will use our best efforts to include the requested registrable shares to be included, but may be limited by market conditions.

Expenses

Pursuant to the investor rights agreement, we are required to pay all registration expenses, including registration and filing fees, exchange listing fees, printing expenses and accounting fees and the fees and expenses of one counsel to represent the selling stockholders, other than any underwriting discounts and commissions, related to any demand or incidental registration. The investor rights agreement contains customary cross-indemnification provisions, pursuant to which we are obligated to indemnify the selling stockholders in the event of material misstatements or omissions in the registration statement attributable to us, and they are obligated to indemnify us for material misstatements or omissions in the registration statement attributable to them.

Transfer agent and registrar

The transfer agent and registrar for our common stock will be Computershare Trust Company, Inc.

NASDAQ Global Market

We have applied to have our common stock listed on The NASDAQ Global Market under the symbol "MACK."

Shares eligible for future sale

Prior to this offering, there has been no public market for our common stock, and a liquid trading market for our common stock may not develop or be sustained after this offering. Future sales of substantial amounts of our common stock in the public market, including shares issued upon exercise of outstanding options and warrants or in the public market after this offering, or the anticipation of these sales, could adversely affect market prices prevailing from time to time and could impair our ability to raise capital through sales of equity securities.

Upon the closing of this offering, we will have outstanding an aggregate of 94,756,679 shares of our common stock, after giving effect to the issuance of 16,666,667 shares of our common stock in this offering and the automatic conversion of all outstanding shares of our preferred stock into an aggregate of 66,255,529 shares of our common stock and assuming no exercise by the underwriters of their over-allotment option, no exercise of options outstanding as of December 31, 2011 and no exercise of the warrants outstanding as of December 31, 2011.

Of the shares to be outstanding immediately after the closing of this offering, we expect that the 16,666,667 shares to be sold in this offering will be freely tradable without restriction under the Securities Act unless purchased by our "affiliates," as that term is defined in Rule 144 under the Securities Act. The remaining 78,090,012 shares of our common stock outstanding after this offering will be "restricted securities" under Rule 144, and we expect that substantially all of these restricted securities will be subject to the 180-day lock-up period under the lock-up agreements as described below. These restricted securities may be sold in the public market only if registered or pursuant to an exemption from registration, such as Rule 144 or Rule 701 under the Securities Act.

Rule 144

In general, under Rule 144, beginning 90 days after the date of this prospectus, any person who is not our affiliate and has held their shares for at least six months, including the holding period of any prior owner other than one of our affiliates, may sell shares without restriction, subject to the availability of current public information about us. In addition, under Rule 144, any person who is not our affiliate and has held their shares for at least one year, including the holding period of any prior owner other than one of our affiliates, would be entitled to sell an unlimited number of shares immediately upon the closing of this offering without regard to whether current public information about us is available.

Beginning 90 days after the date of this prospectus, a person who is our affiliate or who was our affiliate at any time during the preceding three months and who has beneficially owned restricted securities for at least six months, including the holding period of any prior owner other than one of our affiliates, is entitled to sell a number of shares within any three-month period that does not exceed the greater of:

- 1% of the number of shares of our common stock then outstanding, which will equal approximately 947,567 shares immediately after this offering; and
- the average weekly trading volume of our common stock on The NASDAQ Global Market during the four calendar weeks preceding the filing of a Notice of Proposed Sale of Securities Pursuant to Rule 144 with respect to the sale.

Sales under Rule 144 by our affiliates are also subject to manner of sale provisions and notice requirements and to the availability of current public information about us.

Upon expiration of the 180-day lock-up period described below, approximately 94,756,679 shares of our common stock will be eligible for sale under Rule 144, including shares eligible for resale immediately upon the closing of this offering as described above. We cannot estimate the number of shares of our common stock that our existing stockholders will elect to sell under Rule 144.

Rule 701

In general, under Rule 701 of the Securities Act, any of our employees, consultants or advisors, other than our affiliates, who purchased shares from us in connection with a qualified compensatory stock plan or other written agreement is eligible to resell these shares 90 days after the date of this prospectus in reliance on Rule 144, but without compliance with the holding period requirements of Rule 144 and without regard to the volume of such sales or the availability of public information about us. Subject to the 180-day lock-up period described below, approximately 927,083 shares of our common stock will be eligible for sale in accordance with Rule 701.

Lock-up agreements

We and each of our directors and executive officers and certain holders of our outstanding common stock, who collectively own 74,027,171 shares of our common stock, based on shares outstanding as of December 31, 2011, have agreed that, without the prior written consent of J.P. Morgan Securities LLC on behalf of the underwriters, we and they will not, subject to limited exceptions, during the period ending 180 days after the date of this prospectus, subject to extension in specified circumstances:

- offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase or otherwise transfer or dispose of, directly or indirectly, any shares of our common stock or any securities convertible into or exercisable or exchangeable for common stock, or publicly disclose the intention to make any offer, sale, pledge or disposition;

- enter into any swap or other arrangement that transfers to another, in whole or in part, any of the economic consequences of ownership of our common stock; or

- make any demand for or exercise any right with respect to the registration of any shares of our common stock or any security convertible into or exercisable or exchangeable for shares of our common stock.

The lock-up restrictions, specified exceptions and the circumstances under which the lock-up period may be extended are described in more detail under "Underwriting."

Registration rights

Subject to the lock-up agreements described above, upon the closing of this offering, the holders of an aggregate of up to 69,197,426 shares of our common stock, including shares of our common stock issuable upon exercise of outstanding warrants, will have the right to

require us to register these shares under the Securities Act under specified circumstances. After registration pursuant to these rights, these shares will become freely tradable without restriction under the Securities Act. See "Description of capital stock—registration rights" for additional information regarding these registration rights.

Stock options

As of December 31, 2011, we had outstanding options to purchase 17,617,016 shares of our common stock, of which options to purchase 13,570,863 shares were vested. Following this offering, we intend to file one or more registration statements on Form S-8 under the Securities Act to register all of the shares of our common stock subject to outstanding options and options and other awards issuable pursuant to our 2011 plan and shares of our common stock subject to outstanding options issued pursuant to our 1999 plan and our 2008 plan. See "Executive compensation—stock option and other employee benefit plans" for additional information regarding these plans. Accordingly, shares of our common stock registered under the registration statements will be available for sale in the open market, subject to Rule 144 volume limitations applicable to affiliates, and subject to any vesting restrictions and lock-up agreements applicable to these shares.

Warrants

Upon the closing of this offering, and after giving effect to the automatic conversion of our preferred stock into common stock, we will have outstanding warrants to purchase an aggregate of 2,941,897 shares of our common stock at a weighted average exercise price of $3.03 per share held by 74 persons. Any shares of common stock issued upon exercise of such warrants will be restricted securities and may be sold in the public market only if registered or pursuant to an exemption from registration, such as Rule 144, subject to the expiration of the lock-up period described above.

Material U.S. tax considerations for non-U.S. holders of common stock

The following is a general discussion of material U.S. federal income and estate tax considerations relating to ownership and disposition of our common stock by a non-U.S. holder. For purposes of this discussion, the term "non-U.S. holder" means a beneficial owner of our common stock that is not, for U.S. federal income tax purposes:

- an individual who is a citizen or resident of the United States;
- a corporation, or other entity treated as a corporation for U.S. federal income tax purposes, created or organized in or under the laws of the United States or of any political subdivision of the United States;
- an estate the income of which is subject to U.S. federal income taxation regardless of its source; or
- a trust, if a U.S. court is able to exercise primary supervision over the administration of the trust and one or more U.S. persons have authority to control all substantial decisions of the trust or if the trust has a valid election to be treated as a U.S. person under applicable U.S. Treasury Regulations.

An individual may be treated as a resident instead of a nonresident of the United States in any calendar year for U.S. federal income tax purposes if the individual was present in the United States for at least 31 days in that calendar year and for an aggregate of at least 183 days during the three-year period ending with the current calendar year. For purposes of this calculation, all of the days present in the current year, one-third of the days present in the immediately preceding year and one-sixth of the days present in the second preceding year are counted. Residents are taxed for U.S. federal income tax purposes as if they were U.S. citizens.

This discussion is based on current provisions of the U.S. Internal Revenue Code of 1986, as amended, which we refer to as the Code, existing and proposed U.S. Treasury Regulations promulgated thereunder, current administrative rulings and judicial decisions, all as in effect as of the date of this prospectus and all of which are subject to change or to differing interpretation, possibly with retroactive effect. Any change could alter the tax consequences to non-U.S. holders described in this prospectus. In addition, the Internal Revenue Service, or the IRS, could challenge one or more of the tax consequences described in this prospectus.

We assume in this discussion that each non-U.S. holder holds shares of our common stock as a capital asset (generally, property held for investment). This discussion does not address all aspects of U.S. federal income and estate taxation that may be relevant to a particular non-U.S. holder in light of that non-U.S. holder's individual circumstances nor does it address any aspects of U.S. state, local or non-U.S. taxes. This discussion also does not consider any specific facts or circumstances that may apply to a non-U.S. holder and does not address the special tax rules applicable to particular non-U.S. holders, such as:

- insurance companies;
- tax-exempt organizations;

- financial institutions;
- brokers or dealers in securities;
- regulated investment companies;
- pension plans;
- controlled foreign corporations;
- passive foreign investment companies;
- non-U.S. holders that hold our common stock as part of a straddle, hedge, conversion transaction, synthetic security or other integrated investment; and
- certain U.S. expatriates.

In addition, this discussion does not address the tax treatment of partnerships or persons who hold their common stock through partnerships or other entities which are pass-through entities for U.S. federal income tax purposes. A partner in a partnership or other pass-through entity that will hold our common stock should consult his, her or its own tax advisor regarding the tax consequences of the ownership and disposition of our common stock through a partnership or other pass-through entity, as applicable.

Prospective investors should consult their own tax advisors regarding the U.S. federal, state, local and non-U.S. income and other tax considerations of acquiring, holding and disposing of our common stock.

Dividends

If we pay distributions on our common stock, those distributions generally will constitute dividends for U.S. federal income tax purposes to the extent paid from our current or accumulated earnings and profits, as determined under U.S. federal income tax principles. If a distribution exceeds our current and accumulated earnings and profits, the excess will be treated as a tax-free return of the non-U.S. holder's investment, up to such holder's tax basis in the common stock. Any remaining excess will be treated as capital gain, subject to the tax treatment described below under the heading "Gain on disposition of common stock."

As discussed under "Dividend policy," we do not expect to pay cash dividends to holders of our common stock in the foreseeable future. In the event we do pay dividends, dividends paid to a non-U.S. holder generally will be subject to withholding of U.S. federal income tax at a 30% rate or such lower rate as may be specified by an applicable income tax treaty between the United States and such holder's country of residence. If we determine, at a time reasonably close to the date of payment of a distribution on our common stock, that the distribution will not constitute a dividend because we do not anticipate having current or accumulated earnings and profits, we intend not to withhold any U.S. federal income tax on the distribution as permitted by U.S. Treasury Regulations.

Dividends that are treated as effectively connected with a trade or business conducted by a non-U.S. holder within the United States, and if an applicable income tax treaty so provides, that are attributable to a permanent establishment or a fixed base maintained by the non-U.S. holder within the United States, are generally exempt from the 30% withholding tax if the

non-U.S. holder satisfies applicable certification and disclosure requirements. However, such U.S. effectively connected income, net of specified deductions and credits, is taxed at the same graduated U.S. federal income tax rates applicable to U.S. persons (as defined in the Code). Any U.S. effectively connected income received by a non-U.S. holder that is a corporation may also, under certain circumstances, be subject to an additional "branch profits tax" at a 30% rate or such lower rate as may be specified by an applicable income tax treaty between the United States and such holder's country of residence.

A non-U.S. holder of our common stock who claims the benefit of an applicable income tax treaty between the United States and such holder's country of residence generally will be required to provide a properly executed IRS Form W-8BEN (or successor form) and satisfy applicable certification and other requirements. Non-U.S holders are urged to consult their own tax advisors regarding their entitlement to benefits under a relevant income tax treaty.

A non-U.S. holder that is eligible for a reduced rate of U.S. withholding tax under an income tax treaty may obtain a refund or credit of any excess amounts withheld by timely filing an appropriate claim with the IRS.

Gain on disposition of common stock

A non-U.S. holder generally will not be subject to U.S. federal income tax on gain recognized on a disposition of our common stock unless:

- the gain is effectively connected with the non-U.S. holder's conduct of a trade or business in the United States, and if an applicable income tax treaty so provides, the gain is attributable to a permanent establishment or fixed base maintained by the non-U.S. holder in the United States; in these cases, the non-U.S. holder will be taxed on a net income basis at the regular graduated rates and in the manner applicable to U.S. persons, and if the non-U.S. holder is a foreign corporation, an additional branch profits tax at a rate of 30%, or a lower rate as may be specified by an applicable income tax treaty, may also apply;

- the non-U.S. holder is a nonresident alien present in the United States for 183 days or more in the taxable year of the disposition and certain other requirements are met, in which case the non-U.S. holder will be subject to a 30% tax (or such lower rate as may be specified by an applicable income tax treaty) on the net gain derived from the disposition, which may be offset by U.S.-source capital losses of the non-U.S. holder, if any; or

- we are, or have been at any time during the five-year period preceding such disposition (or the non-U.S. holder's holding period, if shorter), a "U.S. real property holding corporation," unless our common stock is regularly traded on an established securities market and the non-U.S. holder held no more than 5% of our outstanding common stock, directly or indirectly, during the shorter of the five-year period ending on the date of the disposition or the period that the non-U.S. holder held our common stock. Generally, a corporation is a "U.S. real property holding corporation" if the fair market value of its "U.S. real property interests" equals or exceeds 50% of the sum of the fair market value of its worldwide real property interests plus its other assets used or held for use in a trade or business. Although there can be no assurance, we believe that we are not currently, and we do not anticipate becoming, a "U.S. real property holding corporation" for U.S. federal income tax purposes.

No assurance can be provided that our common stock will be regularly traded on an established securities market for purposes of the rule described above.

Information reporting and backup withholding

We must report annually to the IRS and to each non-U.S. holder the gross amount of the distributions on our common stock paid to such holder and the tax withheld, if any, with respect to such distributions. Non-U.S. holders may have to comply with specific certification procedures to establish that the holder is not a U.S. person (as defined in the Code) in order to avoid backup withholding at the applicable rate, currently 28%, with respect to dividends on our common stock. Generally, a holder will comply with such procedures if it provides a properly executed IRS Form W-8BEN (or other applicable Form W-8) or otherwise meets documentary evidence requirements for establishing that it is a non-U.S. holder, or otherwise establishes an exemption. Dividends paid to non-U.S. holders subject to withholding of U.S. federal income tax, as described above under the heading "Dividends," will generally be exempt from U.S. backup withholding.

Information reporting and backup withholding generally will apply to the proceeds of a disposition of our common stock by a non-U.S. holder effected by or through the U.S. office of any broker, U.S. or foreign, unless the holder certifies its status as a non-U.S. holder and satisfies certain other requirements, or otherwise establishes an exemption. Generally, information reporting and backup withholding will not apply to a payment of disposition proceeds to a non-U.S. holder where the transaction is effected outside the United States through a non-U.S. office of a broker. However, for information reporting purposes, dispositions effected through a non-U.S. office of a broker with substantial U.S. ownership or operations generally will be treated in a manner similar to dispositions effected through a U.S. office of a broker. Non-U.S. holders should consult their own tax advisors regarding the application of the information reporting and backup withholding rules to them.

Copies of information returns may be made available to the tax authorities of the country in which the non-U.S. holder resides or is incorporated under the provisions of a specific treaty or agreement.

Backup withholding is not an additional tax. Any amounts withheld under the backup withholding rules from a payment to a non-U.S. holder can be refunded or credited against the non-U.S. holder's U.S. federal income tax liability, if any, provided that an appropriate claim is timely filed with the IRS.

Federal estate tax

Common stock owned or treated as owned by an individual who is a non-U.S. holder (as specially defined for U.S. federal estate tax purposes) at the time of death will be included in the individual's gross estate for U.S. federal estate tax purposes and, therefore, may be subject to U.S. federal estate tax, unless an applicable estate tax or other treaty provides otherwise.

Legislation affecting certain non-U.S. holders

Legislation enacted in 2010 generally imposes a U.S. federal withholding tax at a rate of 30% on dividends and the gross proceeds of a disposition of our common stock paid after

December 31, 2012 to certain foreign entities (including foreign financial institutions and foreign intermediaries), unless such foreign entity satisfies various U.S. information reporting and due diligence requirements (generally relating to ownership by U.S. persons of interests in or accounts with the entity). Under certain circumstances, a non-U.S. holder may be eligible for refunds or credits of the tax. Non-U.S. holders should consult their own tax advisors regarding the possible implications of this legislation on their investment in our common stock.

The preceding discussion of material U.S. federal tax considerations is for general information only. It is not tax advice. Prospective investors should consult their own tax advisors regarding the particular U.S. federal, state, local and non-U.S. tax consequences of purchasing, holding and disposing of our common stock, including the consequences of any proposed changes in applicable laws.

Underwriting

We are offering the shares of our common stock described in this prospectus through a number of underwriters. J.P. Morgan Securities LLC is acting as book running manager of the offering and as representative of the underwriters. We have entered into an underwriting agreement with the underwriters. Subject to the terms and conditions of the underwriting agreement, we have agreed to sell to the underwriters, and each underwriter has severally agreed to purchase, at the public offering price less the underwriting discounts and commissions set forth on the cover page of this prospectus, the number of shares of our common stock listed next to its name in the following table:

Name	Number of shares
J.P. Morgan Securities LLC	
Merrill Lynch, Pierce, Fenner & Smith Incorporated	
Cowen and Company, LLC	
Oppenheimer & Co. Inc.	
Total	

The underwriters are committed to purchase all the shares of our common stock offered by us if they purchase any shares. The underwriting agreement also provides that if an underwriter defaults, the purchase commitments of non-defaulting underwriters may also be increased or the offering may be terminated.

The underwriters propose to offer the shares of our common stock directly to the public at the initial public offering price set forth on the cover page of this prospectus and to certain dealers at that price less a concession not in excess of $ per share. Any such dealers may resell shares to certain other brokers or dealers at a discount of up to $ per share from the initial public offering price. After the initial public offering of the shares, the offering price and other selling terms may be changed by the underwriters. Sales of shares made outside of the United States may be made by affiliates of the underwriters. The representative has advised us that the underwriters do not intend to confirm discretionary sales in excess of 5% of the shares of our common stock offered in this offering.

The underwriters have an option to buy up to 2,500,000 additional shares of our common stock from us to cover sales of shares by the underwriters which exceed the number of shares specified in the table above. The underwriters have 30 days from the date of this prospectus to exercise this over-allotment option. If any shares are purchased with this over-allotment option, the underwriters will purchase shares in approximately the same proportion as shown in the table above. If any additional shares of our common stock are purchased, the underwriters will offer the additional shares on the same terms as those on which the shares are being offered.

The underwriting fee is equal to the public offering price per share of our common stock less the amount paid by the underwriters to us per share of our common stock. The underwriting fee is $ per share. The following table shows the per share and total underwriting discounts and commissions to be paid to the underwriters assuming both no exercise and full exercise of the underwriters' option to purchase additional shares.

	Without over-allotment exercise	With full over-allotment exercise
Per Share	$	$
Total	$	$

We estimate that the total expenses of this offering, including registration, filing and listing fees, printing fees and legal and accounting expenses, but excluding the underwriting discounts and commissions, will be approximately $2,350,000. The underwriters have agreed to reimburse a portion of our expenses for this offering.

A prospectus in electronic format may be made available on the web sites maintained by one or more underwriters, or selling group members, if any, participating in the offering. The underwriters may agree to allocate a number of shares to underwriters and selling group members for sale to their online brokerage account holders. Internet distributions will be allocated by the representative to underwriters and selling group members that may make Internet distributions on the same basis as other allocations.

We have agreed that we will not (1) offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, or otherwise transfer or dispose of, directly or indirectly, or file with the SEC a registration statement under the Securities Act relating to, any shares of our common stock or securities convertible into or exchangeable or exercisable for any shares of our common stock, or publicly disclose the intention to make any offer, sale, pledge, disposition or filing, or (2) enter into any swap or other agreement that transfers all or a portion of the economic consequences associated with the ownership of any shares of our common stock or any such other securities (regardless of whether any of these transactions are to be settled by the delivery of shares of our common stock, or such other securities, in cash or otherwise), in each case without the prior written consent of J.P. Morgan Securities LLC for a period of 180 days after the date of this prospectus, and in each case except for (A) shares of common stock to be sold pursuant to the underwriting agreement, (B) shares of common stock issued upon the exercise of options granted under our stock incentive plans or warrants described as outstanding in this prospectus, (C) options and other awards granted under our stock incentive plans, (D) the filing by us of any registration statement on Form S-8 and (E) shares of common stock or other securities issued in connection with a transaction that includes a commercial relationship or any acquisition of assets or not less than a majority or controlling portion of the equity of another entity. In the case of clause (E), the aggregate number of shares issued may not exceed 5.0% of the total number of outstanding shares of our common stock immediately following the issuance and sale of the shares of common stock in this offering, and the recipient of any such shares of common stock and securities issued during the 180-day restricted period described above must enter into a lock-up agreement.

Notwithstanding the foregoing, if (1) during the last 17 days of the 180-day restricted period, we issue an earnings release or material news or a material event relating to our company occurs; or (2) prior to the expiration of the 180-day restricted period, we announce that we will release earnings results during the 16-day period beginning on the last day of the 180-day period, the restrictions described above shall continue to apply until the expiration of the 18-day period beginning on the issuance of the earnings release or the occurrence of the material news or material event.

All of our directors and executive officers and our significant stockholders have entered into lock-up agreements with the underwriters prior to the commencement of this offering pursuant to which we and each of these persons or entities, for a period of 180 days after the date of this prospectus, may not, without the prior written consent of J.P. Morgan Securities LLC, (1) offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, or otherwise transfer or dispose of, directly or indirectly, any shares of our common stock or any securities convertible into or exercisable or exchangeable for common stock (including, without limitation, common stock or such other securities which may be deemed to be beneficially owned by such persons in accordance with the rules and regulations of the SEC and securities which may be issued upon exercise of a stock option or warrant), or publicly disclose the intention to make any offer, sale, pledge or disposition, (2) enter into any swap or other agreement that transfers, in whole or in part, any of the economic consequences of ownership of our common stock or such other securities, whether any such transaction described in clause (1) or (2) above is to be settled by delivery of our common stock or such other securities, in cash or otherwise or (3) make any demand for or exercise any right with respect to the registration of any shares of our common stock or any security convertible into or exercisable or exchangeable for our common stock, in each case subject to certain exceptions, including (A) shares of common stock to be sold pursuant to the underwriting agreement, (B) transfers of shares of common stock or other securities as bona fide gifts, (C) transfers or dispositions of shares of common stock or other securities to any trust for the direct or indirect benefit of the director, officer or stockholder or the immediate family of such person in a transaction not involving a disposition for value, (D) transfers or dispositions of shares of common stock or other securities to any corporation, partnership, limited liability company or other entity all of the beneficial ownership interests of which are held by the director, officer or stockholder or the immediate family of such person in a transaction not involving a disposition for value, (E) transfers or dispositions of shares of common stock or other securities by will, other testamentary document or intestate succession to the legal representative, heir, beneficiary or a member of the immediate family of the director, officer or stockholder, and (F) distributions of shares of common stock or other securities to partners, members or stockholders of the stockholder. In the case of any transfer, disposition or distribution pursuant to clause (B), (C), (D), (E) or (F), each transferee, donee or distributee must execute and deliver to J.P. Morgan Securities LLC a lock-up agreement. In addition, in the case of any transfer, disposition or distribution pursuant to clause (B), (C), (D) or (F), no filing by any party under the Exchange Act, or other public announcement reporting a reduction in the beneficial ownership of common stock held by the director, officer or stockholder, may be required or voluntarily made in connection with such transfer, disposition or distribution, other than a filing on a Form 5 made after the expiration of the 180-day period referred to above.

In addition, notwithstanding the foregoing restrictions, the director, officer or stockholder may (i) exercise an option to purchase shares of common stock granted under any stock incentive plan or stock purchase plan, provided that the underlying shares of common stock continue to be subject to the restrictions on transfer set forth in the lock-up agreement, (ii) establish a trading plan pursuant to Rule 10b5-1 under the Exchange Act for the transfer of common stock, provided that such plan does not provide for any transfers of common stock, and no filing with the SEC or other public announcement shall be required or voluntarily made by the director, officer or stockholder or any other person in connection therewith, in each case

during the 180-day restricted period or any extension thereof pursuant to the lock-up agreement, and (iii) transfer or dispose of shares of common stock acquired in the offering, subject to certain restrictions with respect to company directed shares, or on the open market following the offering, provided that certain limitations on filings under the Exchange Act or other public announcements reporting a reduction in the beneficial ownership of common stock held by the director, officer or stockholder apply in connection with such transfer or disposition.

Notwithstanding the foregoing, if (1) during the last 17 days of the 180-day restricted period, we issue an earnings release or material news or a material event relating to our company occurs; or (2) prior to the expiration of the 180-day restricted period, we announce that we will release earnings results during the 16-day period beginning on the last day of the 180-day period, the restrictions described above shall continue to apply until the expiration of the 18-day period beginning on the issuance of the earnings release or the occurrence of the material news or material event.

We have agreed to indemnify the underwriters against certain liabilities, including liabilities under the Securities Act.

We have applied to have our common stock approved for listing on The NASDAQ Global Market under the symbol "MACK."

In connection with this offering, the underwriters may engage in stabilizing transactions, which involves making bids for, purchasing and selling shares of our common stock in the open market for the purpose of preventing or retarding a decline in the market price of our common stock while this offering is in progress. These stabilizing transactions may include making short sales of our common stock, which involves the sale by the underwriters of a greater number of our shares of common stock than they are required to purchase in this offering, and purchasing shares of our common stock on the open market to cover positions created by short sales. Short sales may be "covered" shorts, which are short positions in an amount not greater than the underwriters' over-allotment option referred to above, or may be "naked" shorts, which are short positions in excess of that amount. The underwriters may close out any covered short position either by exercising their over-allotment option, in whole or in part, or by purchasing shares in the open market. In making this determination, the underwriters will consider, among other things, the price of shares available for purchase in the open market compared to the price at which the underwriters may purchase shares through the over-allotment option. A naked short position is more likely to be created if the underwriters are concerned that there may be downward pressure on the price of our common stock in the open market that could adversely affect investors who purchase in this offering. To the extent that the underwriters create a naked short position, they will purchase shares in the open market to cover the position.

The underwriters have advised us that, pursuant to Regulation M of the Securities Act, they may also engage in other activities that stabilize, maintain or otherwise affect the price of our common stock, including the imposition of penalty bids. This means that if the representative of the underwriters purchases shares of our common stock in the open market in stabilizing transactions or to cover short sales, the representative can require the underwriters that sold those shares as part of this offering to repay the underwriting discount received by them.

These activities may have the effect of raising or maintaining the market price of our common stock or preventing or retarding a decline in the market price of our common stock, and, as a result, the price of the common stock may be higher than the price that otherwise might exist in the open market. If the underwriters commence these activities, they may discontinue them at any time. The underwriters may carry out these transactions on The NASDAQ Global Market, in the over-the-counter market or otherwise.

Prior to this offering, there has been no public market for our common stock. The initial public offering price will be determined by negotiations between us and the representative of the underwriters. In determining the initial public offering price, we and the representative of the underwriters expect to consider a number of factors including:

- the information set forth in this prospectus and otherwise available to the representative;
- our prospects and the history and prospects for the industry in which we compete;
- an assessment of our management;
- our prospects for future earnings;
- the general condition of the securities markets at the time of this offering;
- the recent market prices of, and demand for, publicly traded common stock of generally comparable companies; and
- other factors deemed relevant by the underwriters and us.

Neither we nor the underwriters can assure investors that an active trading market will develop for our common stock, or that the shares will trade in the public market at or above the initial public offering price.

Other than in the United States, no action has been taken by us or the underwriters that would permit a public offering of the securities offered by this prospectus in any jurisdiction where action for that purpose is required. The securities offered by this prospectus may not be offered or sold, directly or indirectly, nor may this prospectus or any other offering material or advertisements in connection with the offer and sale of any such securities be distributed or published in any jurisdiction, except under circumstances that will result in compliance with the applicable rules and regulations of that jurisdiction. Persons into whose possession this prospectus comes are advised to inform themselves about and to observe any restrictions relating to the offering and the distribution of this prospectus. This prospectus does not constitute an offer to sell or a solicitation of an offer to buy any securities offered by this prospectus in any jurisdiction in which such an offer or a solicitation is unlawful.

Selling restrictions

European economic area

In relation to each Member State of the European Economic Area which has implemented the Prospectus Directive (each, a "Relevant Member State") an offer to the public of any shares which are the subject of the offering contemplated by this Prospectus (the "Shares") may not be made in that Relevant Member State, except that an offer to the public in that Relevant

Member State of any Shares may be made at any time under the following exemptions under the Prospectus Directive, if they have been implemented in that Relevant Member State:

(a) to any legal entity which is a qualified investor as defined in the Prospectus Directive;

(b) to fewer than 100 or, if the Relevant Member State has implemented the relevant provision of the 2010 PD Amending Directive, 150, natural or legal persons (other than qualified investors as defined in the Prospectus Directive), as permitted under the Prospectus Directive, subject to obtaining the prior consent of representative of the underwriters for any such offer; or

(c) in any other circumstances falling within Article 3(2) of the Prospectus Directive, provided that no such offer of Shares shall result in a requirement for the publication by us or any underwriter of a prospectus pursuant to Article 3 of the Prospectus Directive.

For the purposes of this provision, the expression an "offer to the public" in relation to any Shares in any Relevant Member State means the communication in any form and by any means of sufficient information on the terms of the offer and any Shares to be offered so as to enable an investor to decide to purchase any Shares, as the same may be varied in that Member State by any measure implementing the Prospectus Directive in that Member State, the expression "Prospectus Directive" means Directive 2003/71/EC (and amendments thereto, including the 2010 PD Amending Directive, to the extent implemented in the Relevant Member State), and includes any relevant implementing measure in the Relevant Member State, and the expression "2010 PD Amending Directive" means Directive 2010/73/EU.

United Kingdom

Each underwriter has represented and agreed that:

(a) it has only communicated or caused to be communicated and will only communicate or cause to be communicated an invitation or inducement to engage in investment activity (within the meaning of Section 21 of the FSMA) received by it in connection with the issue or sale of the Shares in circumstances in which Section 21(1) of the FSMA does not apply to us; and

(b) it has complied and will comply with all applicable provisions of the FSMA with respect to anything done by it in relation to the Shares in, from or otherwise involving the United Kingdom.

Switzerland

The Shares may not be publicly offered in Switzerland and will not be listed on the SIX Swiss Exchange ("SIX") or on any other stock exchange or regulated trading facility in Switzerland. This document has been prepared without regard to the disclosure standards for issuance prospectuses under art. 652a or art. 1156 of the Swiss Code of Obligations or the disclosure standards for listing prospectuses under art. 27 ff. of the SIX Listing Rules or the listing rules of any other stock exchange or regulated trading facility in Switzerland. Neither this document nor any other offering or marketing material relating to the Shares or the offering may be publicly distributed or otherwise made publicly available in Switzerland.

Neither this document nor any other offering or marketing material relating to the offering, the Company, the Shares have been or will be filed with or approved by any Swiss regulatory

authority. In particular, this document will not be filed with, and the offer of Shares will not be supervised by, the Swiss Financial Market Supervisory Authority ("FINMA"), and the offer of Shares has not been and will not be authorized under the Swiss Federal Act on Collective Investment Schemes ("CISA"). The investor protection afforded to acquirers of interests in collective investment schemes under the CISA does not extend to acquirers of Shares.

Dubai international financial centre

This prospectus relates to an Exempt Offer in accordance with the Offered Securities Rules of the Dubai Financial Services Authority ("DFSA"). This prospectus is intended for distribution only to persons of a type specified in the Offered Securities Rules of the DFSA. It must not be delivered to, or relied on by, any other person. The DFSA has no responsibility for reviewing or verifying any documents in connection with Exempt Offers. The DFSA has not approved this prospectus nor taken steps to verify the information set forth herein and has no responsibility for the prospectus. The Shares to which this prospectus relates may be illiquid and/or subject to restrictions on their resale. Prospective purchasers of the Shares offered should conduct their own due diligence on the Shares. If you do not understand the contents of this prospectus you should consult an authorized financial advisor.

Certain of the underwriters and their affiliates have provided in the past to us and our affiliates and may provide from time to time in the future certain commercial banking, financial advisory, investment banking and other services for us and such affiliates in the ordinary course of their business, for which they have received and may continue to receive customary fees and commissions. In addition, from time to time, certain of the underwriters and their affiliates may effect transactions for their own account or the account of customers, and hold on behalf of themselves or their customers, long or short positions in our debt or equity securities or loans, and may do so in the future.

Legal matters

The validity of the shares of our common stock offered hereby is being passed upon for us by Wilmer Cutler Pickering Hale and Dorr LLP. Davis Polk & Wardwell LLP is acting as counsel for the underwriters in connection with this offering.

Experts

The financial statements as of December 31, 2010 and 2009 and for each of the three years in the period ended December 31, 2010 included in this prospectus have been so included in reliance on the report of PricewaterhouseCoopers LLP, an independent registered public accounting firm, given on the authority of said firm as experts in auditing and accounting.

Where you can find more information

We have filed with the SEC a registration statement on Form S-1 under the Securities Act with respect to the shares of common stock we are offering to sell. This prospectus, which constitutes part of the registration statement, does not include all of the information contained in the registration statement and the exhibits, schedules and amendments to the registration statement. For further information with respect to us and our common stock, we refer you to the registration statement and to the exhibits and schedules to the registration statement. Statements contained in this prospectus about the contents of any contract, agreement or other document are not necessarily complete, and, in each instance, we refer you to the copy of the contract, agreement or other document filed as an exhibit to the registration statement. Each of these statements is qualified in all respects by this reference to such contract, agreement or other document.

You may read and copy the registration statement of which this prospectus is a part at the SEC's public reference room, which is located at 100 F Street, N.E., Room 1580, Washington, DC 20549. You can request copies of the registration statement by writing to the SEC and paying a fee for the copying cost. Please call the SEC at 1-800-SEC-0330 for more information about the operation of the SEC's public reference room. In addition, the SEC maintains an Internet website, which is located at http://www.sec.gov, that contains reports, proxy and information statements and other information regarding issuers that file electronically with the SEC. You may access the registration statement of which this prospectus is a part at the SEC's Internet website. Upon completion of this offering, we will be subject to the information reporting requirements of the Exchange Act, and we will file reports, proxy statements and other information with the SEC.

Merrimack Pharmaceuticals, Inc.
Index to consolidated financial statements

Report of independent registered public accounting firm

To the Board of Directors and Stockholders of
Merrimack Pharmaceuticals, Inc.

In our opinion, the accompanying consolidated balance sheets and the related consolidated statements of operations, statements of convertible preferred stock, non-controlling interest and stockholders' deficit, and statements of cash flows present fairly, in all material respects, the financial position of Merrimack Pharmaceuticals, Inc. and its subsidiaries ("the Company") at December 31, 2010 and 2009, and the results of their operations and their cash flows for each of the three years in the period ended December 31, 2010 in conformity with accounting principles generally accepted in the United States of America. These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits of these statements in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

/s/ PricewaterhouseCoopers LLP

Boston, Massachusetts
July 8, 2011

Merrimack Pharmaceuticals, Inc.
Consolidated balance sheets

(in thousands, except par value amounts)	December 31, 2009	December 31, 2010	September 30, 2011 Actual (unaudited)	September 30, 2011 Pro forma (unaudited)
Assets				
Current assets:				
Cash and cash equivalents	$ 58,387	$ 30,713	$ 59,232	$ 59,232
Restricted cash	95	—	—	—
Accounts receivable	1,770	3,745	5,329	5,329
Prepaid expenses and other current assets	1,259	1,830	4,970	4,970
Total current assets	61,511	36,288	69,531	69,531
Restricted cash	381	381	381	381
Property and equipment, net	6,491	7,458	6,137	6,137
Other assets	33	30	23	23
Intangible assets, net	3,125	2,805	2,565	2,565
In-process research and development	7,010	7,010	7,010	7,010
Goodwill	3,605	3,605	3,605	3,605
Total assets	**$ 82,156**	**$ 57,577**	**$ 89,252**	**$ 89,252**
Liabilities, Convertible Preferred Stock, Non-controlling Interest and Stockholders' Deficit				
Current liabilities:				
Accounts payable	$ 2,270	$ 1,440	$ 4,886	$ 4,886
Accrued expenses	6,232	7,256	10,839	10,839
Capital lease obligations	847	443	97	97
Deferred revenue	5,076	6,462	6,879	6,879
Deferred lease benefit	394	454	244	244
Deferred tax incentives	—	270	512	512
Series F amount	69,275	—	—	—
Accrued dividends	—	—	—	4,263
Total current liabilities	84,094	16,325	23,457	27,720
Capital lease obligations	508	48	—	—
Deferred revenues	55,861	67,320	68,637	68,637
Deferred lease benefits	426	102	—	—
Deferred tax incentives	—	810	1,577	1,577
Contingent consideration	178	—	—	—
Convertible preferred stock warrants	578	652	1,394	—
Total liabilities	$ 141,645	$ 85,257	$ 95,065	$ 97,934
Commitments and contingencies (Note 18)				
Convertible preferred stock	131,273	191,257	268,220	—
Non-controlling interest	—	1,027	679	679
Stockholders' deficit:				
Common stock, 90,000 authorized no par shares at December 31, 2009, 125,000 authorized $0.01 par value shares at December 31, 2010, 138,500 authorized $0.01 par value shares at September 30, 2011 (actual, unaudited) and 200,000 authorized $0.01 par value shares at September 30, 2011 (pro forma, unaudited), 10,868, 11,073 and 11,414 issued and outstanding at December 31, 2009 and 2010, and September 30, 2011 (actual, unaudited), respectively, and 77,669 shares at September 30, 2011 (pro forma, unaudited)	17,364	111	114	777
Additional paid-in capital	8,744	45,096	51,452	314,746
Common stock warrants	4,642	6,445	6,445	7,839
Accumulated deficit	(221,512)	(271,616)	(332,723)	(332,723)
Total stockholders' deficit	$ (190,762)	$ (219,964)	$ (274,712)	$ (9,361)
Total liabilities, convertible preferred stock, non-controlling interest and stockholders' deficit	**$ 82,156**	**$ 57,577**	**$ 89,252**	**$ 89,252**

The accompanying notes are an integral part of these consolidated financial statements.

Merrimack Pharmaceuticals, Inc.
Consolidated statements of operations

(in thousands, except per share amounts)	Years ended December 31, 2008	2009	2010	Nine-months ended September 30, 2010 (unaudited)	2011 (unaudited)
Research and development revenues	$ 365	$ 2,148	$ 20,305	$ 13,996	$ 21,638
Operating expenses					
Research and development	34,528	37,658	58,278	41,860	73,101
General and administrative	8,836	12,178	11,381	8,555	11,239
Contingent consideration	—	—	(178)	37	—
Total operating expenses	43,364	49,836	69,481	50,452	84,340
Loss from operations	(42,999)	(47,688)	(49,176)	(36,456)	(62,702)
Other income and expenses					
Interest income	1,243	81	74	54	51
Interest expense	(4,403)	(4,909)	(3,726)	(3,638)	(12)
Other, net	607	41	2,669	12	1,208
Net loss before income taxes and non-controlling interest	(45,552)	(52,475)	(50,159)	(40,028)	(61,455)
Benefit from income taxes	—	3,402	—	—	—
Net loss	(45,552)	(49,073)	(50,159)	(40,028)	(61,455)
Less net loss attributable to non-controlling interest	—	—	(55)	(19)	(348)
Net loss attributable to Merrimack Pharmaceuticals, Inc.	$ (45,552)	$ (49,073)	$ (50,104)	$ (40,009)	$ (61,107)
Net loss per share available to common stockholders—basic and diluted	$ (8.17)	$ (7.28)	$ (5.57)	$ (3.94)	$ (5.92)
Weighted-average common shares used in computing net loss per share available to common stockholders—basic and diluted	6,199	7,387	10,994	10,970	11,292
Pro forma net loss per share available to common stockholders—basic and diluted (unaudited)			$ (0.87)		$ (0.81)
Weighted-average common shares used in computing pro forma net loss per share available to common stockholders—basic and diluted (unaudited)			57,718		74,152

The accompanying notes are an integral part of these consolidated financial statements.

Merrimack Pharmaceuticals, Inc.
Consolidated statements of convertible preferred stock, non-controlling interest and stockholders' deficit

(in thousands)	Series B-F convertible preferred stock Shares	Series B-F convertible preferred stock Amount	Non-controlling interest	Common stock Shares	Common stock Amount	Additional paid-in capital	Common stock warrants	Accumulated deficit	Total stockholders' deficit
Balance at January 1, 2008	42,028	$ 132,739	$ —	6,180	$ 7,822	$ 3,023	$ 4,618	$ (126,887)	$ (111,424)
Exercise of employee stock options	—	—	—	43	67	—	—	—	67
Stock-based compensation	—	—	—	—	—	2,417	—	—	2,417
Issuance of common stock warrants in connection with equipment financing loans	—	—	—	—	—	—	24	—	24
Net loss	—	—	—	—	—	—	—	(45,552)	(45,552)
Balance at December 31, 2008	42,028	$ 132,739	$ —	6,223	$ 7,889	$ 5,440	$ 4,642	$ (172,439)	$ (154,468)
Exercise of employee stock options	—	—	—	262	183	—	—	—	183
Stock-based compensation	—	—	—	—	—	3,304	—	—	3,304
Return of Series C stock as a result of license agreement	(662)	(1,469)	—	—	—	—	—	—	—
Issuance of Series C stock as a result of warrant exercise	2	3	—	—	—	—	—	—	—
Issuance of common stock in connection with acquisition	—	—	—	4,383	9,292	—	—	—	9,292
Net loss	—	—	—	—	—	—	—	(49,073)	(49,073)
Balance at December 31, 2009	41,368	$ 131,273	$ —	10,868	$ 17,364	$ 8,744	$ 4,642	$ (221,512)	$ (190,762)
Exercise of employee stock options	—	—	—	205	294	—	—	—	294
Stock-based compensation	—	—	—	—	—	4,551	—	—	4,551
Issuance of Series F stock	11,776	59,973	—	—	—	—	—	—	—
Issuance of Series C stock as a result of warrant exercises	4	11	—	—	—	—	—	—	—
Series F amount interest	—	—	—	—	—	12,974	—	—	12,974
Common stock warrant modification	—	—	—	—	—	(1,803)	1,803	—	—
Change in par value	—	—	—	—	(17,547)	17,547	—	—	—
Ownership change in non-controlling interest	—	—	1,082	—	—	3,083	—	—	3,083
Loss attributable to non-controlling interest	—	—	(55)	—	—	—	—	55	55
Net loss	—	—	—	—	—	—	—	(50,159)	(50,159)
Balance at December 31, 2010	53,148	$ 191,257	$ 1,027	11,073	$ 111	$ 45,096	$ 6,445	$ (271,616)	$ (219,964)
Exercise of employee stock options (unaudited)	—	—	—	341	3	783	—	—	786
Stock-based compensation (unaudited)	—	—	—	—	—	5,573	—	—	5,573
Issuance of Series G stock (unaudited)	11,000	76,949	—	—	—	—	—	—	—
Issuance of Series C stock as a result of warrant	2	14	—	—	—	—	—	—	—

exercises (unaudited)									
Loss attributable to non-controlling interest (unaudited)	—	—	(348)	—	—	—	—	348	348
Net loss (unaudited)	—	—	—	—	—	—	—	(61,455)	(61,455)
Balance at September 30, 2011 (unaudited)	64,150	$ 268,220	$ 679	11,414	$ 114	$ 51,452	$ 6,445	$ (332,723)	$ (274,712)

The accompanying notes are an integral part of these consolidated financial statements.

Merrimack Pharmaceuticals, Inc.
Consolidated statements of cash flows

(in thousands)	Years ended December 31, 2008	2009	2010	Nine-months ended September 30, 2010 (unaudited)	2011 (unaudited)
Cash flows from operating activities					
Net loss	$ (45,552)	$ (49,073)	$ (50,159)	$ (40,028)	$ (61,455)
Adjustments to reconcile net loss to net cash (used in) provided by operating activities					
Noncash benefit on release of tax valuation allowance	—	(3,402)	—	—	—
Noncash interest expense	4,223	4,805	3,673	3,594	—
(Gain) loss on mark-to-market on preferred stock warrants and contingent consideration	(514)	10	(104)	24	742
(Gain) loss on disposal of property and equipment	(18)	32	(26)	—	—
Amortization of premiums on marketable securities	(261)	—	—	—	—
Amortization of deferred lease benefits and tax incentives	(131)	(317)	(751)	(512)	(567)
Depreciation and amortization	2,058	2,755	4,379	3,019	4,029
Stock-based compensation	2,616	3,304	4,551	3,416	5,573
Changes in operating assets and liabilities, net of effect of acquisition					
Accounts receivable	—	(1,770)	(1,975)	214	(1,584)
Prepaid expenses and other current assets	(148)	(94)	(571)	(1,521)	(3,140)
Accounts payable	(997)	(220)	(830)	(1,325)	3,446
Accrued expenses	934	2,768	1,024	(319)	3,583
Deferred revenues	—	59,469	12,845	11,482	1,734
Deferred lease benefits	—	786	217	217	52
Deferred tax incentive	—	—	1,350	1,350	1,212
Other assets and liabilities, net	(219)	2	8	(1)	13
Net cash (used in) provided by operating activities	(38,009)	19,055	(26,369)	(20,390)	(46,362)
Cash flows from investing activities					
Purchase of property and equipment	(1,528)	(5,038)	(5,025)	(4,492)	(2,468)
Proceeds from sale of property and equipment	18	—	26	—	—
Purchase of marketable securities	(3,447)	—	—	—	—
Sale of marketable securities	24,650	—	—	—	—
Cash acquired in acquisition	—	92	—	—	—
(Assignment) release of restricted cash	(192)	95	95	95	—
Other investing activities, net	—	—	4	—	8
Net cash provided by (used in) investing activities	19,501	(4,851)	(4,900)	(4,397)	(2,460)
Cash flows from financing activities					
Proceeds from issuance of Series G, net of offering costs	—	—	—	—	76,949
Proceeds received in advance of Series F issuance	24,499	—	—	—	—
Proceeds from issuance of common stock	67	183	294	294	786
Proceeds from issuance of convertible preferred stock of Silver Creek Pharmaceuticals, Inc.	—	—	4,165	2,980	—
Principal payment on capital lease obligations	(1,021)	(974)	(864)	(640)	(394)
Proceeds from sale-lease back	675	—	—	—	—
Principal payment of long-term debt	(1,024)	—	—	—	—
Net cash provided by (used in) financing activities	23,196	(791)	3,595	2,634	77,341
Net increase (decrease) in cash and cash equivalents	4,688	13,413	(27,674)	(22,153)	28,519
Cash and cash equivalents, beginning of period	40,286	44,974	58,387	58,387	30,713
Cash and cash equivalents, end of period	$ 44,974	$ 58,387	$ 30,713	$ 36,234	$ 59,232
Noncash financing and investing activities					
Accrued interest on Series F amount relieved to additional paid-in capital (Note 13)	$ —	$ —	$ 12,974	$ —	$ —
Issuance of shares from Series F amount (Note 13)	—	—	59,973	—	—
Series F convertible preferred stock issuable for consulting services rendered	199	—	—	—	—
Series C convertible preferred stock received for technology license	—	1,469	—	—	—
Fair value of assets acquired in acquisition	—	10,252	—	—	—
Fair value of liabilities assumed in acquisition	—	4,479	—	—	—
Fair value of equity issued in acquisition	—	9,292	—	—	—
Supplemental disclosure of cash flows					
Cash paid for interest	$ 219	$ 109	$ 55	$ 46	$ 12

The accompanying notes are an integral part of these consolidated financial statements.

Merrimack Pharmaceuticals, Inc.
Notes to consolidated financial statements
December 31, 2008, 2009, and 2010
(information as of September 30, 2011 and for the nine-months ended September 30, 2010 and 2011 is unaudited)

1. Nature of the business

Merrimack Pharmaceuticals, Inc. (the "Company") is a biopharmaceutical company discovering, developing and preparing to commercialize innovative medicines consisting of novel therapeutics paired with companion diagnostics. The Company has five targeted therapeutic oncology candidates in clinical development (MM-398, MM-121, MM-111, MM-302 and MM-151), multiple product candidates in preclinical development and a discovery effort advancing additional candidate medicines. The Company uses its interdisciplinary Network Biology approach in drug discovery and development. The Company was incorporated in the Commonwealth of Massachusetts in 1993 and reincorporated in the State of Delaware in October 2010.

The Company is subject to risks and uncertainties common to companies in the biopharmaceutical industry, including, but not limited to, ability to secure additional capital to fund operations, development by competitors of new technological innovations, dependence on collaborative arrangements, protection of proprietary technology, compliance with government regulations and dependence on key personnel. Product candidates currently under development will require significant additional research and development efforts, including extensive preclinical and clinical testing and regulatory approval prior to commercialization. These efforts require significant amounts of additional capital, adequate personnel infrastructure and extensive compliance reporting capabilities.

The accompanying consolidated financial statements have been prepared on a basis which assumes that the Company will continue as a going concern and which contemplates the realization of assets and satisfaction of liabilities and commitments in the normal course of business. As of December 31, 2010 and September 30, 2011, the Company had cash and cash equivalents of $30,713,000 and $59,232,000, respectively. On April 6, 2011, the Company raised approximately $77.0 million by issuing 11 million shares of Series G convertible preferred stock. The Company expects its existing cash and cash equivalents on hand at December 31, 2010 together with the proceeds from its Series G financing to be sufficient to fund operations through at least the second quarter of 2012. However, the Company may seek additional funding through public or private financings, or existing or new collaboration arrangements. The Company may not be able to obtain financing on acceptable terms or at all, and the Company may not be able to enter into additional collaborative arrangements. Arrangements with collaborators or others may require the Company to relinquish rights to certain of its technologies or product candidates. The terms of any financing may adversely affect the holdings or the rights of the Company's stockholders. If the Company needs additional funds and it is unable to obtain funding on a timely basis, the Company may need to significantly curtail its research and development programs in an effort to provide sufficient funds to continue its operations, which could adversely affect its business prospects.

2. Summary of significant accounting policies

Significant accounting policies followed by the Company in the preparation of its consolidated financial statements are as follows:

Unaudited interim financial data

The accompanying unaudited September 30, 2011 consolidated balance sheet, the consolidated statements of operations and cash flows for the nine-months ended September 30, 2010 and 2011, and the consolidated statements of convertible preferred stock, non-controlling interest and stockholders' deficit for the nine-months ended September 30, 2011 and the related interim information contained within the notes to the consolidated financial statements have been prepared in accordance with the rules and regulations of the Securities and Exchange Commission for interim financial information. Accordingly, they do not include all of the information and the notes required by accounting principles generally accepted in the United States of America for complete financial statements. In the opinion of management, the unaudited interim consolidated financial statements reflect all adjustments, consisting of normal and recurring adjustments, necessary for the fair statement of the Company's financial position at September 30, 2011 and results of its operations and its cash flows for the nine-months ended September 30, 2010 and 2011. The results for the nine-months ended September 30, 2011 are not necessarily indicative of future results.

Unaudited pro forma balance sheet and pro forma loss per common share

On June 28, 2011, the Company's Board of Directors authorized management of the Company to file a registration statement with the Securities and Exchange Commission permitting the Company to sell shares of its common stock to the public. The unaudited pro forma balance sheet as of September 30, 2011 reflects the conversion of all Series B, Series C, Series D, Series E, Series F and Series G convertible preferred stock outstanding as of that date into 66,255,000 shares of common stock, occurring immediately prior to the closing of the Company's proposed initial public offering. In addition, the unaudited pro forma balance sheet as of September 30, 2011 reflects the impact of the reclassification of warrants to purchase convertible preferred stock into warrants to purchase common stock immediately prior to the closing of the Company's proposed initial public offering and $4,263,000 of accrued dividends payable to the holders of Series B convertible preferred stock upon conversion into common stock.

Unaudited pro forma net loss per share is computed using the weighted-average number of common shares outstanding after giving effect to the pro forma effect of the conversion of all convertible preferred stock, including the Series G convertible preferred stock that was issued in April 2011, during the year ended December 31, 2010 and the nine-months ended September 30, 2011 into shares of the Company's common stock as if such conversion had occurred at the beginning of the period presented, or the date of original issuance, if later. The numerator in the pro forma basic and diluted net loss per share calculation has been adjusted to remove gains and losses resulting from remeasurements of the outstanding convertible preferred stock warrant liabilities through September 30, 2011 as these warrants will be converted into warrants to purchase common stock immediately prior to the closing of the Company's proposed initial public offering. The denominator in the pro forma basic and diluted net loss per share calculation has been adjusted to reflect additional shares of common stock related to preferred stock dividends of $4,263,000.

Principles of consolidation

These consolidated financial statements include the accounts of the Company, its wholly-owned subsidiary Hermes Biosciences, Inc. ("Hermes"), which has subsequently been merged with and into the Company, and its 74% majority-owned subsidiary Silver Creek Pharmaceuticals, Inc. ("Silver Creek"). All intercompany transactions and balances have been eliminated in consolidation.

Use of estimates

The accompanying consolidated financial statements have been prepared in conformity with generally accepted accounting principles ("GAAP") in the United States of America. GAAP requires the Company's management to make estimates and judgments that may affect the reported amounts of assets, liabilities, revenues, expenses and related disclosures. The Company bases estimates and judgments on historical experience and on various other factors that it believes to be reasonable under the circumstances. The significant estimates in these consolidated financial statements include revenue recognition, useful lives with respect to long-lived assets and intangibles, valuation of stock options, convertible preferred stock warrants, contingent consideration, accrued expenses, intangible assets, goodwill, in-process research and development and tax valuation reserves. The Company's actual results may differ from these estimates under different assumptions or conditions. The Company evaluates its estimates on an ongoing basis. Changes in estimates are reflected in reported results in the period in which they become known by the Company's management.

Segment and geographic information

Operating segments are defined as components of an enterprise engaging in business activities for which discrete financial information is available and regularly reviewed by the chief operating decision maker in deciding how to allocate resources and in assessing performance. The Company views its operations and manages its business in one operating segment and the Company operates in only one geographic segment.

Cash, cash equivalents and restricted cash

Cash and cash equivalents are short-term, highly liquid investments with an original maturity of three months or less at the date of purchase. Investments qualifying as cash equivalents primarily consist of money market funds.

Cash accounts with any type of restriction are classified as restricted cash. If restrictions are expected to be lifted in the next twelve months, the restricted cash account is classified as current. As of December 31, 2009 and 2010 and September 30, 2011, the Company recorded restricted cash of $476,000, $381,000 and $381,000, respectively.

Concentration of credit risk

Financial instruments that subject the Company to credit risk consist primarily of cash and cash equivalents and accounts receivable. The Company places its cash and cash equivalents in accredited financial institutions and therefore the Company's management believes these funds are subject to minimal credit risk. The Company has no significant off-balance sheet concentrations of credit risk such as foreign currency exchange contracts, option contracts or other hedging arrangements. For both the years ended December 31, 2009 and 2010, Sanofi represented 98% of research and development revenues. For the nine-months ended September 30, 2010 and 2011, Sanofi represented 97% and greater than 99% of research and

development revenues, respectively. As of December 31, 2009 and 2010, and September 30, 2011, Sanofi represented 91%, 98% and greater than 99% of accounts receivable, respectively.

Property and equipment

Property and equipment are recorded at cost and depreciated when placed into service using the straight-line method, based on their estimated useful lives as follows:

Asset classification	Estimated useful life (in years)
Lab equipment	3
IT equipment	3 - 7
Leaseholds improvements	Lesser of useful life or lease term
Furniture and fixtures	3

Upon retirement or sale, the cost of assets disposed of and the related accumulated depreciation are removed from the accounts and any resulting gain or loss is recognized. Repairs and maintenance costs are expensed as incurred.

The Company reviews its long-lived assets for impairment whenever events or changes in business circumstances indicate that the carrying amount of assets may not be fully recoverable or that the useful lives of these assets are no longer appropriate. Each impairment test is based on a comparison of the undiscounted cash flow to the recorded value of the asset. If an impairment is indicated, the asset will be written down to its estimated fair value on a discounted cash flow basis.

Government contracts and grants

Funds received pursuant to awarded grants or cost reimbursement contracts are recorded as a liability and subsequently recognized as revenue as the Company performs the underlying research and development activities.

In 2006, the Company was awarded a federally funded research grant from the National Cancer Institute with a total value of $750,000. This grant supported studies related to antibody microarrays for cancer diagnostics and was completed during 2008. Revenue of $365,000, $0 and $0 was recognized for costs reimbursed under this grant for the years ended December 31, 2008, 2009 and 2010, respectively. No grant revenue was recognized during the nine-months ended September 30, 2010 or 2011.

Non-controlling interest

Non-controlling interest represents the non-controlling stockholders' proportionate share of preferred stock and net loss of the Company's majority-owned consolidated subsidiary Silver Creek. On August 20, 2010, the Company acquired a controlling interest in Silver Creek (Note 6). The non-controlling stockholders' proportionate share of the preferred stock in Silver Creek of $1,027,000 and $679,000 was reflected as non-controlling interest in the Company's consolidated balance sheets as of December 31, 2010 and September 30, 2011, respectively, as a component of mezzanine equity.

Revenue recognition

The Company enters into biopharmaceutical product development agreements with collaborative partners for the research and development of therapeutic and diagnostic

products. The terms of the agreements may include nonrefundable signing and licensing fees, funding for research, development and manufacturing, milestone payments and royalties on any product sales derived from collaborations. These multiple element arrangements are analyzed to determine whether the deliverables can be separated or whether they must be accounted for as a single unit of accounting.

The Company recognizes upfront license payments as revenue upon delivery of the license only if the license has stand-alone value and the fair value of the undelivered performance obligations can be determined. If the fair value of the undelivered performance obligations can be determined, such obligations are accounted for separately as the obligations are fulfilled. If the license is considered to either not have stand-alone value or have stand-alone value but the fair value of any of the undelivered performance obligations cannot be determined, the arrangement is accounted for as a single unit of accounting and the license payments and payments for performance obligations are recognized as revenue over the estimated period of when the performance obligations will be performed.

Whenever the Company determines that an arrangement should be accounted for as a single unit of accounting, it must determine the period over which the performance obligations will be performed and revenue will be recognized. If the Company cannot reasonably estimate the timing and the level of effort to complete its performance obligations under the arrangement, then revenue under the arrangement is recognized on a straight-line basis over the period the Company is expected to complete its performance obligations.

The Company's collaboration agreements may include additional payments upon the achievement of performance-based milestones. As milestones are achieved, a portion of the milestone payment, equal to the percentage of the total time that the Company has performed the performance obligations to date over the total estimated time to complete the performance obligations, multiplied by the amount of the milestone payment, will be recognized as revenue upon achievement of such milestone. The remaining portion of the milestone will be recognized over the remaining performance period. Milestones that are tied to regulatory approval are not considered probable of being achieved until such approval is received. Milestones tied to counter-party performance are not included in the Company's revenue model until the performance conditions are met.

Royalty revenue will be recognized upon the sale of the related products provided the Company has no remaining performance obligations under the arrangement.

Research and development expenses

Research and development expenses are charged to expense as incurred. Research and development expenses comprise costs incurred in performing research and development activities, including personnel-related costs, stock-based compensation, facilities, research-related overhead, clinical trial costs, contracted services, manufacturing, license fees and other external costs. The Company accounts for nonrefundable advance payments for goods and services that will be used in future research and development activities as expenses when the service has been performed or when the goods have been received rather than when the payment is made.

Stock-based compensation

The Company expenses the fair value of employee stock options over the vesting period. Compensation expense is measured using the fair value of the award at the grant date, net of estimated forfeitures, and is adjusted annually to reflect actual forfeitures. The fair value of each stock-based award is estimated using the Black-Scholes option valuation model and is expensed straight-line over the vesting period.

The Company records stock options issued to nonemployees at fair value, periodically remeasures to reflect the current fair value at each reporting period, and recognizes expense over the related service period. When applicable, these equity instruments are accounted for based on the fair value of the consideration received or the fair value of the equity instrument issued, whichever is more reliably measurable.

Convertible preferred stock

Preferred stock that may be redeemed by the holder based on the occurrence of events not under the Company's control is initially recorded at the proceeds received, net of issuance costs and warrants, where applicable. Subsequently, if redemption is probable, the carrying value is adjusted to its redemption value at each balance sheet date. If redemption is not certain, the carrying value is not adjusted to its full redemption value until redemption is probable.

Accumulated other comprehensive income (loss)

GAAP establishes standards for reporting and displaying a full set of general purpose financial statements to be expanded to include the reporting of comprehensive income, which includes net income and other comprehensive income. For all periods presented the comprehensive loss was equal to the net loss.

Convertible preferred stock warrants

The Company accounts for freestanding warrants as liabilities at their fair value. The Company measures the fair value of the preferred stock warrants at the end of each reporting period and records the change in fair value to other income (expense). For the years ended December 31, 2008, 2009 and 2010, the Company recorded other income (expense) of $514,000, $(10,000) and $(74,000), respectively. For the nine-months ended September 30, 2010 and 2011, the Company recorded other income (expense) of $13,000 and $(742,000), respectively.

Other income (expense)

The Company records gains and losses on the change in value and time to expiration of preferred stock warrants, the recognition of federal and state sponsored tax incentives and other one-time income or expense-related items in other income (expense) on the Company's consolidated statement of operations. Other income for the nine-months ended September 30, 2011 included a cash settlement of $1.8 million from a former service provider.

Income taxes

The Company accounts for income taxes under the asset and liability method. Under this method, deferred tax assets and liabilities are recognized for the estimated future tax consequences attributable to differences between financial statement carrying amounts of existing assets and liabilities and their respective tax bases. Deferred tax assets and liabilities are measured using enacted rates in effect for the year in which these temporary differences are expected to be recovered or settled. Valuation allowances are provided if based on the weight of available evidence, it is more likely than not that some or all of the deferred tax assets will not be realized.

The Company provides reserves for potential payments of tax to various tax authorities related to uncertain tax positions and other issues. Reserves are based on a determination of whether and how much of a tax benefit taken by the Company in its tax filing is more likely than not to be realized following resolution of any potential contingencies present related to the tax benefit. Potential interest and penalties associated with such uncertain tax positions are recorded as components of income tax expense. To date, the Company has not taken any uncertain tax positions or recorded any reserves, interest or penalties.

Goodwill and intangible assets

Goodwill and indefinite-lived intangible assets, including in-process research and development, are evaluated for impairment on an annual basis or more frequently if an indicator of impairment is present. No impairment of goodwill or indefinite-lived intangible assets resulted from the Company's most recent evaluation which occurred in the third quarter of 2011. The Company's next annual impairment evaluation will be made in the third quarter of 2012 unless indicators arise that would require the Company to evaluate at an earlier date. The Company commences amortization of indefinite-lived intangible assets once the assets have reached technological feasibility or are determined to have an alternative future use and amortizes the assets over their estimated future life.

Definite-lived intangible assets, such as core technology, are evaluated for impairment whenever events or circumstances indicate that the carrying value may not be fully recoverable. Definite-lived intangible assets are separate from goodwill and indefinite-lived intangible assets and are deemed to have a definite life. The Company amortizes these assets over their estimated useful life.

Reclassifications

Certain prior period amounts have been reclassified to be consistent with the current year presentation. In 2009, certain general and administrative expenses were misclassified in the consolidated statement of operations between the research and development and general and administrative expense lines. Research and development expense was overstated by $718,000 and the general and administrative expense was understated by the same amount. The Company revised the consolidated statement of operations for the year ended December 31, 2009 to correct this immaterial error in classification. This revision does not impact the consolidated balance sheets or the consolidated statements of cash flows for any periods.

Recent accounting pronouncements

In October 2009, the Financial Accounting Standards Board ("FASB") issued Accounting Standard Update ("ASU") No. 2009-13, *Multiple Deliverable Revenue Arrangements*

("ASU 2009-13"), which amends existing revenue recognition accounting pronouncements for multiple-deliverable revenue arrangements. ASU 2009-13 provides accounting principles and application guidance on whether multiple deliverables exist, how the arrangement should be separated and the consideration allocated. ASU 2009-13 eliminates the requirement to establish the fair value of undelivered products and services and instead provides for separate revenue recognition based upon management's estimate of the selling price for an undelivered item in circumstances when there is no other means to determine the fair value of that undelivered item. Multiple-deliverable revenue arrangement guidance previously required that the fair value of the undelivered item be the price of the item either sold in a separate transaction between unrelated third parties or the price charged for each item when the item is sold separately by the vendor. This was difficult to determine when the product was not individually sold because of its unique features. Under the previous guidance, if the fair value of all of the elements in the arrangement was not determinable, then revenue was deferred until all of the items were delivered or fair value was determined. ASU 2009-13 was effective prospectively for revenue arrangements entered into or materially modified in fiscal years beginning on or after June 15, 2010. The Company adopted this standard on a prospective basis on January 1, 2011 with no impact.

In April 2010, the FASB issued ASU No. 2010-17, *Revenue Recognition—Milestone Method* ("ASU 2010-17"). ASU 2010-17 provides guidance in applying the milestone method of revenue recognition to research or development arrangements. Under this guidance companies may recognize revenue contingent upon the achievement of a milestone in its entirety, in the period in which the milestone is achieved, only if the milestone meets all the criteria within the guidance to be considered substantive. ASU 2010-17 is effective on a prospective basis for research and development milestones achieved in fiscal years, beginning on or after June 15, 2010. The Company adopted this standard on a prospective basis on January 1, 2011 with no impact.

In September 2011, the FASB amended the authoritative guidance regarding the testing for goodwill impairment. Under the amendments, an entity has the option to first assess qualitative factors to determine whether the existence of events or circumstances leads to a determination that it is more likely than not that the fair value of a reporting unit is less than its carrying amount. If, after assessing the totality of events or circumstances, an entity determines it is not more likely than not that the fair value reporting of a reporting unit is less than the carrying amount, then performing the two-step impairment test is unnecessary. The changes are effective for annual and interim goodwill impairment tests performed for fiscal years beginning after December 15, 2011, however, early adoption is permitted. The Company adopted this authoritative guidance on January 1, 2012 with no impact.

3. Net loss per common share

Basic net loss per share is calculated by dividing the net loss attributable to common stockholders by the weighted-average number of common shares outstanding during the period, without consideration for common stock equivalents. Diluted net loss per share is computed by dividing the net loss attributable to common stockholders by the weighted-average number of common share equivalents outstanding for the period determined using the treasury-stock method. For purposes of this calculation, convertible preferred stock, stock options and warrants are considered to be common stock equivalents and are only included in the calculation of diluted net loss per share when their effect is dilutive.

The following table presents the computation of basic and diluted net loss per share available to common stockholders and pro forma net loss per share available to common stockholders (unaudited):

(in thousands, except per share amount)	Years ended December 31, 2008	2009	2010	Nine-months ended September 30, 2010 (unaudited)	2011 (unaudited)
Net Loss Per Share:					
Numerator:					
Net loss attributable to Merrimack Pharmaceuticals, Inc.	$ (45,552)	$ (49,073)	$ (50,104)	$ (40,009)	$ (61,107)
Plus: Unaccreted dividends on convertible preferred stock	(5,100)	(4,684)	(11,185)	(3,166)	(5,728)
Net loss available to common stockholders—basic and diluted	(50,652)	(53,757)	(61,289)	(43,175)	(66,835)
Denominator:					
Weighted-average common shares—basic and diluted	6,199	7,387	10,994	10,970	11,292
Net loss per share available to common stockholders—basic and diluted	$ (8.17)	$ (7.28)	$ (5.57)	$ (3.94)	$ (5.92)
Pro Forma Net Loss Per Share (unaudited):					
Numerator:					
Net loss attributable to Merrimack Pharmaceuticals, Inc			$ (50,104)		$ (61,107)
Less:					
Pro forma adjustment to reverse the mark-to-market adjustment related to the convertible preferred stock warrant liability			74		742
Net loss used to compute pro forma net loss per share available to common stockholders			$ (50,030)		$ (60,365)
Denominator:					
Weighted-average number of common shares used in net loss per share available to common stockholders—basic and diluted			10,994		11,292
Plus:					
Pro forma adjustments to reflect assumed weighted-average effect of conversion of convertible preferred stock			46,250		62,386
Pro forma adjustment to reflect additional shares of common stock related to preferred stock dividends declared in excess of earnings of $4,263			474		474
Weighted-average shares used to compute pro forma net loss per share available to common stockholders—basic and diluted			57,718		74,152
Pro forma net loss per share available to common stockholders basic and diluted			$ (0.87)		$ (0.81)

The following potentially dilutive securities have been excluded from the computation of diluted weighted average shares outstanding as of December 31, 2008, 2009 and 2010 and September 30, 2010 and 2011 as the Company recorded a net loss in all periods and, therefore, they would be anti-dilutive:

	Years ended December 31,			Nine-months ended September 30,	
(in thousands)	2008	2009	2010	2010	2011
				(unaudited)	(unaudited)
Convertible preferred stock	42,028	41,368	53,148	41,372	64,150
Options to purchase common stock	11,483	14,660	16,214	14,646	17,522
Preferred stock warrants	323	317	306	306	303
Common stock warrants	2,937	2,937	2,937	2,937	2,937

4. License and collaboration agreements

Sanofi

On September 30, 2009, the Company entered into a license and collaboration agreement with Sanofi for the development and commercialization of a drug candidate being developed by the Company under the name MM-121. The agreement became effective on November 10, 2009 and Sanofi paid the Company a nonrefundable, noncreditable upfront license fee of $60 million. During the third quarter of 2010, the Company received a milestone payment of $10 million associated with the dosing of the first patient in a Phase 2 clinical trial in breast cancer. The Company is eligible to receive future development, regulatory and sales milestone payments as well as future royalty payments depending on the success of MM-121.

Under the agreement, Sanofi is responsible for all MM-121 development and manufacturing costs. The Company retained the right to participate in the development of MM-121 through Phase 2 proof of concept trials. The Company also has the option to co-promote MM-121 in the United States. Sanofi reimburses the Company for direct costs incurred in development and compensates the Company for its internal development efforts based on a full time equivalent ("FTE") rate. Also as part of the agreement, the Company was required to manufacture certain quantities of MM-121 and, at Sanofi's and the Company's option, may continue to manufacture additional quantities of MM-121 in the future. Sanofi reimburses the Company for direct costs incurred in manufacturing and compensates the Company for its internal manufacturing efforts based on a FTE rate. The Company satisfied its manufacturing obligations during 2010 and has elected to continue to manufacture quantities of MM-121.

The Company applied revenue recognition guidance to determine whether the performance obligations under this collaboration including the license, the right to future technology, back-up compounds, participation on steering committees, development services and manufacturing services could be accounted for separately or as a single unit of accounting. The Company determined that its development services performance obligation is considered a separate unit of accounting as it is set at the Company's option, has stand-alone value and the FTE rate is considered fair value. Therefore, the Company recognizes cost reimbursements for MM-121 development services as incurred. The Company determined that the license, the right to future technology, back-up compounds, participation on steering committees and manufacturing services performance obligations represented a single unit of accounting. As the

Company cannot reasonably estimate its level of effort over the collaboration, the Company recognizes revenue from the upfront payment, milestone payment and manufacturing services payments using the contingency-adjusted performance model over the expected development period, which is currently estimated to be 12 years from the effective date of the agreement. Under this model, when a milestone is earned or manufacturing services are rendered and product is delivered, revenue is immediately recognized on a pro-rata basis in the period the milestone was achieved or product was delivered based on the time elapsed from the effective date of the agreement. Thereafter, the remaining portion is recognized on a straight-line basis over the remaining development period.

During the years ended December 31, 2009 and 2010, and the nine-months ended September 30, 2010 and 2011, the Company recognized revenue based on the following components of the Sanofi agreement:

	Years ended December 31,		Nine-months ended September 30,	
(in thousands)	**2009**	**2010**	**2010**	**2011**
			(unaudited)	**(unaudited)**
Upfront payment	$ 694	$ 5,000	$ 3,750	$ 3,750
Milestone payment	—	949	741	625
Development services	1,410	13,279	8,642	15,976
Manufacturing services and other	—	630	477	1,214
Total	$ 2,104	$ 19,858	$ 13,610	$ 21,565

As of December 31, 2009 and 2010 and September 30, 2011, the Company had deferred revenue of $59,505,000, $72,426,000 and $74,217,000, respectively, related to the collaboration. As of December 31, 2009 and 2010 and September 30, 2011, the Company had accounts receivable of $1,610,000, $3,683,000 and $5,307,000, respectively, under the collaboration of which $783,000, $2,796,000 and $2,906,000 were unbilled as of December 31, 2009 and 2010 and September 30, 2011, respectively.

GTC Biotherapeutics, Inc.

In July 2009, the Company entered into a license agreement with GTC Biotherapeutics, Inc. ("GTC") for the development of MM-093 by GTC. As consideration, GTC returned 662,000 shares of the Company's Series C convertible preferred stock to the Company. The Company determined the fair value of the consideration transferred to be $1,469,000. The Company applied revenue recognition guidance to determine that the performance obligations under this agreement, including the license, the right to future technology, and manufacturing support should be accounted for as a single unit of accounting. The consideration received is being recognized on a straight-line basis over the expected performance period, which is currently estimated to be 19 years from the effective date of the agreement. During the years ended December 31, 2009 and 2010, the Company recognized revenue of $37,000 and $76,000, respectively. During both the nine-months ended September 30, 2010 and 2011, the Company recognized revenue of $57,000. As of December 31, 2009 and 2010 and September 30, 2011, the Company had $1,432,000, $1,356,000 and $1,299,000 of deferred revenue, respectively, and accounts receivable related to the reimbursement of intellectual property costs of $153,000, $42,000 and $7,000, respectively.

PharmaEngine, Inc.

On May 5, 2011, the Company entered into an assignment, sublicense and collaboration agreement with PharmaEngine, Inc. ("PharmaEngine") under which the Company reacquired rights in Europe and certain countries in Asia to a drug being developed under the name MM-398. In exchange, the Company agreed to pay PharmaEngine a nonrefundable, noncreditable upfront payment of $10.0 million and will be required to make up to an aggregate of $80.0 million in development and regulatory milestone payments and $130.0 million in sales milestone payments upon the achievement of specified development, regulatory and annual net sales milestones. PharmaEngine is also entitled to tiered royalties on net sales of MM-398 in Europe and certain countries in Asia. The Company is responsible for all future development costs of MM-398 except those required specifically for regulatory approval in Taiwan. The Company determined that PharmaEngine is a variable interest entity based on an analysis of PharmaEngine's capitalization. However, the Company determined that the Company cannot control the activities of PharmaEngine, and therefore, the Company is not the primary beneficiary and should not consolidate the financial results of PharmaEngine.

During the nine-months ended September 30, 2011, the Company recognized research and development expenses of $10,881,000 related to the agreement with PharmaEngine. As of September 30, 2011, the Company had amounts payable of $881,000 related to the agreement with PharmaEngine.

5. Fair value of financial instruments

The carrying amounts of cash and cash equivalents, restricted cash, prepaid expenses, accounts receivable, accounts payable and accrued expenses approximates fair value due to the short-term nature of these instruments. The capital lease obligations, convertible preferred stock warrants and contingent consideration are also carried at fair value.

Fair value is an exit price, representing the amount that would be received from the sale of an asset or paid to transfer a liability in an orderly transaction between market participants. Fair value is determined based on observable and unobservable inputs. Observable inputs reflect readily obtainable data from independent sources, while unobservable inputs reflect certain market assumptions. As a basis for considering such assumptions, GAAP establishes a three-tier value hierarchy, which prioritizes the inputs used to develop the assumptions and for measuring fair value as follows: (Level 1) observable inputs such as quoted prices in active markets for identical assets; (Level 2) inputs other than the quoted prices in active markets that are observable either directly or indirectly; and (Level 3) unobservable inputs in which there is little or no market data, which requires the Company to develop its own assumptions. This hierarchy requires the Company to use observable market data, when available, and to minimize the use of unobservable inputs when determining fair value.

The following tables show assets and liabilities measured at fair value on a recurring basis as of December 31, 2009 and 2010 and September 30, 2011 and the input categories associated with those assets and liabilities:

As of December 31, 2009 (in thousands)	**Level 1**	**Level 2**	**Level 3**
Assets			
Cash equivalents	$ 56,627	$ —	$ —
Liabilities			
Convertible preferred stock warrants	—	—	578
Contingent consideration (Note 6)	—	—	178

As of December 31, 2010 (in thousands)	Level 1	Level 2	Level 3
Assets			
Cash equivalents	$ 15,500	$ —	$ —
Liabilities			
Convertible preferred stock warrants	—	—	652

As of September 30, 2011 (in thousands)	Level 1	Level 2	Level 3
		(unaudited)	
Assets			
Cash equivalents	$ 55,456	$ —	$ —
Liabilities			
Convertible preferred stock warrants	—	—	1,394

The Company's cash and cash equivalents are invested in a U.S. treasury and federal agency-backed money market fund that approximates its face value. The fair value of the convertible preferred stock warrants was determined using the Black-Scholes option valuation model. The fair value of contingent consideration was determined by performing a probability weighted analysis of the likelihood of occurrence of potential future financing events.

The following table provides a roll-forward of the fair value of the convertible preferred stock warrants and contingent consideration, categorized as Level 3 instruments, for the years ended December 31, 2009 and 2010 and the nine-months ended September 30, 2011:

(in thousands)	Contingent consideration	Convertible preferred stock warrants
Balance, December 31, 2008	$ —	$ 568
Acquisition of Hermes	178	—
Unrealized loss in other expense	—	10
Balance, December 31, 2009	178	578
Realized gain	(178)	—
Unrealized loss included in other expense	—	74
Balance, December 31, 2010	—	652
Unrealized loss included in other expense (unaudited)	—	742
Balance, September 30, 2011 (unaudited)	$ —	$ 1,394

6. Consolidated subsidiaries

Hermes BioSciences, Inc.

On October 6, 2009, (the "Acquisition Date"), the Company completed the acquisition of all outstanding shares of Hermes BioSciences, Inc. ("Hermes"), a privately-held biotechnology company developing lipidic nano-carriers to allow for targeted delivery of small molecule drugs, including chemotherapies, with the goal of improving cancer treatment safety and efficacy.

As consideration for the acquisition, the Company issued 4,383,000 shares of common stock with an estimated fair value of $9,292,000 based on an internal valuation prepared by the Company. The acquisition also included a contingent consideration arrangement that required additional shares to be issued by the Company to Hermes' former stockholders based on the occurrence and timing of certain potential future financing events. The range of additional shares that the Company could have been required to issue on the Acquisition Date as contingent consideration was between 0 and 1,100,000 and issuance could have occurred up to 24 months after the Acquisition Date. The estimated fair value of the contingent consideration recognized on the acquisition date of $178,000 was determined by performing a probability weighted analysis of the likelihood of occurrence of potential future financing events. That estimate was based on significant inputs not observable in the market, which FASB Accounting Standards Codification ("ASC") No. 820, *Fair Value Measurements and Disclosures* ("ASC 820"), refers to as Level 3 inputs. Key assumptions included management's estimates of the probabilities of such potential future financing events occurring.

As of December 31, 2010, 400,000 additional shares could have been issued as contingent consideration. However, the Company determined a zero probability that the contingent consideration would ultimately be paid and recognized a gain of $178,000 for the year ended December 31, 2010. On July 8, 2011, the Company satisfied the contingent consideration triggering event, which reduced the shares that could be issued from 400,000 to zero.

The following table summarizes the consideration transferred to Hermes and the amounts of identified assets acquired and liabilities assumed on the Acquisition Date:

Fair value of consideration transferred:

(in thousands)	
Common shares of Merrimack Pharmaceuticals, Inc.	$ 9,292
Contingent consideration	178
	$ 9,470

Recognized amounts of identifiable assets acquired and liabilities assumed:

(in thousands)	
Cash acquired from Hermes	$ 92
Prepaid expenses	9
Other long-term assets	33
In-process research and development ("IPR&D")	7,010
Intangible assets	3,200
Accounts payable	(1,042)
Accrued expenses	(35)
Deferred tax liabilities, net of deferred tax assets	(3,402)
Total identifiable net assets	5,865
Goodwill	3,605
Total net assets	$ 9,470

The value assigned to IPR&D of $7,010,000 related to several development programs: an antibody-targeted nanotherapeutic which contains a chemotherapy drug, a nanotherapeutic which contains a chemotherapy drug and other programs in the amounts of $2,800,000, $3,400,000 and $810,000, respectively. These values were estimated by applying an income approach which includes significant inputs not observable in the market, which ASC 820 refers to as Level 3 inputs. These values were determined by estimating the costs to develop the acquired IPR&D into commercially viable products, estimating the net cash flows from such projects and discounting the net cash flows back to their present values. The probability of success factors and discount rates used for each project considered the uncertainty surrounding the successful development of the acquired IPR&D. Key assumptions included estimated forecasted future product revenues based on actual sales from similar marketed products, estimated expenses necessary to bring these products to market and margins based on historical company and industry data, application of a company specific discount rate in the range of 25% to 30%, program specific probability of success factors based on management's estimate of the likelihood of occurrence of future events and the estimated timing of product approvals, which were assumed no earlier than 2016, based on company and industry data for similar products in similar markets. The value assigned to intangible assets of $3,200,000 related to core nano-carrier technology acquired from Hermes. The goodwill recognized is not tax deductable.

The following unaudited pro forma summary presents consolidated information of the Company after applying the Company's accounting policies as if the business combination had occurred on January 1, 2008:

(in thousands)	Pro forma year ended December 31, 2008	Pro forma year ended December 31, 2009
Research and development revenues	$ 2,298	$ 3,100
Net loss	$ 45,747	$ 49,257

In 2009, the Company incurred $309,000 of third party acquisition-related costs. These expenses are included in general and administrative expense in the Company's consolidated statement of operations for the year ended December 31, 2009.

As of December 31, 2010 and September 30, 2011, none of the IPR&D projects have reached technological feasibility nor do they have any alternative future use; therefore, the Company has not commenced amortization of those assets. The core technology asset is being amortized on a straight-line basis over a period of ten years which is management's best estimate of the useful life of this technology.

Silver Creek Pharmaceuticals, Inc.

Silver Creek was incorporated on June 22, 2010 and commenced operations on August 20, 2010. On August 20, 2010, the Company purchased 12,000,000 shares of Silver Creek Convertible Series A Preferred Stock ("Silver Creek Series A") in exchange for technology licenses. On August 20, 2010 and December 17, 2010, Silver Creek issued a total of 4,190,000 shares of Silver Creek Series A to other investors in exchange for $4,165,000, net of $25,000 of issuance costs. The Company consolidated Silver Creek on August 20, 2010 as the Company concluded that Silver Creek is a variable interest entity and the Company is the primary

beneficiary. The Company has the ability to direct the activities of Silver Creek through its ownership percentage and through the board of director seats controlled by the Company and its related parties and de facto agents. As of December 31, 2010 and September 30, 2011, the Company owned 74% of the voting stock of Silver Creek and as of December 31, 2010 and September 30, 2011, the Company recorded a non-controlling interest of $1,027,000 and $679,000, respectively, as a component of mezzanine equity on the Company's consolidated balance sheets based on the terms of the Silver Creek Series A.

As of December 31, 2010, the Company consolidated Silver Creek total assets and total liabilities of $3,976,000 and $61,000, respectively. As of September 30, 2011, the Company consolidated Silver Creek total assets and total liabilities of $2,714,000 and $31,000, respectively.

As of December 31, 2010 and September 30, 2011, employees and directors of the Company owned approximately 7% of Silver Creek Series A.

7. Goodwill and intangible assets, net

Changes in the carrying value of goodwill, IPR&D and intangible assets for the years ended December 31, 2009 and 2010 and nine-months ended September 30, 2011 were as follows:

(in thousands)	Intangible assets	IPR&D	Goodwill
Balance, December 31, 2008	$ —	$ —	$ —
Acquisition of Hermes	3,200	7,010	3,605
Amortization	(75)	—	—
Balance, December 31, 2009	3,125	7,010	3,605
Amortization	(320)	—	—
Balance, December 31, 2010	2,805	7,010	3,605
Amortization (unaudited)	(240)	—	—
Balance, September 30, 2011 (unaudited)	$ 2,565	$ 7,010	$ 3,605

Definite-lived intangible assets subject to amortization consist of core technology acquired from Hermes. The Company commenced amortization of these assets as of the Acquisition Date on a straight-line basis over a period of ten years, which is the estimated useful life of this technology. Amortization expense is expected to be as follows for the next five-year period:

Year Ended December 31,	(in thousands)
2011	$ 320
2012	320
2013	320
2014	320
2015	320

Indefinite-lived intangible assets not subject to amortization consist of IPR&D acquired from Hermes. As of December 31, 2010 and September 30, 2011, the Company had not commenced amortization of IPR&D as it has not yet reached technological feasibility and has no alternative future use; accordingly, the full value of the IPR&D recorded at the Acquisition Date remained recorded as of December 31, 2010 and September 30, 2011.

8. Cash equivalents

The Company's investment portfolio consists of investments classified as cash equivalents. All highly liquid investments with an original maturity of three months or less when purchased are considered to be cash equivalents. All cash equivalents are carried at cost, which approximates fair value. Cash equivalents included in cash and cash equivalents were $56,627,000, $15,500,000 and $55,456,000 as of December 31, 2009 and 2010 and September 30, 2011, respectively.

9. Property and equipment, net

Property and equipment consisted of the following:

(in thousands)	December 31, 2009	December 31, 2010	September 30, 2011
			(unaudited)
Lab equipment	$ 6,515	$ 9,221	$ 10,873
IT equipment	1,090	1,301	1,409
Leasehold improvements	5,773	7,564	7,698
Furniture and fixtures	284	314	331
Construction in process	—	182	739
	13,662	18,582	21,050
Less: Accumulated depreciation and amortization	(7,171)	(11,124)	(14,913)
	$ 6,491	$ 7,458	$ 6,137

Depreciation expense was $2,058,000, $2,680,000 and $4,059,000 for the years ended December 31, 2008, 2009 and 2010, respectively. Depreciation expense was $2,779,000 and $3,789,000 for the nine-months ended September 30, 2010 and 2011, respectively.

During 2010, the Company disposed of fixed assets of $106,000 with accumulated depreciation of $106,000. During 2008 and 2010, the Company sold fully depreciated fixed assets of $18,000 and $26,000, respectively, resulting in a gain on disposal. During 2009, the Company disposed of fixed assets of $658,000 with accumulated depreciation of $626,000. This resulted in a loss on disposal of $32,000. No fixed assets were disposed of or sold during the nine-month periods ended September 30, 2010 and 2011.

In August 2004, the Company entered into an equipment financing agreement with a leasing company. The agreement involved the sale of some of the Company's fixed assets to and the leasing of those assets back from the leasing company. The Company's option to draw further on this lease facility expired during 2008. Property and equipment under capital leases as of December 31, 2009 and 2010 and September 30, 2011 was $4,219,000, $2,669,000 and $804,000, respectively. For the years ended December 31, 2008, 2009 and 2010, depreciation of

property and equipment under capital leases totaled $1,255,000, $1,067,000, and $409,000, respectively. For the nine-months ended September 30, 2010 and 2011, depreciation of property and equipment under capital lease totaled $359,000 and $26,000, respectively.

10. Accrued expenses

Accrued expenses as of December 31, 2009 and 2010 and September 30, 2011 consisted of the following:

(in thousands)	December 31, 2009	December 31, 2010	September 30, 2011
			(unaudited)
Goods and services	$ 2,061	$ 4,395	$ 7,687
Payroll and related benefits	2,171	2,861	3,152
Accrued consulting services	2,000	—	—
Total accrued expenses	$ 6,232	$ 7,256	$ 10,839

11. Debt

In April 2005, the Company entered into a $9 million senior loan agreement with a financing company, in exchange for cash proceeds of $9 million and warrants to purchase 302,000 shares of Series D convertible preferred stock at $3.50 per share. The Company allocated $739,000 of the borrowings to the value of the warrants. This reduction in the recorded principal amount of the debt was amortized as interest expense over the term of the senior loans using the effective interest method. The Company recorded interest expense of $135,000, $0, $0, $0 and $0 for the years ended December 31, 2008, 2009 and 2010 and the nine-month periods ended September 30, 2010 and 2011, respectively. As of December 31, 2010 and September 30, 2011, the warrants remain issued and outstanding. The debt matured and was fully repaid during 2008.

12. Convertible preferred stock

The following is a summary of the Company's convertible and nonconvertible redeemable preferred stock:

(in thousands, except per share amounts)	Shares authorized	Shares issued and outstanding	Carrying value	Liquidation preference (per share)	Conversion price (per share)
As of December 31, 2008					
Series A	86	—	$ —	$ —	$ —
Series B	6,000	3,874	14,046	4.40	2.85
Series C	15,100	15,077	25,895	1.89	1.89
Series D	11,500	8,086	28,267	3.50	3.50
Series E	15,000	14,991	64,531	4.50	4.50
	47,686	42,028	$ 132,739		
As of December 31, 2009					
Series A	86	—	$ —	$ —	$ —
Series B	6,000	3,874	14,046	4.40	2.85
Series C	15,100	14,417	24,429	1.89	1.89
Series D	11,500	8,086	28,267	3.50	3.50
Series E	15,000	14,991	64,531	4.50	4.50
	47,686	41,368	$ 131,273		
As of December 31, 2010					
Series B	6,000	3,874	$ 14,046	$ 4.40	$ 2.85
Series C	15,100	14,421	24,440	1.89	1.89
Series D	11,500	8,086	28,267	3.50	3.50
Series E	15,000	14,991	64,531	4.50	4.50
Series F	15,680	11,776	59,973	5.10	5.10
	63,280	53,148	$ 191,257		
As of September 30, 2011 (unaudited)					
Series B	6,000	3,874	$ 14,046	$ 4.40	$ 2.85
Series C	15,100	14,423	24,454	1.89	1.89
Series D	11,500	8,086	28,267	3.50	3.50
Series E	15,000	14,991	64,531	4.50	4.50
Series F	15,680	11,776	59,973	5.10	5.10
Series G	11,000	11,000	76,949	7.00	7.00
	74,280	64,150	$ 268,220		

During 2010, the Company amended its articles of organization to remove Series A nonconvertible redeemable preferred stock and as a result, as of December 31, 2010, Series A was no longer authorized.

The following is the carrying value activity of convertible preferred stock for the years ended December 31, 2008, 2009 and 2010 and the nine-months ended September 30, 2011:

	Convertible preferred stock						
(in thousands)	Series B convertible preferred stock amount	Series C convertible preferred stock amount	Series D convertible preferred stock amount	Series E convertible preferred stock amount	Series F convertible preferred stock amount	Series G convertible preferred stock amount	Total
Balance at December 31, 2007 and 2008	$ 14,046	$ 25,895	$ 28,267	$ 64,531	$ —	$ —	$ 132,739
Return of Series C stock as result of license agreement	—	(1,469)	—	—	—	—	(1,469)
Issuance of Series C stock as result of warrant exercises	—	3	—	—	—	—	3
Balance at December 31, 2009	14,046	24,429	28,267	64,531	—	—	131,273
Issuance of Series F stock	—	—	—	—	59,973	—	59,973
Issuance of Series C stock as result of warrant exercises	—	11	—	—	—	—	11
Balance at December 31, 2010	14,046	24,440	28,267	64,531	59,973	—	191,257
Issuance of Series C stock as result of warrant exercises (unaudited)	—	14	—	—	—	—	14
Issuance of Series G stock (unaudited)	—	—	—	—	—	76,949	76,949
Balance at September 30, 2011 (unaudited)	$ 14,046	$ 24,454	$ 28,267	$ 64,531	$ 59,973	$ 76,949	$ 268,220

There was no change in the carrying value of the Company's convertible preferred stock for the year ended December 31, 2008.

The following is the issued and outstanding share activity of the Company's convertible preferred stock for the years ended December 31, 2008, 2009 and 2010 and nine-months ended September 30, 2011:

	Convertible preferred stock						
(in thousands)	Series B convertible preferred stock shares	Series C convertible preferred stock shares	Series D convertible preferred stock shares	Series E convertible preferred stock shares	Series F convertible preferred stock shares	Series G convertible preferred stock shares	Total
Balance at December 31, 2007 and 2008	3,874	15,077	8,086	14,991	—	—	42,028
Return of Series C stock as result of license agreement	—	(662)	—	—	—	—	(662)
Issuance of Series C stock as result of warrant exercises	—	2	—	—	—	—	2
Balance at December 31, 2009	3,874	14,417	8,086	14,991	—	—	41,368
Issuance of Series F stock	—	—	—	—	11,776	—	11,776
Issuance of Series C stock as result of warrant exercises	—	4	—	—	—	—	4
Balance at December 31, 2010	3,874	14,421	8,086	14,991	11,776	—	53,148
Issuance of Series C stock as result of warrant exercises (unaudited)	—	2	—	—	—	—	2
Issuance of Series G stock (unaudited)	—	—	—	—	—	11,000	11,000
Balance at September 30, 2011 (unaudited)	3,874	14,423	8,086	14,991	11,776	11,000	64,150

There was no change in the issued and outstanding shares of the Company's convertible preferred stock for the year ended December 31, 2008.

The rights and preferences at December 31, 2010 of the Series B, Series C, Series D, Series E, Series F and Series G (collectively, the "Preferred Stock") are as follows:

Voting rights

Series B, Series C, Series D, Series E, Series F and Series G stockholders are entitled to vote together with all other classes and series of stock as a single class on all matters and are entitled to the number of votes equal to the number of shares of common stock into which each share of Preferred Stock is then convertible.

Dividends

Shares of Series B, Series C, Series D, Series E, Series F and Series G accrue cumulative dividends at the annual rate of 4% of the respective purchase prices of each series, up to a maximum of 25% of the respective purchase prices, as provided in the Company's Restated Certificate of Incorporation (the "Accrued Dividends"). The Accrued Dividends are payable only upon an actual liquidation, dissolution or winding-up of the Company, a Deemed Liquidation (as defined in the Company's Restated Certificate of Incorporation), or as to the Series B, a conversion of the Series B into common stock. No dividends shall be declared, paid or set aside on any other series or class of capital stock unless a comparable dividend is declared, paid or set aside for each share of Preferred Stock on an as-converted basis. As of December 31, 2010 and September 30, 2011, no dividends have been declared or paid by the Company.

Liquidation preference

In the event of an actual liquidation, dissolution or winding-up of the Company, the holders of the Preferred Stock shall be entitled to elect to convert their respective shares and/or any Accrued Dividends into common stock or receive a payment out of the assets of the Company available for distribution to its stockholders and prior to any distributions to the holders of common stock, in the amount of $4.40 per share of Series B plus applicable, unpaid Accrued Dividends (the "Series B Liquidation Preference") in the case of Series B, $1.89 per share of Series C plus applicable, unpaid Accrued Dividends (the "Series C Liquidation Preference") in the case of Series C, $3.50 per share of Series D plus applicable, unpaid Accrued Dividends (the "Series D Liquidation Preference") in the case of Series D, $4.50 per share of Series E plus applicable, unpaid Accrued Dividends (the "Series E Liquidation Preference") in the case of Series E, $5.10 per share of Series F plus applicable, unpaid Accrued Dividends (the "Series F Liquidation Preference") in the case of Series F and $7.00 per share of Series G plus applicable, unpaid Accrued Dividends (the "Series G Liquidation Preference") in the case of Series G.

Unless the holders of at least two thirds of the outstanding shares of Series B, Series C, Series D, Series E, Series F and Series G each vote (as a separate class) that such events shall not be a deemed liquidation, upon the occurrence of (i) a consolidation of the Company with, or merger of the Company with or into, another business organization, other than a merger with an affiliate of the Company or a merger in which the Company is the surviving Company and the stockholders of the Company prior to such merger continue to hold a majority of the voting power, or (ii) the sale of all or substantially all of the Company 's business assets (a "Deemed Liquidation"), the holders of shares of Preferred Stock will be entitled to either elect (A) to convert the shares of Preferred Stock and/or any Accrued Dividends into common stock or (B) to receive, prior to any distribution to holders of common stock, a liquidation preference less the amount of any Accrued Dividends converted into common stock; provided that the

aggregate amount received by the holders of Series B, Series C, Series D, Series E, Series F and Series G for each share of Series B, Series C, Series D, Series E, Series F and Series G shall not exceed 125% of the Series B, Series C, Series D, Series E, Series F and Series G purchase price (each as defined in the Company's Restated Certificate of Incorporation), as applicable. After payment of Series B Liquidation Preference, Series C Liquidation Preference, Series D Liquidation Preference, Series E Liquidation Preference, Series F Liquidation Preference and Series G Liquidation Preference, the holders of common stock shall be entitled to receive the remaining assets of the Company available for distributions.

Conversion

Each share of the Preferred Stock is convertible at the option of the holder into common stock of the Company based on a defined conversion ratio, adjustable for certain standard antidilution adjustments. At December 31, 2009 and 2010 and September 30, 2011, the conversion prices for shares of Series B, Series C, Series D, Series E, Series F and Series G were $2.85, $1.89, $3.50, $4.50, $5.10 and $7.00, respectively. If at any time the Company effects a firm commitment underwritten initial public offering for shares of common stock with a per share offering price equal to or greater than the greater of $4.40 or 250% of the Series C conversion price, which results in aggregate gross proceeds to the Company of at least $50 million, then all outstanding shares of the Preferred Stock automatically convert to shares of common stock, with Accrued Dividends of approximately $4,263,000 on the Series B paid in cash.

13. Series F amount

During 2010, management determined that the Company may not have obtained all of the stockholder approvals required with respect to the Restated Articles of Organization that it filed with the Secretary of the Commonwealth of the Commonwealth of Massachusetts (the "Massachusetts Secretary") on November 2, 2007 (the "2007 Restated Articles"). Among other changes, the 2007 Restated Articles were intended to authorize the 11,776,000 shares of Series F Convertible Preferred Stock (the "Series F") that the Company agreed to issue to purchasers in 2007 and 2008. In addition, the Company filed Articles of Amendment to the 2007 Restated Articles with the Massachusetts Secretary on November 5, 2009 (the "2009 Amendment") that the Company believes were ineffective as a result of the failure to obtain the requisite stockholder approvals for the 2007 Restated Articles. As a result, the Series F was not legally issued preferred stock, but rather an unsettled obligation to issue Series F.

In order to properly authorize and issue the Series F, in July and August 2010, the board of directors and stockholders of the Company, respectively, approved new Restated Articles of Organization (the "2010 Restated Articles") that provided for the amendments contemplated by the 2007 Restated Articles and the 2009 Amendment. In order to provide the purchasers with shares of Series F having the economic benefit of the accruing dividends to which they would have been entitled had the Series F been properly authorized and issued as originally intended, the 2010 Restated Articles authorized the Series F in sub-series, with each sub-series corresponding to a closing date in 2007 or 2008. The preferences, limitations and relative rights of the shares of each sub-series of Series F authorized by the 2010 Restated Articles are the same as to the preferences, limitations and relative rights of the shares of Series F intended to be authorized by the 2007 Restated Articles and the 2009 Amendment. The 2010 Restated Articles were filed with the Massachusetts Secretary of State on October 6, 2010.

Following the filing of the 2010 Restated Articles, the Company entered into an Exchange Agreement with each individual and entity that originally agreed to purchase shares of Series F in 2007 or 2008. Pursuant to the Exchange Agreements, the Company agreed to exchange the rights to receive the shares of Series F that it had agreed to issue in 2007 and 2008 for the same number of shares of the applicable sub-series of Series F authorized by the 2010 Restated Articles. Such exchanges were completed on October 6, 2010.

The Company had a liability of $69,275,000 recorded as of December 31, 2009. The Company recorded imputed noncash interest expense for financial reporting purposes of $4,064,000, $4,805,000, $3,673,000 and $3,594,000 for the years ended December 31, 2008, 2009 and 2010 and the nine-month period ended September 30, 2010, respectively, due to the delayed delivery of Series F. Upon completion of the exchanges of Series F on October 6, 2010, the Company issued 11,776,000 shares of Series F. The Series F amount was relieved and the initial investment of $5.10 per share was recorded as convertible preferred stock and the accrued noncash interest expense of $12,974,000 was recorded as additional paid-in capital during the fourth quarter of 2010.

14. Stock warrants

The following is a description of the common stock warrant activity of the Company:

(in thousands, except per share amounts)	Warrants for the purchase of common stock	Weighted average exercise price
Balance—January 1, 2008	2,926	$ 2.35
Issued	11	1.89
Balance—December 31, 2008	2,937	2.35
Balance—December 31, 2009	2,937	2.35
Balance—December 31, 2010	2,937	2.93
Balance—September 30, 2011 (unaudited)	2,937	$ 2.93

During 2008, 11,000 warrants held by a stockholder were issued to purchase common stock at an exercise price of $1.89. The warrants were valued at $24,000 using a Black-Scholes option valuation model.

During the third quarter of 2010, 2,596,000 warrants held by a related party stockholder were modified to extend the expiration dates by 4 years and increase the exercise prices from $2.12 and $2.47 to $3.00 per share. The modification was valued using a Black-Scholes option valuation model and the Company accounted for the $1,803,000 of incremental value within the equity section of the accompanying balance sheets as a capital transaction.

The following is a description of the preferred stock warrant activity of the Company:

	Warrants for the purchase of preferred stock			
(in thousands, except per share amounts)	Series C	Weighted average exercise price	Series D	Weighted average exercise price
Balance, December 31, 2008	21	$1.89	302	$3.50
Exercised	(6)	1.89	—	—
Balance, December 31, 2009	15	1.89	302	3.50
Exercised	(11)	1.89	—	—
Balance, December 31, 2010	4	1.89	302	3.50
Exercised (unaudited)	(3)	1.89	—	—
Balance, September 30, 2011 (unaudited)	1	$1.89	302	$3.50

15. Common stock

As of December 31, 2010 and September 30, 2011, the Company had 125.0 million shares and 138.5 million shares, respectively, of $0.01 par common stock authorized. As of December 31, 2009, the Company had 90 million shares of no par common stock authorized. During the fourth quarter of 2010, the Company changed the par value of its common stock from no par to $0.01 par and recognized a $17,547,000 reduction to common stock and a corresponding increase to additional paid-in capital. There were 10,868,000, 11,073,000 and 11,414,000 common shares issued and outstanding as of December 31, 2009 and 2010 and September 30, 2011, respectively. The shares reserved for future issuance as of December 31, 2010 and September 30, 2011 consisted of the following:

(in thousands)	December 31, 2010	September 30, 2011
		(unaudited)
Conversion of Series B, Series C, Series D, Series E, Series F and Series G preferred stock	55,253	66,255
Preferred stock warrants	306	303
Common stock warrants	2,937	2,937
Contingent consideration	400	—
1999 Stock Option Plan and 2008 Stock Incentive Plan	16,214	17,522
	75,110	87,017

16. Stock-based compensation

Prior to 2008, the Company granted equity awards to employees, officers and consultants under the 1999 Stock Option Plan (the "1999 Plan"). In 2008, the Company adopted the 2008 Stock Incentive Plan (the "2008 Plan") for employees, officers, directors, consultants and advisors and decided that no additional shares of common stock would be issued under the 1999 Plan. The 2008 Plan, which is administered by the Board of Directors of the Company, permitted the Company to grant incentive and nonqualified stock options, restricted stock, restricted stock units and other stock-based awards, up to a maximum of 12.4 million shares. In 2009 and 2011, the Board of Directors and Stockholders of the Company amended the 2008

Plan to increase the number of shares that may be issued under the plan by 4.7 million and 2.5 million, respectively, up to a maximum of 19.6 million shares. Awards typically vest over three years for employees and immediately for directors, at the discretion of the Board of Directors, and options typically have a maximum term of ten years. As of December 31, 2010 and September 30, 2011, there were 201,000 and 1,052,000 shares, respectively, available to be issued under the 2008 Plan.

In 2009, as allowed under the 2008 Plan, the Board of Directors of the Company voted to lower the exercise prices of certain outstanding stock options held by nonexecutive employees which had exercise prices greater than the fair market value of the underlying common stock. As a result, options to purchase 1.9 million shares of common stock with exercise prices greater than $2.12 per share were amended to reflect the new exercise price of $2.12 per share. Share-based compensation recognized as a result of this amendment was $59,000 and $103,000 for the years ended December 31, 2009 and 2010, respectively, and $86,000 and $20,000 for the nine-months ended September 30, 2010 and 2011, respectively.

During 2008, 2009 and 2010 and the nine-months ended September 30, 2010 and 2011, the Company issued options to purchase 2.7 million, 4.2 million, 2.9 million, 1.0 million and 1.9 million shares of common stock, respectively, to its directors and employees. These options generally vest over a three-year period for employees and immediately for directors.

During 2008, 2009 and 2010 and the nine-months ended September 30, 2010 and 2011, the Company granted options to purchase 65,000, 85,000, 40,000, 0 and 83,000 shares of common stock, respectively, to nonemployees. The assumptions used to determine the fair value of options granted to nonemployees were consistent with those used for employee grants.

The Company recognized stock-based compensation expense as follows:

	Year ended December 31,			Nine-months ended September 30,	
(in thousands)	**2008**	**2009**	**2010**	**2010**	**2011**
				(unaudited)	**(unaudited)**
Employee awards:					
Research and development	$ 1,352	$ 1,941	$ 2,787	$ 1,919	$ 2,654
General and administrative	981	1,314	1,706	1,333	2,453
Stock-based compensation for employee awards	2,333	3,255	4,493	3,252	5,107
Stock-based compensation for nonemployee awards	84	49	58	164	466
Total stock-based compensation	$ 2,417	$ 3,304	$ 4,551	$ 3,416	$ 5,573

The fair value of options granted for 2008, 2009 and 2010 and the nine-months ended September 30, 2011, were estimated at the date of grant using the following assumptions:

	Year ended December 31,			Nine-months ended September 30,
	2008	**2009**	**2010**	**2011**
Risk-free interest rate	3.3 - 3.5%	2.4 - 3.2%	1.7 - 2.8%	1.6 - 2.5%
Expected dividend yield	0%	0%	0%	0%
Expected term	5 - 5.9 years	5 - 5.9 years	5 - 5.9 years	5 - 5.9 years
Expected volatility	65 - 67%	69 - 76%	73 - 77%	73%

The Company uses the simplified method to calculate the expected term as it does not have sufficient historical exercise data to provide a reasonable basis upon which to estimate expected term. The computation of expected volatility is based on the historical volatility of comparable companies from a representative peer group selected based on industry and market capitalization. The risk-free interest rate is based on a treasury instrument whose term is consistent with the expected life of the stock options. Management estimates expected forfeitures based on historical experience and recognizes compensation costs only for those equity awards expected to vest.

The following table summarizes stock option activity, including options issued to nonemployees:

(in thousands, except per share amounts)	Number of shares	Weighted average exercise price	Aggregate intrinsic value
Outstanding, December 31, 2007	9,252	$2.07	$11,449
Granted	2,731	2.00	
Exercised	(43)	1.53	
Forfeited	(457)	2.22	
Outstanding, December 31, 2008	11,483	$2.06	$(2,858)
Granted	4,239	2.08	
Exercised	(430)	0.99	
Forfeited	(632)	2.20	
Outstanding, December 31, 2009	14,660	$2.02	$1,492
Granted	2,984	2.52	
Exercised	(205)	1.44	
Forfeited	(1,225)	2.26	
Outstanding, December 31, 2010	16,214	$2.10	$9,628
Granted (unaudited)	2,034	5.57	
Exercised (unaudited)	(341)	2.32	
Forfeited (unaudited)	(385)	2.38	
Outstanding, September 30, 2011 (unaudited)	17,522	$2.48	$75,324
Exercisable, December 31, 2010	11,374	$2.01	$7,737
Exercisable, September 30, 2011 (unaudited)	13,060	$2.14	$60,592
Vested and expected to vest, December 31, 2010	15,797	$2.09	$9,464
Vested and expected to vest, September 30, 2011 (unaudited)	17,178	$2.45	$74,341

The aggregate intrinsic value was calculated as the difference between the exercise price of the stock options and the fair value of the underlying common stock as of the respective balance sheet date. The aggregate intrinsic value of options exercised for 2008, 2009 and 2010 and the nine-months ended September 30, 2011 was $62,000, $226,000, $145,000 and $752,000, respectively.

As of December 31, 2010 and September 30, 2011, there was $7,275,000 and $8,763,000, respectively, of total unrecognized compensation cost related to nonvested stock awards. As of December 31, 2010 and September 30, 2011, the Company expects to recognize those costs over weighted average periods of approximately 1.6 years and 1.8 years, respectively.

The following table summarizes information including the range of exercise prices for stock options outstanding and exercisable at December 31, 2010:

	Options outstanding			Options exercisable		
Exercise Price	Number of shares (in thousands)	Weighted average remaining contractual life (years)	Weighted average exercise price	Number of shares exercisable (in thousands)	Weighted average remaining contractual life (years)	Weighted average exercise price
$0.05	51	0.97	$ 0.05	51	0.97	$ 0.05
0.32	152	0.97	0.32	152	0.97	0.32
1.25	1,115	3.66	1.25	1,115	3.66	1.25
1.71	1,755	4.57	1.71	1,755	4.57	1.71
1.81	2,440	7.82	1.81	1,964	7.80	1.81
2.12	6,153	8.14	2.12	3,571	7.57	2.12
2.19	540	1.88	2.19	540	1.88	2.19
2.25	9	0.12	2.25	9	0.12	2.25
2.47	640	5.69	2.47	640	5.69	2.47
2.59	1,049	6.77	2.59	1,049	6.77	2.59
2.69	2,095	9.83	2.69	313	9.83	2.69
4.40	215	0.51	4.40	215	0.51	4.40
	16,214	7.03	2.10	11,374	7.03	2.01
Vested and expected to vest	15,797	6.97	2.09			

17. Income taxes

As a result of losses incurred, the Company did not provide for any income taxes in the years ended December 31, 2008, 2009 and 2010. A reconciliation of the Company's effective tax rate to the statutory federal income tax rate is as follows:

	Year ended December 31,		
	2008	2009	2010
Federal statutory rate	34.0%	35.0%	35.0%
State taxes, net of Federal benefit	3.3	2.5	4.6
Permanent differences	(2.7)	(3.2)	(2.6)
Stock Compensation	(1.2)	(2.0)	(2.9)
Change in valuation allowance	(37.6)	(30.3)	(39.2)
Tax Credits	3.0	4.5	5.1
Other	1.2	—	—
	—%	6.5%	—%

Temporary differences that give rise to significant net deferred tax assets as of December 31, 2009 and 2010 are as follows:

(in thousands)	2009	2010
Deferred tax assets		
Net operating losses	$ 32,325	$ 34,035
Capitalized research and development expenses	42,963	36,865
Credit carryforwards	7,526	10,262
Depreciation	529	1,080
Deferred compensation	1,429	1,603
Deferred revenue	—	22,495
Accrued expenses	130	608
Other	639	886
Total gross deferred tax asset	85,541	107,834
Intangible assets	(4,121)	(3,953)
Valuation allowance	(81,420)	(103,881)
Net deferred taxes	$ —	$ —

As of December 31, 2010, the Company had federal and state net operating loss ("NOL") carryforwards of $88.9 million and $54.2 million, respectively, which will begin to expire in 2011. As of December 31, 2010, the Company had federal and state research and development ("R&D") and investment tax credit carryforwards of $7.9 million and $3.6 million, respectively, which will begin to expire in 2011. Management has evaluated the positive and negative evidence bearing upon the realizability of its deferred tax assets, which are comprised principally of net operating loss carryforwards. Management has determined that it is more likely than not that the Company will not recognize the benefits of federal and state deferred tax assets and, as a result, a valuation allowance of $81.4 million and $103.9 million have been established at December 31, 2009 and 2010, respectively.

Additionally, the future utilization of the Company's NOL and R&D credit carryforwards to offset future taxable income may be subject to a substantial annual limitation under Section 382 of the Internal Revenue Code due to ownership changes that have occurred previously or that could occur in the future. Ownership changes, as defined in Section 382 of the Internal Revenue Code, may have limited the amount of net operating loss carryforwards and research and development credit carryforwards that the Company can use each year to offset future taxable income and taxes payable. Subsequent ownership changes could impose additional limitations. The Company has not performed a complete 382 study. Any limitation to all or a portion of the NOL or R&D credit carryforwards, before they can be utilized, would reduce the Company's gross deferred tax asset.

The Company adopted the provisions of ASC 740-10, *Accounting for Uncertainty in Income Taxes—an interpretation of ASC 740,* on January 1, 2007. ASC 740-10 clarifies the accounting for uncertainty in income taxes recognized in an enterprise's financial statements in accordance with ASC 740, *Income Taxes*, and prescribes a recognition threshold and measurement process for financial statement recognition and measurement of a tax position taken or expected to be taken in a tax return. ASC 740-10 also provides guidance on derecognition, classification, interest and penalties, accounting in interim periods, disclosure and transition. The Company

concluded that there are no significant uncertain tax positions requiring recognition in the consolidated financial statements. The Company's evaluation was performed for the tax years ended December 31, 2007 through 2010, the tax years which remain subject to examination by major tax jurisdictions as of December 31, 2010. However, to the extent the Company utilizes net operating losses from years prior to 2007, the statute remains open to the extent of the net operating losses utilized.

The change in the valuation allowance against the deferred tax assets in the years ended December 31, 2008, 2009 and 2010 was as follows:

(in thousands)	Balance at beginning of period	Additions	Deductions	Balance at end of period
December 31, 2008	$ 50,052	16,959	—	$ 67,011
December 31, 2009	$ 67,011	17,811	(3,402)	$ 81,420
December 31, 2010	$ 81,420	22,461	—	$ 103,881

As a result of the acquisition of Hermes during 2009, the Company recognized a portion of its valuation allowance. The Company recorded intangible assets and IPR&D for which there is no tax basis. As a result, the Company recorded a net deferred tax liability in connection with the acquisition. The net deferred tax liability was offset with deferred tax assets previously recorded by the Company which resulted in a reduction in the valuation allowance. The decrease in the valuation allowance resulted in a $3,402,000 income tax benefit for the year ended December 31, 2009.

The Company's net deferred tax asset at December 31, 2010 was subject to a full valuation allowance.

In January 2010, the Massachusetts Life Sciences Center ("MLSC"), an independent agency of The Commonwealth of Massachusetts, awarded the Company $1,500,000 of tax incentives under its Life Sciences Tax Incentive Program. These incentives allowed the Company to monetize approximately $1,350,000 of state research and development tax credits. The Company received this monetization in 2010. In exchange for these incentives, the Company pledged to hire 50 employees in 2010 and retain these employees until at least December 31, 2014. Failure to do so could result in repayment of incentives. The Company deferred and is amortizing the benefit of this monetization on a straight-line basis over the 5 year performance period and for the year ended December 31, 2010 and the nine-months ended September 30, 2011, the Company recognized $270,000 and $203,000, respectively, of benefit in other income.

In October 2010, the Company received grants totaling $2,445,000 under the Federal Qualifying Therapeutic Discovery Projects program as provided for under section 48D of the Internal Revenue Code, enacted as part of the Patient Protection and Affordable Care Act of 2010. The Company received $1,941,000 during 2010 and $504,000 during the first quarter of 2011 related to these grants. For the year ended December 31, 2010, the Company recognized $2,445,000 as other income related to these grants.

In January 2011, the MLSC awarded the Company $1,347,000 of tax incentives under its Life Sciences Tax Incentive Program. These incentives allowed the Company to monetize approximately $1,212,000 of state research and development tax credits. The Company received

this monetization in the second quarter of 2011. In exchange for these incentives, the Company has pledged to hire 50 employees in 2011 and retain these employees until at least December 31, 2015. Failure to do so could result in repayment of incentives. As of September 30, 2011, the Company has not recognized any benefit associated with these tax incentives.

18. Commitments and contingencies

Operating leases

The Company leases its office and manufacturing space and certain office equipment under noncancelable operating leases. Total rent expense under these operating leases was $1,387,000, $2,082,000, $2,866,000, $2,145,000 and $2,342,000 for the years ended December 31, 2008, 2009 and 2010 and the nine-months ended September 30, 2010 and 2011, respectively.

Future minimum lease payments under noncancelable operating leases at December 31, 2010 are as follows:

Year ended December 31,	(in thousands)
2011	$ 2,617
2012	1,086
2013	—

During 2008, the Company expanded its existing facility and amended its office and manufacturing space operating lease. As part of this amendment, the landlord agreed to reimburse the Company for a portion of tenant improvements made to the facility. During 2009, the Company received $786,000 from the landlord. In January and June 2010, the Company entered into lease amendments to further expand its office and manufacturing space. These lease amendments are co-terminous with the Company's existing facility lease which expires in April 2012. As part of these amendments, the landlord agreed to reimburse the Company for a portion of tenant improvements made to the facility. During 2010, the Company received $217,000 from the landlord. These amounts were recorded in deferred lease benefits on the Company's balance sheets and are being amortized over the term of the lease as reductions to rent expense. On March 31, 2011, the Company amended its existing office and manufacturing lease to extend the term on a portion of its leased space until April 2015 and extend the term on the remainder of leased space until April 2013 with options to extend until April 2015. Incremental future minimum lease payments as a result of this amendment are $1,695,000, $1,986,000, $1,429,000 and $480,000 for the years ended December 31, 2012, 2013, 2014 and 2015, respectively. As part of this amendment, the landlord agreed to reimburse the Company for a portion of tenant improvements made to the facility, up to a total of $381,000. As of September 30, 2011, the Company had earned reimbursement of $51,000 from the landlord.

Capital leases

In August 2004, the Company entered into an agreement with a leasing company under which the Company was authorized to borrow up to $1.4 million of noncourse debt through sale/lease-back and loan structured transactions which were collateralized by equipment. In January 2006, the agreement was amended increasing the Company's total borrowing capacity to $4.5 million. Each lease is to be repaid over a four year period. The interest rate was

established based on a percentage above treasury interest rates. Borrowings made under this agreement were $675,000 for the year ended December 31, 2008. The Company's option to draw further on this lease facility expired during 2008.

Future minimum lease payments under noncancelable capital leases at December 31, 2010 are as follows:

Year ended December 31,	(in thousands)
2011	$ 456
2012	49
2013	—
	505
Less interest	14
Present value of minimum lease payments	491
Less current portion of capital lease obligations	443
Capital lease obligations, net of current portion	$ 48

Contingencies

Contractual matter (unaudited)

The Company manufactures MM-121 under a license and collaboration agreement with Sanofi. Under this agreement, Sanofi reimburses the Company for direct costs incurred in manufacturing. During 2009 and 2010, the Company utilized a third party contractor to perform fill-finish manufacturing services. This third party contractor experienced FDA inspection issues with its quality control process that resulted in a formal warning letter from the FDA. Following a review by Sanofi and the Company, some MM-121 was pulled from clinical trial sites and replaced with MM-121 that was filled by a different contractor. Sanofi has requested that the Company assume financial responsibility for the MM-121 material that was pulled from clinical trial sites. The Company has disputed Sanofi's request and is currently following the dispute resolution provisions of the license and collaboration agreement. If the executive officers appointed by Sanofi and the Company are unable to resolve the request, then Sanofi may request that the Company submit the matter to binding arbitration. In the event that binding arbitration is pursued and the Company is found financially responsible for the MM-121 material that was pulled from clinical trial sites, the Company may be required to reimburse Sanofi. The arbitration process is inherently uncertain, and the Company cannot guarantee that the outcome of arbitration, if it were to occur, would be favorable for the Company. The Company does not believe that a loss related to this matter is probable. Accordingly, no accrual related to this matter has been recorded as of September 30, 2011. The Company estimates that the potential payment range for this reimbursement may be between $0 and $4.8 million. Based on the revenue recognition model for manufacturing services under the license and collaboration agreement, the Company estimates that a potential reimbursement of between $0 and $4.8 million would result in a reduction of revenue of between $0 and $0.8 million in the accompanying consolidated statement of operations in the period.

19. Retirement plan

On May 31, 2002, the Company established a 401(k) defined contribution savings plan for its employees who meet certain service period and age requirements. Contributions are permitted up to the maximum allowed under the Internal Revenue Code of each covered employee's salary. The savings plan permits the Company to contribute at its discretion. For the years ended December 31, 2008, 2009 and 2010 and the nine-months ended September 30, 2010 and 2011, the Company made contributions of $260,000, $270,000, $380,000, $284,000 and $368,000, respectively, to the plan.

20. Subsequent events

Subsequent events have been evaluated through July 8, 2011, the date the accompanying financial statements were issued, and January 13, 2012 (unaudited), when the accompanying financial statements were re-issued.

The following four paragraphs are unaudited:

During the fourth quarter of 2011, the Company received a milestone payment of $10.0 million under the license and collaboration agreement with Sanofi associated with the dosing of the first patient in a Phase 2 clinical trial of MM-121 in non-small cell lung cancer.

During the fourth quarter of 2011, warrants to purchase 290,000 shares of common stock were exercised, and as a result, the Company received $716,000 in proceeds and issued 290,000 shares of common stock. In addition, warrants to purchase 6,000 shares of common stock and a warrant to purchase 1,000 shares of Series C were cashless exercised, and 4,000 shares of common stock and 800 shares of Series C were issued. Warrants to purchase 2,000 shares of common stock expired in the fourth quarter of 2011.

During the first quarter of 2012, the Company triggered milestone payments of $1.5 million and €50,000, which are payable to collaborators associated with dosing the first patient in a Phase 1 clinical trial of MM-151 in solid tumors.

During the first quarter of 2012, the Company triggered a milestone payment of $5.0 million, which is payable under the collaboration agreement with PharmaEngine in connection with dosing the first patient in a Phase 3 clinical trial of MM-398 in pancreatic cancer.

16,666,667 shares

Common stock

Prospectus

J.P. Morgan

BofA Merrill Lynch

Cowen and Company **Oppenheimer & Co.**

, 2012

We have not authorized anyone to provide you with information other than that contained in this prospectus or in any free writing prospectus prepared by or on behalf of us or to which we have referred you. We take no responsibility for, and can provide no assurance as to the reliability of, any other information that others may give you. We are offering to sell, and seeking offers to buy, shares of common stock only in jurisdictions where offers and sales are permitted. The information contained in this prospectus is accurate only as of the date of this prospectus, regardless of the time of delivery of this prospectus or of any sale of our common stock.

No action is being taken in any jurisdiction outside the United States to permit a public offering of the common stock or possession or distribution of this prospectus in that jurisdiction. Persons who come into possession of this prospectus in jurisdictions outside the United States are required to inform themselves about and to observe any restrictions as to this offering and the distribution of this prospectus applicable to that jurisdiction.

Until , 2012, all dealers that buy, sell or trade in our common stock, whether or not participating in this offering, may be required to deliver a prospectus. This is in addition to the dealers' obligation to deliver a prospectus when acting as underwriters and with respect to their unsold allotments or subscriptions.

Part II
Information not required in prospectus

Item 13. Other expenses of issuance and distribution.

The following table sets forth the expenses to be incurred in connection with the offering described in this Registration Statement, other than underwriting discounts and commissions. The underwriters have agreed to reimburse a portion of our expenses for this offering. All amounts are estimates except the SEC registration fee and the Financial Industry Regulatory Authority, Inc. filing fee.

	Amount
Securities and Exchange Commission registration fee	$ 22,225
Financial Industry Regulatory Authority, Inc. filing fee	19,667
NASDAQ listing fee	200,000
Accountants' fees and expenses	600,000
Legal fees and expenses	1,300,000
Blue Sky fees and expenses	15,000
Transfer Agent's fees and expenses	2,500
Printing and engraving expenses	150,000
Miscellaneous	40,608
Total Expenses	$ 2,350,000

Item 14. Indemnification of directors and officers.

Section 102 of the Delaware General Corporation Law permits a corporation to eliminate the personal liability of its directors or its stockholders for monetary damages for a breach of fiduciary duty as a director, except where the director breached his or her duty of loyalty, failed to act in good faith, engaged in intentional misconduct or knowingly violated a law, authorized the payment of a dividend or approved a stock repurchase in violation of Delaware corporate law or obtained an improper personal benefit. Our certificate of incorporation provides that no director shall be personally liable to us or our stockholders for monetary damages for any breach of fiduciary duty as a director, notwithstanding any provision of law imposing such liability, except to the extent that the Delaware General Corporation Law prohibits the elimination or limitation of liability of directors for breaches of fiduciary duty.

Section 145 of the Delaware General Corporation Law provides that a corporation has the power to indemnify a director, officer, employee or agent of the corporation and certain other persons serving at the request of the corporation in related capacities against expenses (including attorneys' fees), judgments, fines and amounts paid in settlements actually and reasonably incurred by the person in connection with an action, suit or proceeding to which he or she is or is threatened to be made a party by reason of such position, if such person acted in good faith and in a manner he or she reasonably believed to be in or not opposed to the best interests of the corporation, and, in any criminal action or proceeding, had no reasonable cause to believe his or her conduct was unlawful, except that, in the case of actions brought by or in the right of the corporation, no indemnification shall be made with respect to any claim, issue or matter as to which such person shall have been adjudged to be liable to the

corporation unless and only to the extent that the Court of Chancery or other adjudicating court determines that, despite the adjudication of liability but in view of all of the circumstances of the case, such person is fairly and reasonably entitled to indemnify for such expenses which the Court of Chancery or such other court shall deem proper.

Our certificate of incorporation provides that we will indemnify each person who was or is a party or threatened to be made a party to any threatened, pending or completed action, suit or proceeding whether civil, criminal, administrative or investigative (other than an action by or in the right of us) by reason of the fact that he or she is or was, or has agreed to become, our director or officer, or is or was serving, or has agreed to serve, at our request as a director, officer, partner, employee or trustee of, or in a similar capacity with, another corporation, partnership, joint venture, trust or other enterprise (all such persons being referred to as an "Indemnitee"), or by reason of any action alleged to have been taken or omitted in such capacity, against all expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred in connection with such action, suit or proceeding and any appeal therefrom, if such Indemnitee acted in good faith and in a manner he or she reasonably believed to be in, or not opposed to, our best interests, and, with respect to any criminal action or proceeding, he or she had no reasonable cause to believe his or her conduct was unlawful.

Our certificate of incorporation also provides that we will indemnify any Indemnitee who was or is a party to an action or suit by or in the right of us to procure a judgment in our favor by reason of the fact that the Indemnitee is or was, or has agreed to become, our director or officer, or is or was serving, or has agreed to serve, at our request as a director, officer, partner, employee or trustee or, or in a similar capacity with, another corporation, partnership, joint venture, trust or other enterprise, or by reason of any action alleged to have been taken or omitted in such capacity, against all expenses (including attorneys' fees) and, to the extent permitted by law, amounts paid in settlement actually and reasonably incurred in connection with such action, suit or proceeding, and any appeal therefrom, if the Indemnitee acted in good faith and in a manner he or she reasonably believed to be in, or not opposed to, our best interests, except that no indemnification shall be made with respect to any claim, issue or matter as to which such person shall have been adjudged to be liable to us, unless a court determines that, despite such adjudication but in view of all of the circumstances, he or she is entitled to indemnification of such expenses. Notwithstanding the foregoing, to the extent that any Indemnitee has been successful, on the merits or otherwise, he or she will be indemnified by us against all expenses (including attorneys' fees) actually and reasonably incurred by him or her or on his or her behalf in connection therewith. If we don't assume the defense, expenses must be advanced to an Indemnitee under certain circumstances.

We have entered into indemnification agreements with our directors and executive officers. In general, these agreements provide that we will indemnify the director or executive officer to the fullest extent permitted by law for claims arising in his or her capacity as a director or officer of our company or in connection with their service at our request for another corporation or entity. The indemnification agreements also provide for procedures that will apply in the event that a director or executive officer makes a claim for indemnification and establish certain presumptions that are favorable to the director or executive officer.

We maintain a general liability insurance policy which covers certain liabilities of our directors and officers arising out of claims based on acts or omissions in their capacities as directors or officers.

The underwriting agreement we will enter into in connection with the offering of common stock being registered hereby provides that the underwriters will indemnify, under certain conditions, our directors and officers (as well as certain other persons) against certain liabilities arising in connection with such offering.

Item 15. Recent sales of unregistered securities.

Set forth below is information regarding shares of common stock and preferred stock issued, and options and warrants granted, by us within the past three years that were not registered under the Securities Act. Also included is the consideration, if any, received by us for such shares, options and warrants and information relating to the section of the Securities Act, or rule of the SEC, under which exemption from registration was claimed.

(a) Issuances of securities

Between November 2007 and April 2008, we agreed to issue an aggregate of 11,775,995 shares of our series F convertible preferred stock at a price per share of $5.10 for an aggregate purchase price of $60,057,575. In July 2010, in connection with a review of our corporate records, we determined that we may not have obtained all of the required stockholder approvals to amend our articles of organization to authorize the shares of series F convertible preferred stock that we agreed to issue in 2007 and 2008. As a result, we conducted an exchange offer in which we provided investors to whom we had agreed to issue and sell shares of series F convertible preferred stock in the series F convertible preferred stock financing in 2007 and 2008 with the opportunity to acquire shares of properly authorized series F convertible preferred stock. All of the holders of shares of series F convertible preferred stock accepted our offer and received new, properly authorized shares of series F convertible preferred stock. Each such holder received a sub-series of the properly authorized series F convertible preferred stock that is intended to provide the investor with the economic benefit of the accrued dividends to which the investor would be entitled had the properly authorized shares of series F convertible preferred stock been issued on the date that we originally agreed to do so in 2007 and 2008. In the exchange offer, we issued an aggregate of 11,775,995 shares of our properly authorized series F convertible preferred stock. All outstanding shares of series F preferred stock will automatically convert into an aggregate of 11,775,995 shares of common stock upon completion of this offering.

In October 2010, our stockholders approved an agreement and plan of merger that had the effect of changing the state in which we were incorporated from Massachusetts to Delaware by merging our predecessor entity, Merrimack Pharmaceuticals, Inc., a Massachusetts corporation, or Merrimack Massachusetts, with and into a Delaware corporation formed for purposes of the merger that was a wholly owned subsidiary of Merrimack Massachusetts. As a result, we are now a Delaware corporation with the name Merrimack Pharmaceuticals, Inc. At the effective time of the merger in October 2010, all of the outstanding shares of each class and series of capital stock of Merrimack Massachusetts were converted into corresponding shares of our capital stock on a one-to-one basis. In connection with the merger, we issued an aggregate of 11,215,211 shares of our common stock, 3,873,448 shares of our series B

convertible preferred stock, 14,417,702 shares of our series C convertible preferred stock, 8,086,305 shares of our series D convertible preferred stock, 14,990,892 shares of our series E convertible preferred stock and 11,775,995 shares of our series F convertible preferred stock. In addition, all options and warrants to purchase shares of Merrimack Massachusetts capital stock that were outstanding at the effective time of the merger in October 2010 were automatically converted into options and warrants to purchase corresponding shares of our capital stock.

In October 2009, we issued an aggregate of 4,382,993 shares of our common stock to 20 stockholders as consideration for their shares of Hermes BioSciences, Inc. in connection with our acquisition of Hermes BioSciences, Inc. For purposes of the merger agreement and the escrow agreement entered into in connection with the acquisition, the per share value of our common stock was deemed to be $5.68.

In April 2011, we issued an aggregate of 11,000,000 shares of our series G convertible preferred stock at a price per share of $7.00 for an aggregate purchase price of $77,000,000. All outstanding shares of series G preferred stock will automatically convert into an aggregate of 11,000,000 shares of common stock upon completion of this offering.

No underwriters were involved in the foregoing sales of securities. The securities described in this section (a) of Item 15 were issued to investors in reliance upon the exemption from the registration requirements of the Securities Act, as set forth in Section 4(2) under the Securities Act and Regulation D promulgated thereunder relative to transactions by an issuer not involving any public offering, to the extent an exemption from such registration was required. All purchasers of shares of convertible preferred stock described above represented to us in connection with their purchase that they were accredited investors and were acquiring the shares for their own account for investment purposes only and not with a view to, or for sale in connection with, any distribution thereof and that they could bear the risks of the investment and could hold the securities for an indefinite period of time. The purchasers received written disclosures that the securities had not been registered under the Securities Act and that any resale must be made pursuant to a registration statement or an available exemption from such registration.

(b) Stock option grants

Between January 1, 2008 and December 31, 2011, we issued to certain employees, directors and consultants options to purchase an aggregate of 12,303,158 shares of common stock, of which, as of December 31, 2011, options to purchase 52,695 shares of common stock had been exercised, options to purchase 1,058,357 shares of common stock had been forfeited and options to purchase 11,192,106 shares of common stock remained outstanding at a weighted average exercise price of $2.91 per share.

The issuance of stock options and the common stock issuable upon the exercise of such options as described in this section (b) of Item 15 were issued pursuant to written compensatory plans or arrangements with our employees, directors and consultants, in reliance on the exemption from the registration requirements of the Securities Act provided by Rule 701 promulgated under the Securities Act or the exemption set forth in Section 4(2) under the Securities Act and Regulation D promulgated thereunder relative to transactions by an issuer not involving any public offering. All recipients either received adequate information about us or had access, through employment or other relationships, to such information.

(c) Issuance of warrants

In connection with certain equipment financing transactions undertaken pursuant to a master lease agreement dated August 13, 2004 between us and General Electric Capital Corporation, as amended in February, March and June of 2008, we issued to General Electric Capital Corporation warrants to purchase 10,726 shares of common stock at an exercise price of $1.889 per share. All such warrants to purchase common stock will remain outstanding upon completion of this offering.

The sale and issuance of these warrants were made in reliance on the exemption provided by Section 4(2) of the Securities Act and Regulation D promulgated thereunder. The recipients of warrants in the transaction described above represented that they were accredited investors and were acquiring the warrants for their own account for investment purposes only and not with a view to, or for sale in connection with, any distribution thereof and that they could bear the risks of the investment and could hold the warrants for an indefinite period of time and appropriate legends were affixed to the instruments representing such warrants issued in such transactions. Such recipients either received adequate information about us or had, through its relationship with us, access to such information.

All of the foregoing securities are deemed restricted securities for purposes of the Securities Act. All certificates representing the issued shares of capital stock described in this Item 15 included appropriate legends setting forth that the securities had not been registered and the applicable restrictions on transfer.

Item 16. Exhibits and financial statement schedules.

The exhibits to the registration statement are listed in the Exhibit Index attached hereto and incorporated by reference herein.

Item 17. Undertakings.

(a) The undersigned registrant hereby undertakes to provide to the underwriter at the closing specified in the underwriting agreements, certificates in such denominations and registered in such names as required by the underwriter to permit prompt delivery to each purchaser.

(b) Insofar as indemnification for liabilities arising under the Securities Act of 1933 may be permitted to directors, officers and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been advised that, in the opinion of the Securities and Exchange Commission, such indemnification is against public policy as expressed in the Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the registrant of expenses incurred or paid by a director, officer or controlling person of the registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Act and will be governed by the final adjudication of such issue.

(c) The undersigned registrant hereby undertakes that:

(1) For purposes of determining any liability under the Securities Act of 1933, the information omitted from the form of prospectus filed as part of this registration statement in reliance upon Rule 430A and contained in a form of prospectus filed by the registrant pursuant to Rule 424(b)(1) or (4) or 497(h) under the Securities Act shall be deemed to be part of this registration statement as of the time it was declared effective.

(2) For the purpose of determining any liability under the Securities Act of 1933, each post-effective amendment that contains a form of prospectus shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial *bona fide* offering thereof.

Signatures

Pursuant to the requirements of the Securities Act of 1933, the registrant has duly caused this Amendment No. 4 to the Registration Statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Cambridge, Commonwealth of Massachusetts, on this 13th day of January, 2012.

MERRIMACK PHARMACEUTICALS, INC.

By: /s/ ROBERT J. MULROY

Robert J. Mulroy
President and Chief Executive Officer

Pursuant to the requirements of the Securities Act of 1933, this Amendment No. 4 to the Registration Statement has been signed by the following persons in the capacities held on the dates indicated.

Signature	Title	Date
/s/ ROBERT J. MULROY Robert J. Mulroy	President, Chief Executive Officer and Director (Principal executive officer)	January 13, 2012
/s/ WILLIAM A. SULLIVAN William A. Sullivan	Chief Financial Officer and Treasurer (Principal financial and accounting officer)	January 13, 2012
* Gary L. Crocker	Director	January 13, 2012
* James van B. Dresser	Director	January 13, 2012
* Gordon J. Fehr	Director	January 13, 2012
* Robert C. Gay, Ph.D.	Director	January 13, 2012

Signature	Title	Date
*		
Walter M. Lovenberg, Ph.D.	Director	January 13, 2012
*		
Sarah E. Nash	Director	January 13, 2012
*		
Michael E. Porter, Ph.D.	Director	January 13, 2012
*		
Anthony J. Sinskey, Sc.D.	Director	January 13, 2012

*By: /s/ ROBERT J. MULROY

Robert J. Mulroy
Attorney-in-Fact

Exhibit index

Exhibit number	Description of exhibit
1.1	Underwriting Agreement
3.1*	Restated Certificate of Incorporation of the Registrant
3.2*	Bylaws of the Registrant
3.3	Certificate of Amendment of Restated Certificate of Incorporation of the Registrant to be effective prior to the effectiveness of this Registration Statement
3.4	Restated Certificate of Incorporation of the Registrant to be effective upon the closing of this offering
3.5	Amended and Restated Bylaws of the Registrant to be effective upon the closing of this offering
4.1*	Specimen certificate evidencing shares of common stock
4.2*	Fifth Amended and Restated Investor Rights Agreement, dated April 6, 2011, by and among the Registrant and the other parties thereto
4.3*	Warrant to purchase shares of Series D Convertible Preferred Stock, dated April 6, 2005, issued by the Registrant to Hercules Technology Growth Capital, Inc.
4.4	[Intentionally omitted]
4.5	[Intentionally omitted]
4.6*	Form of warrant to purchase shares of Common Stock issued by the Registrant to General Electric Capital Corporation
4.7*	Form of warrant to purchase shares of Common Stock issued by the Registrant to various parties expiring on December 10, 2015
4.8*	Form of warrant to purchase shares of Common Stock issued by the Registrant to various parties expiring on December 17, 2015
4.9*	Form of warrant to purchase shares of Common Stock issued by the Registrant to various parties expiring on March 10, 2016
5.1	Opinion of Wilmer Cutler Pickering Hale and Dorr LLP
10.1*	1999 Stock Option Plan
10.2*	2008 Stock Incentive Plan
10.3	2011 Stock Incentive Plan
10.4	Form of Incentive Stock Option Agreement under 2011 Stock Incentive Plan
10.5	Form of Non-Qualified Stock Option Agreement under 2011 Stock Incentive Plan
10.6*	Amended and Restated Employment Agreement, dated as of August 16, 2011, by and between the Registrant and Fazal R. Khan
10.7*	Amended and Restated Employment Agreement, dated as of August 16, 2011, by and between the Registrant and Robert J. Mulroy
10.8*	Amended and Restated Employment Agreement, dated as of August 16, 2011, by and between the Registrant and Ulrik B. Nielsen
10.9*	Amended and Restated Employment Agreement, dated as of August 16, 2011, by and between the Registrant and Clet M. Niyikiza
10.10*	Amended and Restated Employment Agreement, dated as of August 16, 2011, by and between the Registrant and Edward J. Stewart
10.11*	Amended and Restated Employment Agreement, dated as of August 16, 2011, by and between the Registrant and William A. Sullivan
10.12*	Form of Indemnification Agreement between the Registrant and each director and executive officer

Exhibit number	Description of exhibit
10.13*	Indenture of Lease, dated as of May 16, 2006, by and between the Registrant and RB Kendall Fee, LLC, as amended on March 23, 2007, July 1, 2007, April 1, 2008, November 17, 2008, July 6, 2009, January 27, 2010, June 29, 2010 and March 31, 2011
10.14*	Sublease, dated as of August 20, 2010, by and between Silver Creek Pharmaceuticals, Inc. and FibroGen, Inc., as amended on January 20, 2011, May 4, 2011, May 26, 2011 and August 1, 2011
10.15*†	Patent License Agreement, dated as of February 20, 2008, by and between the Registrant and the United States Public Health Service
10.16*†	License Agreement, dated as of September 26, 2005, by and between the Registrant (as successor-in-interest to Hermes BioSciences, Inc.) and Merrimack Pharmaceuticals (Bermuda) Ltd. (as assignee from PharmaEngine, Inc.), as amended on June 30, 2011
10.17*†	Assignment, Sublicense and Collaboration Agreement, dated as of May 5, 2011, by and between Merrimack Pharmaceuticals (Bermuda) Ltd. and PharmaEngine, Inc.
10.18*†	License and Collaboration Agreement, dated as of September 30, 2009, by and between the Registrant and Sanofi, as amended on February 18, 2011
10.19*†	Commercial License Agreement, dated as of June 6, 2008, by and between the Registrant and Selexis SA, as amended on January 8, 2010
10.20*†	Exclusive License Agreement, dated as of November 1, 2000, by and between the Registrant (as successor-in-interest to Hermes BioSciences, Inc.) and The Regents of the University of California, as amended on October 6, 2003, September 13, 2006, June 6, 2007 and September 28, 2007
10.21*†	Exclusive License Agreement, dated as of March 16, 2005, by and between the Registrant and The Regents of the University of California, as amended on November 17, 2009
10.22*†	Collaboration Agreement, dated as of November 16, 2009, by and between the Registrant and Adimab LLC, as amended on April 27, 2010, June 2, 2010 and October 11, 2011
10.23*†	Sublicense Agreement, dated as of June 30, 2008, by and between the Registrant and Dyax Corp.
10.24*†	Amended and Restated Collaboration Agreement, dated as of January 24, 2007, by and between the Registrant and Dyax Corp., as amended on July 31, 2008 and November 6, 2009
10.25*	Non-Employee Director Compensation and Reimbursement Policy
10.26	Employment Agreement, dated as of September 30, 2011, by and between the Registrant and William M. McClements
21.1*	Subsidiaries of the Registrant
23.1	Consent of PricewaterhouseCoopers LLP, an independent registered public accounting firm
23.2	Consent of Wilmer Cutler Pickering Hale and Dorr LLP (included in Exhibit 5.1)
24.1*	Power of Attorney (included on signature page)

* Previously filed.

† Confidential treatment requested as to portions of the exhibit. Confidential materials omitted and filed separately with the Securities and Exchange Commission.

Exhibit 1.1

J.P. MORGAN SECURITIES LLC

MERRIMACK PHARMACEUTICALS, INC.

[·] Shares of Common Stock, par value $0.01 per share

Underwriting Agreement

[·], 2012

J. P. Morgan Securities LLC
As Representative of the
several Underwriters listed
in Schedule 1 hereto
c/o J. P. Morgan Securities LLC
383 Madison Avenue
New York, New York 10179

Ladies and Gentlemen:

Merrimack Pharmaceuticals, Inc., a Delaware corporation (the "Company"), proposes to issue and sell to the several Underwriters listed in Schedule 1 hereto (the "Underwriters"), for whom you are acting as representative (the "Representative"), an aggregate of [·] shares of Common Stock, par value $0.01 per share, of the Company (the "Underwritten Shares") and, at the option of the Underwriters, up to an additional [·] shares of Common Stock, par value $0.01 per share, of the Company (the "Option Shares"). The Underwritten Shares and the Option Shares are herein referred to as the "Shares". The shares of Common Stock, par value $0.01 per share, of the Company to be outstanding after giving effect to the sale of the Shares are referred to herein as the "Stock".

The Company hereby confirms its agreement with the several Underwriters concerning the purchase and sale of the Shares, as follows:

1. Registration Statement. The Company has prepared and filed with the Securities and Exchange Commission (the "Commission") under the Securities Act of 1933, as amended, and the rules and regulations of the Commission thereunder (collectively, the "Securities Act"), a registration statement (File No. 333-175427), including a prospectus, relating to the Shares. Such registration statement, as amended at the time it became effective, including the information, if any, deemed pursuant to Rule 430A, 430B or 430C under the Securities Act to be part of the registration statement at the time of its effectiveness ("Rule 430 Information"), is referred to herein as the "Registration Statement"; and as used herein, the term "Preliminary Prospectus" means each prospectus included in such registration statement (and any amendments thereto) before effectiveness, any prospectus filed with the Commission pursuant to Rule 424(a) under the Securities Act and the prospectus included in the Registration Statement at the time of its effectiveness that omits Rule 430 Information, and the term "Prospectus" means the prospectus in the form first used (or made available upon request of purchasers pursuant to Rule 173 under the Securities Act) in connection with confirmation of sales of the Shares. If the Company has filed an abbreviated registration statement pursuant to Rule 462(b) under the Securities Act (the "Rule 462 Registration Statement"), then any reference herein to the term "Registration Statement" shall be deemed to include such Rule 462 Registration Statement. Capitalized terms used but not defined herein shall have the meanings given to such terms in the Registration Statement and the Prospectus.

At or prior to the Applicable Time (as defined below), the Company had prepared the following information (collectively with the pricing information set forth on Annex B, the "Pricing Disclosure Package"): a Preliminary Prospectus dated [·], 2012 and each "free-writing prospectus" (as defined pursuant to Rule 405 under the Securities Act) listed on Annex B hereto.

"Applicable Time" means [·] [A/P].M., New York City time, on [·], 2012.

2. Purchase of the Shares by the Underwriters.

(a) The Company agrees to issue and sell the Underwritten Shares to the several Underwriters as provided in this Agreement, and each Underwriter, on the basis of the representations, warranties and agreements set forth herein and subject to the conditions set forth herein, agrees, severally and not jointly, to purchase from the Company the respective number of Underwritten Shares set forth opposite such Underwriter's name in Schedule 1 hereto at a price per share (the "Purchase Price") of $[·].

In addition, the Company agrees to issue and sell the Option Shares to the several Underwriters as provided in this Agreement, and the Underwriters, on the basis of the representations, warranties and agreements set forth herein and subject to the conditions set forth herein, shall have the option to purchase, severally and not jointly, from the Company the Option Shares at the Purchase Price less an amount per share equal to any dividends or distributions declared by the Company and payable on the Underwritten Shares but not payable on the Option Shares.

If any Option Shares are to be purchased, the number of Option Shares to be purchased by each Underwriter shall be the number of Option Shares which bears the same ratio to the aggregate number of Option Shares being purchased as the number of Underwritten Shares set forth opposite the name of such Underwriter in Schedule 1 hereto (or such number increased as set forth in Section 10 hereof) bears to the aggregate number of Underwritten Shares being purchased from the Company by the several Underwriters, subject, however, to such adjustments to eliminate any fractional Shares as the Representative in its sole discretion shall make.

The Underwriters may exercise the option to purchase Option Shares at any time in whole, or from time to time in part, on or before the thirtieth day following the date of the Prospectus, by written notice from the Representative to the Company. Such notice shall set forth the aggregate number of Option Shares as to which the option is being exercised and the date and time when the Option Shares are to be delivered and paid for, which may be the same date and time as the Closing Date (as hereinafter defined) but shall not be earlier than the Closing Date or later than the tenth full business day (as hereinafter

defined) after the date of such notice (unless such time and date are postponed in accordance with the provisions of Section 10 hereof). Any such notice shall be given at least two business days prior to the date and time of delivery specified therein.

(b) The Company understands that the Underwriters intend to make a public offering of the Shares as soon after the effectiveness of this Agreement as in the judgment of the Representative is advisable, and initially to offer the Shares on the terms set forth in the Prospectus. The Company acknowledges and agrees that the Underwriters may offer and sell Shares to or through any affiliate of an Underwriter.

(c) Payment for the Shares shall be made by wire transfer in immediately available funds to the account specified by the Company to the Representative in the case of the Underwritten Shares, at the offices of Davis Polk & Wardwell LLP, 450 Lexington Avenue, New York, New York 10017, at 10:00 A.M., New York City time, on [·], 2012, or at such other time or place on the same or such other date, not later than the fifth business day thereafter, as the Representative and the Company may agree upon in

writing or, in the case of the Option Shares, on the date and at the time and place specified by the Representative in the written notice of the Underwriters' election to purchase such Option Shares. The time and date of such payment for the Underwritten Shares is referred to herein as the "Closing Date", and the time and date for such payment for the Option Shares, if other than the Closing Date, is herein referred to as the "Additional Closing Date".

Payment for the Shares to be purchased on the Closing Date or the Additional Closing Date, as the case may be, shall be made against delivery to the Representative for the respective accounts of the several Underwriters of the Shares to be purchased on such date or the Additional Closing Date, as the case may be, with any transfer taxes payable in connection with the sale of such Shares duly paid by the Company. Delivery of the Shares shall be made through the facilities of The Depository Trust Company ("DTC") unless the Representative shall otherwise instruct. The certificates for the Shares will be made available for inspection and packaging by the Representative at the office of DTC or its designated custodian not later than 1:00 P.M., New York City time, on the business day prior to the Closing Date or the Additional Closing Date, as the case may be.

(d) [*Reserved*].

(e) The Company acknowledges and agrees that the Underwriters are acting solely in the capacity of an arm's length contractual counterparty to the Company with respect to the offering of Shares contemplated hereby (including in connection with determining the terms of the offering) and not as a financial advisor or a fiduciary to, or an agent of, the Company or any other person. Additionally, neither the Representative nor any other Underwriter is advising the Company or any other person as to any legal, tax, investment, accounting or regulatory matters in any jurisdiction. The Company shall consult with its own advisors concerning such matters and shall be responsible for making its own independent investigation and appraisal of the transactions contemplated hereby, and the Underwriters shall have no responsibility or liability to the Company with respect thereto. Any review by the Underwriters of the Company, the transactions contemplated hereby or other matters relating to such transactions will be performed solely for the benefit of the Underwriters and shall not be on behalf of the Company.

3. Representations and Warranties of the Company. The Company represents and warrants to each Underwriter that:

(a) *Preliminary Prospectus.* No order preventing or suspending the use of any Preliminary Prospectus has been issued by the Commission, and each Preliminary Prospectus included in the Pricing Disclosure Package, at the time of filing thereof, complied in all material respects with the Securities Act, and no Preliminary Prospectus, at the time of filing thereof, contained any untrue statement of a material fact or omitted to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading; provided that the Company makes no representation and warranty with respect to any statements or omissions made in reliance upon and in conformity with information relating to any Underwriter furnished to the Company in writing by such Underwriter through the Representative expressly for use in any Preliminary Prospectus, it being understood and agreed that the only such information furnished by any Underwriter consists of the information described as such in Section 7(b) hereof.

(b) *Pricing Disclosure Package*. The Pricing Disclosure Package as of the Applicable Time did not, and as of the Closing Date and as of the Additional Closing Date, as the case may be, will not, contain any untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances under

which they were made, not misleading; provided that the Company makes no representation and warranty with respect to any statements or omissions made in reliance upon and in conformity with information relating to any Underwriter furnished to the Company in writing by such Underwriter through the Representative expressly for use in such Pricing Disclosure Package, it being understood and agreed that the only such information furnished by any Underwriter consists of the information described as such in Section 7(b) hereof.

(c) *Issuer Free Writing Prospectus.* Other than the Registration Statement, the Preliminary Prospectus and the Prospectus, the Company (including its agents and representatives, other than the Underwriters in their capacity as such) has not prepared, used, authorized, approved or referred to and will not prepare, use, authorize, approve or refer to any "written communication" (as defined in Rule 405 under the Securities Act) that constitutes an offer to sell or solicitation of an offer to buy the Shares (each such communication by the Company or its agents and representatives (other than a communication referred to in clause (i) below) an "Issuer Free Writing Prospectus") other than (i) any document not constituting a prospectus pursuant to Section 2(a)(10)(a) of the Securities Act or Rule 134 under the Securities Act or (ii) the documents listed on Annex B hereto, each electronic road show and any other written communications approved in writing in advance by the Representative. Each such Issuer Free Writing Prospectus complied in all material respects with the Securities Act, has been or will be (within the time period specified in Rule 433) filed in accordance with the Securities Act (to the extent required thereby) and, when taken together with the Preliminary Prospectus accompanying, or delivered prior to delivery of, such Issuer Free Writing Prospectus, did not, and as of the Closing Date and as of the Additional Closing Date, as the case may be, will not, contain any untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading; provided that the Company makes no representation and warranty with respect to any statements or omissions made in each such Issuer Free Writing Prospectus or Preliminary Prospectus in reliance upon and in conformity with information relating to any Underwriter furnished to the Company in writing by such Underwriter through

the Representative expressly for use in such Issuer Free Writing Prospectus or Preliminary Prospectus, it being understood and agreed that the only such information furnished by any Underwriter consists of the information described as such in Section 7(b) hereof.

(d) *Registration Statement and Prospectus.* The Registration Statement has been declared effective by the Commission. No order suspending the effectiveness of the Registration Statement has been issued by the Commission, and, to the knowledge of the Company, no proceeding for that purpose or pursuant to Section 8A of the Securities Act against the Company or related to the offering of the Shares has been initiated or threatened by the Commission; as of the applicable effective date of the Registration Statement and any post-effective amendment thereto, the Registration Statement and any such post-effective amendment complied and will comply in all material respects with the Securities Act, and did not and will not contain any untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary in order to make the statements therein not misleading; and as of the date of the Prospectus and any amendment or supplement thereto and as of the Closing Date and as of the Additional Closing Date, as the case may be, the Prospectus will not contain any untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading; provided that the Company makes no representation and warranty with respect to any statements or omissions made in reliance upon and in conformity with information relating to any Underwriter furnished to the Company in writing by such Underwriter through the Representative expressly for use in the Registration Statement and the Prospectus and any amendment or supplement thereto, it being

understood and agreed that the only such information furnished by any Underwriter consists of the information described as such in Section 7(b) hereof.

(e) *[Reserved]*.

(f) *Financial Statements.* The financial statements (including the related notes thereto) of the Company and its consolidated subsidiaries included in the Registration Statement, the Pricing Disclosure Package and the Prospectus comply in all material respects with the applicable requirements of the Securities Act and present fairly the financial position of the Company and its consolidated subsidiaries as of the dates indicated and the results of their operations and the changes in their cash flows for the periods specified; such financial statements have been prepared in conformity with generally accepted accounting principles in the United States applied on a consistent basis throughout the periods covered thereby, except as otherwise disclosed therein and, in the case of unaudited, interim financial statements, subject to normal year-end audit adjustments and the exclusion of certain footnotes, and any supporting schedules included in the Registration Statement present fairly the information required to be stated therein; and the other financial information included in the Registration Statement, the Pricing Disclosure Package and the Prospectus has been derived from the accounting records of the Company and its consolidated subsidiaries and presents fairly the information shown thereby.

(g) *No Material Adverse Change.* Since the date of the most recent financial statements of the Company included in the Registration Statement, the Pricing Disclosure Package and the Prospectus, (i) there has not been any material change in the capital stock (other than the issuance of shares of Common Stock upon exercise of stock options and warrants described as outstanding in, and the grant of options and awards under existing equity incentive plans described in, the Registration Statement, the Pricing Disclosure Package and the Prospectus), short-term debt or long-term debt of the Company or any of its subsidiaries, or any dividend or distribution of any kind declared, set aside for payment, paid or made by the Company on any class of capital stock, or any material adverse change, or any development that would reasonably be expected to result in a material adverse change, in or affecting the business, properties, management, financial position, stockholders' equity, results of operations or prospects of the Company and its subsidiaries taken as a whole; (ii) neither the Company nor any of its subsidiaries has entered into any transaction or agreement (whether or not in the ordinary course of business) that is material to the Company and its subsidiaries taken as a whole or incurred any liability or obligation, direct or contingent, that is material to the Company and its subsidiaries taken as a whole; and (iii) neither the Company nor any of its subsidiaries has sustained any loss or interference with its business that is material to the Company and its subsidiaries taken as a whole and that is either from fire, explosion, flood or other calamity, whether or not covered by insurance, or from any labor disturbance or dispute or any action, order or decree of any court or arbitrator or governmental or regulatory authority, except in each case as otherwise disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus.

(h) *Organization and Good Standing.* The Company and each of its subsidiaries have been duly organized and are validly existing and in good standing under the laws of their respective jurisdictions of organization, are duly qualified to do business and are in good standing in each jurisdiction in which their respective ownership or lease of property or the conduct of their respective businesses requires such qualification, and have all power and authority necessary to own or hold their respective properties and to conduct the businesses in which they are engaged, except where the failure to be so qualified or in good standing or have such power or authority would not, individually or in the aggregate, have a material adverse effect on the

business, properties, management, financial position, stockholders' equity, results of operations or prospects of the Company and its subsidiaries taken as a whole or on the performance by the Company of its obligations under this Agreement (a "Material Adverse Effect"). The Company does not own or control, directly or indirectly, any corporation, association or other entity other than the subsidiaries listed in Exhibit 21 to the Registration Statement.

(i) *Capitalization.* The Company has an authorized capitalization as set forth in the Registration Statement, the Pricing Disclosure Package and the Prospectus under the heading "Capitalization"; all the outstanding shares of capital stock of the Company have been duly and validly authorized and issued and are fully paid and non-assessable and are not subject to any pre-emptive or similar rights; except as described in or expressly contemplated by the Pricing Disclosure Package and the Prospectus, there are no outstanding rights (including, without limitation, pre-emptive rights), warrants or options to acquire, or instruments convertible into or exchangeable for, any shares of capital stock or other equity interest in the Company or any of its subsidiaries, or any contract, commitment, agreement, understanding or arrangement of any kind relating to the issuance of any capital stock of the Company or any such subsidiary, any such convertible or exchangeable securities or any such rights, warrants or options; the capital stock of the Company conforms in all material respects to the description thereof contained in the Registration Statement, the Pricing Disclosure Package and the Prospectus; and all the outstanding shares of capital stock or other equity interests of each subsidiary owned,

directly or indirectly, by the Company have been duly and validly authorized and issued, are fully paid and non-assessable (except, in the case of any foreign subsidiary, for directors' qualifying shares) and are owned directly or indirectly by the Company, free and clear of any lien, charge, encumbrance, security interest, restriction on voting or transfer or any other claim of any third party.

(j) *Stock Options.* With respect to the stock options (the "Stock Options") granted pursuant to the stock-based compensation plans of the Company and its subsidiaries (the "Company Stock Plans"), (i) to the knowledge of the Company, each Stock Option intended to qualify as an "incentive stock option" under Section 422 of the Code so qualifies, (ii) each grant of a Stock Option was duly authorized no later than the date on which the grant of such Stock Option was by its terms to be effective (the "Grant Date") by all necessary corporate action, including, as applicable, approval by the board of directors of the Company (or a duly constituted and authorized committee thereof) and any required stockholder approval by the necessary number of votes or written consents, and, to the knowledge of the Company (other than with respect to due execution and delivery by the Company), the award agreement governing such grant (if any) was duly executed and delivered by each party thereto, (iii) each such grant was made in accordance with the terms of the Company Stock Plans, and (iv) each such grant was properly accounted for in accordance with generally accepted accounting principles in the United States ("GAAP") in the financial statements (including the related notes) of the Company.

(k) *Due Authorization.* The Company has full right, power and authority to execute and deliver this Agreement and to perform its obligations hereunder; and all action required to be taken for the due and proper authorization, execution and delivery by it of this Agreement and the consummation by it of the transactions contemplated hereby has been duly and validly taken.

(l) *Underwriting Agreement.* This Agreement has been duly authorized, executed and delivered by the Company.

(m) *The Shares.* The Shares to be issued and sold by the Company hereunder have been duly authorized and, when issued and delivered and paid for as provided herein, will be duly and validly issued, will be fully paid and nonassessable and will conform in all material respects

to the descriptions thereof in the Registration Statement, the Pricing Disclosure Package and the Prospectus; and the issuance of the Shares is not subject to any preemptive or similar rights that have not been validly waived.

(n) [*Reserved*].

(o) *Descriptions of the Underwriting Agreement.* This Agreement conforms in all material respects to the description thereof contained in the Registration Statement, the Pricing Disclosure Package and the Prospectus.

(p) *No Violation or Default.* Neither the Company nor any of its subsidiaries is (i) in violation of its charter or by-laws or similar organizational documents; (ii) in default, and no event has occurred that, with notice or lapse of time or both, would constitute such a default, in the due performance or observance of any term, covenant or condition contained in any indenture, mortgage, deed of trust, loan agreement or other agreement or instrument to which the Company or any of its subsidiaries is a party or by which the Company or any of its subsidiaries is bound or to which any of the property or assets of the Company or any of its subsidiaries is subject; or (iii) in violation of any law or statute or any judgment, order, rule or regulation of any court or arbitrator or governmental or regulatory authority having jurisdiction over the Company or any of its subsidiaries, except, in the case of clauses (ii) and (iii) above, for any such default or violation that would not, individually or in the aggregate, have a Material Adverse Effect.

(q) *No Conflicts.* The execution, delivery and performance by the Company of this Agreement, the issuance and sale of the Shares and the consummation of the transactions contemplated by this Agreement will not (i) conflict with or result in a breach or violation of any of the terms or provisions of, or constitute a default under, or result in the creation or imposition of any lien, charge or encumbrance upon any property or assets of the Company or any of its subsidiaries pursuant to, any indenture, mortgage, deed of trust, loan agreement or other agreement or instrument to which the Company or any of its subsidiaries is a party or by which the Company or any of its subsidiaries is bound or to which any of the property or assets of the Company or any of its subsidiaries is subject, (ii) result in any violation of the provisions of the charter or by-laws or similar organizational documents of the Company or any of its subsidiaries or (iii) result in the violation of any law or statute or any judgment, order, rule or regulation of any court or arbitrator or governmental or regulatory authority having jurisdiction over the Company or any of its subsidiaries, except, in the case of clauses (i) and (iii) above, for any such conflict, breach, violation or default that would not, individually or in the aggregate, have a Material Adverse Effect.

(r) *No Consents Required.* No consent, approval, authorization, order, license, registration or qualification of or with any court or arbitrator or governmental or regulatory authority is required for the execution, delivery and performance by the Company of the Agreement, the issuance and sale of the Shares and the consummation of the transactions contemplated by this Agreement, except for the registration of the Shares under the Securities Act and such consents, approvals, authorizations, orders and registrations or qualifications as have already been obtained or made or as may be required by the Financial Industry Regulatory Authority, Inc. ("FINRA") or the Nasdaq Global Market (the "Nasdaq Market") or under applicable state securities laws in connection with the purchase and distribution of the Shares by the Underwriters.

(s) *Legal Proceedings.* Except as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, there are no legal, governmental or regulatory

investigations, actions, suits or proceedings pending to which the Company or any of its subsidiaries is a party or to which any property of the Company or any of its subsidiaries is subject that, individually or in the aggregate, would reasonably be expected to have a Material Adverse Effect; to the knowledge of the Company, no such investigations, actions, suits or proceedings are threatened or contemplated by any governmental or regulatory authority or threatened by others; and (i) there are no current or pending legal, governmental or regulatory actions, suits or proceedings that are required under the Securities Act to be described in the Registration Statement, the Pricing Disclosure Package or the Prospectus that are not so described in the Registration Statement, the Pricing Disclosure Package and the Prospectus and (ii) there are no statutes, regulations or contracts

or other documents that are required under the Securities Act to be filed as exhibits to the Registration Statement or described in the Registration Statement, the Pricing Disclosure Package or the Prospectus that are not so filed as exhibits to the Registration Statement or described in the Registration Statement, the Pricing Disclosure Package and the Prospectus.

(t) *Independent Accountants*. PricewaterhouseCoopers LLP, who have certified certain financial statements of the Company and its subsidiaries, is an independent registered public accounting firm with respect to the Company and its subsidiaries within the applicable rules and regulations adopted by the Commission and the Public Company Accounting Oversight Board (United States) and as required by the Securities Act.

(u) *Title to Real and Personal Property*. Except as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, the Company and its subsidiaries have good title in fee simple (in the case of real property) to, or have valid rights to lease or otherwise use, all items of real and personal property and assets that are material to the business of the Company and its subsidiaries taken as a whole, in each case free and clear of all liens, encumbrances, claims and defects and imperfections of title except those that (i) do not materially interfere with the use made and proposed to be made of such property by the Company and its subsidiaries or (ii) would not reasonably be expected, individually or in the aggregate, to have a Material Adverse Effect.

(v) *Title to Intellectual Property*. Except as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, the Company and its subsidiaries own or possess adequate rights to all patents, patent applications, trademarks, service marks, trade names, trademark registrations and applications, service mark registrations and applications, domain names, goodwill associated with the foregoing, copyrights, licenses and know-how (including trade secrets and other unpatented and/or unpatentable proprietary or confidential information, systems or procedures) necessary for the conduct of their respective businesses in all material respects as currently conducted and as proposed to be conducted, and, to the knowledge of the Company, the conduct of their respective businesses does not and will not infringe, constitute a misappropriation of, or otherwise violate in any material respect any such rights of others. The Company and its subsidiaries have not received any written notice of any claim of infringement, misappropriation or other violation of any such rights of others or any written notice challenging the validity, scope or enforceability of their respective patents or rights therein, in each case, which could reasonably be expected to result in a Material Adverse Effect. The Company is not aware of any specific facts or combination of facts that cause the Company to reasonably conclude that any of the material issued or granted patents owned by or licensed to the Company or any of its subsidiaries is invalid or unenforceable and, to the knowledge of the Company, all such issued or granted patents are valid and enforceable.

(w) *No Undisclosed Relationships*. No relationship, direct or indirect, exists between or among the Company or any of its subsidiaries, on the one hand, and the directors, officers, stockholders, customers or suppliers of the Company or any of its subsidiaries, on the other, that is required by the Securities Act to be described in the Registration Statement and the Prospectus and that is not so described in such documents and in the Pricing Disclosure Package.

(x) *Investment Company Act*. The Company is not and, after giving effect to the offering and sale of the Shares and the application of the proceeds thereof as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, will not be required to register as an "investment company" or an entity "controlled" by an "investment company" within the meaning of the Investment Company Act of 1940, as amended, and the rules and regulations of the Commission thereunder (collectively, the "Investment Company Act").

(y) *Taxes.* The Company and its subsidiaries have filed all federal, state, local and foreign tax returns required to be filed through the date hereof and all such returns are true and complete in all material respects. The Company and its subsidiaries have paid all taxes shown as due on such returns, except for taxes being contested in good faith and for which adequate reserves have been taken, and except as would not, individually or in the aggregate, have a Material Adverse Effect. Except as otherwise disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus, there is no tax deficiency that has been, or would reasonably be expected to be, asserted against the Company or any of its subsidiaries or any of their respective properties or assets, in each case, except as would not have a Material Adverse Effect.

(z) *Licenses and Permits.* The Company and its subsidiaries possess all licenses, certificates, permits and other authorizations issued by, and have made all declarations and filings with, the appropriate federal, state, local or foreign governmental or regulatory authorities that are necessary for the ownership or lease of their respective properties or the conduct of their respective businesses as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, except where the failure to possess or make the same would not, individually or in the aggregate, have a Material Adverse Effect; and except as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, neither the Company nor any of its subsidiaries has received notice of any revocation or modification of any such license, certificate, permit or authorization or has any reason to believe that any such license, certificate, permit or authorization will not be renewed in the ordinary course. Except as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, as applicable, the Company and its subsidiaries (i) are, and at all times have been, in compliance with all statutes, rules and regulations applicable to the ownership, testing, development, manufacture, packaging, processing, use, distribution, storage, import, export or disposal of any product manufactured or distributed by the Company or its subsidiaries ("Applicable Laws"), except where such noncompliance would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect; and (ii) have not received any U.S. Food and Drug Administration ("FDA") Form 483, written notice of adverse finding, warning letter, untitled letter or other correspondence or written notice from any court or arbitrator or governmental or regulatory authority alleging or asserting non-compliance with (x) any Applicable Laws or (y) any licenses, exemptions, certificates, approvals, clearances, authorizations, permits and supplements or amendments thereto required by any such Applicable Laws.

(aa) *No Labor Disputes.* No labor disturbance by or dispute with employees of the Company or any of its subsidiaries exists or, to the knowledge of the Company, is contemplated or threatened, and the Company is not aware of any existing or imminent labor disturbance by, or

dispute with, the employees of any of its or its subsidiaries' principal suppliers, contractors or customers, except as would not have a Material Adverse Effect.

(bb) *Compliance with and Liability under Environmental Laws.* (i) The Company and its subsidiaries (a) are, and at all prior times were, in compliance with any and all applicable federal, state, local and foreign laws, rules, regulations, requirements, decisions, judgments, decrees, orders and the common law relating to pollution or the protection of the environment, natural resources or human health or safety, including those relating to the generation, storage, treatment, use, handling, transportation, Release or threat of Release of Hazardous Materials (collectively, "Environmental Laws"), (b) have received and are in compliance with all permits, licenses, certificates or other authorizations or approvals required of them under applicable Environmental Laws to conduct their respective businesses, (c) have not received notice of any actual or potential liability under or relating to, or actual or potential violation of, any Environmental Laws, including for the investigation or remediation of any Release or threat of Release of Hazardous Materials, and have no knowledge of any event or condition that would reasonably be expected to result in any such notice, (d) are not conducting or paying for, in whole or in part, any investigation, remediation or other corrective action pursuant to any Environmental Law at any location, and (e) are not a party to any order, decree or agreement that imposes any obligation or liability under any Environmental Law, and (ii) there are no costs or liabilities associated with Environmental Laws of or relating to the Company or its subsidiaries, except in the case of each of (i) and (ii) above, for any such matter, as would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect; and (iii) except as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, (a) there are no proceedings that are pending, or, to the knowledge of the Company, contemplated, against the Company or any of its subsidiaries under any Environmental Laws in which a governmental entity is also a party, other than such proceedings regarding which it is reasonably believed no monetary sanctions of $100,000 or more will be imposed, (b) the Company and its subsidiaries are not aware of any facts or issues regarding compliance with Environmental Laws, or liabilities or other obligations under Environmental Laws, including the Release or threat of Release of Hazardous Materials, that would reasonably be expected to have a material effect on the capital expenditures, earnings or competitive position of the Company and its subsidiaries, and (c) none of the Company and its subsidiaries anticipates material capital expenditures relating to any Environmental Laws.

(cc) *Hazardous Materials*. There has been no storage, generation, transportation, use, handling, treatment, Release or threat of Release of Hazardous Materials by, relating to or caused by the Company or any of its subsidiaries (or, to the knowledge of the Company and its subsidiaries, any other entity (including any predecessor) for whose acts or omissions the Company or any of its subsidiaries is or would reasonably be expected to be liable) at, on, under or from any property or facility now or previously owned, operated or leased by the Company or any of its subsidiaries, or at, on, under or from any other property or facility, in violation of any Environmental Laws or in a manner or amount or to a location that would reasonably be expected to result in any liability under any Environmental Law, except for any violation or liability which would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect. "Hazardous Materials" means any material, chemical, substance ,waste, pollutant, contaminant, compound, mixture, or constituent thereof, in any form or amount, including petroleum (including crude oil or any fraction thereof) and petroleum products, natural gas liquids, asbestos and asbestos containing materials, naturally occurring radioactive materials, brine, and drilling mud, regulated or which can give rise to liability under any Environmental Law. "Release" means any spilling, leaking, seepage, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, disposing, depositing, dispersing, or

migrating in, into or through the environment, or in, into from or through any building or structure.

(dd) *Compliance with ERISA.* (i) Each employee benefit plan, within the meaning of Section 3(3) of the Employee Retirement Income Security Act of 1974, as amended ("ERISA"), for which the Company or any member of its "Controlled Group" (defined as any organization which is a member of a controlled group of corporations within the meaning of Section 414 of the Internal Revenue Code of 1986, as amended (the "Code")) would have any liability (each, a "Plan") has been maintained in compliance with its terms and the requirements of any applicable statutes, orders, rules and regulations, including but not limited to ERISA and the Code, except for noncompliance that would not reasonably be expected to result in material liability to the Company or its subsidiaries; (ii) no prohibited transaction, within the meaning of Section 406 of ERISA or Section 4975 of the Code, has occurred with respect to any Plan excluding transactions effected pursuant to a statutory or administrative exemption that would reasonably be expected to result in a material liability to the Company or its subsidiaries; (iii) for each Plan that is subject to the funding rules of Section 412 of the Code or Section 302 of ERISA, the minimum funding standard of Section 412 of the Code or Section 302 of ERISA, as applicable, has been satisfied (without taking into account any waiver thereof or extension of any amortization period) and is reasonably expected to be satisfied in the future (without taking into account any waiver thereof or extension of any amortization period); (iv) the fair market value of the assets of each Plan that is required to be funded exceeds the present value of all benefits accrued under such Plan (determined based on those assumptions used to fund such Plan); (v) no "reportable event" (within the meaning of Section 4043(c) of ERISA) has occurred or is reasonably expected to occur that either has resulted, or would reasonably be expected to result, in material liability to the Company or its subsidiaries; (vi) neither the Company nor any member of the Controlled Group has incurred, nor reasonably expects to incur, any liability under Title IV of ERISA (other than contributions to the Plan or premiums to the PBGC, in the ordinary course and without default) in respect of a Plan (including a "multiemployer plan", within the meaning of Section 4001(a)(3) of ERISA); and (vii) there is no pending audit or investigation by the Internal Revenue Service, the U.S. Department of Labor, the Pension Benefit Guaranty Corporation or any other governmental agency or any foreign regulatory agency with respect to any Plan that would reasonably be expected to result in material liability to the Company or its subsidiaries. None of the following events has occurred or is reasonably likely to occur: (x) a material increase in the aggregate amount of contributions required to be made to all Plans by the Company or its subsidiaries in the current fiscal year of the Company and its subsidiaries compared to the amount of such contributions made in the Company and its subsidiaries' most recently completed fiscal year, other than an increase solely attributable to (A) an increase in the number of employees covered by such Plans or (B) an increase arising from the renewal in the ordinary course of business of contracts with vendors, insurers, plan administrators or other similar service providers under which the benefits of the Plans are provided; or (y) a material increase in the Company and its subsidiaries' "accumulated post-retirement benefit obligations" (within the meaning of Statement of Financial Accounting Standards 106) compared to the amount of such obligations in the Company and its subsidiaries' most recently completed fiscal year.

(ee) *Disclosure Controls*. The Company and its subsidiaries have established an effective system of "disclosure controls and procedures" (as defined in Rule 13a-15(e) of the Securities Exchange Act of 1934, as amended, and the rules and regulations of the Commission thereunder (collectively, the "Exchange Act")) that complies with the requirements of the Exchange Act and that has been designed to ensure that information required to be disclosed by the Company in reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the Commission's rules and forms,

including controls and procedures designed to ensure that such information is accumulated and communicated to the Company's management as appropriate to allow timely decisions regarding required disclosure.

(ff) *Accounting Controls.* The Company and its subsidiaries have established systems of "internal control over financial reporting" (as defined in Rule 13a-15(f) of the Exchange Act) that have been designed by, or under the supervision of, their respective principal executive and principal financial officers, or persons performing similar functions, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles, including, but not limited to, internal accounting controls sufficient to provide reasonable assurance that (i) transactions are executed in accordance with management's general or specific authorizations; (ii) transactions are recorded as necessary to permit preparation of financial statements in conformity with generally accepted accounting principles and to maintain asset accountability; (iii) access to assets is permitted only in accordance with management's general or specific authorization; and (iv) the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action is taken with respect to any differences. Except as disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus, there are no material weaknesses in the Company's internal controls. The Company's auditors and the Audit Committee of the Board of Directors of the Company have been advised of: (i) all significant deficiencies and material weaknesses in the design or operation of internal controls over financial reporting which have adversely affected or are reasonably likely to adversely affect the Company's ability to record, process, summarize and report financial information; and (ii) any fraud, whether or not material, that involves management or other employees who have a significant role in the Company's internal controls over financial reporting.

(gg) *Insurance.* Except as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, the Company and its subsidiaries have insurance covering their respective properties, operations, personnel and businesses, including business interruption insurance, which insurance is in amounts and insures against such losses and risks as the Company reasonably believes are adequate to protect the Company and its subsidiaries and their respective businesses; and neither the Company nor any of its subsidiaries has (i) received notice from any insurer or agent of such insurer that material capital improvements or other expenditures are required or necessary to be made in order to continue such insurance or (ii) any reason to believe that it will not be able to renew its existing insurance coverage as and when such coverage expires or to obtain similar coverage at reasonable cost from similar insurers as may be necessary to continue its business.

(hh) *No Unlawful Payments.* Neither the Company nor any of its subsidiaries nor, to the knowledge of the Company, any director, officer, agent, employee or other person associated with or acting on behalf of the Company or any of its subsidiaries has (i) used any corporate funds for any unlawful contribution, gift, entertainment or other unlawful expense relating to political activity; (ii) made any direct or indirect unlawful payment to any foreign or domestic government official or employee from corporate funds; (iii) violated or is in violation of any provision of the Foreign Corrupt Practices Act of 1977; or (iv) made any bribe, rebate, payoff, influence payment, kickback or other unlawful payment.

(ii) *Compliance with Money Laundering Laws*. The operations of the Company and its subsidiaries are and have been conducted at all times in compliance with applicable financial recordkeeping and reporting requirements of the Currency and Foreign Transactions Reporting

Act of 1970, as amended, the money laundering statutes of all jurisdictions, the rules and regulations thereunder and any related or similar rules, regulations or guidelines, issued, administered or enforced by any governmental agency (collectively, the "Money Laundering Laws") and no action, suit or proceeding by or before any court or governmental agency, authority or body or any arbitrator involving the Company or any of its subsidiaries with respect to the Money Laundering Laws is pending or, to the knowledge of the Company, threatened.

(jj) *Compliance with OFAC.* None of the Company, any of its subsidiaries or, to the knowledge of the Company, any director, officer, agent, employee or affiliate of the Company or any of its subsidiaries is currently subject to any U.S. sanctions administered by the Office of Foreign Assets Control of the U.S. Department of the Treasury ("OFAC"); and the Company will not, directly or indirectly, use the proceeds of the offering of the Shares hereunder, or lend, contribute or otherwise make available such proceeds to any subsidiary, joint venture partner or other person or entity, for the purpose of financing the activities of any person currently subject to any U.S. sanctions administered by OFAC.

(kk) *No Restrictions on Subsidiaries*. Except as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, no subsidiary of the Company is currently prohibited, directly or indirectly, under any agreement or other instrument to which it is a party or is subject, from paying any dividends to the Company, from making any other distribution on such subsidiary's capital stock, from repaying to the Company any loans or advances to such subsidiary from the Company or from transferring any of such subsidiary's properties or assets to the Company or any other subsidiary of the Company.

(ll) *No Broker's Fees.* Neither the Company nor any of its subsidiaries is a party to any contract, agreement or understanding with any person (other than this Agreement) that would give rise to a valid claim against the Company or any of its subsidiaries or any Underwriter for a brokerage commission, finder's fee or like payment in connection with the offering and sale of the Shares.

(mm) *No Registration Rights*. Except as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, no person has the right to require the Company or any of its subsidiaries to register any securities for sale under the Securities Act by reason of the filing of the Registration Statement with the Commission or the issuance and sale of the Shares , other than rights that have been validly waived.

(nn) *No Stabilization.* The Company has not taken, directly or indirectly, without giving effect to activities by the Underwriters, any action designed to or that would reasonably be expected to cause or result in any stabilization or manipulation of the price of the Shares.

(oo) [*Reserved*].

(pp) *Margin Rules*. The application of the proceeds received by the Company from the issuance, sale and delivery of the Shares as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus will not violate Regulation T, U or X of the Board of Governors of the Federal Reserve System or any other regulation of such Board of Governors.

(qq) *Forward-Looking Statements.* No forward-looking statement (within the meaning of Section 27A of the Securities Act and Section 21E of the Exchange Act) contained in the Registration Statement, the Pricing Disclosure Package or the Prospectus has been made or reaffirmed without a reasonable basis or has been disclosed other than in good faith.

(rr) *Statistical and Market Data.* Nothing has come to the attention of the Company that has caused the Company to believe that the statistical and market-related data included in the Registration Statement, the Pricing Disclosure Package and the Prospectus is not based on or derived from sources that are reliable and accurate in all material respects.

(ss) *Clinical Trials*. The clinical and pre-clinical trials conducted by or, to the knowledge of the Company after due inquiry, on behalf of or sponsored by the Company or its subsidiaries, or in which the Company or its subsidiaries have participated, that are described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, or the results of which are referred to in the Registration Statement, the Pricing Disclosure Package and the Prospects, as applicable, were, and if still pending are, being conducted in all material respects in accordance with standard medical and scientific research standards and procedures for products or product candidates comparable to those being developed by the Company and all applicable statutes and all applicable rules and regulations of the FDA and comparable regulatory agencies outside of the United States to which they are subject (collectively, the "Regulatory Authorities") and current Good Clinical Practices and Good Laboratory Practices; the descriptions in the Registration Statement, the Pricing Disclosure Package or the Prospectus of the results of such studies and tests are accurate and complete descriptions in all material respects and fairly present the data derived therefrom; the Company has no knowledge of any other trials not described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, the results of which are inconsistent with or call into question the results described or referred to in the Registration Statement, the Pricing Disclosure Package and the Prospectus; the Company and its subsidiaries have operated at all times and are currently in compliance in all material respects with all applicable statutes, rules and regulations of the Regulatory Authorities; neither the Company nor any of its subsidiaries have received any written notices, correspondence or other communications from the Regulatory Authorities or any other governmental agency requiring or threatening the termination, material modification or suspension of any clinical or pre-clinical trials that are described in the Registration Statement, the Pricing Disclosure Package and the Prospectus or the results of which are referred to in the Registration Statement, the Pricing Disclosure Package and the Prospectus, other than ordinary course communications with respect to modifications in connection with the design and implementation of such trials, and, to the Company's best knowledge, there are no reasonable grounds for the same.

(tt) *Regulatory Filings*. The Company has not failed to file with the Regulatory Authorities any required filing, declaration, listing, registration, report or submission with respect to the Company's product candidates that are described or referred to in the Registration Statement, the Pricing Disclosure Package and the Prospectus; all such filings, declarations, listings, registrations, reports or submissions were in material compliance with applicable laws when filed; and no deficiencies regarding compliance with applicable law have been asserted by any applicable regulatory authority with respect to any such filings, declarations, listings, registrations, reports or submissions.

(uu) *Sarbanes-Oxley Act*. There is and has been no material failure on the part of the Company or, to the knowledge of the Company, any of the Company's directors or officers, in their capacities as such, to comply with any applicable provision of the Sarbanes-Oxley Act of 2002 and the rules and regulations promulgated in connection therewith (the "Sarbanes-Oxley Act"), including Section 402 related to loans.

(vv) *Status under the Securities Act*. At the time of filing the Registration Statement and any post-effective amendment thereto, at the earliest time thereafter that the Company or any offering participant made a *bona fide* offer (within the meaning of Rule 164(h)(2) under the

Securities Act) of the Shares and at the date hereof, the Company was not and is not an "ineligible issuer," as defined in Rule 405 under the Securities Act.

4. Further Agreements of the Company. The Company covenants and agrees with each Underwriter that:

(a) *Required Filings.* The Company will file the final Prospectus with the Commission within the time periods specified by Rule 424(b) and Rule 430A, 430B or 430C under the Securities Act, will file any Issuer Free Writing Prospectus to the extent required by Rule 433 under the Securities Act; and will furnish copies of the Prospectus and each Issuer Free Writing Prospectus (to the extent not previously delivered) to the Underwriters in New York City as soon as practicable, and in any event no later than 10:00 A.M., New York City time, on the second business day succeeding the date of this Agreement, in such quantities as the Representative may reasonably request.

(b) *Delivery of Copies.* The Company will deliver, without charge, (i) to the Representative, two signed copies of the Registration Statement as originally filed and each amendment thereto, in each case including all exhibits and consents filed therewith; and (ii) to each Underwriter (A) a conformed copy of the Registration Statement as originally filed and each amendment thereto (without exhibits) and (B) during the Prospectus Delivery Period (as defined below), as many copies of the Prospectus (including all amendments and supplements thereto and each Issuer Free Writing Prospectus) as the Representative may reasonably request. As used herein, the term "Prospectus Delivery Period" means such period of time after the first date of the public offering of the Shares as in the opinion of counsel for the Underwriters a prospectus relating to the Shares is required by law to be delivered (or required to be delivered but for Rule 172 under the Securities Act) in connection with sales of the Shares by any Underwriter or dealer.

(c) *Amendments or Supplements, Issuer Free Writing Prospectuses.* Before preparing, using, authorizing, approving, referring to or filing any Issuer Free Writing Prospectus, and before filing any amendment or supplement to the Registration Statement or the Prospectus, the Company will furnish to the Representative and counsel for the Underwriters a copy of the proposed Issuer Free Writing Prospectus, amendment or supplement for review and will not prepare, use, authorize, approve, refer to or file any such Issuer Free Writing Prospectus or file any such proposed amendment or supplement to which the Representative reasonably objects.

(d) *Notice to the Representative.* The Company will advise the Representative promptly, and confirm such advice in writing, (i) when the Registration Statement has become effective; (ii) when any amendment to the Registration Statement has been filed or becomes effective; (iii) when any supplement to the Prospectus or any Issuer Free Writing Prospectus or any amendment to the Prospectus has been filed; (iv) of any request by the Commission for any amendment to the Registration Statement or any amendment or supplement to the Prospectus or the receipt of any comments from the Commission relating to the Registration Statement or any other request by the Commission for any additional information;

(v) of the issuance by the Commission of any order suspending the effectiveness of the Registration Statement or preventing or suspending the use of any Preliminary Prospectus, any of the Pricing Disclosure Package or the Prospectus or the initiation or threatening of any proceeding for that purpose or pursuant to Section 8A of the Securities Act; (vi) of the occurrence of any event within the Prospectus Delivery Period as a result of which the Prospectus, the Pricing Disclosure Package or any Issuer Free Writing Prospectus as then amended or supplemented would include any untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances existing when the Prospectus, the Pricing

Disclosure Package or any such Issuer Free Writing Prospectus is delivered to a purchaser, not misleading; and (vii) of the receipt by the Company of any notice with respect to any suspension of the qualification of the Shares for offer and sale in any jurisdiction or the initiation or threatening of any proceeding for such purpose; and the Company will use its best efforts to prevent the issuance of any such order suspending the effectiveness of the Registration Statement, preventing or suspending the use of any Preliminary Prospectus, any of the Pricing Disclosure Package or the Prospectus or suspending any such qualification of the Shares and, if any such order is issued, will use its reasonable best efforts to obtain as soon as possible the withdrawal thereof.

(e) *Ongoing Compliance.* (1) If during the Prospectus Delivery Period (i) any event shall occur or condition shall exist as a result of which the Prospectus as then amended or supplemented would include any untrue statement of a material fact or omit to state any material fact necessary in order to make the statements therein, in the light of the circumstances existing when the Prospectus is delivered to a purchaser, not misleading or (ii) it is necessary to amend or supplement the Prospectus to comply with law, the Company will immediately notify the Underwriters thereof and forthwith prepare and, subject to paragraph (c) above, file with the Commission and furnish to the Underwriters and to such dealers as the Representative may designate such amendments or supplements to the Prospectus as may be necessary so that the statements in the Prospectus as so amended or supplemented will not, in the light of the circumstances existing when the Prospectus is delivered to a purchaser, be misleading or so that the Prospectus will comply with law and (2) if at any time prior to the Closing Date (i) any event shall occur or condition shall exist as a result of which the Pricing Disclosure Package as then amended or supplemented would include any untrue statement of a material fact or omit to state any material fact necessary in order to make the statements therein, in the light of the circumstances existing when the Pricing Disclosure Package is delivered to a purchaser, not misleading or (ii) it is necessary to amend or supplement the Pricing Disclosure Package to comply with law, the Company will immediately notify the Underwriters thereof and forthwith prepare and, subject to paragraph (c) above, file with the Commission (to the extent required) and furnish to the Underwriters and to such dealers as the Representative may designate such amendments or supplements to the Pricing Disclosure Package as may be necessary so that the statements in the Pricing Disclosure Package as so amended or supplemented will not, in the light of the circumstances existing when the Pricing Disclosure Package is delivered to a purchaser, be misleading or so that the Pricing Disclosure Package will comply with law.

(f) *Blue Sky Compliance.* The Company will qualify the Shares for offer and sale under the securities or Blue Sky laws of such jurisdictions as the Representative shall reasonably request and will continue such qualifications in effect so long as required for distribution of the Shares; provided that the Company shall not be required to (i) qualify as a foreign corporation or other entity or as a dealer in securities in any such jurisdiction where it would not otherwise be required to so qualify, (ii) file any general consent to service of process in any such jurisdiction or (iii) subject itself to taxation in any such jurisdiction if it is not otherwise so subject.

(g) *Earning Statement.* The Company will make generally available to its security holders and the Representative as soon as practicable an earning statement that satisfies the provisions of Section 11(a) of the Securities Act and Rule 158 of the Commission promulgated thereunder covering a period of at least twelve months beginning with the first fiscal quarter of the Company occurring after the "effective date" (as defined in Rule 158) of the Registration Statement.

(h) *Clear Market.* For a period of 180 days after the date of the Prospectus, the Company will not (i) offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, or otherwise transfer or dispose of, directly or indirectly, or file with the Commission a registration statement under the Securities Act relating to, any shares of Stock or any securities convertible into or exercisable or exchangeable for Stock, or publicly disclose the intention to make any offer, sale, pledge, disposition or filing, or (ii) enter into any swap or other agreement that transfers, in whole or in part, any of the economic consequences of ownership of the Stock or any such other securities, whether any such transaction described in clause (i) or (ii) above is to be settled by delivery of Stock or such other securities, in cash or otherwise, without the prior written consent of J. P. Morgan Securities LLC, other than (A) the Shares to be sold hereunder, (B) any shares of Stock of the Company issued upon the exercise of options granted under Company Stock Plans or warrants described as outstanding in the Registration Statement, the Pricing Disclosure Package and the Prospectus, (C) any options and other awards granted under Company Stock Plans, (D) the filing by the Company of any registration statement on Form S-8 or a successor form thereto and (E) shares of Stock or other securities issued in connection with a transaction that includes a commercial relationship (including joint ventures, marketing or distribution arrangements, collaboration agreements or intellectual property license agreements) or any acquisition of assets or not less than a majority or controlling portion of the equity of another entity, provided that (x) the aggregate number of shares issued pursuant to this clause (E) shall not exceed 5.0% of the total number of outstanding shares of Stock immediately following the issuance and sale of the Underwritten Shares pursuant hereto and (y) the recipient of any such shares of Stock and securities issued pursuant to this clause (E) during the 180-day restricted period described above shall enter into an agreement substantially in the form of Exhibit A hereto.

Notwithstanding the foregoing, if (1) during the last 17 days of the 180-day restricted period, the Company issues an earnings release or material news or a material event relating to the Company occurs; or (2) prior to the expiration of the 180-day restricted period, the Company announces that it will release earnings results during the 16-day period beginning on the last day of the 180-day period, the restrictions imposed by this Agreement shall continue to apply until the expiration of the 18-day period beginning on the issuance of the earnings release or the occurrence of the material news or material event.

If J.P. Morgan Securities LLC, in its sole discretion, agrees to release or waive the restrictions set forth in a lock-up letter described in Section 6(n) hereof for an officer or director of the Company and provides the Company with notice of the impending release or waiver at least three business days before the effective date of the release or waiver, the Company agrees to announce the impending release or waiver by a press

release substantially in the form of Exhibit C hereto through a major news service at least two business days before the effective date of the release or waiver.

(i) *Use of Proceeds.* The Company will apply the net proceeds from the sale of the Shares in all material respects as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus under the heading "Use of proceeds".

(j) *No Stabilization.* The Company will not take, directly or indirectly, without giving effect to activities by the Underwriters, any action designed to or that would reasonably be expected to cause or result in any stabilization or manipulation of the price of the Stock.

(k) *Exchange Listing.* The Company will use its best efforts to list the Shares on the Nasdaq Market.

(l) *Reports.* During a period of two years from the date hereof, the Company will furnish to the Representative, as soon as they are available, copies of all reports or other communications (financial or other) furnished to holders of the Shares, and copies of any reports and financial statements furnished to or filed with the Commission or any national securities exchange or automatic quotation system; provided the Company will be deemed to have furnished such reports and financial statements to the Representative to the extent they are filed on the Commission's Electronic Data Gathering, Analysis, and Retrieval system or any successor system.

(m) *Record Retention*. The Company will, pursuant to reasonable procedures developed in good faith, retain copies of each Issuer Free Writing Prospectus that is not filed with the Commission in accordance with Rule 433 under the Securities Act.

(n) *Filings.* The Company will file with the Commission such reports as may be required by Rule 463 under the Securities Act.

5. Certain Agreements of the Underwriters. Each Underwriter hereby represents and agrees that:

(a) It has not used, authorized use of, referred to or participated in the planning for use of, and will not use, authorize use of, refer to or participate in the planning for use of, any "free writing prospectus", as defined in Rule 405 under the Securities Act (which term includes use of any written information furnished to the Commission by the Company and not incorporated by reference into the Registration Statement and any press release issued by the Company) other than (i) a free writing prospectus that contains no "issuer information" (as defined in Rule 433(h)(2) under the Securities Act) that was not included in the Preliminary Prospectus or a previously filed Issuer Free Writing Prospectus, (ii) any Issuer Free Writing Prospectus listed on Annex B or prepared pursuant to Section 3(c) or Section 4(c) above (including any electronic road show), or (iii) any free writing prospectus prepared by such underwriter and approved by the Company in advance in writing (each such free writing prospectus referred to in clauses (i) or (iii), an "Underwriter Free Writing Prospectus").

(b) It has not and will not, without the prior written consent of the Company, use any free writing prospectus that contains the final terms of the Shares unless such terms have previously been included in a free writing prospectus filed with the Commission; *provided* that Underwriters may use a term sheet substantially in the form of Annex C hereto without the consent of the Company; *provided further* that any Underwriter using such term sheet shall notify the Company, and provide a copy of such term sheet to the Company, prior to, or substantially concurrently with, the first use of such term sheet.

(c) It is not subject to any pending proceeding under Section 8A of the Securities Act with respect to the offering (and will promptly notify the Company if any such proceeding against it is initiated during the Prospectus Delivery Period).

6. Conditions of Underwriters' Obligations. The obligation of each Underwriter to purchase the Underwritten Shares on the Closing Date or the Option Shares on the Additional Closing Date, as the case may be, as provided herein is subject to the performance by the Company of its covenants and other obligations hereunder and to the following additional conditions:

(a) *Registration Compliance; No Stop Order.* No order suspending the effectiveness of the Registration Statement shall be in effect, and no proceeding for such purpose or pursuant to Section 8A under the Securities Act shall be pending before or threatened by the Commission; the Prospectus and each Issuer Free Writing Prospectus shall have been timely filed with the Commission under the Securities Act (in the case of an Issuer Free Writing Prospectus, to the extent required by Rule 433 under the Securities Act) and in accordance with Section 4(a) hereof; and all requests by the Commission for additional information shall have been complied with to the reasonable satisfaction of the Representative.

(b) *Representations and Warranties.* The representations and warranties of the Company contained herein shall be true and correct on the date hereof and on and as of the Closing Date or the Additional Closing Date, as the case may be; and the statements of the Company and its officers made in any certificates delivered pursuant to this Agreement shall be true and correct on and as of the Closing Date or the Additional Closing Date, as the case may be.

(c) *No Downgrade.* Subsequent to the earlier of (A) the Applicable Time and (B) the execution and delivery of this Agreement, if there are any debt securities or preferred stock of, or guaranteed by, the Company or any of its subsidiaries that are rated by a "nationally recognized statistical rating organization," as such term is defined in Section 3(a)(62) of the Exchange Act, (i) no downgrading shall have occurred in the rating accorded any such debt securities or preferred stock and (ii) no such organization shall have publicly announced that it has under surveillance or review, or has changed its outlook with respect to, its rating of any such debt securities or preferred stock (other than an announcement with positive implications of a possible upgrading).

(d) *No Material Adverse Change.* No event or condition of a type described in Section 3(g) hereof shall have occurred or shall exist, which event or condition is not described in the Pricing Disclosure Package (excluding any amendment or supplement thereto) and the Prospectus (excluding any amendment or supplement thereto) and the effect of which in the judgment of the Representative makes it impracticable or

inadvisable to proceed with the offering, sale or delivery of the Shares on the Closing Date or the Additional Closing Date, as the case may be, on the terms and in the manner contemplated by this Agreement, the Pricing Disclosure Package and the Prospectus.

(e) *Officer's Certificate.* The Representative shall have received on and as of the Closing Date or the Additional Closing Date, as the case may be, a certificate on behalf of the Company of the chief financial officer or chief accounting officer of the Company and one additional senior executive officer of the Company who is reasonably satisfactory to the Representative (i) confirming that such officers have carefully reviewed the Registration Statement, the Pricing Disclosure Package and the Prospectus and, to the knowledge of such officers, the representations set forth in Sections 3(b) and 3(d) hereof are true and correct, (ii) confirming that the other representations and warranties of the Company in this Agreement are true and correct and that the Company has in all material respects complied with all agreements and satisfied all conditions on its part to be performed or satisfied hereunder at or prior to the Closing Date or the Additional Closing Date, as the case may be, and (iii) to the effect set forth in paragraphs (a), (c) and (d) above.

(f) *Comfort Letters.* On the date of this Agreement and on the Closing Date or the Additional Closing Date, as the case may be, PricewaterhouseCoopers LLP shall have furnished to the Representative, at the request of the Company, letters, dated the respective dates of delivery thereof and addressed to the Underwriters, in form and substance reasonably satisfactory to the

Representative, containing statements and information of the type customarily included in accountants' "comfort letters" to underwriters with respect to the financial statements and certain financial information contained in the Registration Statement, the Pricing Disclosure Package and the Prospectus; provided, that the letter delivered on the Closing Date or the Additional Closing Date, as the case may be, shall use a "cut-off" date no more than three business days prior to such Closing Date or such Additional Closing Date, as the case may be.

(g) *Opinion and 10b-5 Statement of Counsel for the Company.* Wilmer Cutler Pickering Hale and Dorr LLP, counsel for the Company, shall have furnished to the Representative, at the request of the Company, their written opinion and 10b-5 statement, dated the Closing Date or the Additional Closing Date, as the case may be, and addressed to the Underwriters, in form and substance reasonably satisfactory to the Representative, to the effect set forth in Annex A-1 hereto.

(h) *Opinion of Intellectual Property Counsel for the Company.* Seth Fidel, Esq., special counsel for the Company with respect to intellectual property matters, shall have furnished to the Representative, at the request of the Company, their written opinion, dated the Closing Date or the Additional Closing Date, as the case may be, and addressed to the Underwriters, in form and substance reasonably satisfactory to the Representative, to the effect set forth in Annex A-2 hereto.

(i) *Opinion of Regulatory Counsel for the Company*. Hyman, Phelps & McNamara, P.C., special counsel for the Company with respect to regulatory matters shall have furnished to the Representative, at the request of the Company, their written opinion, dated the Closing Date or the Additional Closing Date, as the case may be, and addressed to the Underwriters, in form and substance reasonably satisfactory to the Representative, to the effect set forth in Annex A-3 hereto.

(j) *Opinion and 10b-5 Statement of Counsel for the Underwriters.* The Representative shall have received on and as of the Closing Date or the Additional Closing Date, as the case may be, an opinion and 10b-5 statement of Davis Polk & Wardwell LLP, counsel for the Underwriters, with respect to such matters as the Representative may reasonably request, and such counsel shall have received such documents and information as they may reasonably request to enable them to pass upon such matters.

(k) *No Legal Impediment to Issuance.* No action shall have been taken and no statute, rule, regulation or order shall have been enacted, adopted or issued by any federal, state or foreign governmental or regulatory authority that would, as of the Closing Date or the Additional Closing Date, as the case may be, prevent the issuance or sale of the Shares; and no injunction or order of any federal, state or foreign court shall have been issued that would, as of the Closing Date or the Additional Closing Date, as the case may be, prevent the issuance or sale of the Shares.

(l) *Good Standing.* The Representative shall have received on and as of the Closing Date or the Additional Closing Date, as the case may be, satisfactory evidence of the good standing of the Company and its subsidiaries in their respective jurisdictions of organization and their good standing as foreign entities in such other jurisdictions as the Representative may reasonably request, in each case in writing or any standard form of telecommunication from the appropriate governmental authorities of such jurisdictions.

(m) *Exchange Listing.* The Shares to be delivered on the Closing Date or Additional Closing Date, as the case may be, shall have been approved for listing on the Nasdaq Market, subject to official notice of issuance.

(n) *Lock-up Agreements*. The "lock-up" agreements, each substantially in the form of Exhibit A hereto, between you and certain shareholders, officers and directors of the Company relating to sales and certain other dispositions of shares of Stock or certain other securities, delivered to you on or before the date hereof, shall be in full force and effect on the Closing Date or Additional Closing Date, as the case may be.

(o) *Additional Documents.* On or prior to the Closing Date or the Additional Closing Date, as the case may be, the Company shall have furnished to the Representative such further certificates and documents as the Representative may reasonably request.

All opinions, letters, certificates and evidence mentioned above or elsewhere in this Agreement shall be deemed to be in compliance with the provisions hereof only if they are in form and substance reasonably satisfactory to counsel for the Underwriters.

7. Indemnification and Contribution.

(a) *Indemnification of the Underwriters.* The Company agrees to indemnify and hold harmless each Underwriter, its affiliates, directors and officers and each person, if any, who controls such Underwriter within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act,

from and against any and all losses, claims, damages and liabilities (including, without limitation, reasonable legal fees and other reasonable expenses incurred in connection with any suit, action or proceeding or any claim asserted, as such fees and expenses are incurred), joint or several, that arise out of, or are based upon, (i) any untrue statement or alleged untrue statement of a material fact contained in the Registration Statement or caused by any omission or alleged omission to state therein a material fact required to be stated therein or necessary in order to make the statements therein, not misleading, (ii) or any untrue statement or alleged untrue statement of a material fact contained in the Prospectus (or any amendment or supplement thereto), any Issuer Free Writing Prospectus, any "issuer information" filed or required to be filed pursuant to Rule 433(d) under the Securities Act or any Pricing Disclosure Package (including any Pricing Disclosure Package that has subsequently been amended), or caused by any omission or alleged omission to state therein a material fact necessary in order to make the statements therein, in light of the circumstances under which they were made, not misleading, in each case except insofar as such losses, claims, damages or liabilities arise out of, or are based upon, any untrue statement or omission or alleged untrue statement or omission made in reliance upon and in conformity with any information relating to any Underwriter furnished to the Company in writing by such Underwriter through the Representative expressly for use therein, it being understood and agreed that the only such information furnished by any Underwriter consists of the information described as such in subsection (b) below.

(b) *Indemnification of the Company.* Each Underwriter agrees, severally and not jointly, to indemnify and hold harmless the Company, its directors, its officers who signed the Registration Statement and each person, if any, who controls the Company within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act to the same extent as the indemnity set forth in paragraph (a) above, but only with respect to any losses, claims, damages or liabilities that arise out of, or are based upon, any untrue statement or omission or alleged untrue statement or omission made in reliance upon and in conformity with any information relating to such Underwriter furnished to the Company in writing by such Underwriter through the Representative expressly for use in the Registration Statement, the Prospectus (or any amendment or supplement thereto), any Issuer Free Writing Prospectus

or any Pricing Disclosure Package, it being understood and agreed upon that the only such information furnished by any Underwriter consists of the following information in the Prospectus furnished on behalf of each Underwriter: the concession and reallowance figures appearing in the third paragraph, the information regarding electronic and internet distribution appearing in the seventh paragraph and the information relating to stabilizing transactions contained in the fifteenth and sixteenth paragraphs, in each case under the caption "Underwriting".

(c) *Notice and Procedures.* If any suit, action, proceeding (including any governmental or regulatory investigation), claim or demand shall be brought or asserted against any person in respect of which indemnification may be sought pursuant to either paragraph (a) or (b) above, such person (the "Indemnified Person") shall promptly notify the person against whom such indemnification may be sought (the "Indemnifying Person") in writing; provided that the failure to notify the Indemnifying Person shall not relieve it from any liability that it may have under paragraph (a) or (b) above except to the extent that it has been materially prejudiced (through the forfeiture of substantive rights or defenses) by such failure; and provided, further, that the failure to notify the Indemnifying Person shall not relieve it from any liability that it may have to an Indemnified Person otherwise than under paragraph (a) or (b) above. If any such proceeding shall be brought or asserted against an Indemnified Person and it shall have notified the Indemnifying Person thereof, the Indemnifying Person shall retain counsel reasonably satisfactory to the Indemnified Person (who shall not, without the consent of the Indemnified Person, be counsel to the Indemnifying Person) to represent the Indemnified Person in such proceeding and shall pay the reasonable fees and expenses of such counsel related to such proceeding, as incurred. In any such proceeding, any Indemnified Person shall have the right to retain its own counsel, but the fees and expenses of such counsel shall be at the expense of such Indemnified Person unless (i) the Indemnifying Person and the Indemnified Person shall have mutually agreed to the contrary; (ii) the Indemnifying Person has failed within a reasonable time to retain counsel reasonably satisfactory to the Indemnified Person; (iii) the Indemnified Person shall have reasonably concluded that there may be legal defenses available to it that are different from or in addition to those available to the Indemnifying Person; or (iv) the named parties in any such proceeding (including any impleaded parties) include both the Indemnifying Person and the Indemnified Person and representation of both parties by the same counsel would be inappropriate due to actual or potential differing interest between them. It is understood and agreed that the Indemnifying Person shall not, in connection with any proceeding or related proceedings in the same jurisdiction, be liable for the fees and expenses of more than one separate firm (in addition to any local counsel) for all Indemnified Persons, and that all such reasonable fees and expenses shall be paid or reimbursed as they are incurred. Any such separate firm for any Underwriter, its affiliates, directors and officers and any control persons of such Underwriter shall be designated in writing by J. P. Morgan Securities LLC and any such separate firm for the Company, its directors, its officers who signed the Registration Statement and any control persons of the Company shall be designated in writing by the Company. The Indemnifying Person shall not be liable for any settlement of any proceeding effected without its written consent, but if settled with such consent or if there be a final judgment for the plaintiff, the Indemnifying Person agrees to indemnify each Indemnified Person from and against any loss or liability by reason of such settlement or judgment. Notwithstanding the foregoing sentence, if at any time an Indemnified Person shall have requested that an Indemnifying Person reimburse the Indemnified Person for fees and expenses of counsel as contemplated by this paragraph, the Indemnifying Person shall be liable for any settlement of any proceeding effected without its written consent if (i) such settlement is entered into (A) more than 60 days after receipt by the Indemnifying Person of such request and (B) more than 30 days after receipt by the Indemnifying Person of the proposed terms of such settlement and (ii) the Indemnifying Person shall not have reimbursed the Indemnified Person in accordance with such request prior to the date of such settlement. No Indemnifying Person shall, without the written consent of the Indemnified Person, effect any settlement of any pending or threatened proceeding in respect of which any Indemnified Person is or could have been a party and indemnification could have been sought hereunder by such Indemnified Person, unless such settlement (x) includes an unconditional release of

such Indemnified Person, in form and substance reasonably satisfactory to such Indemnified Person, from all liability on claims that are the subject matter of such proceeding and (y) does not include any statement as to or any admission of fault, culpability or a failure to act by or on behalf of any Indemnified Person.

(d) *Contribution.* If the indemnification provided for in paragraphs (a) and (b) above is unavailable to an Indemnified Person or insufficient in respect of any losses, claims, damages or liabilities referred to therein, then each Indemnifying Person under such paragraph, in lieu of indemnifying such Indemnified Person thereunder, shall contribute to the amount paid or payable by such Indemnified Person as a result of such losses, claims, damages or liabilities (i) in such proportion as is appropriate to reflect the relative benefits received by the Company, on the one hand, and the Underwriters on the other, from the offering of the Shares or (ii) if the allocation provided by clause (i) is not permitted by applicable law, in such proportion as is appropriate to reflect not only the relative benefits referred to in clause (i) but also the relative fault of the Company, on the one hand, and the Underwriters on the other, in connection with the statements or omissions that resulted in such losses, claims, damages or liabilities, as well as any other relevant equitable considerations. The relative benefits received by the Company, on the one hand, and the Underwriters on the other, shall be deemed to be in the same respective proportions as the net proceeds (before deducting expenses) received by the Company from the sale of the Shares and the total underwriting discounts and commissions

received by the Underwriters in connection therewith, in each case as set forth in the table on the cover of the Prospectus, bear to the aggregate offering price of the Shares. The relative fault of the Company, on the one hand, and the Underwriters on the other, shall be determined by reference to, among other things, whether the untrue or alleged untrue statement of a material fact or the omission or alleged omission to state a material fact relates to information supplied by the Company or by the Underwriters and the parties' relative intent, knowledge, access to information and opportunity to correct or prevent such statement or omission.

(e) *Limitation on Liability.* The Company and the Underwriters agree that it would not be just and equitable if contribution pursuant to this Section 7 were determined by pro rata allocation (even if the Underwriters were treated as one entity for such purpose) or by any other method of allocation that does not take account of the equitable considerations referred to in paragraph (d) above. The amount paid or payable by an Indemnified Person as a result of the losses, claims, damages and liabilities referred to in paragraph (d) above shall be deemed to include, subject to the limitations set forth above, any reasonable legal or other reasonable expenses incurred by such Indemnified Person in connection with any such action or claim. Notwithstanding the provisions of this Section 7, in no event shall an Underwriter be required to contribute any amount in excess of the amount by which the total underwriting discounts and commissions received by such Underwriter with respect to the offering of the Shares exceeds the amount of any damages that such Underwriter has otherwise been required to pay by reason of such untrue or alleged untrue statement or omission or alleged omission. No person guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) shall be entitled to contribution from any person who was not guilty of such fraudulent misrepresentation. The Underwriters' obligations to contribute pursuant to this Section 7 are several in proportion to their respective purchase obligations hereunder and not joint.

(f) *Non-Exclusive Remedies.* The remedies provided for in this Section 7 are not exclusive and shall not limit any rights or remedies which may otherwise be available to any Indemnified Person at law or in equity.

8. Effectiveness of Agreement. This Agreement shall become effective upon the execution and delivery hereof by the parties hereto.

9. Termination. This Agreement may be terminated in the absolute discretion of the Representative, by notice to the Company, if after the execution and delivery of this Agreement and prior to the Closing Date or, in the case of the Option Shares, prior to the Additional Closing Date (i) trading generally shall have been suspended or materially limited on or by any of the New York Stock Exchange, NYSE Amex, the Nasdaq Stock Market, the Chicago Board Options Exchange, the Chicago Mercantile Exchange or the Chicago Board of Trade; (ii) trading of any securities issued or guaranteed by the Company shall have been suspended on any exchange or in any over-the-counter market; (iii) a general moratorium on commercial banking activities shall have been declared by federal or New York State authorities; or (iv) there shall have occurred any outbreak or escalation of hostilities or any change in financial markets or any calamity or crisis, either within or outside the United States, that, in the judgment of the Representative, is material and adverse and makes it impracticable or inadvisable to proceed with the offering, sale or delivery of the Shares on the Closing Date or the Additional Closing Date, as the case may be, on the terms and in the manner contemplated by this Agreement, the Pricing Disclosure Package and the Prospectus.

10. Defaulting Underwriter.

(a) If, on the Closing Date or the Additional Closing Date, as the case may be, any Underwriter defaults on its obligation to purchase the Shares that it has agreed to purchase hereunder on such date, the non-defaulting Underwriters may in their discretion arrange for the purchase of such Shares by other persons satisfactory to the Company on the terms contained in this Agreement. If, within 36 hours after any such default by any Underwriter, the non-defaulting Underwriters do not arrange for the purchase of such Shares, then the Company shall be entitled to a further period of 36 hours within which to procure other persons satisfactory to the non-defaulting Underwriters to purchase such Shares on such terms. If other persons become obligated or agree to purchase the Shares of a defaulting Underwriter, either the non-defaulting Underwriters or the Company may postpone the Closing Date or the Additional Closing Date, as the case may be, for up to five full business days in order to effect any changes that in the opinion of counsel for the Company or counsel for the Underwriters may be necessary in the Registration Statement and the Prospectus or in any other document or arrangement, and the Company agrees to promptly prepare any amendment or supplement to the Registration Statement and the Prospectus that effects any such changes. As used in this Agreement, the term "Underwriter" includes, for all purposes of this Agreement unless the context otherwise requires, any person not listed in Schedule 1 hereto that, pursuant to this Section 10, purchases Shares that a defaulting Underwriter agreed but failed to purchase.

(b) If, after giving effect to any arrangements for the purchase of the Shares of a defaulting Underwriter or Underwriters by the non-defaulting Underwriters and the Company as provided in paragraph (a) above, the aggregate number of Shares that remain unpurchased on the Closing Date or the Additional Closing Date, as the case may be, does not exceed one-eleventh of the aggregate number of Shares to be purchased on such date, then the Company shall have the right to require each non-defaulting Underwriter to purchase the number of Shares that such Underwriter agreed to purchase hereunder on such date plus such Underwriter's pro rata share (based on the number of Shares that such Underwriter agreed to purchase on such date) of the Shares of such defaulting Underwriter or Underwriters for which such arrangements have not been made.

(c) If, after giving effect to any arrangements for the purchase of the Shares of a defaulting Underwriter or Underwriters by the non-defaulting Underwriters and the Company as provided in paragraph (a) above, the aggregate number of Shares that remain unpurchased on the Closing Date or the Additional Closing Date, as the case may be, exceeds one-eleventh of the aggregate amount of Shares to be purchased on such date, or if the Company shall not exercise the right described in paragraph (b) above, then this Agreement or, with respect to any Additional Closing Date, the obligation of the

Underwriters to purchase Shares on the Additional Closing Date shall terminate without liability on the part of the non-defaulting Underwriters. Any termination of this Agreement pursuant to this Section 10 shall be without liability on the part of the Company, except that the provisions of Section 7 hereof shall not terminate and shall remain in effect.

(d) Nothing contained herein shall relieve a defaulting Underwriter of any liability it may have to the Company or any non-defaulting Underwriter for damages caused by its default.

11. Payment of Expenses.

(a) Whether or not the transactions contemplated by this Agreement are consummated or this Agreement is terminated, the Company will pay or cause to be paid all costs and expenses incident to the performance of its obligations hereunder, including without limitation, (i) the costs incident to the authorization, issuance, sale, preparation and delivery of the Shares and any taxes payable in that connection; (ii) the costs incident to the preparation, printing and filing under the Securities Act of the Registration Statement, the Preliminary Prospectus, any Issuer Free Writing Prospectus, any Pricing Disclosure Package and the Prospectus (including all exhibits, amendments and supplements thereto) and the distribution thereof; (iii) the costs of reproducing and distributing this Agreement, (iv) the fees and expenses of the Company's counsel and independent accountants; (v) the reasonable fees and expenses incurred in connection with the registration or qualification of the Shares under the state or foreign securities or blue sky laws of such jurisdictions as the Representative may designate and the preparation, printing and distribution of a Blue Sky Memorandum (including the related fees and expenses of counsel for the Underwriters); (vi) the cost of preparing stock certificates; (vii) the costs and charges of any transfer agent and any registrar; (viii) all expenses and application fees incurred in connection with any filing with, and clearance of the offering by, FINRA; (ix) all expenses incurred by the Company in connection with any "road show" presentation to potential investors; and (x) all expenses and application fees related to the listing of the Shares on the Nasdaq Market.

(b) If (i) this Agreement is terminated pursuant to clause (i) or (ii) of Section 9, (ii) the Company for any reason fails to tender the Shares for delivery to the Underwriters or (iii) the Underwriters decline to purchase the Shares for any reason permitted under this Agreement (other than following termination of this Agreement pursuant to clause (iii) or (iv) of Section 9), the Company agrees to reimburse the Underwriters for all out-of-pocket costs and expenses (including the fees and expenses of their counsel) reasonably incurred by the Underwriters in connection with this Agreement and the offering contemplated hereby.

12. Persons Entitled to Benefit of Agreement. This Agreement shall inure to the benefit of and be binding upon the parties hereto and their respective successors and the officers and directors and any controlling persons referred to in Section 7 hereof. Nothing in this Agreement is intended or shall be construed to give any other person any legal or equitable right, remedy or claim under or in respect of this Agreement or any provision contained herein. No purchaser of Shares from any Underwriter shall be deemed to be a successor merely by reason of such purchase.

13. Survival. The respective indemnities, rights of contribution, representations, warranties and agreements of the Company and the Underwriters contained in this Agreement or made by or on behalf of the Company or the Underwriters pursuant to this Agreement or any certificate delivered pursuant hereto shall survive the delivery of and payment for the Shares and shall remain in full force and effect, regardless of any termination of this Agreement or any investigation made by or on behalf of the Company or the Underwriters.

14. Certain Defined Terms. For purposes of this Agreement, (a) except where otherwise expressly provided, the term "affiliate" has the meaning set forth in Rule 405 under the Securities Act; (b) the term "business day" means any day other than a day on which banks are permitted or required to be closed in New York City; and (c) the term "subsidiary" has the meaning set forth in Rule 405 under the Securities Act.

15. Miscellaneous.

(a) *Authority of J. P. Morgan Securities LLC.* Any action by the Underwriters hereunder may be taken by J. P. Morgan Securities LLC on behalf of the Underwriters, and any such action taken by J. P. Morgan Securities LLC shall be binding upon the Underwriters.

(b) *Notices.* All notices and other communications hereunder shall be in writing and shall be deemed to have been duly given if mailed or transmitted and confirmed by any standard form of telecommunication. Notices to the Underwriters shall be given to the Representative c/o J. P. Morgan Securities LLC, 383 Madison Avenue, New York, New York 10179 (fax: (212) 622-8358); Attention Equity Syndicate Desk. Notices to the Company shall be given to it at Merrimack Pharmaceuticals, Inc., One Kendall Square, Building 700, 2nd Floor, Cambridge, Massachusetts 02139, (fax:); Attention: Corporate Counsel.

(c) *Governing Law.* This Agreement and any claim, controversy or dispute arising under or related to this Agreement shall be governed by and construed in accordance with the laws of the State of New York applicable to agreements made and to be performed in such state.

(d) *Counterparts.* This Agreement may be signed in counterparts (which may include counterparts delivered by any standard form of telecommunication), each of which shall be an original and all of which together shall constitute one and the same instrument.

(e) *Amendments or Waivers.* No amendment or waiver of any provision of this Agreement, nor any consent or approval to any departure therefrom, shall in any event be effective unless the same shall be in writing and signed by the parties hereto.

(f) *Headings.* The headings herein are included for convenience of reference only and are not intended to be part of, or to affect the meaning or interpretation of, this Agreement.

If the foregoing is in accordance with your understanding, please indicate your acceptance of this Agreement by signing in the space provided below.

Very truly yours,

MERRIMACK PHARMACEUTICALS, INC.

By: _____
Name:
Title:

Accepted: [·], 2012

J. P. MORGAN SECURITIES LLC

For itself and on behalf of the
several Underwriters listed
in Schedule 1 hereto.

By: _____
Authorized Signatory

Schedule 1

Underwriter	Number of Shares
J. P. Morgan Securities LLC	
Merrill Lynch, Pierce, Fenner & Smith Incorporated	
Cowen and Company, LLC	
Oppenheimer & Co. Inc.	
Total	

Exhibit A

FORM OF LOCK-UP AGREEMENT

, 20[ ]

J. P. MORGAN SECURITIES LLC
As Representative of
the several Underwriters listed in
Schedule 1 to the Underwriting
Agreement referred to below
c/o J. P. Morgan Securities LLC
383 Madison Avenue
New York, NY 10179

Re: Merrimack Pharmaceuticals, Inc. — Public Offering

Ladies and Gentlemen:

The undersigned understands that you, as Representative of the several Underwriters, propose to enter into an Underwriting Agreement (the "Underwriting Agreement") with Merrimack Pharmaceuticals, Inc., a Delaware corporation (the "Company"), providing for the public offering (the "Public Offering") by the several Underwriters named in Schedule 1 to the Underwriting Agreement (the "Underwriters"), of Common Stock, par value $0.01 per share, of the Company (the "Common Stock"). Capitalized terms used herein and not otherwise defined shall have the meanings set forth in the Underwriting Agreement.

In consideration of the Underwriters' agreement to purchase and make the Public Offering of the Common Stock, and for other good and valuable consideration receipt of which is hereby acknowledged, the undersigned hereby agrees that, without the prior written consent of J. P. Morgan Securities LLC on behalf of the Underwriters, the undersigned will not, during the period ending 180 days after the date of the prospectus relating to the Public Offering (the "Prospectus"), (1) offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, or otherwise transfer or dispose of, directly or indirectly, any shares of Common Stock or any securities convertible into or exercisable or exchangeable for Common Stock (including without limitation, Common Stock or such other securities which may be deemed to be beneficially owned by the undersigned in accordance with the rules and regulations of the Securities and Exchange Commission and securities which may be issued upon exercise of a stock option or warrant), or publicly disclose the intention to make any offer, sale, pledge or disposition, (2) enter into any swap or other agreement that transfers, in whole or in part, any of the economic consequences of ownership of the Common Stock or such other securities, whether any such transaction described in clause (1) or (2) above is to be settled by delivery of Common Stock or such other securities, in cash or otherwise or (3) make any demand for or exercise any right with respect to the registration of any shares of Common Stock or any security convertible into or exercisable or exchangeable for Common Stock, in each case other than (A) any Common Stock to be sold by the undersigned pursuant to the Underwriting Agreement, (B) transfers of shares of Common Stock or such other securities as a bona fide gift or gifts, (C) transfers or dispositions of shares of Common Stock or such other securities to any trust for the direct or indirect benefit of the undersigned or the immediate family of the undersigned in a transaction not involving a disposition for value, (D) transfers or dispositions of shares of Common Stock or such other securities to any

corporation, partnership, limited liability company or other entity all of the beneficial ownership interests of which are held by the undersigned or the immediate family of the undersigned in a transaction not involving a disposition for value, (E) transfers or dispositions of shares of Common Stock or such other securities by will, other testamentary document or intestate succession to the legal representative, heir, beneficiary or a member of the immediate family

of the undersigned, and (F) distributions of shares of Common Stock or such other securities to partners, members or stockholders of the undersigned; provided that in the case of any transfer, disposition or distribution pursuant to clause (B), (C), (D), (E) or (F), each transferee, donee or distributee shall execute and deliver to the Representative a lock-up letter in the form of this paragraph; and provided, further, that in the case of any transfer, disposition or distribution pursuant to clause (B), (C), (D) or (F), no filing by any party (donor, donee, transferor or transferee) under the Securities Exchange Act of 1934, as amended (the "Exchange Act"), or other public announcement reporting a reduction in the beneficial ownership of Common Stock held by the undersigned shall be required or shall be made voluntarily in connection with such transfer, disposition or distribution (other than a filing on a Form 5 made after the expiration of the 180-day period referred to above). For purposes of this Letter Agreement, "immediate family" shall mean any relationship by blood, marriage or adoption, not more remote than first cousin. Furthermore, notwithstanding the restrictions imposed by this Letter Agreement, the undersigned may, without the prior written consent of J.P. Morgan Securities LLC, (i) exercise an option to purchase shares of Common Stock granted under any stock incentive plan or stock purchase plan of the Company, provided that the underlying shares of Common Stock shall continue to be subject to the restrictions on transfer set forth in this Letter Agreement, (ii) establish a trading plan pursuant to Rule 10b5-1 under the Exchange Act for the transfer of Common Stock, provided that such plan does not provide for any transfers of Common Stock during the 180-day restricted period or any extension thereof pursuant to this Letter Agreement and provided further that no filing with the United States Securities and Exchange Commission or other public announcement shall be required or voluntarily made by the undersigned or any other person in connection therewith, and (iii) transfer or dispose of shares of Common Stock acquired in the Public Offering (other than any Company-directed Common Stock purchased in the Public Offering by an officer or director of the Company) or on the open market following the Public Offering, provided that no filing by any party under the Exchange Act or other public announcement reporting a reduction in the beneficial ownership of Common Stock held by the undersigned shall be required or shall be made voluntarily in connection with such transfer or disposition (other than a filing on Form 5 made after the expiration of the 180-day period referred to above). If the undersigned is an officer or director of the Company, the undersigned further agrees that the foregoing provisions shall be equally applicable to any Company-directed Common Stock the undersigned may purchase in the Public Offering.

If the undersigned is an officer or director of the Company, (i) J.P. Morgan Securities LLC on behalf of the Underwriters agrees that, at least three business days before the effective date of any release or waiver of the foregoing restrictions in connection with a transfer of shares of Common Stock, J.P. Morgan Securities LLC on behalf of the Underwriters will notify the Company of the impending release or waiver, and (ii) the Company has agreed in the Underwriting Agreement to announce the impending release or waiver by press release through a major news service at least two business days before the effective date of the release or waiver. Any release or waiver granted by J.P. Morgan Securities LLC on behalf of the Underwriters hereunder to any such officer or director shall only be effective two business days after the publication date of such press release. The provisions of this paragraph will not apply if (a) the release or waiver is effected solely to permit a transfer not for consideration and (b) the transferee has agreed in writing to be bound by the same terms described in this letter to the extent and for the duration that such terms remain in effect at the time of the transfer.

Notwithstanding the foregoing, if (1) during the last 17 days of the 180-day restricted period, the Company issues an earnings release or material news or a material event relating to the Company occurs; or (2) prior to the expiration of the 180-day restricted period, the Company announces that it will release

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earnings results during the 16-day period beginning on the last day of the 180-day period, the restrictions imposed by this Letter Agreement shall continue to apply until the expiration of the 18-day period beginning on the issuance of the earnings release or the occurrence of the material news or material event.

In furtherance of the foregoing, the Company, and any duly appointed transfer agent for the registration or transfer of the securities described herein, are hereby authorized to decline to make any transfer of securities if such transfer would constitute a violation or breach of this Letter Agreement.

The undersigned hereby represents and warrants that the undersigned has full power and authority to enter into this Letter Agreement. All authority herein conferred or agreed to be conferred and any obligations of the undersigned shall be binding upon the successors, assigns, heirs or personal representatives of the undersigned.

The undersigned understands that, if either J.P. Morgan Securities LLC, on the one hand, or the Company, on the other hand, informs the other, prior to the execution of the Underwriting Agreement, that it has determined not to proceed with the Public Offering, if the Underwriting Agreement does not become effective by March 31, 2012, or if the Underwriting Agreement (other than the provisions thereof which survive termination) shall terminate or be terminated prior to payment for and delivery of the Common Stock to be sold thereunder, the undersigned shall be released from all obligations under this Letter Agreement. The undersigned understands that the Underwriters are entering into the Underwriting Agreement and proceeding with the Public Offering in reliance upon this Letter Agreement.

This Letter Agreement and any claim, controversy or dispute arising under or related to this Letter Agreement shall be governed by and construed in accordance with the laws of the State of New York, without regard to the conflict of laws principles thereof.

Very truly yours,

[*NAME OF STOCKHOLDER*]

By: _____

Name:
Title:

Exhibit B

[Form of Waiver of Lock-up]

J.P. MORGAN SECURITIES LLC

Merrimack Pharmaceuticals, Inc.
Public Offering of Common Stock

, 20[ ]

[Name and Address of
Officer or Director
Requesting Waiver]

Dear Mr./Ms. [Name]:

This letter is being delivered to you in connection with the offering by Merrimack Pharmaceuticals, Inc. (the "Company") of shares of common stock, $0.01 par value (the "Common Stock"), of the Company and the lock-up letter dated , 20[ ] (the "Lock-up Letter"), executed by you in connection with such offering, and your request for a [waiver] [release] dated , 20[ ], with respect to shares of Common Stock (the "Shares").

J.P. Morgan Securities LLC hereby agrees to [waive] [release] the transfer restrictions set forth in the Lock-up Letter, but only with respect to the Shares, effective , 2012; provided, however, that such [waiver] [release] is conditioned on the Company announcing the impending [waiver] [release] by press release through a major news service at least two business days before effectiveness of such [waiver] [release]. This letter will serve as notice to the Company of the impending [waiver] [release].

Except as expressly [waived] [released] hereby, the Lock-up Letter shall remain in full force and effect.

Yours very truly,

J.P. MORGAN SECURITIES LLC

By: _____

Name:
Title:

cc: Company

Exhibit C

[Form of Press Release]

Merrimack Pharmaceuticals, Inc.
[Date]

Merrimack Pharmaceuticals, Inc. (the "Company") announced today that J.P. Morgan Securities LLC, the book-running manager in the Company's recent public sale of shares of common stock, is [waiving] [releasing] a lock-up restriction with respect to shares of the Company's common stock held by [certain officers or directors] [an officer or director] of the Company. The [waiver] [release] will take effect on , 2012, and the shares may be sold on or after such date.

This press release is not an offer for sale of the securities in the United States or in any other jurisdiction where such offer is prohibited, and such securities may not be offered or sold in the United States absent registration or an exemption from registration under the United States Securities Act of 1933, as amended.

CERTIFICATE OF AMENDMENT

OF

RESTATED CERTIFICATE OF INCORPORATION

OF

MERRIMACK PHARMACEUTICALS, INC.

Pursuant to Section 242 of the
General Corporation Law of the State of Delaware

Merrimack Pharmaceuticals, Inc. (the "Corporation"), a corporation organized and existing under and by virtue of the General Corporation Law of the State of Delaware, does hereby certify as follows:

A resolution was duly adopted by the Board of Directors of the Corporation pursuant to Section 242 of the General Corporation Law of the State of Delaware setting forth a proposed amendment to the Restated Certificate of Incorporation of the Corporation and declaring such amendment advisable. The stockholders of the Corporation duly approved and adopted such proposed amendment by written consent in accordance with Sections 228 and 242 of the General Corporation Law of the State of Delaware. Accordingly, to effect such proposed amendment, it is:

RESOLVED: That the first paragraph of Article FOURTH of the Restated Certificate of Incorporation of the Corporation (prior to the listing of the various series of Preferred Stock) be and hereby is deleted in its entirety and the following is inserted in lieu thereof:

"**FOURTH:** The total number of shares of all classes of stock which the Corporation shall have authority to issue is 274,280,000 shares, consisting of (i) 200,000,000 shares of Common Stock, $0.01 par value per share (**"Common Stock"**), and (ii) 74,280,000 shares of Preferred Stock, $0.01 par value per share (**"Preferred Stock"**), of which:"

RESOLVED: That Section 4.14 of Part B of Article FOURTH of the Restated Certificate of Incorporation be and hereby is amended and restated in its entirety to read as follows:

"4.14 Mandatory Conversion. If at any time the Corporation shall effect a firm commitment underwritten public offering of shares of Common Stock pursuant to an effective registration statement filed under the Securities Act of 1933, as amended, with a per share offering price equal to or greater than the greater of $4.40 or 250% of the Conversion Price then in effect for the Series C Preferred Stock (subject to adjustment for stock splits, stock dividends and the like), which results in aggregate gross proceeds to the Corporation of at least $50,000,000 (a "**Qualified**

Public Offering"), then effective upon the closing of such Qualified Public Offering, all outstanding shares of Convertible Preferred Stock shall automatically convert to shares of Common Stock on the basis set forth in this Section 4 (but not any Accrued Dividends with respect to Convertible Preferred Stock, which Accrued Dividends shall be paid in cash upon any such conversion as provided in Section 4.1). If at any time the holders of a majority in interest of the then outstanding shares of Convertible Preferred Stock, voting together as a class, shall exercise their rights to convert such shares, all outstanding shares of Convertible Preferred Stock shall, at the option of the Corporation, convert to shares of Common Stock on the basis set forth herein."

[Remainder of Page Intentionally Left Blank.]

IN WITNESS WHEREOF, this Certificate of Amendment, which has been duly adopted in accordance with Sections 228 and 242 of the General Corporation Law of the State of Delaware, has been executed by a duly authorized officer of the Corporation on this day of , 2012.

MERRIMACK PHARMACEUTICALS, INC.

By: _____
Robert J. Mulroy
President and Chief Executive Officer

RESTATED CERTIFICATE OF INCORPORATION

OF

MERRIMACK PHARMACEUTICALS, INC.

Merrimack Pharmaceuticals, Inc. (the "Corporation"), a corporation organized and existing under and by virtue of the provisions of the General Corporation Law of the State of Delaware, does hereby certify as follows:

The current name of the Corporation is Merrimack Pharmaceuticals, Inc. The original Certificate of Incorporation was filed with the Secretary of State of the State of Delaware on July 6, 2010. The Certificate of Incorporation was amended and restated on April 6, 2011. A Certificate of Amendment was filed on .

A resolution was duly adopted by the Board of Directors of the Corporation pursuant to Sections 242 and 245 of the General Corporation Law of the State of Delaware setting forth this Restated Certificate of Incorporation and declaring such Restated Certificate of Incorporation advisable. The stockholders of the Corporation duly approved and adopted this Restated Certificate of Incorporation by written consent in accordance with Sections 228, 242 and 245 of the General Corporation Law of the State of Delaware.

Accordingly, the Certificate of Incorporation of this Corporation, as previously amended and restated, is hereby further amended and restated in its entirety to read as follows:

FIRST: The name of the Corporation is Merrimack Pharmaceuticals, Inc.

SECOND: The address of the Corporation's registered office in the State of Delaware is Corporation Trust Center, 1209 Orange Street, in the City of Wilmington, County of New Castle, 19801. The name of its registered agent at that address is The Corporation Trust Company.

THIRD: The nature of the business or purposes to be conducted or promoted by the Corporation is to engage in any lawful act or activity for which corporations may be organized under the General Corporation Law of the State of Delaware.

FOURTH: The total number of shares of all classes of stock which the Corporation shall have authority to issue is 210,000,000 shares, consisting of (i) 200,000,000 shares of Common Stock, $0.01 par value per share ("Common Stock"), and (ii) 10,000,000 shares of Preferred Stock, $0.01 par value per share ("Preferred Stock").

The following is a statement of the designations and the powers, privileges and rights, and the qualifications, limitations or restrictions thereof in respect of each class of capital stock of the Corporation.

A. COMMON STOCK

1. General. The voting, dividend and liquidation rights of the holders of the Common Stock are subject to and qualified by the rights of the holders of the Preferred Stock of

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any series as may be designated by the Board of Directors upon any issuance of the Preferred Stock of any series.

2. Voting. The holders of the Common Stock shall have voting rights at all meetings of stockholders, each such holder being entitled to one vote for each share thereof held by such holder; provided, however, that, except as otherwise required by law, holders of Common Stock shall not be entitled to vote on any amendment to this Restated Certificate of Incorporation (which, as used herein, shall mean the certificate of incorporation of the Corporation, as amended from time to time, including the terms of any certificate of designations of any series of Preferred Stock) that relates solely to the terms of one or more outstanding series of Preferred Stock if the holders of such affected series are entitled, either separately or together as a class with the holders of one or more other such series, to vote thereon pursuant to this Restated Certificate of Incorporation. There shall be no cumulative voting.

The number of authorized shares of Common Stock may be increased or decreased (but not below the number of shares thereof then outstanding) by the affirmative vote of the holders of a majority of the stock of the Corporation entitled to vote, irrespective of the provisions of Section 242(b)(2) of the General Corporation Law of the State of Delaware.

3. Dividends. Dividends may be declared and paid on the Common Stock from funds lawfully available therefor as and when determined by the Board of Directors and subject to any preferential dividend or other rights of any then outstanding Preferred Stock.

4. Liquidation. Upon the dissolution or liquidation of the Corporation, whether voluntary or involuntary, holders of Common Stock will be entitled to receive all assets of the Corporation available for distribution to its stockholders, subject to any preferential or other rights of any then outstanding Preferred Stock.

B. PREFERRED STOCK

Preferred Stock may be issued from time to time in one or more series, each of such series to have such terms as stated or expressed herein and in the resolution or resolutions providing for the issue of such series adopted by the Board of Directors of the Corporation as hereinafter provided. Any shares of Preferred Stock which may be redeemed, purchased or acquired by the Corporation may be reissued except as otherwise provided by law.

Authority is hereby expressly granted to the Board of Directors from time to time to issue the Preferred Stock in one or more series, and in connection with the creation of any such series, by adopting a resolution or resolutions providing for the issuance of the shares thereof and by filing a certificate of designations relating thereto in accordance with the General Corporation Law of the State of Delaware, to determine and fix the number of

shares of such series and such voting powers, full or limited, or no voting powers, and such designations, preferences and relative participating, optional or other special rights, and qualifications, limitations or restrictions thereof, including without limitation thereof, dividend rights, conversion rights, redemption privileges and liquidation preferences, as shall be stated and expressed in such resolutions, all to the full extent now or hereafter permitted by the General Corporation Law of the State of Delaware. Without limiting the generality of the foregoing, the resolutions providing

for issuance of any series of Preferred Stock may provide that such series shall be superior or rank equally or be junior to any other series of Preferred Stock to the extent permitted by law.

The number of authorized shares of Preferred Stock may be increased or decreased (but not below the number of shares then outstanding) by the affirmative vote of the holders of a majority of the voting power of the capital stock of the Corporation entitled to vote thereon, voting as a single class, irrespective of the provisions of Section 242(b)(2) of the General Corporation Law of the State of Delaware.

FIFTH: Except as otherwise provided herein, the Corporation reserves the right to amend, alter, change or repeal any provision contained in this Restated Certificate of Incorporation, in the manner now or hereafter prescribed by statute and this Restated Certificate of Incorporation, and all rights conferred upon stockholders herein are granted subject to this reservation.

SIXTH: In furtherance and not in limitation of the powers conferred upon it by the General Corporation Law of the State of Delaware, and subject to the terms of any series of Preferred Stock, the Board of Directors shall have the power to adopt, amend, alter or repeal the Bylaws of the Corporation by the affirmative vote of a majority of the directors present at any regular or special meeting of the Board of Directors at which a quorum is present. The stockholders may not adopt, amend, alter or repeal the Bylaws of the Corporation, or adopt any provision inconsistent therewith, unless such action is approved, in addition to any other vote required by this Restated Certificate of Incorporation, by the affirmative vote of the holders of at least seventy-five percent (75%) of the votes that all the stockholders would be entitled to cast in any annual election of directors. Notwithstanding any other provisions of law, this Restated Certificate of Incorporation or the Bylaws of the Corporation, and notwithstanding the fact that a lesser percentage may be specified by law, the affirmative vote of the holders of at least seventy-five percent (75%) of the votes which all the stockholders would be entitled to cast in any annual election of directors shall be required to amend or repeal, or to adopt any provision inconsistent with, this Article SIXTH.

SEVENTH: Except to the extent that the General Corporation Law of the State of Delaware prohibits the elimination or limitation of liability of directors for breaches of fiduciary duty, no director of the Corporation shall be personally liable to the Corporation or its stockholders for monetary damages for any breach of fiduciary duty as a director, notwithstanding any provision of law imposing such liability. No amendment to or repeal of this provision shall apply to or have any effect on the liability or alleged liability of any director of the Corporation for or with respect to any acts or omissions of such director occurring prior to such amendment or repeal. If the General Corporation Law of the State of Delaware is amended to permit further elimination or limitation of the personal liability of directors, then the liability of a director of the Corporation shall be eliminated or limited to the fullest extent permitted by the General Corporation Law of the State of Delaware as so amended.

EIGHTH: The Corporation shall provide indemnification as follows:

1. Actions, Suits and Proceedings Other than by or in the Right of the Corporation. The Corporation shall indemnify each person who was or is a party or threatened to be made a

party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative (other than an action by or in the right of the Corporation) by reason of the fact that he or she is or was, or has agreed to become, a director or officer of the Corporation, or is or was serving, or has agreed to serve, at the request of the Corporation, as a director, officer, partner, employee or trustee of, or in a similar capacity with, another corporation, partnership, joint venture, trust or other enterprise (including any employee benefit plan) (all such persons being referred to hereafter as an "Indemnitee"), or by reason of any action alleged to have been taken or omitted in such capacity, against all expenses (including attorneys' fees), liabilities, losses, judgments, fines (including excise taxes and penalties arising under the Employee Retirement Income Security Act of 1974), and amounts paid in settlement actually and reasonably incurred by or on behalf of Indemnitee in connection with such action, suit or proceeding and any appeal therefrom, if Indemnitee acted in good faith and in a manner which Indemnitee reasonably believed to be in, or not opposed to, the best interests of the Corporation, and, with respect to any criminal action or proceeding, had no reasonable cause to believe his or her conduct was unlawful. The termination of any action, suit or proceeding by judgment, order, settlement, conviction or upon a plea of nolo contendere or its equivalent, shall not, of itself, create a presumption that Indemnitee did not act in good faith and in a manner which Indemnitee reasonably believed to be in, or not opposed to, the best interests of the Corporation, and, with respect to any criminal action or proceeding, had reasonable cause to believe that his or her conduct was unlawful.

2. Actions or Suits by or in the Right of the Corporation. The Corporation shall indemnify any Indemnitee who was or is a party to or threatened to be made a party to any threatened, pending or completed action or suit by or in the right of the Corporation to procure a judgment in its favor by reason of the fact that Indemnitee is or was, or has agreed to become, a director or officer of the Corporation, or is or was serving, or has agreed to serve, at the request of the Corporation, as a director, officer, partner, employee or trustee of, or in a similar capacity with, another corporation, partnership, joint venture, trust or other enterprise (including any employee benefit plan), or by reason of any action alleged to have been taken or omitted in such capacity, against all expenses (including attorneys' fees) and, to the extent permitted by law, amounts paid in settlement actually and reasonably incurred by or on behalf of Indemnitee in connection with such action, suit or proceeding and any appeal therefrom, if Indemnitee acted in good faith and in a manner which Indemnitee reasonably believed to be in, or not opposed to, the best interests of the Corporation, except that no indemnification shall be made under this Section 2 in respect of any claim, issue or matter as to which Indemnitee shall have been adjudged to be liable to the Corporation, unless, and only to the extent, that the Court of Chancery of Delaware or the court in which such action or suit was brought shall determine upon application that, despite the adjudication of such liability but in view of all the circumstances of the case, Indemnitee is fairly and reasonably entitled to indemnity for such expenses (including attorneys' fees) which the Court of Chancery of Delaware or such other court shall deem proper.

3. Indemnification for Expenses of Successful Party. Notwithstanding any other provisions of this Article EIGHTH, to the extent that an Indemnitee has been successful, on the merits or otherwise, in defense of any action, suit or proceeding referred to in Sections 1 and 2 of this

Article EIGHTH, or in defense of any claim, issue or matter therein, or on appeal from any such action, suit or proceeding, Indemnitee shall be indemnified against all expenses (including attorneys' fees) actually and reasonably incurred by or on behalf of Indemnitee in connection

therewith. Without limiting the foregoing, if any action, suit or proceeding is disposed of, on the merits or otherwise (including a disposition without prejudice), without (i) the disposition being adverse to Indemnitee, (ii) an adjudication that Indemnitee was liable to the Corporation, (iii) a plea of guilty or nolo contendere by Indemnitee, (iv) an adjudication that Indemnitee did not act in good faith and in a manner he or she reasonably believed to be in or not opposed to the best interests of the Corporation, and (v) with respect to any criminal proceeding, an adjudication that Indemnitee had reasonable cause to believe his or her conduct was unlawful, Indemnitee shall be considered for the purposes hereof to have been wholly successful with respect thereto.

4. Notification and Defense of Claim. As a condition precedent to an Indemnitee's right to be indemnified, such Indemnitee must notify the Corporation in writing as soon as practicable of any action, suit, proceeding or investigation involving such Indemnitee for which indemnity will or could be sought. With respect to any action, suit, proceeding or investigation of which the Corporation is so notified, the Corporation will be entitled to participate therein at its own expense and/or to assume the defense thereof at its own expense, with legal counsel reasonably acceptable to Indemnitee. After notice from the Corporation to Indemnitee of its election so to assume such defense, the Corporation shall not be liable to Indemnitee for any legal or other expenses subsequently incurred by Indemnitee in connection with such action, suit, proceeding or investigation, other than as provided below in this Section 4. Indemnitee shall have the right to employ his or her own counsel in connection with such action, suit, proceeding or investigation, but the fees and expenses of such counsel incurred after notice from the Corporation of its assumption of the defense thereof shall be at the expense of Indemnitee unless (i) the employment of counsel by Indemnitee has been authorized by the Corporation, (ii) counsel to Indemnitee shall have reasonably concluded that there may be a conflict of interest or position on any significant issue between the Corporation and Indemnitee in the conduct of the defense of such action, suit, proceeding or investigation or (iii) the Corporation shall not in fact have employed counsel to assume the defense of such action, suit, proceeding or investigation, in each of which cases the fees and expenses of counsel for Indemnitee shall be at the expense of the Corporation, except as otherwise expressly provided by this Article EIGHTH. The Corporation shall not be entitled, without the consent of Indemnitee, to assume the defense of any claim brought by or in the right of the Corporation or as to which counsel for Indemnitee shall have reasonably made the conclusion provided for in clause (ii) above. The Corporation shall not be required to indemnify Indemnitee under this Article EIGHTH for any amounts paid in settlement of any action, suit, proceeding or investigation effected without its written consent. The Corporation shall not settle any action, suit, proceeding or investigation in any manner which would impose any penalty or limitation on Indemnitee without Indemnitee's written consent. Neither the Corporation nor Indemnitee will unreasonably withhold or delay its consent to any proposed settlement.

5. Advance of Expenses. Subject to the provisions of Section 6 of this Article EIGHTH, in the event of any threatened or pending action, suit, proceeding or investigation of which the Corporation receives notice under this Article EIGHTH, any expenses (including attorneys' fees) incurred by or on behalf of Indemnitee in defending an action, suit, proceeding or investigation or any appeal therefrom shall be paid by the Corporation in advance of the final disposition of such matter; provided, however, that the payment of such expenses incurred by or on behalf of Indemnitee in advance of the final disposition of such matter shall be made only upon receipt of an undertaking by or on behalf of Indemnitee to repay all amounts so advanced

in the event that it shall ultimately be determined by final judicial decision from which there is no further right to appeal that Indemnitee is not entitled to be indemnified by the Corporation as authorized in this Article EIGHTH; and provided further that no such advancement of expenses shall be made under this Article EIGHTH if it is determined (in the manner described in Section 6) that (i) Indemnitee did not act in good faith and in a manner he or she reasonably believed to be in, or not opposed to, the best interests of the Corporation, or (ii) with respect to any criminal action or proceeding, Indemnitee had reasonable cause to believe his or her conduct was unlawful. Such undertaking shall be accepted without reference to the financial ability of Indemnitee to make such repayment.

6. Procedure for Indemnification and Advancement of Expenses. In order to obtain indemnification or advancement of expenses pursuant to Section 1, 2, 3 or 5 of this Article EIGHTH, an Indemnitee shall submit to the Corporation a written request. Any such advancement of expenses shall be made promptly, and in any event within 60 days after receipt by the Corporation of the written request of Indemnitee, unless (i) the Corporation has assumed the defense pursuant to Section 4 of this Article EIGHTH (and none of the circumstances described in Section 4 of this Article EIGHTH that would nonetheless entitle the Indemnitee to indemnification for the fees and expenses of separate counsel have occurred) or (ii) the Corporation determines within such 60-day period that Indemnitee did not meet the applicable standard of conduct set forth in Section 1, 2 or 5 of this Article EIGHTH, as the case may be. Any such indemnification, unless ordered by a court, shall be made with respect to requests under Section 1 or 2 only as authorized in the specific case upon a determination by the Corporation that the indemnification of Indemnitee is proper because Indemnitee has met the applicable standard of conduct set forth in Section 1 or 2, as the case may be. Such determination shall be made in each instance (a) by a majority vote of the directors of the Corporation consisting of persons who are not at that time parties to the action, suit or proceeding in question ("disinterested directors"), whether or not a quorum, (b) by a committee of disinterested directors designated by majority vote of disinterested directors, whether or not a quorum, (c) if there are no disinterested directors, or if the disinterested directors so direct, by independent legal counsel (who may, to the extent permitted by law, be regular legal counsel to the Corporation) in a written opinion, or (d) by the stockholders of the Corporation.

7. Remedies. The right to indemnification or advancement of expenses as granted by this Article EIGHTH shall be enforceable by Indemnitee in any court of competent jurisdiction. Neither the failure of the Corporation to have made a determination prior to the commencement of such action that indemnification is proper in the circumstances because Indemnitee has met the applicable standard of conduct, nor an actual determination by the Corporation pursuant to Section 6 of this Article EIGHTH that Indemnitee has not met such applicable standard of conduct, shall be a defense to the action or create a presumption that Indemnitee has not met the applicable standard of conduct. In any suit brought by Indemnitee to enforce a right to indemnification, or brought by the Corporation to recover an advancement of expenses pursuant to the terms of an undertaking, the Corporation shall have the burden of proving that Indemnitee is not entitled to be indemnified, or to such advancement of expenses, under this Article EIGHTH. Indemnitee's expenses (including attorneys' fees) reasonably incurred in connection with successfully establishing Indemnitee's right to indemnification, in whole or in part, in any such proceeding shall also be indemnified by the Corporation. Notwithstanding the foregoing, in any suit brought by Indemnitee to enforce a right to

indemnification hereunder it shall be a defense that the Indemnitee has not met any applicable standard for indemnification set forth in the General Corporation Law of the State of Delaware.

8. Limitations. Notwithstanding anything to the contrary in this Article EIGHTH, except as set forth in Section 7 of this Article EIGHTH, the Corporation shall not indemnify an Indemnitee pursuant to this Article EIGHTH in connection with a proceeding (or part thereof) initiated by such Indemnitee unless the initiation thereof was approved by the Board of Directors of the Corporation. Notwithstanding anything to the contrary in this Article EIGHTH, the Corporation shall not indemnify an Indemnitee to the extent such Indemnitee is reimbursed from the proceeds of insurance, and in the event the Corporation makes any indemnification payments to an Indemnitee and such Indemnitee is subsequently reimbursed from the proceeds of insurance, such Indemnitee shall promptly refund indemnification payments to the Corporation to the extent of such insurance reimbursement.

9. Subsequent Amendment. No amendment, termination or repeal of this Article EIGHTH or of the relevant provisions of the General Corporation Law of the State of Delaware or any other applicable laws shall adversely affect or diminish in any way the rights of any Indemnitee to indemnification under the provisions hereof with respect to any action, suit, proceeding or investigation arising out of or relating to any actions, transactions or facts occurring prior to the final adoption of such amendment, termination or repeal.

10. Other Rights. The indemnification and advancement of expenses provided by this Article EIGHTH shall not be deemed exclusive of any other rights to which an Indemnitee seeking indemnification or advancement of expenses may be entitled under any law (common or statutory), agreement or vote of stockholders or disinterested directors or otherwise, both as to action in Indemnitee's official capacity and as to action in any other capacity while holding office for the Corporation, and shall continue as to an Indemnitee who has ceased to be a director or officer, and shall inure to the benefit of the estate, heirs, executors and administrators of Indemnitee. Nothing contained in this Article EIGHTH shall be deemed to prohibit, and the Corporation is specifically authorized to enter into, agreements with officers and directors providing indemnification rights and procedures different from those set forth in this Article EIGHTH. In addition, the Corporation may, to the extent authorized from time to time by its Board of Directors, grant indemnification rights to other employees or agents of the Corporation or other persons serving the Corporation and such rights may be equivalent to, or greater or less than, those set forth in this Article EIGHTH.

11. Partial Indemnification. If an Indemnitee is entitled under any provision of this Article EIGHTH to indemnification by the Corporation for some or a portion of the expenses (including attorneys' fees), liabilities, losses, judgments, fines (including excise taxes and penalties arising under the Employee Retirement Income Security Act of 1974) or amounts paid in settlement actually and reasonably incurred by or on behalf of Indemnitee in connection with any action, suit, proceeding or investigation and any appeal therefrom but not, however, for the total amount thereof, the Corporation shall nevertheless indemnify Indemnitee for the portion of such expenses (including attorneys' fees), liabilities, losses, judgments, fines (including excise taxes and penalties arising under the Employee Retirement Income Security Act of 1974) or amounts paid in settlement to which Indemnitee is entitled.

12. Insurance. The Corporation may purchase and maintain insurance, at its expense, to protect itself and any director, officer, employee or agent of the Corporation or another corporation, partnership, joint venture, trust or other enterprise (including any employee benefit plan) against any expense, liability or loss incurred by him or her in any such capacity, or arising out of his or her status as such, whether or not the Corporation would have the power to indemnify such person against such expense, liability or loss under the General Corporation Law of the State of Delaware.

13. Savings Clause. If this Article EIGHTH or any portion hereof shall be invalidated on any ground by any court of competent jurisdiction, then the Corporation shall nevertheless indemnify each Indemnitee as to any expenses (including attorneys' fees), liabilities, losses, judgments, fines (including excise taxes and penalties arising under the Employee Retirement Income Security Act of 1974) and amounts paid in settlement in connection with any action, suit, proceeding or investigation, whether civil, criminal or administrative, including an action by or in the right of the Corporation, to the fullest extent permitted by any applicable portion of this Article EIGHTH that shall not have been invalidated and to the fullest extent permitted by applicable law.

14. Definitions. Terms used herein and defined in Section 145(h) and Section 145(i) of the General Corporation Law of the State of Delaware shall have the respective meanings assigned to such terms in such Section 145(h) and Section 145(i).

NINTH: In furtherance of and not in limitation of powers conferred by law, it is further provided:

1. General Powers of Board. The business and affairs of the Corporation shall be managed by or under the direction of the Board of Directors.

2. Election of Directors. Election of directors need not be by written ballot, except as and to the extent provided in the Bylaws of the Corporation.

TENTH: Stockholders of the Corporation may not take any action by written consent in lieu of a meeting. Notwithstanding any other provisions of law, this Restated Certificate of Incorporation or the Bylaws of the Corporation, and notwithstanding the fact that a lesser percentage may be specified by law, the affirmative vote of the holders of at least seventy-five percent (75%) of the votes which all the stockholders would be entitled to cast in any annual election of directors shall be required to amend or repeal, or to adopt any provision inconsistent with, this Article TENTH.

ELEVENTH: Special meetings of stockholders for any purpose or purposes may be called at any time by only the Board of Directors, the Chairman of the Board or the Chief Executive Officer, and may not be called by any other person or persons. Business transacted at any special meeting of stockholders shall be limited to matters relating to the purpose or purposes stated in the notice of meeting. Notwithstanding any other provisions of law, this Restated Certificate of Incorporation or the Bylaws of the Corporation, and notwithstanding the fact that a lesser percentage may be specified by law, the affirmative vote of the holders of at least seventy-five percent (75%) of the votes which all the stockholders would be entitled to cast

in any annual election of directors shall be required to amend or repeal, or to adopt any provision inconsistent with, this Article ELEVENTH.

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IN WITNESS WHEREOF, this Restated Certificate of Incorporation, which restates, integrates and amends the restated certificate of incorporation of the Corporation, and which has been duly adopted in accordance with Sections 228, 242 and 245 of the General Corporation Law of the State of Delaware, has been executed by its duly authorized officer this day of , .

MERRIMACK PHARMACEUTICALS, INC.

By: _____
Robert J. Mulroy
President and Chief Executive Officer

Exhibit 3.5

AMENDED AND RESTATED BYLAWS

OF

MERRIMACK PHARMACEUTICALS, INC.

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ARTICLE I
STOCKHOLDERS

1.1 Place of Meetings. All meetings of stockholders shall be held at such place as may be designated from time to time by the Board of Directors, the Chairman of the Board, the Chief Executive Officer or the President or, if not so designated, at the principal office of the corporation.

1.2 Annual Meeting. The annual meeting of stockholders for the election of directors to succeed those whose terms expire and for the transaction of such other business as may properly be brought before the meeting shall be held on a date and at a time designated by the Board of Directors, the Chairman of the Board, the Chief Executive Officer or the President (which date shall not be a legal holiday in the place where the meeting is to be held).

1.3 Special Meetings. Special meetings of stockholders for any purpose or purposes may be called at any time by only the Board of Directors, the Chairman of the Board or the Chief Executive Officer, and may not be called by any other person or persons. The Board of Directors may postpone or reschedule any previously scheduled special meeting of stockholders. Business transacted at any special meeting of stockholders shall be limited to matters relating to the purpose or purposes stated in the notice of meeting.

1.4 Notice of Meetings. Except as otherwise provided by law, notice of each meeting of stockholders, whether annual or special, shall be given not less than 10 nor more than 60 days before the date of the meeting to each stockholder entitled to vote at such meeting. Without limiting the manner by which notice otherwise may be given to stockholders, any notice shall be effective if given by a form of electronic transmission consented to (in a manner consistent with the General Corporation Law of the State of Delaware) by the stockholder to whom the notice is given. The notices of all meetings shall state the place, date and time of the meeting and the means of remote communications, if any, by which stockholders and proxyholders may be deemed to be present in person and vote at such meeting. The notice of a special meeting shall state, in addition, the purpose or purposes for which the meeting is called. If notice is given by mail, such notice shall be deemed given when deposited in the United States mail, postage prepaid, directed to the stockholder at such stockholder's address as it appears on the records of

the corporation. If notice is given by electronic transmission, such notice shall be deemed given at the time specified in Section 232 of the General Corporation Law of the State of Delaware.

1.5 Voting List. The Secretary shall prepare, at least 10 days before every meeting of stockholders, a complete list of the stockholders entitled to vote at the meeting, arranged in alphabetical order, and showing the address of each stockholder and the number of shares registered in the name of each stockholder. Such list shall be open to the examination of any stockholder, for any purpose germane to the meeting, for a period of at least 10 days prior to the meeting: (a) on a reasonably accessible electronic network, provided that the information required to gain access to such list is provided with the notice of the meeting, or (b) during ordinary business hours, at the principal place of business of the corporation. The list shall also be produced and kept at the time and place of the meeting during the whole time thereof, and may be inspected by any stockholder who is present. The list shall presumptively determine the identity of the stockholders entitled to vote at the meeting and the number of shares held by each of them.

1.6 Quorum. Except as otherwise provided by law, the Certificate of Incorporation or these Bylaws, the holders of a majority in voting power of the shares of the capital stock of the corporation issued and outstanding and entitled to vote at the meeting, present in person, present by means of remote communication in a manner, if any, authorized by the Board of Directors in its sole discretion, or represented by proxy, shall constitute a quorum for the transaction of business; provided, however, that where a separate vote by a class or classes or series of capital stock is required by law or the Certificate of Incorporation, the holders of a majority in voting power of the shares of such class or classes or series of the capital stock of the corporation issued and outstanding and entitled to vote on such matter, present in person, present by means of remote communication in a manner, if any, authorized by the Board of Directors in its sole discretion, or represented by proxy, shall constitute a quorum entitled to take action with respect to the vote on such matter. A quorum, once established at a meeting, shall not be broken by the withdrawal of enough votes to leave less than a quorum.

1.7 Adjournments. Any meeting of stockholders may be adjourned from time to time to any other time and to any other place at which a meeting of stockholders may be held under

these Bylaws by the chairman of the meeting or by the stockholders present or represented at the meeting and entitled to vote, although less than a quorum. It shall not be necessary to notify any stockholder of any adjournment of less than 30 days if the time and place of the adjourned meeting, and the means of remote communication, if any, by which stockholders and proxyholders may be deemed to be present in person and vote at such adjourned meeting, are announced at the meeting at which adjournment is taken, unless after the adjournment a new record date is fixed for the adjourned meeting. At the adjourned meeting, the corporation may transact any business which might have been transacted at the original meeting.

1.8 Voting and Proxies. Each stockholder shall have one vote for each share of stock entitled to vote held of record by such stockholder and a proportionate vote for each fractional share so held, unless otherwise provided by law or the Certificate of Incorporation. Each stockholder of record entitled to vote at a meeting of stockholders may vote in person (including by means of remote communications, if any, by which stockholders may be deemed to be present in person and vote at such meeting) or may authorize another person or persons to vote for such stockholder by a proxy executed or transmitted in a manner permitted by the General Corporation Law of the State of Delaware by the stockholder or such stockholder's authorized agent and delivered (including by electronic transmission) to the Secretary of the corporation. No such proxy shall be voted upon after three years from the date of its execution, unless the proxy expressly provides for a longer period.

1.9 Action at Meeting. When a quorum is present at any meeting, any matter other than the election of directors to be voted upon by the stockholders at such meeting shall be decided by the vote of the holders of shares of stock having a majority in voting power of the votes cast by the holders of all of the shares of stock present or represented at the meeting and voting affirmatively or negatively on such matter (or if there are two or more classes or series of stock entitled to vote as separate classes, then in the case of each such class or series, the holders of a majority in voting power of the shares of stock of that class or series present or represented at the meeting and voting affirmatively or negatively on such matter), except when a different vote is required by law, the Certificate of Incorporation or these Bylaws. When a quorum is present at any meeting, any election by stockholders of directors shall be determined by a plurality of the votes cast by the stockholders entitled to vote on the election.

1.10 Nomination of Directors.

(a) Except for (1) any directors entitled to be elected by the holders of preferred stock, (2) any directors elected in accordance with Section 2.7 hereof by the Board of Directors to fill a vacancy or newly-created directorship or (3) as otherwise required by applicable law or stock exchange regulation, at any meeting of stockholders, only persons who are nominated in accordance with the procedures in this Section 1.10 shall be eligible for election as directors. Nomination for election to the Board of Directors at a meeting of stockholders may be made (i) by or at the direction of the Board of Directors or (ii) by any stockholder of the corporation who (x) timely complies with the notice procedures in Section 1.10(b), (y) is a stockholder of record on the date of the giving of such notice and on the record date for the determination of stockholders entitled to vote at such meeting and (z) is entitled to vote at such meeting.

(b) To be timely, a stockholder's notice must be received in writing by the Secretary at the principal executive offices of the corporation as follows: (i) in the case of an election of directors at an annual meeting of stockholders, not less than 90 days nor more than 120 days prior to the first anniversary of the preceding year's annual meeting; provided, however, that in the event that the date of the annual meeting is advanced by more than 20 days, or delayed by more than 60 days, from the first anniversary of the preceding year's annual meeting, a stockholder's notice must be so received not earlier than the 120th day prior to such annual meeting and not later than the close of business on the later of (A) the 90th day prior to such annual meeting and (B) the tenth day following the day on which notice of the date of such annual meeting was mailed or public disclosure of the date of such annual meeting was made, whichever first occurs; or (ii) in the case of an election of directors at a special meeting of stockholders, provided that the Board of Directors, the Chairman of the Board or the Chief Executive Officer has determined, in accordance with Section 1.3, that directors shall be elected at such special meeting and provided further that the nomination made by the stockholder is for one of the director positions that the Board of Directors, the Chairman of the Board or the Chief Executive Officer, as the case may be, has determined will be filled at such special meeting, not earlier than the 120th day prior to such special meeting and not later than the close of business on the later of (x) the 90th day prior to such special meeting and (y) the tenth day following the

day on which notice of the date of such special meeting was mailed or public disclosure of the date of such special meeting was made, whichever first occurs. In no event shall the adjournment or postponement of a meeting (or the public disclosure thereof) commence a new time period (or extend any time period) for the giving of a stockholder's notice.

The stockholder's notice to the Secretary shall set forth: (A) as to each proposed nominee (1) such person's name, age, business address and, if known, residence address, (2) such person's principal occupation or employment, (3) the class and series and number of shares of stock of the corporation that are, directly or indirectly, owned, beneficially or of record, by such person, (4) a description of all direct and indirect compensation and other material monetary agreements, arrangements and understandings during the past three years, and any other material relationships, between or among (x) the stockholder, the beneficial owner, if any, on whose behalf the nomination is being made and the respective affiliates and associates of, or others acting in concert with, such stockholder and such beneficial owner, on the one hand, and (y) each proposed nominee, and his or her respective affiliates and associates, or others acting in concert with such nominee(s), on the other hand, including all information that would be required to be disclosed pursuant to Item 404 of Regulation S-K if the stockholder making the nomination and any beneficial owner on whose behalf the nomination is made or any affiliate or associate thereof or person acting in concert therewith were the "registrant" for purposes of such Item and the proposed nominee were a director or executive officer of such registrant, and (5) any other information concerning such person that must be disclosed as to nominees in proxy solicitations pursuant to Regulation 14A under the Securities Exchange Act of 1934, as amended (the "Exchange Act"); and (B) as to the stockholder giving the notice and the beneficial owner, if any, on whose behalf the nomination is being made (1) the name and address of such stockholder, as they appear on the corporation's books, and of such beneficial owner, (2) the class and series and number of shares of stock of the corporation that are, directly or indirectly, owned, beneficially or of record, by such stockholder and such beneficial owner, (3) a description of any agreement, arrangement or understanding between or among such stockholder and/or such beneficial owner and each proposed nominee and any other person or persons (including their names) pursuant to which the nomination(s) are being made or who may participate in the solicitation of proxies in favor of electing such nominee(s), (4) a description of any agreement, arrangement or understanding (including any derivative or short positions,

swaps, profit interests, options, warrants, convertible securities, stock appreciation or similar rights, hedging transactions, and borrowed or loaned shares) that has been entered into by, or on behalf of, such stockholder or such beneficial owner, the effect or intent of which is to mitigate loss to, manage risk or benefit

of share price changes for, or increase or decrease the voting power of, such stockholder or such beneficial owner with respect to shares of stock of the corporation, (5) any other information relating to such stockholder and such beneficial owner that would be required to be disclosed in a proxy statement or other filings required to be made in connection with solicitations of proxies for the election of directors in a contested election pursuant to Section 14 of the Exchange Act and the rules and regulations promulgated thereunder, (6) a representation that such stockholder intends to appear in person or by proxy at the meeting to nominate the person(s) named in its notice and (7) a representation whether such stockholder and/or such beneficial owner intends or is part of a group which intends (x) to deliver a proxy statement and/or form of proxy to holders of at least the percentage of the corporation's outstanding capital stock reasonably believed by such stockholder or such beneficial owner to be sufficient to elect the nominee (and such representation shall be included in any such proxy statement and form of proxy) and/or (y) otherwise to solicit proxies from stockholders in support of such nomination (and such representation shall be included in any such solicitation materials). Not later than 10 days after the record date for the meeting, the information required by Items (A)(1)-(5) and (B)(1)-(5) of the prior sentence shall be supplemented by the stockholder giving the notice to provide updated information as of the record date. In addition, to be effective, the stockholder's notice must be accompanied by the written consent of the proposed nominee to serve as a director if elected. The corporation may require any proposed nominee to furnish such other information as the corporation may reasonably require to determine the eligibility of such proposed nominee to serve as a director of the corporation or whether such nominee would be independent under applicable Securities and Exchange Commission and stock exchange rules and the corporation's publicly disclosed corporate governance guidelines. A stockholder shall not have complied with this Section 1.10(b) if the stockholder (or beneficial owner, if any, on whose behalf the nomination is made) solicits or does not solicit, as the case may be, proxies in support of such stockholder's nominee in contravention of the representations with respect thereto required by this Section 1.10.

(c) The chairman of any meeting shall have the power and duty to determine whether a nomination was made in accordance with the provisions of this Section 1.10 (including whether the stockholder or beneficial owner, if any, on whose behalf the nomination is made solicited (or is part of a group which solicited) or did not so solicit, as the case may be, proxies in support of such stockholder's nominee in compliance with the representations with respect thereto required by this Section 1.10), and if the chairman should determine that a nomination was not made in accordance with the provisions of this Section 1.10, the chairman shall so declare to the meeting and such nomination shall not be brought before the meeting.

(d) Except as otherwise required by law, nothing in this Section 1.10 shall obligate the corporation or the Board of Directors to include in any proxy statement or other stockholder communication distributed on behalf of the corporation or the Board of Directors information with respect to any nominee for director submitted by a stockholder.

(e) Notwithstanding the foregoing provisions of this Section 1.10, unless otherwise required by law, if the stockholder (or a qualified representative of the stockholder) does not appear at the meeting to present a nomination, such nomination shall not be brought before the meeting, notwithstanding that proxies in respect of such nominee may have been received by the corporation. For purposes of this Section 1.10, to be considered a "qualified representative of the stockholder", a person must be authorized by a written instrument executed by such stockholder or an electronic transmission delivered by such stockholder to act for such stockholder as proxy at the meeting of stockholders and such person must produce such written instrument or electronic transmission, or a reliable reproduction of the written instrument or electronic transmission, at the meeting of stockholders.

(f) For purposes of this Section 1.10, "public disclosure" shall include disclosure in a press release reported by the Dow Jones News Service, Associated Press or comparable national news service or in a document publicly filed by the corporation with the Securities and Exchange Commission pursuant to Section 13, 14 or 15(d) of the Exchange Act.

1.11 Notice of Business at Annual Meetings.

(a) At any annual meeting of the stockholders, only such business shall be conducted as shall have been properly brought before the meeting. To be properly brought before an annual meeting, business must be (1) specified in the notice of meeting (or any supplement thereto) given by or at the direction of the Board of Directors, (2) otherwise properly brought before the meeting by or at the direction of the Board of Directors, or (3) properly brought before the meeting by a stockholder. For business to be properly brought before an annual meeting by a stockholder, (i) if such business relates to the nomination of a person for election as a director of the corporation, the procedures in Section 1.10 must be complied with and (ii) if such business relates to any other matter, the business must constitute a proper matter under Delaware law for stockholder action and the stockholder must (x) have given timely notice thereof in writing to the Secretary in accordance with the procedures in Section 1.11(b), (y) be a stockholder of record on the date of the giving of such notice and on the record date for the determination of stockholders entitled to vote at such annual meeting and (z) be entitled to vote at such annual meeting.

(b) To be timely, a stockholder's notice must be received in writing by the Secretary at the principal executive offices of the corporation not less than 90 days nor more than 120 days prior to the first anniversary of the preceding year's annual meeting; provided, however, that in the event that the date of the annual meeting is advanced by more than 20 days, or delayed by more than 60 days, from the first anniversary of the preceding year's annual meeting, a stockholder's notice must be so received not earlier than the 120th day prior to such annual meeting and not later than the close of business on the later of (A) the 90th day prior to such annual meeting and (B) the tenth day following the day on which notice of the date of such annual meeting was mailed or public disclosure of the date of such annual meeting was made, whichever first occurs. In no event shall the adjournment or postponement of an annual meeting (or the public disclosure thereof) commence a new time period (or extend any time period) for the giving of a stockholder's notice.

The stockholder's notice to the Secretary shall set forth: (A) as to each matter the stockholder proposes to bring before the annual meeting (1) a brief description of the business

desired to be brought before the annual meeting, (2) the text of the proposal (including the exact text of any resolutions proposed for consideration and, in the event that such business includes a proposal to amend the Bylaws, the exact text of the proposed amendment), and (3) the reasons for conducting such

business at the annual meeting, and (B) as to the stockholder giving the notice and the beneficial owner, if any, on whose behalf the proposal is being made (1) the name and address of such stockholder, as they appear on the corporation's books, and of such beneficial owner, (2) the class and series and number of shares of stock of the corporation that are, directly or indirectly, owned, beneficially or of record, by such stockholder and such beneficial owner, (3) a description of any material interest of such stockholder or such beneficial owner and the respective affiliates and associates of, or others acting in concert with, such stockholder or such beneficial owner in such business, (4) a description of any agreement, arrangement or understanding between or among such stockholder and/or such beneficial owner and any other person or persons (including their names) in connection with the proposal of such business or who may participate in the solicitation of proxies in favor of such proposal, (5) a description of any agreement, arrangement or understanding (including any derivative or short positions, swaps, profit interests, options, warrants, convertible securities, stock appreciation or similar rights, hedging transactions, and borrowed or loaned shares) that has been entered into by, or on behalf of, such stockholder or such beneficial owner, the effect or intent of which is to mitigate loss to, manage risk or benefit of share price changes for, or increase or decrease the voting power of, such stockholder or such beneficial owner with respect to shares of stock of the corporation, (6) any other information relating to such stockholder and such beneficial owner that would be required to be disclosed in a proxy statement or other filings required to be made in connection with solicitations of proxies for the business proposed pursuant to Section 14 of the Exchange Act and the rules and regulations promulgated thereunder, (7) a representation that such stockholder intends to appear in person or by proxy at the annual meeting to bring such business before the meeting and (8) a representation whether such stockholder and/or such beneficial owner intends or is part of a group which intends (x) to deliver a proxy statement and/or form of proxy to holders of at least the percentage of the corporation's outstanding capital stock required to approve or adopt the proposal (and such representation shall be included in any such proxy statement and form of proxy) and/or (y) otherwise to solicit proxies from stockholders in support of such proposal (and such representation shall be included in any such

solicitation materials). Not later than 10 days after the record date for the meeting, the information required by Items (A)(3) and (B)(1)-(6) of the prior sentence shall be supplemented by the stockholder giving the notice to provide updated information as of the record date. Notwithstanding anything in these Bylaws to the contrary, no business shall be conducted at any annual meeting of stockholders except in accordance with the procedures in this Section 1.11, provided that any stockholder proposal which complies with Rule 14a-8 of the proxy rules (or any successor provision) promulgated under the Exchange Act and is to be included in the corporation's proxy statement for an annual meeting of stockholders shall be deemed to comply with the notice requirements of this Section 1.11. A stockholder shall not have complied with this Section 1.11(b) if the stockholder (or beneficial owner, if any, on whose behalf the proposal is made) solicits or does not solicit, as the case may be, proxies in support of such stockholder's proposal in contravention of the representations with respect thereto required by this Section 1.11.

(c) The chairman of any annual meeting shall have the power and duty to determine whether business was properly brought before the annual meeting in accordance with the provisions of this Section 1.11 (including whether the stockholder or beneficial owner, if any, on whose behalf the proposal is made solicited (or is part of a group which solicited) or did not so solicit, as the case may be, proxies in support of such stockholder's proposal in compliance with the representation with respect thereto required by this Section 1.11), and if the chairman should determine that business was not properly brought before the annual meeting in accordance with the provisions of this Section 1.11, the chairman shall so declare to the meeting and such business shall not be brought before the annual meeting.

(d) Except as otherwise required by law, nothing in this Section 1.11 shall obligate the corporation or the Board of Directors to include in any proxy statement or other stockholder communication distributed on behalf of the corporation or the Board of Directors information with respect to any proposal submitted by a stockholder.

(e) Notwithstanding the foregoing provisions of this Section 1.11, unless otherwise required by law, if the stockholder (or a qualified representative of the stockholder) does not appear at the annual meeting to present business, such business shall not be

considered, notwithstanding that proxies in respect of such business may have been received by the corporation.

(f) For purposes of this Section 1.11, the terms "qualified representative of the stockholder" and "public disclosure" shall have the same meaning as in Section 1.10.

1.12 Conduct of Meetings.

(a) Meetings of stockholders shall be presided over by the Chairman of the Board, if any, or in the Chairman's absence by the Vice Chairman of the Board, if any, or in the Vice Chairman's absence by the Chief Executive Officer, or in the Chief Executive Officer's absence, by the President, or in the President's absence by a Vice President, or in the absence of all of the foregoing persons by a chairman designated by the Board of Directors. The Secretary shall act as secretary of the meeting, but in the Secretary's absence the chairman of the meeting may appoint any person to act as secretary of the meeting.

(b) The Board of Directors may adopt by resolution such rules, regulations and procedures for the conduct of any meeting of stockholders of the corporation as it shall deem appropriate including, without limitation, such guidelines and procedures as it may deem appropriate regarding the participation by means of remote communication of stockholders and proxyholders not physically present at a meeting. Except to the extent inconsistent with such rules, regulations and procedures as adopted by the Board of Directors, the chairman of any meeting of stockholders shall have the right and authority to prescribe such rules, regulations and procedures and to do all such acts as, in the judgment of such chairman, are appropriate for the proper conduct of the meeting. Such rules, regulations or procedures, whether adopted by the Board of Directors or prescribed by the chairman of the meeting, may include, without limitation, the following: (i) the establishment of an agenda or order of business for the meeting; (ii) rules and procedures for maintaining order at the meeting and the safety of those present; (iii) limitations on attendance at or participation in the meeting to stockholders of record of the corporation, their duly authorized and constituted proxies or such other persons as shall be determined; (iv) restrictions on entry to the meeting after the time fixed for the commencement thereof; and (v) limitations on the time allotted to questions or comments by participants. Unless and to the extent determined by the Board of Directors or the chairman of

the meeting, meetings of stockholders shall not be required to be held in accordance with the rules of parliamentary procedure.

(c) The chairman of the meeting shall announce at the meeting when the polls for each matter to be voted upon at the meeting will be opened and closed. After the polls close, no ballots, proxies or votes or any revocations or changes thereto may be accepted.

(d) In advance of any meeting of stockholders, the Board of Directors, the Chairman of the Board, the Chief Executive Officer or the President shall appoint one or more inspectors of election to act at the meeting and make a written report thereof. One or more other persons may be designated as alternate inspectors to replace any inspector who fails to act. If no inspector or alternate is present, ready and willing to act at a meeting of stockholders, the chairman of the meeting shall appoint one or more inspectors to act at the meeting. Unless otherwise required by law, inspectors may be officers, employees or agents of the corporation. Each inspector, before entering upon the discharge of such inspector's duties, shall take and sign an oath faithfully to execute the duties of inspector with strict impartiality and according to the best of such inspector's ability. The inspector shall have the duties prescribed by law and shall take charge of the polls and, when the vote is completed, shall make a certificate of the result of the vote taken and of such other facts as may be required by law. Every vote taken by ballots shall be counted by a duly appointed inspector or duly appointed inspectors.

1.13 No Action by Consent in Lieu of a Meeting. Stockholders of the corporation may not take any action by written consent in lieu of a meeting.

ARTICLE II
DIRECTORS

2.1 General Powers. The business and affairs of the corporation shall be managed by or under the direction of a Board of Directors, who may exercise all of the powers of the corporation except as otherwise provided by law or the Certificate of Incorporation.

2.2 Number, Election and Qualification. Subject to the rights of holders of any series of Preferred Stock to elect directors, the number of directors of the corporation shall be

established by the Board of Directors. Election of directors need not be by written ballot. Directors need not be stockholders of the corporation.

2.3 Chairman of the Board; Vice Chairman of the Board. The Board of Directors may appoint from its members a Chairman of the Board and a Vice Chairman of the Board, neither of whom need be an employee or officer of the corporation. If the Board of Directors appoints a Chairman of the Board, such Chairman shall perform such duties and possess such powers as are assigned by the Board of Directors and, if the Chairman of the Board is also designated as the corporation's Chief Executive Officer, shall have the powers and duties of the Chief Executive Officer prescribed in Section 3.7 of these Bylaws. If the Board of Directors appoints a Vice Chairman of the Board, such Vice Chairman shall perform such duties and possess such powers as are assigned by the Board of Directors. Unless otherwise provided by the Board of Directors, the Chairman of the Board or, in the Chairman's absence, the Vice Chairman of the Board, if any, shall preside at all meetings of the Board of Directors.

2.4 Quorum. The greater of (a) a majority of the directors at any time in office and (b) one-third of the number of directors established by the Board of Directors pursuant to Section 2.2 of these Bylaws shall constitute a quorum of the Board of Directors. If at any meeting of the Board of Directors there shall be less than such a quorum, a majority of the directors present may adjourn the meeting from time to time without further notice other than announcement at the meeting, until a quorum shall be present.

2.5 Action at Meeting. Every act or decision done or made by a majority of the directors present at a meeting duly held at which a quorum is present shall be regarded as the act of the Board of Directors, unless a greater number is required by law or by the Certificate of Incorporation.

2.6 Removal. Subject to the rights of any series of Preferred Stock, directors of the corporation may be removed, with or without cause, by a majority in voting power of the shares of capital stock of the corporation issued and outstanding and entitled to vote in any annual election of directors.

2.7 Vacancies. Subject to the rights of holders of any series of Preferred Stock, any vacancy or newly-created directorship on the Board of Directors, however occurring, shall be filled only by vote of a majority of the directors then in office, although less than a quorum, or by a sole remaining director and shall not be filled by the stockholders. A director elected to fill a vacancy shall hold office until the next election of directors, subject to the election and qualification of a successor or until such director's earlier death, resignation or removal.

2.8 Resignation. Any director may resign by delivering a resignation in writing or by electronic transmission to the corporation at its principal office or to the Chairman of the Board, the Chief Executive Officer, the President or the Secretary. Such resignation shall be effective upon delivery unless it is specified to be effective at some later time or upon the happening of some later event.

2.9 Regular Meetings. Regular meetings of the Board of Directors may be held without notice at such time and place as shall be determined from time to time by the Board of Directors, provided that any director who is absent when such a determination is made shall be given notice of the determination. A regular meeting of the Board of Directors may be held without notice immediately after and at the same place as the annual meeting of stockholders.

2.10 Special Meetings. Special meetings of the Board of Directors may be held at any time and place designated in a call by the Chairman of the Board, the Chief Executive Officer, the President, two or more directors, or by one director in the event that there is only a single director in office.

2.11 Notice of Special Meetings. Notice of the date, place and time of any special meeting of directors shall be given to each director by the Secretary or by the officer or one of the directors calling the meeting. Notice shall be duly given to each director (a) in person or by telephone at least 24 hours in advance of the meeting, (b) by sending written notice by reputable overnight courier, telecopy, facsimile or electronic transmission, or delivering written notice by hand, to such director's last known business, home or electronic transmission address at least 48 hours in advance of the meeting, or (c) by sending written notice by first-class mail to such director's last known business or home address at least 72 hours in advance of the meeting. A

notice or waiver of notice of a meeting of the Board of Directors need not specify the purposes of the meeting.

2.12 Meetings by Conference Communications Equipment. Directors may participate in meetings of the Board of Directors or any committee thereof by means of conference telephone or other communications equipment by means of which all persons participating in the meeting can hear each other, and participation by such means shall constitute presence in person at such meeting.

2.13 Action by Consent. Any action required or permitted to be taken at any meeting of the Board of Directors or of any committee thereof may be taken without a meeting, if all members of the Board of Directors or committee, as the case may be, consent to the action in writing or by electronic transmission, and the written consents or electronic transmissions are filed with the minutes of proceedings of the Board of Directors or committee. Such filing shall be in paper form if the minutes are maintained in paper form and shall be in electronic form if the minutes are maintained in electronic form.

2.14 Committees. The Board of Directors may designate one or more committees, each committee to consist of one or more of the directors of the corporation with such lawfully delegable powers and duties as the Board of Directors thereby confers, to serve at the pleasure of the Board of Directors. The Board of Directors may designate one or more directors as alternate members of any committee, who may replace any absent or disqualified member at any meeting of the committee. In the absence or disqualification of a member of a committee, the member or members of the committee present at any meeting and not disqualified from voting, whether or not such member or members constitute a quorum, may unanimously appoint another member of the Board of Directors to act at the meeting in the place of any such absent or disqualified member. Any such committee, to the extent provided in the resolution of the Board of Directors and subject to the provisions of law, shall have and may exercise all the powers and authority of the Board of Directors in the management of the business and affairs of the corporation and may authorize the seal of the corporation to be affixed to all papers which may require it. Each such committee shall keep minutes and make such reports as the Board of Directors may from time to time request. Except as the Board of Directors may otherwise determine, any committee may

make rules for the conduct of its business, but unless otherwise provided by the directors or in such rules, its business shall be conducted as nearly as possible in the same manner as is provided in these Bylaws for the Board of Directors. Except as otherwise provided in the Certificate of Incorporation, these Bylaws, or the resolution of the Board of Directors designating the committee, a committee may create one or more subcommittees, each subcommittee to consist of one or more members of the committee, and delegate to a subcommittee any or all of the powers and authority of the committee.

2.15 Compensation of Directors. Directors may be paid such compensation for their services and such reimbursement for expenses of attendance at meetings as the Board of Directors may from time to time determine. No such payment shall preclude any director from serving the corporation or any of its parent or subsidiary entities in any other capacity and receiving compensation for such service.

ARTICLE III
OFFICERS

3.1 Titles. The officers of the corporation shall consist of a Chief Executive Officer, a President, a Secretary, a Treasurer and such other officers with such other titles as the Board of Directors shall determine, including one or more Vice Presidents, Assistant Treasurers and Assistant Secretaries. The Board of Directors may appoint such other officers as it may deem appropriate.

3.2 Election. The Chief Executive Officer, President, Treasurer and Secretary shall be elected annually by the Board of Directors at its first meeting following the annual meeting of stockholders. Other officers may be appointed by the Board of Directors at such meeting or at any other meeting.

3.3 Qualification. No officer need be a stockholder. Any two or more offices may be held by the same person.

3.4 Tenure. Except as otherwise provided by law, by the Certificate of Incorporation or by these Bylaws, each officer shall hold office until such officer's successor is elected and

qualified, unless a different term is specified in the resolution electing or appointing such officer, or until such officer's earlier death, resignation or removal.

3.5 Resignation and Removal. Any officer may resign by delivering a written resignation to the corporation at its principal office or to the Chief Executive Officer, the President or the Secretary. Such resignation shall be effective upon receipt unless it is specified to be effective at some later time or upon the happening of some later event. Any officer may be removed at any time, with or without cause, by vote of a majority of the directors then in office. Except as the Board of Directors may otherwise determine, no officer who resigns or is removed shall have any right to any compensation as an officer for any period following such officer's resignation or removal, or any right to damages on account of such removal, whether such officer's compensation be by the month or by the year or otherwise, unless such compensation is expressly provided for in a duly authorized written agreement with the corporation.

3.6 Vacancies. The Board of Directors may fill any vacancy occurring in any office for any reason and may, in its discretion, leave unfilled for such period as it may determine any offices other than those of Chief Executive Officer, President, Treasurer and Secretary. Each such successor shall hold office for the unexpired term of such officer's predecessor and until a successor is elected and qualified, or until such officer's earlier death, resignation or removal.

3.7 President; Chief Executive Officer. Unless the Board of Directors has designated another person as the corporation's Chief Executive Officer, the President shall be the Chief Executive Officer of the corporation. The Chief Executive Officer shall have general charge and supervision of the business of the corporation subject to the direction of the Board of Directors, and shall perform all duties and have all powers that are commonly incident to the office of chief executive or that are delegated to such officer by the Board of Directors. The President shall perform such other duties and shall have such other powers as the Board of Directors or the Chief Executive Officer (if the President is not the Chief Executive Officer) may from time to time prescribe. In the event of the absence, inability or refusal to act of the Chief Executive Officer or the President (if the President is not the Chief Executive Officer), the Vice President (or if there shall be more than one, the Vice Presidents in the order determined by the Board of Directors) shall perform the duties of the Chief Executive Officer and when so performing such

duties shall have all the powers of and be subject to all the restrictions upon the Chief Executive Officer.

3.8 Vice Presidents. Each Vice President shall perform such duties and possess such powers as the Board of Directors or the Chief Executive Officer may from time to time prescribe. The Board of Directors may assign to any Vice President the title of Executive Vice President, Senior Vice President or any other title selected by the Board of Directors.

3.9 Secretary and Assistant Secretaries. The Secretary shall perform such duties and shall have such powers as the Board of Directors or the Chief Executive Officer may from time to time prescribe. In addition, the Secretary shall perform such duties and have such powers as are incident to the office of the secretary, including without limitation the duty and power to give notices of all meetings of stockholders and special meetings of the Board of Directors, to attend all meetings of stockholders and the Board of Directors and keep a record of the proceedings, to maintain a stock ledger and prepare lists of stockholders and their addresses as required, to be custodian of corporate records and the corporate seal and to affix and attest to the same on documents.

Any Assistant Secretary shall perform such duties and possess such powers as the Board of Directors, the Chief Executive Officer or the Secretary may from time to time prescribe. In the event of the absence, inability or refusal to act of the Secretary, the Assistant Secretary (or if there shall be more than one, the Assistant Secretaries in the order determined by the Board of Directors) shall perform the duties and exercise the powers of the Secretary.

In the absence of the Secretary or any Assistant Secretary at any meeting of stockholders or directors, the chairman of the meeting shall designate a temporary secretary to keep a record of the meeting.

3.10 Treasurer and Assistant Treasurers. The Treasurer shall perform such duties and shall have such powers as may from time to time be assigned by the Board of Directors or the Chief Executive Officer. In addition, the Treasurer shall perform such duties and have such powers as are incident to the office of treasurer, including without limitation the duty and power to keep and be responsible for all funds and securities of the corporation, to deposit funds of the

corporation in depositories selected in accordance with these Bylaws, to disburse such funds as ordered by the Board of Directors, to make proper accounts of such funds, and to render as required by the Board of Directors statements of all such transactions and of the financial condition of the corporation.

The Assistant Treasurers shall perform such duties and possess such powers as the Board of Directors, the Chief Executive Officer or the Treasurer may from time to time prescribe. In the event of the absence, inability or refusal to act of the Treasurer, the Assistant Treasurer (or if there shall be more than one, the Assistant Treasurers in the order determined by the Board of Directors) shall perform the duties and exercise the powers of the Treasurer.

3.11 Salaries. Officers of the corporation shall be entitled to such salaries, compensation or reimbursement as shall be fixed or allowed from time to time by the Board of Directors.

3.12 Delegation of Authority. The Board of Directors may from time to time delegate the powers or duties of any officer to any other officer or agent, notwithstanding any provision hereof.

ARTICLE IV
CAPITAL STOCK

4.1 Issuance of Stock. Subject to the provisions of the Certificate of Incorporation, the whole or any part of any unissued balance of the authorized capital stock of the corporation or the whole or any part of any shares of the authorized capital stock of the corporation held in the corporation's treasury may be issued, sold, transferred or otherwise disposed of by vote of the Board of Directors in such manner, for such lawful consideration and on such terms as the Board of Directors may determine.

4.2 Stock Certificates; Uncertificated Shares. The shares of the corporation shall be represented by certificates, provided that the Board of Directors may provide by resolution or resolutions that some or all of any or all classes or series of the corporation's stock shall be uncertificated shares. Every holder of stock of the corporation represented by certificates shall be entitled to have a certificate, in such form as may be prescribed by law and by the Board of

Directors, representing the number of shares held by such holder registered in certificate form. Each such certificate shall be signed in a manner that complies with Section 158 of the General Corporation Law of the State of Delaware.

Each certificate for shares of stock which are subject to any restriction on transfer pursuant to the Certificate of Incorporation, these Bylaws, applicable securities laws or any agreement among any number of stockholders or among such holders and the corporation shall have conspicuously noted on the face or back of the certificate either the full text of the restriction or a statement of the existence of such restriction.

If the corporation shall be authorized to issue more than one class of stock or more than one series of any class, the powers, designations, preferences and relative participating, optional or other special rights of each class of stock or series thereof and the qualifications, limitations or restrictions of such preferences and/or rights shall be set forth in full or summarized on the face or back of each certificate representing shares of such class or series of stock, provided that in lieu of the foregoing requirements there may be set forth on the face or back of each certificate representing shares of such class or series of stock a statement that the corporation will furnish without charge to each stockholder who so requests a copy of the full text of the powers, designations, preferences and relative, participating, optional or other special rights of each class of stock or series thereof and the qualifications, limitations or restrictions of such preferences and/or rights.

Within a reasonable time after the issuance or transfer of uncertificated shares, the corporation shall send to the registered owner thereof a written notice containing the information required to be set forth or stated on certificates pursuant to Sections 151, 202(a) or 218(a) of the General Corporation Law of the State of Delaware or, with respect to Section 151 of General Corporation Law of the State of Delaware, a statement that the corporation will furnish without charge to each stockholder who so requests the powers, designations, preferences and relative participating, optional or other special rights of each class of stock or series thereof and the qualifications, limitations or restrictions of such preferences and/or rights.

4.3 Transfers. Shares of stock of the corporation shall be transferable in the manner prescribed by law and in these Bylaws. Transfers of shares of stock of the corporation shall be

made only on the books of the corporation or by transfer agents designated to transfer shares of stock of the corporation. Subject to applicable law, shares of stock represented by certificates shall be transferred only on the books of the corporation by the surrender to the corporation or its transfer agent of the certificate representing such shares properly endorsed or accompanied by a written assignment or power of attorney properly executed, and with such proof of authority or the authenticity of signature as the corporation or its transfer agent may reasonably require. Except as may be otherwise required by law, by the Certificate of Incorporation or by these Bylaws, the corporation shall be entitled to treat the record holder of stock as shown on its books as the owner of such stock for all purposes, including the payment of dividends and the right to vote with respect to such stock, regardless of any transfer, pledge or other disposition of such stock until the shares have been transferred on the books of the corporation in accordance with the requirements of these Bylaws.

4.4 Lost, Stolen or Destroyed Certificates. The corporation may issue a new certificate of stock in place of any previously issued certificate alleged to have been lost, stolen or destroyed, upon such terms and conditions as the Board of Directors may prescribe, including the presentation of reasonable evidence of such loss, theft or destruction and the giving of such indemnity and posting of such bond as the Board of Directors may require for the protection of the corporation or any transfer agent or registrar.

4.5 Record Date. The Board of Directors may fix in advance a date as a record date for the determination of the stockholders entitled to notice of or to vote at any meeting of stockholders, or entitled to receive payment of any dividend or other distribution or allotment of any rights in respect of any change, conversion or exchange of stock, or for the purpose of any other lawful action. Such record date shall not precede the date on which the resolution fixing the record date is adopted, and such record date shall not be more than 60 nor less than 10 days before the date of such meeting, nor more than 60 days prior to any other action to which such record date relates.

If no record date is fixed, the record date for determining stockholders entitled to notice of or to vote at a meeting of stockholders shall be at the close of business on the day before the day on which notice is given, or, if notice is waived, at the close of business on the day before

the day on which the meeting is held. If no record date is fixed, the record date for determining stockholders for any other purpose shall be at the close of business on the day on which the Board of Directors adopts the resolution relating to such purpose.

A determination of stockholders of record entitled to notice of or to vote at a meeting of stockholders shall apply to any adjournment of the meeting; provided, however, that the Board of Directors may fix a new record date for the adjourned meeting.

4.6 Regulations. The issue, transfer, conversion and registration of shares of stock of the corporation shall be governed by such other regulations as the Board of Directors may establish.

ARTICLE V
GENERAL PROVISIONS

5.1 Fiscal Year. Except as from time to time otherwise designated by the Board of Directors, the fiscal year of the corporation shall begin on the first day of January of each year and end on the last day of December in each year.

5.2 Corporate Seal. The corporate seal shall be in such form as shall be approved by the Board of Directors.

5.3 Waiver of Notice. Whenever notice is required to be given by law, by the Certificate of Incorporation or by these Bylaws, a written waiver signed by the person entitled to notice, or a waiver by electronic transmission by the person entitled to notice, whether before, at or after the time of the event for which notice is to be given, shall be deemed equivalent to notice required to be given to such person. Neither the business nor the purpose of any meeting need be specified in any such waiver. Attendance of a person at a meeting shall constitute a waiver of notice of such meeting, except when the person attends

a meeting for the express purpose of objecting at the beginning of the meeting, to the transaction of any business because the meeting is not lawfully called or convened.

5.4 Voting of Securities. Except as the Board of Directors may otherwise designate, the Chief Executive Officer, the President or the Treasurer may waive notice of, vote, or appoint

any person or persons to vote, on behalf of the corporation at, and act as, or appoint any person or persons to act as, proxy or attorney-in-fact for this corporation (with or without power of substitution) at, any meeting of stockholders or securityholders of any other entity, the securities of which may be held by this corporation.

5.5 Evidence of Authority. A certificate by the Secretary, or an Assistant Secretary, or a temporary Secretary, as to any action taken by the stockholders, directors, a committee or any officer or representative of the corporation shall as to all persons who rely on the certificate in good faith be conclusive evidence of such action.

5.6 Certificate of Incorporation. All references in these Bylaws to the Certificate of Incorporation shall be deemed to refer to the Certificate of Incorporation of the corporation, as amended and in effect from time to time.

5.7 Severability. Any determination that any provision of these Bylaws is for any reason inapplicable, illegal or ineffective shall not affect or invalidate any other provision of these Bylaws.

5.8 Pronouns. All pronouns used in these Bylaws shall be deemed to refer to the masculine, feminine or neuter, singular or plural, as the identity of the person or persons may require.

ARTICLE VI
AMENDMENTS

These Bylaws may be altered, amended or repealed, in whole or in part, or new Bylaws may be adopted by the Board of Directors or by the stockholders as provided in the Certificate of Incorporation.

Exhibit 5.1

WILMERHALE

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January 13, 2012

Merrimack Pharmaceuticals, Inc.
One Kendall Square, Suite B7201
Cambridge, MA 02139

Re: Registration Statement on Form S-1

Ladies and Gentlemen:

This opinion is furnished to you in connection with a Registration Statement on Form S-1 (File No. 333-175427) (the "Registration Statement") filed with the Securities and Exchange Commission (the "Commission") under the Securities Act of 1933, as amended (the "Securities Act"), for the registration of shares of Common Stock, $0.01 par value per share, of Merrimack Pharmaceuticals, Inc., a Delaware corporation (the "Company"), with a proposed maximum aggregate offering price of $191,666,670 (the "Shares"), including Shares issuable upon exercise of an over-allotment option granted by the Company.

The Shares are to be sold by the Company pursuant to an underwriting agreement (the "Underwriting Agreement") to be entered into by and among the Company and the several underwriters listed in Schedule 1 thereto, for which J.P. Morgan Securities LLC is acting as representative, the form of which has been filed as Exhibit 1.1 to the Registration Statement.

We are acting as counsel for the Company in connection with the issue and sale by the Company of the Shares. We have examined signed copies of the Registration Statement as filed with the Commission. We have also examined and relied upon the Underwriting Agreement, minutes of meetings and actions of the stockholders and the Board of Directors of the Company as provided to us by the Company, stock record books of the Company as provided to us by the Company, the Certificate of Incorporation and Bylaws of the Company, each as restated and/or amended to date, and such other documents as we have deemed necessary for purposes of rendering the opinions hereinafter set forth.

In our examination of the foregoing documents, we have assumed the genuineness of all signatures, the authenticity of all documents submitted to us as originals, the conformity to original documents of all documents submitted to us as copies, the authenticity of the originals of such latter documents and the legal competence of all signatories to such documents.

We express no opinion herein as to the laws of any state or jurisdiction other than the state laws of the Commonwealth of Massachusetts, the General Corporation Law of the State of Delaware and the federal laws of the United States of America.

Based upon and subject to the foregoing, we are of the opinion that the Shares have been duly authorized for issuance and, when the Shares are issued and paid for in accordance with the terms and conditions of the Underwriting Agreement, the Shares will be validly issued, fully paid and nonassessable.

Please note that we are opining only as to the matters expressly set forth herein, and no opinion should be inferred as to any other matters. This opinion is based upon currently existing statutes, rules, regulations and judicial decisions, and we disclaim any obligation to advise you of any change in any of these sources of law or subsequent legal or factual developments which might affect any matters or opinions set forth herein.

We hereby consent to the filing of this opinion with the Commission as an exhibit to the Registration Statement in accordance with the requirements of Item 601(b)(5) of Regulation S-K under the Securities Act and to the use of our name therein and in the related Prospectus under the caption "Legal matters." In giving such consent, we do not hereby admit that we are in the category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations of the Commission.

Very truly yours,

WILMER CUTLER PICKERING
HALE AND DORR LLP

By: /s/ Brian A. Johnson
Brian A. Johnson, a Partner

Exhibit 10.3

MERRIMACK PHARMACEUTICALS, INC.

2011 Stock Incentive Plan

1. Purpose

The purpose of this 2011 Stock Incentive Plan (the "Plan") of Merrimack Pharmaceuticals, Inc., a Delaware corporation (the "Company"), is to advance the interests of the Company's stockholders by enhancing the Company's ability to attract, retain and motivate persons who are expected to make important contributions to the Company and by providing such persons with equity ownership opportunities and performance-based incentives that are intended to better align the interests of such persons with those of the Company's stockholders. Except where the context otherwise requires, the term "Company" shall include any of the Company's present or future parent or subsidiary corporations as defined in Sections 424(e) or (f) of the Internal Revenue Code of 1986, as amended, and any regulations thereunder (the "Code") and any other business venture (including, without limitation, joint venture or limited liability company) in which the Company has a controlling interest, as determined by the Board of Directors of the Company (the "Board").

2. Eligibility

All of the Company's employees, officers and directors, as well as consultants and advisors to the Company (as such terms consultants and advisors are defined and interpreted for purposes of Form S-8 under the Securities Act of 1933, as amended (the "Securities Act"), or any successor form) are eligible to be granted Awards under the Plan. Each person who is granted an Award under the Plan is deemed a "Participant." "Award" means Options (as defined in Section 5), SARs (as defined in Section 6), Restricted Stock (as defined in Section 7), Restricted Stock Units (as defined in Section 7) and Other Stock-Based Awards (as defined in Section 8).

3. Administration and Delegation

(a) Administration by Board of Directors. The Plan will be administered by the Board. The Board shall have authority to grant Awards and to adopt, amend and repeal such administrative rules, guidelines and practices relating to the Plan as it shall deem advisable. The Board may construe and interpret the terms of the Plan and any Award agreements entered into under the Plan. The Board may correct any defect, supply any omission or reconcile any inconsistency in the Plan or any Award in the manner and to the extent it shall deem expedient and it shall be the sole and final judge of such expediency. All decisions by the Board shall be made in the Board's sole discretion and shall be final and binding on all persons having or claiming any interest in the Plan or in any Award.

(b) Appointment of Committees. To the extent permitted by applicable law, the Board may delegate any or all of its powers under the Plan to one or more committees or subcommittees of the Board (a "Committee"). All references in the Plan to the "Board" shall mean the Board or a Committee of the Board or the officers referred to in Section 3(c) to the extent that the Board's powers or authority under the Plan have been delegated to such Committee or officers.

(c) Delegation to Officers. To the extent permitted by applicable law, the Board may delegate to one or more officers of the Company the power to grant Options and other Awards that constitute rights under Delaware law (subject to any limitations under the Plan) to employees or officers of the Company and to exercise such other powers under the Plan as the Board may determine, provided that the Board shall fix the terms of such Awards to be granted by such officers (including the exercise price of such Awards, which may include a formula by which the exercise price will be determined) and the maximum number of shares subject to such Awards that the officers may grant; provided further, however, that no officer shall be authorized to grant such Awards to any "executive officer" of the Company (as defined by Rule 3b-7 under the Securities Exchange Act of 1934, as amended (the "Exchange Act")) or to any "officer" of the Company (as defined by Rule 16a-1 under the Exchange Act). The Board may not delegate authority under this Section 3(c) to grant Restricted Stock, unless Delaware law then permits such delegation.

4. Stock Available for Awards

(a) Number of Shares; Share Counting.

(1) Authorized Number of Shares. Subject to adjustment under Section 9, Awards may be made under the Plan (any or all of which Awards may be in the form of Incentive Stock Options, as defined in Section 5(b)) for up to such number of shares of common stock, $0.01 par value per share, of the Company (the "Common Stock") as is equal to the sum of:

(A) 3,500,000 shares of Common Stock; plus

(B) such additional number of shares of Common Stock (up to 18,669,858 shares) as is equal to the sum of (x) the number of shares of Common Stock reserved for issuance under the Company's 1999 Stock Option Plan and the Company's 2008 Stock Incentive Plan, as amended, (together, the "Existing Plans") that remain available for grant under the Existing Plans immediately prior to the closing of the Company's initial public offering and (y) the number of shares of Common Stock subject to awards granted under the Existing Plans which awards expire, terminate or are otherwise surrendered, canceled, forfeited or repurchased by the Company at their original issuance price pursuant to a contractual repurchase right (subject, however, in the case of Incentive Stock Options to any limitations of the Code); plus

(C) an annual increase to be added on the first day of each of the fiscal year beginning with the fiscal year ending December 31, 2013, and on each anniversary thereof until the expiration of the Plan equal to the lesser of (i) 4,500,000 shares of Common Stock, (ii) 3.5% of the outstanding shares on such date or (iii) an amount determined by the Board.

Shares issued under the Plan may consist in whole or in part of authorized but unissued shares or treasury shares.

(2) Share Counting. For purposes of counting the number of shares available for the grant of Awards under the Plan:

(A) all shares of Common Stock covered by SARs shall be counted against the number of shares available for the grant of Awards under the Plan; provided, however, that (i) SARs that may be settled only in cash shall not be so counted and (ii) if the Company grants an SAR in tandem with an Option for the same number of shares of Common Stock and provides that only one such Award may be exercised (a "Tandem SAR"), only the shares covered by the Option, and not the shares covered by the Tandem SAR, shall be so counted, and the expiration of one in connection with the other's exercise will not restore shares to the Plan;

(B) if any Award (i) expires or is terminated, surrendered or canceled without having been fully exercised or is forfeited in whole or in part (including as the result of shares of Common Stock subject to such Award being repurchased by the Company at the original issuance price pursuant to a contractual repurchase right) or (ii) results in any Common Stock not being issued (including as a result of an SAR that was settleable either in cash or in stock actually being settled in cash), the unused Common Stock covered by such Award shall again be available for the grant of Awards; provided, however, that (1) in the case of Incentive Stock Options, the foregoing shall be subject to any limitations under the Code, (2) in the case of the exercise of an SAR, the number of shares counted against the shares available under the Plan and against the sublimits listed in the first clause of this Section 4(a)(2) shall be the full number of shares subject to the SAR multiplied by the percentage of the SAR actually exercised, regardless of the number of shares actually used to settle such SAR upon exercise and (3) the shares covered by a Tandem SAR shall not again become available for grant upon the expiration or termination of such Tandem SAR; and

(C) shares of Common Stock delivered (either by actual delivery, attestation, or net exercise) to the Company by a Participant to (i) purchase shares of Common Stock upon the exercise of an Award or (ii) satisfy tax withholding obligations (including shares retained from the Award creating the tax obligation) shall not be added back to the number of shares available for the future grant of Awards.

(b) Section 162(m) Per-Participant Limit. Subject to adjustment under Section 9, the maximum number of shares of Common Stock with respect to which Awards may be granted to any Participant under the Plan shall be 2,000,000 per calendar year. For purposes of the foregoing limit, the combination of an Option in tandem with an SAR shall be treated as a single Award. The per Participant limit described in this Section 4(b) shall be construed and applied consistently with Section 162(m) of the Code or any successor provision thereto, and the regulations thereunder ("Section 162(m)").

(c) Substitute Awards. In connection with a merger or consolidation of an entity with the Company or the acquisition by the Company of property or stock of an entity, the Board may grant Awards in substitution for any options or other stock or stock-based awards granted by such entity or an affiliate thereof. Substitute Awards may be granted on such terms as the Board deems appropriate in the circumstances, notwithstanding any limitations on Awards contained in the Plan. Substitute Awards shall not count against the overall share limit set forth in Section 4(a)(1) or any sublimit contained in the Plan, except as may be required by reason of Section 422 and related provisions of the Code.

5. Stock Options

(a) General. The Board may grant options to purchase Common Stock (each, an "Option") and determine the number of shares of Common Stock to be covered by each Option, the exercise price of each Option and the conditions and limitations applicable to the exercise of each Option, including conditions relating to applicable federal or state securities laws, as it considers necessary or advisable.

(b) Incentive Stock Options. An Option that the Board intends to be an "incentive stock option" as defined in Section 422 of the Code (an "Incentive Stock Option") shall only be granted to employees of Merrimack Pharmaceuticals, Inc., any of Merrimack Pharmaceuticals, Inc.'s parent or subsidiary corporations as defined in Sections 424(e) or (f) of the Code at the time of grant, and any other entities the employees of which are eligible to receive Incentive Stock Options under the Code, and shall be subject to and shall be construed consistently with the requirements of Section 422 of the Code. An Option that is not intended to be an Incentive Stock Option shall be designated a "Non-Qualified Stock Option." The Company shall have no liability to a Participant, or any other party, if an Option (or any part thereof) that is intended to be an Incentive Stock Option is not an Incentive Stock Option or if the Company converts an Incentive Stock Option to a Non-Qualified Stock Option.

(c) Exercise Price. The Board shall establish the exercise price of each Option and specify the exercise price in the applicable Option agreement. The exercise price shall be not less than 100% of the fair market value per share of Common Stock as determined by (or in a manner approved by) the Board ("Fair Market Value") on the date the Option is granted; provided that if the Board approves the grant of an Option with an exercise price to be determined on a future date, the exercise price shall be not less than 100% of the Fair Market Value on such future date.

(d) Duration of Options. Each Option shall be exercisable at such times and subject to such terms and conditions as the Board may specify in the applicable option agreement; provided, however, that no Option will be granted with a term in excess of 10 years.

(e) Exercise of Options. Options may be exercised by delivery to the Company of a notice of exercise in a form (which may be electronic) approved by the Company, together with payment in full (in the manner specified in Section 5(f)) of the exercise price for the number of shares for which the Option is exercised. Shares of Common Stock subject to the Option will be delivered by the Company as soon as practicable following exercise.

(f) Payment Upon Exercise. Common Stock purchased upon the exercise of an Option granted under the Plan shall be paid for as follows:

(1) in cash or by check, payable to the order of the Company;

(2) except as may otherwise be provided in the applicable Option agreement or approved by the Board, in its sole discretion, by (i) delivery of an irrevocable and unconditional undertaking by a creditworthy broker to deliver promptly to the Company sufficient funds to pay the exercise price and any required tax withholding or (ii) delivery by the Participant to the Company of a copy of irrevocable and unconditional instructions to a

creditworthy broker to deliver promptly to the Company cash or a check sufficient to pay the exercise price and any required tax withholding;

(3) to the extent provided for in the applicable Option agreement or approved by the Board, in its sole discretion, by delivery (either by actual delivery or attestation) of shares of Common Stock owned by the Participant valued at their Fair Market Value, provided (i) such method of payment is then permitted under applicable law, (ii) such Common Stock, if acquired directly from the Company, was owned by the Participant for such minimum period of time, if any, as may be established by the Board in its discretion and (iii) such Common Stock is not subject to any repurchase, forfeiture, unfulfilled vesting or other similar requirements;

(4) to the extent provided for in the applicable Non-Qualified Stock Option agreement or approved by the Board in its sole discretion, by delivery of a notice of "net exercise" to the Company, as a result of which the Participant would receive (i) the number of shares underlying the portion of the Option being exercised, less (ii) such number of shares as is equal to (A) the aggregate exercise price for the portion of the Option being exercised divided by (B) the Fair Market Value on the date of exercise;

(5) to the extent permitted by applicable law and provided for in the applicable Option agreement or approved by the Board, in its sole discretion, by payment of such other lawful consideration as the Board may determine; or

(6) by any combination of the above permitted forms of payment.

(g) Repricing. The Board may, without stockholder approval, (1) amend any outstanding Option granted under the Plan to provide an exercise price per share that is lower than the then-current exercise price per share of such outstanding Option, (2) cancel any outstanding option (whether or not granted under the Plan) and grant in substitution therefor new Awards under the Plan (other than Awards granted pursuant to Section 4(c)) covering the same or a different number of shares of Common Stock and having an exercise price per share lower than the then-current exercise price per share of the cancelled option, (3) cancel in exchange for a cash payment any outstanding Option with an exercise price per share above the then-current Fair Market Value, other than pursuant to Section 9s, or (4) take any other action under the Plan that constitutes a "repricing" within the meaning of the rules of the NASDAQ Stock Market.

6. Stock Appreciation Rights

(a) General. The Board may grant Awards consisting of stock appreciation rights ("SARs") entitling the holder, upon exercise, to receive an amount of Common Stock or cash or a combination thereof (such form to be determined by the Board) determined by reference to appreciation, from and after the date of grant, in the Fair Market Value of a share of Common Stock over the measurement price established pursuant to Section 6(b). The date as of which such appreciation is determined shall be the exercise date.

(b) Measurement Price. The Board shall establish the measurement price of each SAR and specify it in the applicable SAR agreement. The measurement price shall not be less than 100% of the Fair Market Value on the date the SAR is granted; provided that if the Board

approves the grant of an SAR effective as of a future date, the measurement price shall be not less than 100% of the Fair Market Value on such future date.

(c) Duration of SARs. Each SAR shall be exercisable at such times and subject to such terms and conditions as the Board may specify in the applicable SAR agreement; provided, however, that no SAR will be granted with a term in excess of 10 years.

(d) Exercise of SARs. SARs may be exercised by delivery to the Company of a notice of exercise in a form (which may be electronic) approved by the Company, together with any other documents required by the Board.

7. Restricted Stock; Restricted Stock Units

(a) General. The Board may grant Awards entitling recipients to acquire shares of Common Stock ("Restricted Stock"), subject to the right of the Company to repurchase all or part of such shares at their issue price or other stated or formula price (or to require forfeiture of such shares if issued at no cost) from the recipient in the event that conditions specified by the Board in the applicable Award are not satisfied prior to the end of the applicable restriction period or periods established by the Board for such Award. The Board may also grant Awards entitling the recipient to receive shares of Common Stock or cash to be delivered at the time such Award vests ("Restricted Stock Units") (Restricted Stock and Restricted Stock Units are each referred to herein as a "Restricted Stock Award").

(b) Terms and Conditions for All Restricted Stock Awards. The Board shall determine the terms and conditions of a Restricted Stock Award, including the conditions for vesting and repurchase (or forfeiture) and the issue price, if any.

(c) Additional Provisions Relating to Restricted Stock.

(1) Dividends. Unless otherwise provided in the applicable Award agreement, any dividends (whether paid in cash, stock or property) declared and paid by the Company with respect to shares of Restricted Stock ("Accrued Dividends") shall be paid to the Participant only if and when such shares become free from the restrictions on transferability and forfeitability that apply to such shares. Each payment of Accrued Dividends will be made no later than the end of the calendar year in which the dividends are paid to stockholders of that class of stock or, if later, the 15th day of the third month following the lapsing of the restrictions on transferability and the forfeitability provisions applicable to the underlying shares of Restricted Stock.

(2) Stock Certificates. The Company may require that any stock certificates issued in respect of shares of Restricted Stock, as well as dividends or distributions paid on such Restricted Stock, shall be deposited in escrow by the Participant, together with a stock power endorsed in blank, with the Company (or its designee). At the expiration of the applicable restriction periods, the Company (or such designee) shall deliver the certificates no longer subject to such restrictions to the Participant or if the Participant has died, to his or her Designated Beneficiary. "Designated Beneficiary" means (i) the beneficiary designated, in a manner determined by the Board, by a Participant to receive amounts due or exercise rights of

the Participant in the event of the Participant's death or (ii) in the absence of an effective designation by a Participant, the Participant's estate.

(d) Additional Provisions Relating to Restricted Stock Units.

(1) Settlement. Upon the vesting of and/or lapsing of any other restrictions (i.e., settlement) with respect to each Restricted Stock Unit, the Participant shall be entitled to receive from the Company one share of Common Stock or (if so provided in the applicable Award agreement) an amount of cash equal to the Fair Market Value of one share of Common Stock. The Board may, in its discretion, provide that settlement of Restricted Stock Units shall be deferred, on a mandatory basis or at the election of the Participant in a manner that complies with Section 409A of the Code.

(2) Voting Rights. A Participant shall have no voting rights with respect to any Restricted Stock Units.

(3) Dividend Equivalents. The Award agreement for Restricted Stock Units may provide Participants with the right to receive an amount equal to any dividends or other distributions declared and paid on an equal number of outstanding shares of Common Stock ("Dividend Equivalents"). Dividend Equivalents may be paid currently or credited to an account for the Participant, may be settled in cash and/or shares of Common Stock and may be subject to the same restrictions on transfer and forfeitability as the Restricted Stock Units with respect to which paid, in each case to the extent provided in the Award agreement.

8. Other Stock-Based Awards

(a) General. Other Awards of shares of Common Stock, and other Awards that are valued in whole or in part by reference to, or are otherwise based on, shares of Common Stock or other property, may be granted hereunder to Participants ("Other Stock-Based-Awards"). Such Other Stock-Based Awards shall also be available as a form of payment in the settlement of other Awards granted under the Plan or as payment in lieu of compensation to which a Participant is otherwise entitled. Other Stock-Based Awards may be paid in shares of Common Stock or cash, as the Board shall determine.

(b) Terms and Conditions. Subject to the provisions of the Plan, the Board shall determine the terms and conditions of each Other Stock-Based Award, including any purchase price applicable thereto.

9. Adjustments for Changes in Common Stock and Certain Other Events

(a) Changes in Capitalization. In the event of any stock split, reverse stock split, stock dividend, recapitalization, combination of shares, reclassification of shares, spin-off or other similar change in capitalization or event, or any dividend or distribution to holders of Common Stock other than an ordinary cash dividend, (i) the number and class of securities available under the Plan, (ii) the share counting rules and sublimit set forth in Sections 4(a) and 4(b), (iii) the number and class of securities and exercise price per share of each outstanding Option, (iv) the share and per-share provisions and the measurement price of each outstanding SAR, (v) the number of shares subject to and the repurchase price per share subject to each

outstanding Restricted Stock Award and (vi) the share and per-share-related provisions and the purchase price, if any, of each outstanding Other Stock-Based Award, shall be equitably adjusted by the Company (or substituted Awards may be made, if applicable) in the manner determined by the Board. Without limiting the generality of the foregoing, in the event the Company effects a split of the Common Stock by means of a stock dividend and the exercise price of and the number of shares subject to an outstanding Option are adjusted as of the date of the distribution of the dividend (rather than as of the record date for such dividend), then an optionee who exercises an Option between the record date and the distribution date for such stock dividend shall be entitled to receive, on the distribution date, the stock dividend with respect to the shares of Common Stock acquired upon such Option exercise, notwithstanding the fact that such shares were not outstanding as of the close of business on the record date for such stock dividend.

(b) Reorganization Events.

(1) Definition. A "Reorganization Event" shall mean: (a) any merger or consolidation of the Company with or into another entity as a result of which all of the Common Stock of the Company is converted into or exchanged for the right to receive cash, securities or other property or is cancelled, (b) any transfer or disposition of all of the Common Stock of the Company for cash, securities or other property pursuant to a share exchange or other transaction or (c) any liquidation or dissolution of the Company.

(2) Consequences of a Reorganization Event on Awards Other than Restricted Stock.

(A) In connection with a Reorganization Event, the Board may take any one or more of the following actions as to all or any (or any portion of) outstanding Awards other than Restricted Stock on such terms as the Board determines (except to the extent specifically provided otherwise in an applicable Award agreement or another agreement between the Company and the Participant): (i) provide that such Awards shall be assumed, or substantially equivalent Awards shall be substituted, by the acquiring or succeeding corporation (or an affiliate thereof), (ii) upon written notice to a Participant, provide that all of the Participant's unexercised Awards will terminate immediately prior to the consummation of such Reorganization Event unless exercised by the Participant (to the extent then exercisable) within a specified period following the date of such notice, (iii) provide that outstanding Awards shall become exercisable, realizable, or deliverable, or restrictions applicable to an Award shall lapse, in whole or in part prior to or upon such Reorganization Event, (iv) in the event of a Reorganization Event under the terms of which holders of Common Stock will receive upon consummation thereof a cash payment for each share surrendered in the Reorganization Event (the "Acquisition Price"), make or provide for a cash payment to Participants with respect to each Award held by a Participant equal to (A) the number of shares of Common Stock subject to the vested portion of the Award (after giving effect to any acceleration of vesting that occurs upon or immediately prior to such Reorganization Event) multiplied by (B) the excess, if any, of (I) the Acquisition Price over (II) the exercise, measurement or purchase price of such Award and any applicable tax withholdings, in exchange for the termination of such Award, (v) provide that, in connection with a liquidation or dissolution of the Company, Awards shall convert into the right to receive liquidation proceeds (if applicable, net of the exercise, measurement or purchase price thereof and any applicable tax withholdings) and (vi) any combination of the

foregoing. In taking any of the actions permitted under this Section 9(b)(2), the Board shall not be obligated by the Plan to treat all Awards, all Awards held by a Participant, or all Awards of the same type, identically.

(B) Notwithstanding the terms of Section 9(b)(2)(A), in the case of outstanding Restricted Stock Units that are subject to Section 409A of the Code: (i) if the applicable Restricted Stock Unit agreement provides that the Restricted Stock Units shall be settled upon a "change in control event" within the meaning of Treasury Regulation Section 1.409A-3(i)(5)(i), and the Reorganization Event constitutes such a "change in control event", then no assumption or substitution shall be permitted pursuant to Section 9(b)(2)(A)(i) and the Restricted Stock Units shall instead be settled in accordance with the terms of the applicable Restricted Stock Unit agreement; and (ii) the Board may only undertake the actions set forth in clauses (iii), (iv) or (v) of Section 9(b)(2)(A) if the Reorganization Event constitutes a "change in control event" as defined under Treasury Regulation Section 1.409A-3(i)(5)(i) and such action is permitted or required by Section 409A of the Code; if the Reorganization Event is not a "change in control event" as so defined or such action is not permitted or required by Section 409A of the Code, and the acquiring or succeeding corporation does not assume or substitute the Restricted Stock Units pursuant to clause (i) of Section 9(b)(2)(A), then the unvested Restricted Stock Units shall terminate immediately prior to the consummation of the Reorganization Event without any payment in exchange therefor.

(C) For purposes of Section 9(b)(2)(A)(i), an Award (other than Restricted Stock) shall be considered assumed if, following consummation of the Reorganization Event, such Award confers the right to purchase or receive pursuant to the terms of such Award, for each share of Common Stock subject to the Award immediately prior to the consummation of the Reorganization Event, the consideration (whether cash, securities or other property) received as a result of the Reorganization Event by holders of Common Stock for each share of Common Stock held immediately prior to the consummation of the Reorganization Event (and if holders were offered a choice of consideration, the type of consideration chosen by the holders of a majority of the outstanding shares of Common Stock); provided, however, that if the consideration received as a result of the Reorganization Event is not solely common stock of the acquiring or succeeding corporation (or an affiliate thereof), the Company may, with the consent of the acquiring or succeeding corporation, provide for the consideration to be received upon the exercise or settlement of the Award to consist solely of such number of shares of common stock of the acquiring or succeeding corporation (or an affiliate thereof) that the Board determined to be equivalent in value (as of the date of such determination or another date specified by the Board) to the per share consideration received by holders of outstanding shares of Common Stock as a result of the Reorganization Event.

(3) Consequences of a Reorganization Event on Restricted Stock. Upon the occurrence of a Reorganization Event other than a liquidation or dissolution of the Company, the repurchase and other rights of the Company with respect to outstanding Restricted Stock shall inure to the benefit of the Company's successor and shall, unless the Board determines otherwise, apply to the cash, securities or other property which the Common Stock was converted into or exchanged for pursuant to such Reorganization Event in the same manner and to the same extent as they applied to such Restricted Stock; provided, however, that the Board may provide for termination or deemed satisfaction of such repurchase or other rights under the

instrument evidencing any Restricted Stock or any other agreement between a Participant and the Company, either initially or by amendment. Upon the occurrence of a Reorganization Event involving the liquidation or dissolution of the Company, except to the extent specifically provided to the contrary in the instrument evidencing any Restricted Stock or any other agreement between a Participant and the Company, all restrictions and conditions on all Restricted Stock then outstanding shall automatically be deemed terminated or satisfied.

10. General Provisions Applicable to Awards

(a) Transferability of Awards. Awards shall not be sold, assigned, transferred, pledged or otherwise encumbered by the person to whom they are granted, either voluntarily or by operation of law, except by will or the laws of descent and distribution or, other than in the case of an Incentive Stock Option and Awards that are subject to Section 409A of the Code, pursuant to a qualified domestic relations order, and, during the life of the Participant, shall be exercisable only by the Participant; provided, however, except with respect to Awards that are subject to Section 409A of the Code, that the Board may permit or provide in an Award for the gratuitous transfer of the Award by the Participant to or for the benefit of any immediate family member, family trust or other entity established for the benefit of the Participant and/or an immediate family member thereof if the Company would be eligible to use a Form S-8 under the Securities Act for the registration of the sale of the Common Stock subject to such Award to such proposed transferee; provided further, that the Company shall not be required to recognize any such permitted transfer until such time as such permitted transferee shall, as a condition to such transfer, deliver to the Company a written instrument in form and substance satisfactory to the Company confirming that such transferee shall be bound by all of the terms and conditions of the Award. References to a Participant, to the extent relevant in the context, shall include references to authorized transferees. For the avoidance of doubt, nothing contained in this Section 10(a) shall be deemed to restrict a transfer to the Company.

(b) Documentation. Each Award shall be evidenced in such form (written, electronic or otherwise) as the Board shall determine. Each Award may contain terms and conditions in addition to those set forth in the Plan.

(c) Board Discretion. Except as otherwise provided by the Plan, each Award may be made alone or in addition or in relation to any other Award. The terms of each Award need not be identical, and the Board need not treat Participants uniformly.

(d) Termination of Status. The Board shall determine the effect on an Award of the disability, death, termination or other cessation of employment, authorized leave of absence or other change in the employment or other status of a Participant and the extent to which, and the period during which, the Participant, or the Participant's legal representative, conservator, guardian or Designated Beneficiary, may exercise rights under the Award.

(e) Withholding. The Participant must satisfy all applicable federal, state, and local or other income and employment tax withholding obligations before the Company will deliver stock certificates or otherwise recognize ownership of Common Stock under an Award. The Company may decide to satisfy the withholding obligations through additional withholding on salary or wages. If the Company elects not to or cannot withhold from other compensation, the

Participant must pay the Company the full amount, if any, required for withholding or have a broker tender to the Company cash equal to the withholding obligations. Payment of withholding obligations is due before the Company will issue any shares on exercise, vesting or release from forfeiture of an Award or at the same time as payment of the exercise or purchase price, unless the Company determines otherwise. If provided for in an Award or approved by the Board in its sole discretion, a Participant may satisfy such tax obligations in whole or in part by delivery (either by actual delivery or attestation) of shares of Common Stock, including shares retained from the Award creating the tax obligation, valued at their Fair Market Value; provided, however, except as otherwise provided by the Board, that the total tax withholding where stock is being used to satisfy such tax obligations cannot exceed the Company's minimum statutory withholding obligations (based on minimum statutory withholding rates for federal and state tax purposes, including payroll taxes, that are applicable to such supplemental taxable income). Shares used to satisfy tax withholding requirements cannot be subject to any repurchase, forfeiture, unfulfilled vesting or other similar requirements.

(f) Amendment of Award. The Board may amend, modify or terminate any outstanding Award, including but not limited to, substituting therefor another Award of the same or a different type, changing the date of exercise or realization, and converting an Incentive Stock Option to a Non-Qualified Stock Option. The Participant's consent to such action shall be required unless (i) the Board determines that the action, taking into account any related action, does not materially and adversely affect the Participant's rights under the Plan or (ii) the change is permitted under Section 9.

(g) Conditions on Delivery of Stock. The Company will not be obligated to deliver any shares of Common Stock pursuant to the Plan or to remove restrictions from shares previously issued or delivered under the Plan until (i) all conditions of the Award have been met or removed to the satisfaction of the Company, (ii) in the opinion of the Company's counsel, all other legal matters in connection with the issuance and delivery of such shares have been satisfied, including any applicable securities laws and regulations and any applicable stock exchange or stock market rules and regulations, and (iii) the Participant has executed and delivered to the Company such representations or agreements as the Company may consider appropriate to satisfy the requirements of any applicable laws, rules or regulations.

(h) Acceleration. The Board may at any time provide that any Award shall become immediately exercisable in whole or in part, free of some or all restrictions or conditions, or otherwise realizable in whole or in part, as the case may be.

(i) Performance Awards.

(1) Grants. Restricted Stock Awards and Other Stock-Based Awards under the Plan may be made subject to the achievement of performance goals pursuant to this Section 10(i) ("Performance Awards"). Subject to Section 10(i)(4), no Performance Awards shall vest prior to the first anniversary of the date of grant.

(2) Committee. Grants of Performance Awards to any Covered Employee (as defined below) intended to qualify as "performance-based compensation" under Section 162(m) ("Performance-Based Compensation") shall be made only by a Committee (or a subcommittee

of a Committee) comprised solely of two or more directors eligible to serve on a committee making Awards qualifying as "performance-based compensation" under Section 162(m). In the case of such Awards granted to Covered Employees, references to the Board or to a Committee shall be treated as referring to such Committee (or subcommittee). "Covered Employee" shall mean any person who is, or whom the Committee, in its discretion, determines may be, a "covered employee" under Section 162(m)(3) of the Code.

(3) Performance Measures. For any Award that is intended to qualify as Performance-Based Compensation, the Committee shall specify that the degree of granting, vesting and/or payout shall be subject to the achievement of one or more objective performance measures established by the Committee, which shall be based on the relative or absolute attainment of specified levels of one or any combination of the following, which may be determined pursuant to generally accepted accounting principles ("GAAP") or on a non-GAAP basis, as determined by the Committee: net income (loss), earnings before or after discontinued operations, interest, taxes, depreciation and/or amortization, operating profit before or after discontinued operations and/or taxes, sales, sales growth, earnings growth, cash flow or cash position, gross margins, stock price, market share, return on sales, assets, equity or investment, improvement of financial ratings, achievement of balance sheet or income statement objectives total stockholder return, operating income (loss), gross profit, revenue growth, cost savings, clinical milestones, fundraising objectives, working capital, manufacturing objectives, market share, completion of strategic acquisitions/dispositions, or receipt of regulatory approvals. Such goals may reflect absolute entity or business unit performance or a relative comparison to the performance of a peer group of entities or other external measure of the selected performance criteria and may be absolute in their terms or measured against or in relationship to other companies comparably, similarly or otherwise situated. The Committee may specify that such performance measures shall be adjusted to exclude any one or more of (i) extraordinary items, (ii) gains or losses on the dispositions of discontinued operations, (iii) the cumulative effects of changes in accounting principles, (iv) the writedown of any asset, (vi) fluctuation in foreign currency exchange rates, and (vi) charges for restructuring and rationalization programs. Such performance measures: (i) may vary by Participant and may be different for different Awards; (ii) may be particular to a Participant or the department, branch, line of business, subsidiary or other unit in which the Participant works and may cover such period as may be specified by the Committee; and (iii) shall be set by the Committee within the time period prescribed by, and shall otherwise comply with the requirements of, Section 162(m). Awards that are not intended to qualify as Performance-Based Compensation may be based on these or such other performance measures as the Board may determine.

(4) Adjustments. Notwithstanding any provision of the Plan, with respect to any Performance Award that is intended to qualify as Performance-Based Compensation, the Committee may adjust downwards, but not upwards, the cash or number of shares payable pursuant to such Award, and the Committee may not waive the achievement of the applicable performance measures except in the case of the death or disability of the Participant or a change in control of the Company.

(5) Other. The Committee shall have the power to impose such other restrictions on Performance Awards as it may deem necessary or appropriate to ensure that such Awards satisfy all requirements for Performance-Based Compensation.

11. Miscellaneous

(a) No Right To Employment or Other Status. No person shall have any claim or right to be granted an Award by virtue of the adoption of the Plan, and the grant of an Award shall not be construed as giving a Participant the right to continued employment or any other relationship with the Company. The Company expressly reserves the right at any time to dismiss or otherwise terminate its relationship with a Participant free from any liability or claim under the Plan, except as expressly provided in the applicable Award.

(b) No Rights As Stockholder. Subject to the provisions of the applicable Award, no Participant or Designated Beneficiary shall have any rights as a stockholder with respect to any shares of Common Stock to be distributed with respect to an Award until becoming the record holder of such shares.

(c) Effective Date and Term of Plan. The Plan shall become effective on the date on which the Plan is approved by the Company's stockholders (the "Effective Date"). No Awards shall be granted under the Plan after the expiration of 10 years from the Effective Date, but Awards previously granted may extend beyond that date.

(d) Amendment of Plan. The Board may amend, suspend or terminate the Plan or any portion thereof at any time provided that (i) to the extent required by Section 162(m), no Award granted to a Participant that is intended to comply with Section 162(m) after the date of such amendment shall become exercisable, realizable or vested, as applicable to such Award, unless and until the Company's stockholders approve such amendment in the manner required by Section 162(m); and (ii) no amendment that would require stockholder approval under the rules of the NASDAQ Stock Market may be made effective unless and until the Company's stockholders approve such amendment;. In addition, if at any time the approval of the Company's stockholders is required as to any other modification or amendment under Section 422 of the Code or any successor provision with respect to Incentive Stock Options, the Board may not effect such modification or amendment without such approval. Unless otherwise specified in the amendment, any amendment to the Plan adopted in accordance with this Section 11(d) shall apply to, and be binding on the holders of, all Awards outstanding under the Plan at the time the amendment is adopted, provided the Board determines that such amendment, taking into account any related action, does not materially and adversely affect the rights of Participants under the Plan. No Award shall be made that is conditioned upon stockholder approval of any amendment to the Plan unless the Award provides that (i) it will terminate or be forfeited if stockholder approval of such amendment is not obtained within no more than 12 months from the date of grant and (2) it may not be exercised or settled (or otherwise result in the issuance of Common Stock) prior to such stockholder approval.

(e) Authorization of Sub-Plans (including for Grants to non-U.S. Employees). The Board may from time to time establish one or more sub-plans under the Plan for purposes of satisfying applicable securities, tax or other laws of various jurisdictions. The Board shall establish such sub-plans by adopting supplements to the Plan containing (i) such limitations on the Board's discretion under the Plan as the Board deems necessary or desirable or (ii) such additional terms and conditions not otherwise inconsistent with the Plan as the Board shall deem necessary or desirable. All supplements adopted by the Board shall be deemed to be part of the

Plan, but each supplement shall apply only to Participants within the affected jurisdiction and the Company shall not be required to provide copies of any supplement to Participants in any jurisdiction which is not the subject of such supplement.

(f) Compliance with Section 409A of the Code. Except as provided in individual Award agreements initially or by amendment, if and to the extent (i) any portion of any payment, compensation or other benefit provided to a Participant pursuant to the Plan in connection with his or her employment termination constitutes "nonqualified deferred compensation" within the meaning of Section 409A of the Code and (ii) the Participant is a specified employee as defined in Section 409A(a)(2)(B)(i) of the Code, in each case as determined by the Company in accordance with its procedures, by which determinations the Participant (through accepting the Award) agrees that he or she is bound, such portion of the payment, compensation or other benefit shall not be paid before the day that is six months plus one day after the date of "separation from service" (as determined under Section 409A of the Code) (the "New Payment Date"), except as Section 409A of the Code may then permit. The aggregate of any payments that otherwise would have been paid to the Participant during the period between the date of separation from service and the New Payment Date shall be paid to the Participant in a lump sum on such New Payment Date, and any remaining payments will be paid on their original schedule.

The Company makes no representations or warranty and shall have no liability to the Participant or any other person if any provisions of or payments, compensation or other benefits under the Plan are determined to constitute nonqualified deferred compensation subject to Section 409A of the Code but do not to satisfy the conditions of that section.

(g) Limitations on Liability. Notwithstanding any other provisions of the Plan, no individual acting as a director, officer, employee or agent of the Company will be liable to any Participant, former Participant, spouse, beneficiary, or any other person for any claim, loss, liability, or expense incurred in connection with the Plan, nor will such individual be personally liable with respect to the Plan because of any contract or other instrument he or she executes in his or her capacity as a director, officer, employee or agent of the Company. The Company will indemnify and hold harmless each director, officer, employee or agent of the Company to whom any duty or power relating to the administration or interpretation of the Plan has been or will be delegated, against any cost or expense (including attorneys' fees) or liability (including any sum paid in settlement of a claim with the Board's approval) arising out of any act or omission to act concerning the Plan unless arising out of such person's own fraud or bad faith.

(h) Governing Law. The provisions of the Plan and all Awards made hereunder shall be governed by and interpreted in accordance with the laws of the State of Delaware, excluding choice-of-law principles of the law of such state that would require the application of the laws of a jurisdiction other than the State of Delaware.

Exhibit 10.4

Merrimack Pharmaceuticals, Inc.
One Kendall Square
Suite B7201
Cambridge, MA 02139

Notice of Grant of
Incentive Stock Option

%%FIRST_NAME%-%
%%MIDDLE_NAME%-%
%%LAST_NAME%-%
%%ADDRESS_LINE_1%-%
%%ADDRESS_LINE_2%-%
%%CITY%-%**, %%STATE**%-%
%%COUNTRY%-%
%%ZIPCODE%-%

Grant Number: **%%OPTION_NUMBER%-%**
Plan: **2011 Stock Incentive Plan**
ID: **%%EMPLOYEE_IDENTIFIER%-%**

You ("Participant") have been granted an option to purchase shares of Common Stock, $0.01 par value per share, of Merrimack Pharmaceuticals, Inc. (the "Company"), subject to the terms and conditions of the Company's 2011 Stock Incentive Plan (the "Plan"), as follows:

Date of Grant:	%%OPTION_DATE,'MM/DD/YYYY'%-%
Exercise Price Per Share:	%%OPTION_PRICE,'$999,999,999.9999'%-%
Total Number of Shares Granted:	%%TOTAL_SHARES_GRANTED,'999,999,999'%-%
Total Exercise Price:	%%TOTAL_OPTION_PRICE,'$999,999,999.99'%-%
Type of Option:	Incentive Stock Option
Expiration Date of Option:	11:59 p.m., Eastern time, %%EXPIRE_DATE_PERIOD1,'MM/DD/YYYY'%-%

This option may be exercised in whole or in part in accordance with the following vesting schedule:

Shares	Vest Date
%%SHARES_PERIOD1,'999,999,999'%-%	%%VEST_DATE_PERIOD1,'MM/DD/YYYY'%-%
%%SHARES_PERIOD2,'999,999,999'%-%	%%VEST_DATE_PERIOD2,'MM/DD/YYYY'%-%
%%SHARES_PERIOD3,'999,999,999'%-%	%%VEST_DATE_PERIOD3,'MM/DD/YYYY'%-%
%%SHARES_PERIOD4,'999,999,999'%-%	%%VEST_DATE_PERIOD4,'MM/DD/YYYY'%-%
%%SHARES_PERIOD5,'999,999,999'%-%	%%VEST_DATE_PERIOD5,'MM/DD/YYYY'%-%
%%SHARES_PERIOD6,'999,999,999'%-%	%%VEST_DATE_PERIOD6,'MM/DD/YYYY'%-%
%%SHARES_PERIOD7,'999,999,999'%-%	%%VEST_DATE_PERIOD7,'MM/DD/YYYY'%-%
%%SHARES_PERIOD8,'999,999,999'%-%	%%VEST_DATE_PERIOD8,'MM/DD/YYYY'%-%
%%SHARES_PERIOD9,'999,999,999'%-%	%%VEST_DATE_PERIOD9,'MM/DD/YYYY'%-%
%%SHARESPERIOD10,'999,999,999'%-%	%%VEST_DATE_PERIOD10,'MM/DD/YYYY'%-%

Participant understands and agrees that this option is granted subject to and in accordance with the terms of the Plan. Participant further agrees to be bound by the terms of the Plan, this Notice and the General Terms and Conditions attached hereto as Exhibit A. A copy of the Plan is available upon request from the Company's Secretary.

Merrimack Pharmaceuticals, Inc.

William A. Sullivan
Chief Financial Officer and Treasurer

Incentive Stock Option Agreement
2011 Stock Incentive Plan

Exhibit A

General Terms and Conditions

For valuable consideration, receipt of which is acknowledged, the parties hereto agree as follows:

1. Grant of Option.

This agreement evidences the grant by the Company, on the date of grant (the "Grant Date") set forth in the Notice of Grant that forms part of this Agreement (the "Notice of Grant"), to the Participant, an employee of the Company, of an option to purchase, in whole or in part, on the terms provided herein and in the Company's 2011 Stock Incentive Plan (the "Plan"), the number of shares set forth in the Notice of Grant (the "Shares") of common stock, $0.01 par value per share, of the Company ("Common Stock") at the exercise price set forth in the Notice of Grant (the "Exercise Price"). Unless earlier terminated, this option shall expire at 11:59 p.m., Eastern time, on the tenth anniversary of the Grant Date (the "Final Exercise Date").

The Company intends that this option shall be an incentive stock option as defined in Section 422 of the Internal Revenue Code of 1986, as amended, and any regulations promulgated thereunder (the "Code") to the extent permitted by law. To the extent that the option does not qualify as an incentive stock option, the option shall be treated as a nonstatutory stock option. Except as otherwise indicated by the context, the term "Participant", as used in this option, shall be deemed to include any person who acquires the right to exercise this option validly under its terms.

2. Vesting Schedule.

This option will become exercisable ("vest") in accordance with the vesting schedule set forth in the Notice of Grant.

The right of exercise shall be cumulative so that to the extent the option is not exercised in any period to the maximum extent permissible it shall continue to be exercisable, in whole or in part, with respect to all Shares for which it is vested until the earlier of the Final Exercise Date or the termination of this option under Section 3 hereof or the Plan.

3. Exercise of Option.

(a) Form of Exercise. Each election to exercise this option shall be in writing, signed by the Participant, and received by the Company at its principal office, accompanied by this agreement, and payment in full in the manner provided in the Plan. Alternatively, the exercise can be effected using the software solution provided by the Company's option management software vendor, with payment in full in the manner provided in the Plan. The Participant may purchase less than the number of shares covered hereby, provided that no partial exercise of this option may

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be for any fractional share. No Shares will be issued until the Participant has executed any and all agreements that the Company may require the Participant to execute in connection with such exercise and / or in connection with any transactions involving the Shares (for example, not by limitation, lock-up agreements and FINRA questionnaires).

(b) Continuous Relationship with the Company Required. Except as otherwise provided in this Section 3, this option may not be exercised unless the Participant, at the time he or she exercises this option, is, and has been at all times since the Grant Date, an employee or officer of or consultant or advisor to, the Company or any other entity the employees, officers, directors, consultants, or advisors of which are eligible to receive option grants under the Plan (an "Eligible Participant").

(c) Termination of Relationship with the Company. If the Participant ceases to be an Eligible Participant for any reason, then, except as provided in paragraph (d), (e) and (f) below, the right to exercise this option shall terminate sixty (60) days after such cessation (but in no event after the Final Exercise Date), provided that this option shall be exercisable only to the extent that the Participant was entitled to exercise this option on the date of such cessation. Notwithstanding the foregoing, if the Participant, prior to the Final Exercise Date, violates the non-competition or confidentiality provisions of any employment contract, confidentiality and nondisclosure agreement or other agreement between the Participant and the Company, the right to exercise this option shall terminate immediately upon such violation.

(d) Exercise Period Upon Disability. If the Participant ceases to be an Eligible Participant by reason of becoming disabled (within the meaning of Section 22(e)(3) of the Code) prior to the Final Exercise Date and the Company has not terminated such relationship for "cause" as defined in paragraph (f) below, then, except as expressly set forth in another agreement between the Participant and the Company, this option shall be exercisable, within the period of six months following such cessation (but in no event after the Final Exercise Date), by the Participant, provided that this option shall be exercisable only to the extent that this option was exercisable by the Participant on the date of such cessation.

(e) Exercise Period Upon Death. If the Participant ceases to be an Eligible Participant by reason of his or her death prior to the Final Exercise Date and the Company has not terminated such relationship for "cause", or the Participant dies within the ninety (90)-day period following cessation of service with the Company other than for "cause", then, except as expressly set forth in another agreement between the Participant and the Company, this option shall be exercisable, within the period of six months following the date of death of the Participant (but in no event after the Final Exercise Date), by the Participant's authorized transferee, provided that this option shall be exercisable only to the extent that this option was exercisable by the Participant on the date of his or her death.

(f) Termination for Cause. If, prior to the Final Exercise Date, the Participant's employment or other relationship with the Company is terminated by the Company for Cause (as defined below), the right to exercise this option shall terminate immediately upon the effective date of such termination of employment or other relationship. If the Participant is party to an employment, consulting or severance agreement with the Company that contains a definition of "cause" for termination of employment or other relationship, "cause" shall have the meaning ascribed to such term in such agreement. Otherwise, "cause" shall mean willful misconduct by the Participant or willful failure by the Participant to perform his or her responsibilities to the

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Company (including, without limitation, breach by the Participant of any provision of any employment, consulting, advisory, nondisclosure, non-competition or other similar agreement between the Participant and the Company), as determined by the Company, which determination shall be conclusive. The Participant's employment or other relationship shall be considered to have been terminated for "cause" if the Company determines, within 30 days after the Participant's resignation, that termination for Cause was warranted.

4. Tax Matters.

(a) Withholding. No Shares will be issued pursuant to the exercise of this option unless and until the Participant pays to the Company, or makes provision satisfactory to the Company for payment of, any federal, state or local withholding taxes required by law to be withheld in respect of this option.

(b) Disqualifying Disposition. If this option satisfies the requirements to be treated as an incentive stock option under the Code and the Participant disposes of Shares acquired upon exercise of this option within two years from the Grant Date or one year after such Shares were acquired pursuant to exercise of this option, the Participant shall notify the Company in writing of such disposition.

5. Agreement in Connection with Public Offering.

The Participant agrees, in connection with an underwritten public offering of the Common Stock pursuant to a registration statement under the Securities Act of 1933, as amended, (i) not to (a) offer, pledge, announce the intention to sell, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, or otherwise transfer or dispose of, directly or indirectly, any shares of Common Stock or any other securities of the Company or (b) enter into any swap or other agreement that transfers, in whole or in part, any of the economic consequences of ownership of shares of Common Stock or other securities of the Company, whether any transaction described in clause (a) or (b) is to be settled by delivery of securities, in cash or otherwise, during the period beginning on the date of the filing of such registration statement with the Securities and Exchange Commission and ending 180 days after the date of the final prospectus relating to the offering (plus up to an additional 34 days to the extent requested by the managing underwriters for such offering in order to address Rule 2711(f) of the National Association of Securities Dealers, Inc. or any similar successor provision), and (ii) to execute any agreement reflecting clause (i) above as may be requested by the Company or the managing underwriters at the time of such offering. The Company may impose stop-transfer instructions with respect to the shares of Common Stock or other securities subject to the foregoing restriction until the end of the "lock-up" period.

6. Transfer Restrictions.

This option may not be sold, assigned, transferred, pledged or otherwise encumbered by the Participant, either voluntarily or by operation of law, except by will or the laws of descent and distribution, and, during the lifetime of the Participant, this option shall be exercisable only by the Participant.

7. Miscellaneous.

(a) No Rights to Employment. The Participant acknowledges and agrees that the grant of the this option and its vesting pursuant to Section 2 do not constitute an express or implied promise of continued employment for the vesting period of the option, or for any period.

(b) Section 409A. This Agreement is intended to comply with or be exempt from the requirements of Section 409A and shall be construed consistently therewith. In any event, the Company makes no representations or warranties and will have no liability to the Participant or to any other person, if any of the provisions of or payments under this Agreement are determined to constitute nonqualified deferred compensation subject to Section 409A but that do not satisfy the requirements of that Section.

(c) Entire Agreement. This Agreement and the Plan constitute the entire agreement between the parties, and supersede all prior agreements and understandings, relating to the subject matter of this Agreement, provided that any separate employment or severance agreement between the Company and the Participant that includes terms relating to the acceleration of vesting of equity awards shall not be superseded by this Agreement. In the event of a conflict between the terms and provisions of the Plan and the terms and provisions of this Agreement, the Plan terms and provisions shall prevail.

(d) Governing Law. This Agreement shall be construed, interpreted and enforced in accordance with the internal laws of the State of Delaware, without regard to any applicable conflict of law principles.

(e) Interpretation. The interpretation and construction of any terms or conditions of the Plan or this Agreement by the Compensation Committee shall be final and conclusive.

Exhibit 10.5

Merrimack Pharmaceuticals, Inc.
One Kendall Square
Suite B7201
Cambridge, MA 02139

Notice of Grant of
Non-Qualified Stock Option

%%FIRST_NAME%-%
%%MIDDLE_NAME%-%
%%LAST_NAME%-%
%%ADDRESS_LINE_1%-%
%%ADDRESS_LINE_2%-%
%%CITY%-%**, %%STATE**%-%
%%COUNTRY%-%
%%ZIPCODE%-%

Grant Number: **%%OPTION_NUMBER%-%**
Plan: **2011 Stock Incentive Plan**
ID: **%%EMPLOYEE_IDENTIFIER%-%**

You ("Participant") have been granted an option to purchase shares of Common Stock, $0.01 par value per share, of Merrimack Pharmaceuticals, Inc. (the "Company"), subject to the terms and conditions of the Company's 2011 Stock Incentive Plan (the "Plan"), as follows:

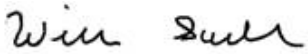
Date of Grant:	%%OPTION_DATE,'MM/DD/YYYY'%-%
Exercise Price Per Share:	%%OPTION_PRICE,'$999,999,999.9999'%-%
Total Number of Shares Granted:	%%TOTAL_SHARES_GRANTED,'999,999,999'%-%
Total Exercise Price:	%%TOTAL_OPTION_PRICE,'$999,999,999.99'%-%
Type of Option:	Non-Qualified Stock Option
Expiration Date of Option:	11:59 p.m., Eastern time, %%EXPIRE_DATE_PERIOD1,'MM/DD/YYYY'%-%

This option may be exercised in whole or in part in accordance with the following vesting schedule:

Shares	Vest Date
%%SHARES_PERIOD1,'999,999,999'%-%	%%VEST_DATE_PERIOD1,'MM/DD/YYYY'%-%
%%SHARES_PERIOD2,'999,999,999'%-%	%%VEST_DATE_PERIOD2,'MM/DD/YYYY'%-%
%%SHARES_PERIOD3,'999,999,999'%-%	%%VEST_DATE_PERIOD3,'MM/DD/YYYY'%-%
%%SHARES_PERIOD4,'999,999,999'%-%	%%VEST_DATE_PERIOD4,'MM/DD/YYYY'%-%
%%SHARES_PERIOD5,'999,999,999'%-%	%%VEST_DATE_PERIOD5,'MM/DD/YYYY'%-%
%%SHARES_PERIOD6,'999,999,999'%-%	%%VEST_DATE_PERIOD6,'MM/DD/YYYY'%-%
%%SHARES_PERIOD7,'999,999,999'%-%	%%VEST_DATE_PERIOD7,'MM/DD/YYYY'%-%
%%SHARES_PERIOD8,'999,999,999'%-%	%%VEST_DATE_PERIOD8,'MM/DD/YYYY'%-%
%%SHARES_PERIOD9,'999,999,999'%-%	%%VEST_DATE_PERIOD9,'MM/DD/YYYY'%-%
%%SHARESPERIOD10,'999,999,999'%-%	%%VEST_DATE_PERIOD10,'MM/DD/YYYY'%-%

Participant understands and agrees that this option is granted subject to and in accordance with the terms of the Plan. Participant further agrees to be bound by the terms of the Plan, this Notice and the General Terms and Conditions attached hereto as Exhibit A. A copy of the Plan is available upon request from the Company's Secretary.

Merrimack Pharmaceuticals, Inc.



William A. Sullivan
Chief Financial Officer and Treasurer

Non-Qualified Stock Option Agreement
2011 Stock Incentive Plan

Exhibit A

General Terms and Conditions

For valuable consideration, receipt of which is acknowledged, the parties hereto agree as follows:

1. Grant of Option.

This agreement evidences the grant by the Company, on the date of grant (the "Grant Date") set forth in the Notice of Grant that forms part of this Agreement (the "Notice of Grant"), to the Participant, an employee, consultant, or director of the Company, of an option to purchase, in whole or in part, on the terms provided herein and in the Company's 2011 Stock Incentive Plan (the "Plan"), the number of shares set forth in the Notice of Grant (the "Shares") of common stock, $0.01 par value per share, of the Company ("Common Stock") at the exercise price set forth in the Notice of Grant (the "Exercise Price"). Unless earlier terminated, this option shall expire at 11:59 p.m., Eastern time, on the tenth anniversary of the Grant Date (the "Final Exercise Date").

The Company intends that this option shall be a nonqualified stock option and shall not be an incentive stock option as defined in Section 422 of the Internal Revenue Code of 1986, as amended, and any regulations promulgated thereunder (the "Code"). Except as otherwise indicated by the context, the term "Participant", as used in this option, shall be deemed to include any person who acquires the right to exercise this option validly under its terms.

2. Vesting Schedule.

This option will become exercisable ("vest") in accordance with the vesting schedule set forth in the Notice of Grant.

The right of exercise shall be cumulative so that to the extent the option is not exercised in any period to the maximum extent permissible it shall continue to be exercisable, in whole or in part, with respect to all Shares for which it is vested until the earlier of the Final Exercise Date or the termination of this option under Section 3 hereof or the Plan.

3. Exercise of Option.

(a) Form of Exercise. Each election to exercise this option shall be in writing, signed by the Participant, and received by the Company at its principal office, accompanied by this agreement, and payment in full in the manner provided in the Plan. Alternatively, the exercise can be effected using the software solution provided by the Company's option management software vendor, with payment in full in the manner provided in the Plan. The Participant may purchase less than the number of shares covered hereby, provided that no partial exercise of this option may be for any fractional share. No Shares will be issued until the Participant has executed any and all

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agreements that the Company may require the Participant to execute in connection with such exercise and / or in connection with any transactions involving the Shares (for example, not by limitation, lock-up agreements and FINRA questionnaires).

(b) Continuous Relationship with the Company Required. Except as otherwise provided in this Section 3, this option may not be exercised unless the Participant, at the time he or she exercises this option, is, and has been at all times since the Grant Date, an employee or officer of or consultant or advisor to, the Company or any other entity the employees, officers, directors, consultants, or advisors of which are eligible to receive option grants under the Plan (an "Eligible Participant").

(c) Termination of Relationship with the Company. If the Participant ceases to be an Eligible Participant for any reason, then, except as provided in paragraph (d), (e) and (f) below, the right to exercise this option shall terminate sixty (60) days after such cessation (but in no event after the Final Exercise Date), provided that this option shall be exercisable only to the extent that the Participant was entitled to exercise this option on the date of such cessation. Notwithstanding the foregoing, if the Participant, prior to the Final Exercise Date, violates the non-competition or confidentiality provisions of any employment contract, confidentiality and nondisclosure agreement or other agreement between the Participant and the Company, the right to exercise this option shall terminate immediately upon such violation.

(d) Exercise Period Upon Disability. If the Participant ceases to be an Eligible Participant by reason of becoming disabled (within the meaning of Section 22(e)(3) of the Code) prior to the Final Exercise Date and the Company has not terminated such relationship for "cause" as defined in paragraph (f) below, then, except as expressly set forth in another agreement between the Participant and the Company, this option shall be exercisable, within the period of six months following such cessation (but in no event after the Final Exercise Date), by the Participant, provided that this option shall be exercisable only to the extent that this option was exercisable by the Participant on the date of such cessation.

(e) Exercise Period Upon Death. If the Participant ceases to be an Eligible Participant by reason of his or her death prior to the Final Exercise Date and the Company has not terminated such relationship for "cause", or the Participant dies within the ninety (90)-day period following cessation of service with the Company other than for "cause", then, except as expressly set forth in another agreement between the Participant and the Company, this option shall be exercisable, within the period of six months following the date of death of the Participant (but in no event after the Final Exercise Date), by the Participant's authorized transferee, provided that this option shall be exercisable only to the extent that this option was exercisable by the Participant on the date of his or her death.

(f) Termination for Cause. If, prior to the Final Exercise Date, the Participant's employment or other relationship with the Company is terminated by the Company for Cause (as defined below), the right to exercise this option shall terminate immediately upon the effective date of such termination of employment or other relationship. If the Participant is party to an employment, consulting or severance agreement with the Company that contains a definition of "cause" for termination of employment or other relationship, "cause" shall have the meaning ascribed to such term in such agreement. Otherwise, "cause" shall mean willful misconduct by the Participant or willful failure by the Participant to perform his or her responsibilities to the Company (including, without limitation, breach by the Participant of any provision of any

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employment, consulting, advisory, nondisclosure, non-competition or other similar agreement between the Participant and the Company), as determined by the Company, which determination shall be conclusive. The Participant's employment or other relationship shall be considered to have been terminated for "cause" if the Company determines, within 30 days after the Participant's resignation, that termination for Cause was warranted.

4. Tax Matters.

No Shares will be issued pursuant to the exercise of this option unless and until the Participant pays to the Company, or makes provision satisfactory to the Company for payment of, any federal, state or local withholding taxes required by law to be withheld in respect of this option.

5. Agreement in Connection with Public Offering.

The Participant agrees, in connection with an underwritten public offering of the Common Stock pursuant to a registration statement under the Securities Act of 1933, as amended, (i) not to (a) offer, pledge, announce the intention to sell, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, or otherwise transfer or dispose of, directly or indirectly, any shares of Common Stock or any other securities of the Company or (b) enter into any swap or other agreement that transfers, in whole or in part, any of the economic consequences of ownership of shares of Common Stock or other securities of the Company, whether any transaction described in clause (a) or (b) is to be settled by delivery of securities, in cash or otherwise, during the period beginning on the date of the filing of such registration statement with the Securities and Exchange Commission and ending 180 days after the date of the final prospectus relating to the offering (plus up to an additional 34 days to the extent requested by the managing underwriters for such offering in order to address Rule 2711(f) of the National Association of Securities Dealers, Inc. or any similar successor provision), and (ii) to execute any agreement reflecting clause (i) above as may be requested by the Company or the managing underwriters at the time of such offering. The Company may impose stop-transfer instructions with respect to the shares of Common Stock or other securities subject to the foregoing restriction until the end of the "lock-up" period.

6. Transfer Restrictions.

This option may not be sold, assigned, transferred, pledged or otherwise encumbered by the Participant, either voluntarily or by operation of law, except by will or the laws of descent and distribution, and, during the lifetime of the Participant, this option shall be exercisable only by the Participant.

7. Miscellaneous.

(a) No Rights to Employment. The Participant acknowledges and agrees that the grant of the this option and its vesting pursuant to Section 2 do not constitute an express or implied promise of continued employment for the vesting period of the option, or for any period.

(b) Section 409A. This Agreement is intended to comply with or be exempt from the requirements of Section 409A and shall be construed consistently therewith. In any event, the

Company makes no representations or warranties and will have no liability to the Participant or to any other person, if any of the provisions of or payments under this Agreement are determined to constitute nonqualified deferred compensation subject to Section 409A but that do not satisfy the requirements of that Section.

(c) Entire Agreement. This Agreement and the Plan constitute the entire agreement between the parties, and supersede all prior agreements and understandings, relating to the subject matter of this Agreement, provided that any separate employment or severance agreement between the Company and the Participant that includes terms relating to the acceleration of vesting of equity awards shall not be superseded by this Agreement. In the event of a conflict between the terms and provisions of the Plan and the terms and provisions of this Agreement, the Plan terms and provisions shall prevail.

(d) Governing Law. This Agreement shall be construed, interpreted and enforced in accordance with the internal laws of the State of Delaware, without regard to any applicable conflict of law principles.

(e) Interpretation. The interpretation and construction of any terms or conditions of the Plan or this Agreement by the Compensation Committee shall be final and conclusive.

Exhibit 10.26

EMPLOYMENT AGREEMENT

This Employment Agreement (this "Agreement"), dated as of September 30, 2011, is entered into by and between Merrimack Pharmaceuticals, Inc., a Delaware corporation with a place of business at One Kendall Square, Suite B7201, Cambridge, Massachusetts 02139 (the "Company"), and William M. McClements, an individual residing at 5 Stetson Street, Lexington, MA 02420 (the "Employee").

RECITALS

WHEREAS, the Company desires to employ the Employee as Senior Vice President of Corporate Operations; and

WHEREAS, the Employee has agreed to accept such employment upon the terms and conditions set forth in this Agreement.

NOW, THEREFORE, in consideration of the foregoing and of the respective covenants and agreements of the parties herein contained, the parties hereto agree as follows:

1. ***Term of Employment***. Subject to the terms and conditions hereinafter set forth, the Company hereby employs the Employee, and the Employee hereby enters into the employment of the Company, for an employment term commencing on the date set forth above and, unless earlier terminated in accordance with the provisions set forth in Section 10, continuing until December 31, 2012. This Agreement shall renew automatically for successive one (1) year terms, unless either party shall give the other notice of non-renewal in accordance with Section 10. Both the initial term of this Agreement and any annual renewal term of the Agreement shall be referred to as the "Term of Employment." The Employee's Base Salary (as defined below) for any renewal term shall be as agreed by the parties, provided that (i) the Base Salary shall in no event be less than the Base Salary the Employee received in the immediately preceding term, and (ii) in the absence of an agreement otherwise, the Employee's Base Salary shall be the same as the Base Salary he received in the immediately preceding term.

2. ***Position***. During the Term of Employment, the Employee shall serve as Senior Vice President of Corporate Operations of the Company and in such additional position(s) as he and the Company shall agree.

3. ***Scope of Employment***. During the Term of Employment, the Employee shall be responsible for the performance of all financial, managerial and administrative duties customarily performed by a Senior Vice President of Corporate Operations, together with such other duties as the Chief Executive Officer and the Employee shall agree. The Employee shall be accountable to the Chief Executive Officer and shall perform and discharge, faithfully, diligently and to the best of his ability, his duties and responsibilities hereunder. The Employee shall devote substantially all of his working time and efforts to the business and affairs of the Company and its affiliates.

4. ***Compensation***. As full compensation for all services to be rendered by the Employee during the Term of Employment, the Company will provide to the Employee, and the Employee will accept, the following:

(a) *Base Salary.* During the Term of Employment, the Employee shall receive a salary of $295,000 per calendar year, less all applicable taxes and withholdings (the "Base Salary"), paid in semi-monthly installments in accordance with the Company's regularly established payroll procedure. The Employee's Base Salary shall be reviewed annually by the Company's Board of Directors (the "Board") and may be adjusted from time to time in accordance with normal business practices and taking into account then-current market factors, but in no event shall the Employee's salary be less than the base salary the Employee received from the Company in the immediately preceding year.

(b) *Bonus.* During the Term of Employment, the Employee shall be eligible to receive a discretionary annual performance and retention bonus of up to 40% of his then current Base Salary, at a time and under circumstances determined by the Board, in its sole discretion. In order to receive the discretionary annual performance bonus, the Employee must be an active employee of the Company on the date any bonus is determined and no discretionary annual bonus shall be considered earned before such date. Such discretionary bonus, if any, shall be paid no later than thirty (30) days following the date on which the Board approves such bonus.

(c) *Stock Options; Equity Grants.* The Employee shall be eligible to receive option grants or other equity grants at times and under circumstances determined by the Board, in its sole discretion.

(d) *Vacation.* The Employee shall be eligible for twenty (20) vacation days per year and ten (10) personal days per year, in each case to be used in accordance with the Company's Employee Time Off Policy contained within the Company's Employee Handbook, as amended and/or superseded from time to time.

(e) *Insurance*. The Employee shall be entitled to participate in, and receive benefits under, all Company sponsored insurance and benefit programs (i.e. health, dental, life, and disability) available to senior management employees of the Company, subject to and on a basis consistent with the terms, conditions and overall administration of such programs.

(f) *Other Benefits.* The Employee shall be entitled to participate in, and receive benefits under, all Company employee benefit plans and arrangements (including but not limited to 401k and similar programs), available to senior management employees of the Company, subject to and on a basis consistent with the terms, conditions and overall administration of such plans, policies and arrangements.

5. ***Expenses***. The Employee shall be entitled to reimbursement by the Company for all reasonable expenses actually incurred by him on the Company's behalf in the course of his employment by the Company, upon the prompt presentation by the Employee, from time to time, of an itemized account of such expenditures together with all supporting vouchers and receipts.

6. ***Restrictive Covenants***.

(a) *Non-Competition.* The Employee agrees that, during the Term of Employment and any Severance Period (as defined below), and for a period of one (1) year thereafter, he will not engage, directly or indirectly, in any business that competes with the

business of the Company. For purposes of this paragraph, a business competes with the business of the Company if it is engaged in the research, development, production, sales or marketing of any diagnostic or therapeutics process or product that is directed at any molecular targets or related to any therapeutic candidate compound that the Company developed, produced or sold, or planned to develop, produce or sell, while the Employee was employed with the Company. The Employee will be deemed to be directly or indirectly engaged in a competitive business if he is engaged in such competitive business as proprietor, partner, joint venturer, stockholder (other than the holder of less than two percent (2%) of the outstanding shares of any publicly owned corporation), director, officer, manager, member, employee, consultant, independent contractor, adviser, marketer, or agent or if he otherwise controls such business.

(b) *Non-Solicitation.* The Employee agrees with the Company that during the Term of Employment and any Severance Period, and for a period of one (1) year thereafter, he will not, directly or indirectly, solicit, entice away, employ, hire or otherwise interfere with the Company's relationship with any officer, employee, consultant or agent of the Company.

(c) *Waiver.* The Company may waive the prohibitions of Sections 6(a) or (b) hereof without waiving any other provisions of this Agreement

(d) *Validity.* In the event any provision of Section 6(a) or 6(b) hereof shall to any extent be held to be invalid or unenforceable by reason of geographic or business scope or the duration thereof, such invalidity or enforceability shall attach only to such provision to the extent of such invalidity, and shall not affect or render invalid or unenforceable any other provision of this Agreement and, in such event, such provision shall be deemed to be modified to such extent as may be necessary to cause the geographic or business scope or duration thereof to be valid and enforceable to the maximum extent permitted by law.

(e) *Pre-existing Obligations.* The Employee agrees that the restrictive covenants contained herein do not cancel or modify the Employee's obligations under the Non-Competition, Non-Solicitation, Non-Disclosure and Developments Agreement attached hereto as Exhibit A and executed on the date hereof except to the extent set forth in Section 14.

7. ***Confidential Information***. While employed by the Company and thereafter, the Employee shall not, directly or indirectly, use any Confidential Information (as hereinafter defined) other than pursuant to his employment by and for the benefit of the Company, or disclose any such Confidential Information to anyone outside of the Company whether by private communication, public address, publication or otherwise or to anyone within the Company who has not been authorized to receive such information, except as directed in writing by the Board. For purposes of this Section 7, "Confidential Information" means all trade secrets, proprietary information, and other data and information, in any form, belonging to the Company or any of its clients, customers, consultants, licensees or affiliates, that is held in confidence by the Company. Confidential Information includes but is not limited to computer software, business plans and arrangements, customer lists, marketing materials, financial information, research, and any other information identified or treated as confidential by the Company or any of its clients, customers, consultants, licensees or affiliates. Notwithstanding the foregoing, Confidential Information does not include information which the Company has voluntarily disclosed to the public without restriction, or which is otherwise known to the public at large

through no fault of the Employee. The Employee further acknowledges and reaffirms his obligation to keep confidential and not to disclose any and all Confidential Information that he has acquired or will acquire during the course of his employment with the Company, as is stated more fully in the Non-Competition, Non-Solicitation, Non-Disclosure and Developments Agreement attached hereto as Exhibit A and executed on the date hereof.

8. ***Developments***. As a condition of the Employee's employment with the Company and the promises contained herein, the Employee acknowledges and reaffirms his obligations, as stated more fully in the Non-Competition, Non-Solicitation, Non-Disclosure and Developments Agreement attached hereto as Exhibit A and executed on the date hereof except to the extent set forth in Section 14.

9. ***Injunctive Relief***. The parties hereto recognize that irreparable damage will result to the Company and its business and properties if the Employee fails or refuses to perform his obligations under Section 6(a), 6(b), 7 or 8 hereof, and that the remedy at law for any such failure or refusal will be inadequate. Accordingly, in addition to any other remedies and damages available, the Company shall be entitled to injunctive relief, and the Employee may be specifically compelled to perform his obligations thereunder.

10. ***Early Termination***.

(a) *Death and Disability.* In the event of the Employee's death during the Term of Employment, this Agreement shall terminate immediately. If, during the Term of Employment, the Employee shall be unable for a period of more than any three (3) consecutive months or for periods aggregating more than twenty-six (26) weeks in a twelve (12) month period to perform the services provided for herein as a result of any illness or disability, the Company may terminate the Employee's employment hereunder. The Employee shall be considered unable to perform the services provided for herein if and whenever the Company reasonably determines, based upon the results of a medical examination performed by a mutually agreed-upon professional, that he is mentally or physically incapable of performing his duties hereunder.

(b) *Termination For Cause.* The Employee may be terminated by the Company without notice for "Cause." The following, as determined by the Board in its reasonable judgment, shall constitute "Cause" for termination:

(i) *Failure to Perform Duties.* The Employee's material failure to perform (other than by reason of illness or disability) his duties to the Company, or his material negligence in the performance of his duties and/or responsibilities to the Company, provided that the Employee shall have had prior written notice and a reasonable opportunity of not less than thirty (30) days to correct any deficiency in such performance;

(ii) *Breach of Employment Agreement.* The Employee's material breach of this Agreement;

(iii) *Misconduct.* The Employee's conviction for or plea of *nolo contendere* or guilty to any crime involving fraud, embezzlement or moral turpitude; or

(iv) *Harmful Conduct.* Any conduct of the Employee that is materially harmful to the business, interests or reputation of the Company, provided that the Employee shall have had prior written notice and a reasonable opportunity of not less than ten (10) days to correct any such conduct.

(c) *Termination By Company Without Cause.* The Employee may be terminated by the Company without "Cause" upon delivery of written notice to the Employee. In the event the Employee is terminated without "Cause," the Employee shall be entitled to receive the severance benefits set forth in Section 10(f) or 10(g), as applicable. The Company's decision not to renew the Term of Employment shall constitute a termination without "Cause".

(d) *Termination by the Employee for Good Reason.* This Agreement may be terminated by the Employee for "Good Reason" (as defined below), upon thirty (30) days' prior written notice to the Company, provided that the Company shall have the opportunity to cure the asserted Good Reason within the thirty (30) day period. The Employee shall have "Good Reason" to terminate this Agreement in the event that the Company, without the express written consent of the Employee: (i) causes a material diminution of the Employee's authority, duties or responsibilities; (ii) materially breaches this Agreement, including, without limitation, by materially reducing the Employee's Base Salary or (iii) relocating the Employee's place of business by more than thirty (30) miles from the Company's current Cambridge, Massachusetts office. In the event the Employee terminates his employment for Good Reason, the Employee shall be entitled to the severance benefits set forth in Section 10(f) or 10(g), as applicable.

(e) *Effect of Early Termination.* Except for a termination by the Company without "Cause" or by the Employee for "Good Reason," in the event of any early termination of the Term of Employment, the Company's obligations under this Agreement shall immediately cease and the Employee shall be entitled to only the Employee's Base Salary and employment benefits which have accrued and to which the Employee is entitled to through the date of such termination, including any bonus that may have been awarded but not yet paid. These accrued salary and benefits shall be paid on or about the date of termination. The Employee shall not be entitled to any other compensation or consideration, including any bonus not yet awarded that the Employee may have been eligible for had his Term of Employment not ceased. In the event of an early termination of the Term of Employment due to the Employee's disability, as set forth in Section 10(a), the Employee will be eligible to receive a pro rata amount of any bonus he would have received had his Term of Employment not ceased (determined in the manner set forth in the penultimate sentence of Section 10(f)), which bonus shall be paid within thirty (30) days of the date of the Employee's termination.

(f) *Severance Benefits Prior to a Change in Control.* If the Term of Employment is terminated by the Company without "Cause" (as that term is defined in Section 10(b)) or by the Employee for "Good Reason" (as that term is defined in Section 10(d)), in each case prior to a Change in Control (as that term is defined in Exhibit B), the Employee shall be entitled to receive his Base Salary and all other employment benefits accrued through the effective date of such termination, which shall be paid on or about the date of termination. In addition, provided the Employee executes and allows to become binding a severance agreement and release of claims drafted by and satisfactory to the Company (the "Release") on or before the sixtieth (60^{th}) day after the date of termination, then beginning on the first regularly scheduled

payroll that is sixty (60) days following the date of termination (such date, the "Payment Commencement Date"), for a period of twelve (12) months (the "Severance Period"), the Company shall: (i) pay to the Employee his base salary in accordance with the Company's regularly established payroll procedure, (ii) pay for coverage under any benefit plans provided pursuant to Section 4(e), provided the Employee is eligible for and elects to continue receiving such benefits pursuant to the federal "COBRA" law, 29 U.S.C. § 1161 et. seq., and provided further that the Employee continues to pay the applicable share of the premium for such coverage that is paid for active and similarly situated employees who receive the same type of coverage, and (iii) to the extent allowed by applicable law and the applicable plan documents, continue to provide the Employee with such benefits as described in Section 4(f), subject to and on a basis consistent with the terms, conditions and overall administration of such plans. In addition, the Company shall pay to the Employee, on the Payment Commencement Date, a pro-rata bonus equal to (A) the average of the Employee's annual bonus payments over each of the three (3) years prior to the year of termination (or such lesser period during which the Employee served as an executive officer of the Company) multiplied by (B) a fraction, the numerator of which is the number of days during the year during which the Employee remained employed by the Company and the denominator of which is 365. The distribution of all severance benefits under this Section 10(f) shall be subject to the provisions of Exhibit C.

(g) *Severance Benefits After a Change in Control*. If the Term of Employment is terminated by the Company without "Cause" (as that term is defined in Section 10(b)) or by the Employee for "Good Reason" (as that term is defined in Section 10(d)), in each case within the eighteen (18) month period following a Change in Control (as that term is defined in Exhibit B), the Employee shall be entitled to receive his Base Salary and all other employment benefits accrued through the effective date of such termination, which shall be paid on or about the date of termination. In addition, provided the Employee executes and allows to become binding the Release on or before the Payment Commencement Date, the Company shall: (i) pay to the Employee on the Payment Commencement Date a lump sum amount equal to thirty-six (36) months of his Base Salary; (ii) pay to the Employee on the Payment Commencement Date a bonus equal to (A) three (3) multiplied by (B) the average of the Employee's annual bonus payments over each of the three (3) years prior to the year of termination (or such lesser period during which the Employee served as an executive officer of the Company); (iii) accelerate the vesting of all outstanding Company stock options, restricted stock or other equity awards granted to the Employee; (iv) pay for coverage under any benefit plans provided pursuant to Section 4(e) for a period of eighteen (18) months following the Employee's date of termination, provided the Employee is eligible for and elects to continue receiving such benefits pursuant to the federal "COBRA" law, 29 U.S.C. § 1161 et. seq., and provided further that the Employee continues to pay the applicable share of the premium for such coverage that is paid for active and similarly situated employees who receive the same type of coverage; and (v) to the extent allowed by applicable law and the applicable plan documents, continue for a period of eighteen (18) months following the Employee's date of termination to provide the Employee with such benefits as described in Section 4(f), subject to and on a basis consistent with the terms, conditions and overall administration of such plans. The distribution of all severance benefits under this Section 10(g) shall be subject to the provisions of Exhibit C.

11. ***Absence of Restrictions***. The Employee represents and warrants that he is not a party to any commitment or undertaking by which he is subject to any restriction or limitation

upon his entering into this Agreement or performing the services required of him hereunder.

12. ***Amendments***. Any amendment to this Agreement, including any extension or renewal of the Term of Employment, shall be made in writing and signed by the parties hereto sought

13. ***Applicable Law***. This Agreement shall be governed by and construed in accordance with the laws of the Commonwealth of Massachusetts (without reference to the conflict of laws provisions thereof). Any action, suit, or other legal proceeding arising under or relating to any provision of this Agreement shall be commenced only in a court of the Commonwealth of Massachusetts (or, if appropriate, a federal court located within the Commonwealth of Massachusetts), and the Company and the Employee each consents to the jurisdiction of such a court. The Company and the Employee each hereby irrevocably waives any right to a trial by jury in any action, suit or other legal proceeding arising under or relating to any provision of this Agreement.

14. ***Entire Agreement***. This Agreement, together with the Non-Competition, Non-Solicitation, Non-Disclosure and Developments Agreement attached hereto as Exhibit A and executed on the date hereof, constitutes the entire agreement between the parties and supersedes all prior agreements and understandings, whether written or oral, relating to the subject matter of these Agreements; provided however that the Employee and the Company agree that Section 4(a) of the Non-Competition, Non-Solicitation, Non-Disclosure and Developments Agreement is superseded by this Agreement.

15. ***Successors and Assigns***. This Agreement shall be binding upon and inure to the benefit of both parties and their respective successors and assigns, including any corporation with which or into which the Company may be merged or which may succeed to its assets or business; provided, however, that the obligations of the Employee are personal and shall not be assigned by him.

16. ***Acknowledgment***. The Employee states and represents that he has had an opportunity to fully discuss and review the terms of this Agreement with an attorney. The Employee further states and represents that he has carefully read this Agreement, understands the contents herein, freely and voluntarily assents to all of the terms and conditions hereof, and signs his name of his own free act.

17. ***Miscellaneous***.

(a) No delay or omission by the Company in exercising any right under this Agreement shall operate as a waiver of that or any other right. A waiver or consent given by the Company on any one occasion shall be effective only in that instance and shall not be construed as a bar to or waiver of any right on any other occasion.

(b) The captions of the sections of this Agreement are for convenience of reference only and in no way define, limit or affect the scope or substance of any section of this Agreement.

(c) In case any provision of this Agreement shall be invalid, illegal or

otherwise unenforceable, the validity, legality and enforceability of the remaining provisions shall in no way be affected or impaired thereby.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the date first written above.

COMPANY: **MERRIMACK PHARMACEUTICALS, INC**.

By: /s/ Robert J. Mulroy
Robert J. Mulroy
President and Chief Executive Officer

EMPLOYEE: /s/ William M. McClements
William M. McClements

Exhibit A

Non-Competition, Non-Solicitation, Non-Disclosure and Developments Agreement

NON-COMPETITION, NON-SOLICITATION,
NON-DISCLOSURE AND DEVELOPMENTS AGREEMENT

This Non-Competition, Non-Solicitation, Non-Disclosure and Developments Agreement (this "Agreement"), dated as of September 30, 2011, is entered into by and between Merrimack Pharmaceuticals, Inc., a Delaware corporation (the "Company"), and William M. McClements (the "Employee").

In consideration of the Employee's employment with the Company and for other valuable consideration, the receipt and sufficiency of which are hereby acknowledged by the Employee, the Employee hereby agrees as follows:

1. Condition of Employment.

The Employee acknowledges that his/her employment and the continuance of that employment with the Company is contingent upon his/her agreement to sign and adhere to the provisions of this Agreement. The Employee further acknowledges that the nature of the Company's business is such that protection of its proprietary and confidential information is critical to its survival and success.

2. Proprietary and Confidential Information.

(a) The Employee agrees that all information and know-how, whether or not in writing, of a private, secret or confidential nature concerning the Company and its operations and business or financial affairs (collectively, "Proprietary Information") is and shall be the exclusive property of the Company. By way of illustration but not limitation, Proprietary Information may include models, systems, software and codes, or systems, software and codes in the course of development, or planned or proposed systems, software or codes, customer, prospect, and supplier lists, contacts at or knowledge of customers or prospective customers, customer accounts and other customer financial information, strategic partners and/or collaborators, price lists and all other pricing, marketing and sales information, projections, or results relating to the Company or any customer or supplier of the Company, databases, modules, products, programs, product improvements, product enhancements and/or developments, designs, specifications, processes, methods, techniques, operations, projects, plans, chemical compounds, chemical or biological materials, engineering data, clinical or technological data, research data, financial data, personnel data, and other confidential agreements or documents (including, but not limited to, clinical trial protocols and unpublished patent applications). The Employee will not disclose any Proprietary Information to others outside the Company or use the same for any unauthorized purposes without written approval by an officer of the Company, either during or at any time after his/her employment with the Company, unless and until such Proprietary Information has become public knowledge without fault by the Employee. While employed by the Company, the Employee will use the Employee's best efforts to prevent publication or disclosure of any confidential or Proprietary Information.

(b) The Employee agrees that all Company Property, whether created by the Employee or others, which shall come into the Employee's custody or possession, shall be and are the sole and exclusive property of the Company to be used only in the performance of the

Employee's duties for the Company. "Company Property" means any and all written, photographic, or any other record containing Proprietary Information and shall include, but not be limited to, all agreements, notes, disks, files, letters, memoranda, reports, records, lists, data, drawings, sketches, notebooks, program listings, specifications, software programs, software code, computers and other electronic equipment, documentation, or other equipment or materials of any nature and in any form, containing Property Information. Upon the earliest of the Employee's termination or a request from the Company, the Employee will return to the Company any and all Company Property in the Employee's custody or possession without retaining any copies thereof (including, without limitation, any electronic copy) and without using or allowing others to improperly use such Company Property.

(c) The Employee acknowledges that the Employee's obligations with regard to Proprietary Information that are set out in subparagraphs (a) and (b) above, extend to all information, know-how, records and tangible property of customers of the Company or suppliers to the Company or of any third party who may have disclosed or entrusted the same to the Company or to the Employee in the course of the Company's business.

3. Developments.

(a) The Employee will make full and prompt disclosure to the Company of all inventions, ideas, concepts, improvements, discoveries, methods, techniques, tools, formula, developments, enhancements, modifications, databases, processes, software, and works of authorship, whether patentable or not, which are created, made, conceived or reduced to practice by the Employee or under the Employee's direction or jointly with others during the Employee's employment by the Company, whether or not during normal working hours or on the premises of the Company (all of which are collectively referred to in this Agreement as "Developments").

(b) The Employee agrees to assign and does hereby assign to the Company (or any person or entity designated by the Company) all of the Employee's right, title and interest in and to all Developments and all related intellectual property rights. Except as, and solely to the extent that, it may be necessary for the Employee to perform the Employee's duties and fulfill the Employee's obligations in the course of the Employee's employment with the Company, the Company does not grant the Employee, and the Employee agrees that he/she will not receive, any license or right to use any Development or related intellectual property right. The Employee hereby also waives all claims to moral rights in any Developments. However, this paragraph 3(b) shall not apply to Developments that do not relate to the present or planned business or research and development of the Company and that are made and conceived by the Employee not during normal working hours, not on the Company's premises and not using the Company's tools, devices, equipment or Proprietary Information. This paragraph 3(b) also shall not apply to any inventions that the Employee conceived of prior to the Employee's employment with the Company, which invention(s) the Employee shall disclose on Exhibit A attached hereto. IF THERE ARE ANY SUCH INVENTIONS TO BE EXCLUDED UNDER THIS AGREEMENT, THE EMPLOYEE SHALL INITIAL HERE; OTHERWISE IT WILL BE DEEMED THAT THERE ARE NO SUCH EXCLUSIONS. The Employee understands that, to the extent this Agreement shall be construed in accordance with the laws of any state that precludes the requirement in an employee agreement to assign certain classes of inventions made

by an employee, this paragraph 3(b) shall be interpreted not to apply to any invention that a court rules and/or the Company agrees falls within such classes.

(c) The Employee agrees to cooperate fully with the Company, both during and after the Employee's employment with the Company, with respect to the procurement, maintenance and enforcement of all copyrights, trademarks, patents, and other intellectual property rights (both in the United States and foreign countries) relating to any Development. The Employee shall sign all papers, including, without limitation, copyright applications, patent

applications, declarations, oaths, formal assignments, assignment of priority rights, and powers of attorney, which the Company may deem necessary or desirable in order to protect its rights and interests in any Development. The Employee further agrees that if the Company is unable, after reasonable effort, to secure the signature of the Employee on any such papers, any executive officer of the Company shall be entitled to execute any such papers as the agent and the attorney-in-fact of the Employee, and the Employee hereby irrevocably designates and appoints each executive officer of the Company as the Employee's agent and attorney-in-fact to execute any such papers on the Employee's behalf, and to take any and all actions as the Company may deem necessary or desirable in order to protect its rights and interests in any Development, under the conditions described in this sentence.

4. Non-Competition and Non-Solicitation.

While the Employee is employed by the Company and for a period of twelve (12) months following the Employee's termination or cessation of employment for any reason, the Employee will not, directly or indirectly:

(a) Engage in any business or enterprise (whether as an owner, partner, officer, employee, director, investor, lender, consultant, independent contractor or otherwise, except as the holder of not more than 1% of the combined voting power of the outstanding stock of a publicly held company) that is competitive with the Company's business, including but not limited to, any business or enterprise that develops, designs, produces, markets, sells or renders any product or service competitive with any product or service developed, designed, produced, marketed, sold or rendered or planned to be developed, designed, produced, marketed, sold or rendered by the Company while the Employee was employed by the Company;

(b) Either alone or in association with others, recruit, solicit, hire or engage as an independent contractor, or attempt to recruit, solicit, hire or engage as an independent contractor, any person who was employed by the Company or engaged as an independent contractor for the Company at any time during the period of the Employee's employment with the Company, except for an individual whose employment with or service for the Company has been terminated for a period of six (6) months or longer; and/or

(c) Either alone or in association with others, solicit, divert or take away, or attempt to solicit, divert or take away, the business or patronage of any of the clients, customers or accounts, or prospective clients, customers or accounts, of the Company that were contacted, solicited or served by the Employee while the Employee was employed by the Company.

(d) The geographic scope of this paragraph shall extend to anywhere the Company or any of its subsidiaries is doing business, has done business, or has plans to do business.

(e) If any restriction set forth in this paragraph 4 is found by any court of competent jurisdiction to be unenforceable because it extends for too long a period of time or over too great a range of activities or in too broad a geographic area, it shall be interpreted to extend only over the maximum period of time, range of activities or geographic area as to which it may be enforceable.

(f) The Employee agrees that during the non-competition and non-solicitation period, the Employee will give notice to the Company of each new business activity the Employee plans to undertake, at least ten (10) business days prior to beginning any such activity. The notice shall state the name and address of the individual, corporation, association or other entity or organization (the "Entity") for whom such activity is undertaken and the Employee's proposed business relationship or position with the Entity. The Employee further agrees to provide the Company with other pertinent information concerning such business activity as the Company may reasonably request in order to determine the Employee's continued compliance with his/her obligations under this Agreement. During the non-competition and non-solicitation period, the Employee agrees to provide a copy of this Agreement to all person and Entities with whom the Employee seeks to be hired or do business before accepting employment or engagement with any of them.

(g) If the Employee violates any of the provisions of this paragraph, the Employee shall continue to be held by the restrictions set forth in this paragraph until a period equal to the period of restriction has expired without any violation.

5. Other Agreements.

The Employee hereby represents that, except as the Employee has disclosed in writing to the Company, the Employee is not bound by the terms of any agreement with any previous employer or other party to refrain from using or disclosing any trade secret or confidential or proprietary information in the course of the Employee's employment with the Company or to refrain from competing, directly or indirectly, with the business of such previous employer or any other party. The Employee further represents that the Employee's performance of all the terms of this Agreement and as an employee of the Company does not and will not breach any agreement to keep in confidence proprietary information, knowledge or data acquired by the Employee in confidence or in trust prior to the Employee's employment with the Company, and the Employee will not disclose to the Company or induce the Company to use any confidential or proprietary information or material belonging to any previous employer or others.

6. Employment At Will.

The Employee acknowledges that this Agreement does not constitute a contract of employment for any period of time and does not modify the at-will nature of the Employee's employment with the Company, pursuant to which both the Company and the Employee may terminate the employment relationship at any time, for any or no reason, with or without notice.

7. General Provisions.

(a) Equitable Relief. The Employee acknowledges that the restrictions contained in this Agreement are necessary for the protection of the business and goodwill of the Company and are considered by the Employee to be reasonable for such purpose. The Employee agrees that any breach or threatened breach of this Agreement will cause the Company substantial and irrevocable damage that is difficult to measure. Therefore, in the event of any such breach or threatened breach, the Employee agrees that the Company, in addition to such other remedies that may be available, shall have the right to seek specific performance and injunctive relief without posting a bond. The Employee hereby waives the adequacy of a remedy at law as a defense to such relief.

(b) No Conflict. The Employee represents that the execution and performance by the Employee of this Agreement does not and will not conflict with or breach the terms of any other agreement by which the Employee is bound.

(c) Severability. The invalidity or unenforceability of any provision of this Agreement shall not affect or impair the validity or enforceability of any other provision of this Agreement.

(d) Waiver; Amendments. No delay or omission by the Company in exercising any right under this Agreement will operate as a waiver of that or any other right. A waiver or consent given by the Company on any one occasion is effective only in that instance and will not be construed as a bar to or waiver of any right on any other occasion. Any amendment to or modification of this Agreement, or any waiver of any provision thereof, shall be in writing and signed by the Company.

(e) Successors and Assigns. This Agreement shall be binding upon and inure to the benefit of both parties and their respective successors and assigns, including any corporation or entity with which or into which the Company may be merged or which may succeed to all or substantially all of its assets or business; provided, however, that the obligations of the Employee are personal and shall not be assigned by the Employee.

(f) Governing Law, Forum and Jurisdiction. This Agreement shall be governed by and construed as a sealed instrument under and in accordance with the laws of the Commonwealth of Massachusetts without regard to conflict of laws provisions. Any action, suit, or other legal proceeding that is commenced to resolve any matter arising under or relating to any provision of this Agreement shall be commenced only in a court of the Commonwealth of Massachusetts (or, if appropriate, a federal court located within Massachusetts), and the Company and the Employee each consents to the jurisdiction of such a court.

(g) Captions. The captions of the paragraphs of this Agreement are for convenience of reference only and in no way define, limit or affect the scope or substance of any paragraph of this Agreement.

(h) Entire Agreement. This Agreement supersedes all prior agreements, written or oral, between the Employee and the Company relating to the subject matter of this Agreement. This Agreement may not modified, changed or discharged in whole or in part,

except by an agreement in writing signed by the Employee and the Company. The Employee agrees that any change or changes in the Employee's position, employment duties, or compensation after the signing of this Agreement, shall not affect the validity or scope of this Agreement.

THE EMPLOYEE ACKNOWLEDGES THAT HE/SHE HAS CAREFULLY READ THIS AGREEMENT AND UNDERSTANDS AND AGREES TO ALL OF THE PROVISIONS IN THIS AGREEMENT.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the date first written above.

COMPANY: **MERRIMACK PHARMACEUTICALS, INC**.

By: /s/ Robert J. Mulroy
Robert J. Mulroy
President and Chief Executive Officer

EMPLOYEE: /s/ William M. McClements
William M. McClements

Exhibit A

List of Prior Inventions and Original Works of Authorship

Title	Date	Identifying Number or Brief Description

Additional Sheets Attached

Signature of Employee: _____

Printed Name of Employee: _____

Date: _____

Exhibit B

Definition of Change in Control

A "Change in Control" shall occur upon the following events, provided, in each case, that such event constitutes a "change in control event" within the meaning of Treasury Regulation Section 1.409-3(i)(5)(i):

(A) the acquisition by an individual, entity or group (within the meaning of Section 13(d)(3) or 14(d)(2) of the Securities Exchange Act of 1934, as amended (the "Exchange Act") (a "Person") of beneficial ownership of any capital stock of the Company if, after such acquisition, such Person beneficially owns (within the meaning of Rule 13d-3 under the Exchange Act) 50% or more of either (x) the then-outstanding shares of common stock of the Company (the "Outstanding Company Common Stock") or (y) the combined voting power of the then-outstanding securities of the Company entitled to vote generally in the election of directors (the "Outstanding Company Voting Securities"); provided, however, that for purposes of this subsection (A), the following acquisitions shall not constitute a Change in Control Event: (1) any acquisition directly from the Company or (2) any acquisition by any corporation pursuant to a Business Combination (as defined below) which complies with clauses (x) and (y) of subsection (C) of this definition;

(B) a change in the composition of the Board that results in the Continuing Directors (as defined below) no longer constituting a majority of the Board (or, if applicable, the Board of Directors of a successor corporation to the Company), where the term "Continuing Director" means at any date a member of the Board (x) who was a member of the Board on the date of this Agreement or (y) who was nominated or elected subsequent to such date by at least a majority of the directors who were Continuing Directors at the time of such nomination or election or whose election to the Board was recommended or endorsed by at least a majority of the directors who were Continuing Directors at the time of such nomination or election; provided, however, that there shall be excluded from this clause (y) any individual whose initial assumption of office occurred as a result of an actual or threatened election contest with respect to the election or removal of directors or other actual or threatened solicitation of proxies or consents, by or on behalf of a person other than the Board; or

(C) the consummation of a merger, consolidation, reorganization, recapitalization or share exchange involving the Company or a sale or other disposition of all or substantially all of the assets of the Company (a "Business Combination"), unless, immediately following such Business Combination, each of the following two conditions is satisfied: (x) all or substantially all of the individuals and entities who were the beneficial owners of the Outstanding Company Common Stock and Outstanding Company Voting Securities immediately prior to such Business Combination beneficially own, directly or indirectly, more than 50% of the then-outstanding shares of common stock and the combined voting power of the then-outstanding securities entitled to vote generally in the election of directors, respectively, of the resulting or acquiring corporation in such Business Combination (which shall include, without limitation, a corporation which as a result of such transaction owns the Company or substantially all of the Company's assets either directly or through one or more subsidiaries) (such resulting or acquiring corporation is referred to herein as the "Acquiring Corporation") in substantially the same

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proportions as their ownership of the Outstanding Company Common Stock and Outstanding Company Voting Securities, respectively, immediately prior to such Business Combination and (y) no Person (excluding any employee benefit plan (or related trust) maintained or sponsored by the Company or by the Acquiring Corporation) beneficially owns, directly or indirectly, 50% or more of the then-outstanding shares of common stock of the Acquiring Corporation, or of the combined voting power of the then-outstanding securities of such corporation entitled to vote generally in the election of directors (except to the extent that such ownership existed prior to the Business Combination).

Exhibit C

Payments Subject to Section 409A

Subject to this Exhibit C, severance payments or benefits under this Agreement shall begin only on or after the date of the Employee's "separation from service," (determined as set forth below) which occurs on or after the termination of the Employee's employment. The following rules shall apply with respect to distribution of the payments and benefits, if any, to be provided to the Employee under this Agreement:

1. It is intended that each installment of the payments provided under the Agreement shall be treated as a separate "payment" for purposes of Section 409A of the Internal Revenue Code and the guidance issued thereunder ("Section 409A"). Neither the Company nor the Employee shall have the right to accelerate or defer the delivery of any such payments or benefits except to the extent specifically permitted or required by Section 409A.

2. If, as of the date of the Employee's "separation from service" from the Company, the Employee is not a "specified employee" (within the meaning of Section 409A), then each installment of the severance payments and benefits shall be made on the dates and terms set forth in the Agreement.

3. If, as of the date of the Employee's "separation from service" from the Company, the Employee is a "specified employee" (within the meaning of Section 409A), then:

(a) Each installment of the severance payments and benefits due under the Agreement that, in accordance with the dates and terms set forth herein, will in all circumstances, regardless of when the Employee's separation from service occurs, be paid within the Short-Term Deferral Period (as defined under Section 409A) shall be treated as a short-term deferral within the meaning of Treasury Regulation Section 1.409A- l(b)(4) to the maximum extent permissible under Section 409A and shall be paid at the time set forth in the Agreement; and

(b) Each installment of the severance payments and benefits due under the Agreement that is not described in this Exhibit C, Section l(c)(i) and that would, absent this subsection, be paid within the six (6) month period following the Employee's "separation from service" from the Company shall not be paid until the date that is six (6) months and one (1) day after such separation from service (or, if earlier, the Employee's death), with any such installments that are required to be delayed being accumulated during the six (6) month period and paid in a lump sum on the date that is six (6) months and one (1) day following the Employee's separation from service and any subsequent installments, if any, being paid in accordance with the dates and terms set forth herein; provided, however, that the preceding provisions of this sentence shall not apply to any installment of severance payments and benefits if and to the maximum extent that such installment is deemed to be paid under a separation pay plan that does not provide for a deferral of compensation by reason of the application

of Treasury Regulation 1.409A-l(b)(9)(iii) (relating to separation pay upon an involuntary separation from service). Any installments that qualify for the exception under Treasury Regulation Section 1.409A-l(b)(9)(iii) must be paid no later than the last day of the Employee's second taxable year following the taxable year in which the separation from service occurs.

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4. The determination of whether and when the Employee's separation from service from the Company has occurred shall be made and in a manner consistent with, and based on the presumptions set forth in, Treasury Regulation Section 1.409A-l(h). Solely for purposes of this Exhibit C, Section 4, "Company" shall include all persons with whom the Company would be considered a single employer under Section 414(b) and 414(c) of the Code.

5. All reimbursements and in-kind benefits provided under this Agreement shall be made or provided in accordance with the requirements of Section 409A to the extent that such reimbursements or in-kind benefits are subject to Section 409A, including, where applicable, the requirement that (i) any reimbursement is for expenses incurred during the Employee's lifetime (or during a shorter period of time specified in this Agreement), (ii) the amount of expenses eligible for reimbursement during a calendar year may not affect the expenses eligible for reimbursement in any other calendar year, (iii) the reimbursement of an eligible expense will be made on or before the last day of the calendar year following the year in which the expense is incurred and (iv) the right to reimbursement is not subject to set off or liquidation or exchange for any other benefit.

6. The Company makes no representation or warranty and shall have no liability to you or to any other person if any of the provisions of the agreement (including this Exhibit C) are determined to constitute deferred compensation subject to Section 409A but that do not satisfy an exemption from, or the conditions of, that section.

7. The Company may withhold (or cause to be withheld) from any payments made under this Agreement, all federal, state, city or other taxes as shall be required to be withheld pursuant to any law or governmental regulation or ruling.

Exhibit 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the use in this Amendment No. 4 to the Registration Statement on Form S-1 of Merrimack Pharmaceuticals, Inc. of our report dated July 8, 2011 relating to the financial statements of Merrimack Pharmaceuticals, Inc. which appears in such Registration Statement. We also consent to the reference to us under the heading "Experts" in such Registration Statement.

/s/ PricewaterhouseCoopers LLP

Boston, Massachusetts
January 13, 2012