MERRIMACK PHARMACEUTICALS INC
Form 424B4
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Prospectus

14,300,000 shares

Common stock

This is an initial public offering of common stock by Merrimack Pharmaceuticals, Inc. Merrimack is selling 14,300,000 shares of common stock.

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

	Per share		Total
Initial public offering price	$7.00	$	100,100,000
Underwriting discounts and commissions(1)	$0.49	$	4,450,478
Proceeds to Merrimack, before expenses(1)	$6.51	$	95,649,522

(1) The underwriters will not receive any underwriting discount or commission on the sale of shares of our common stock in this offering to certain investors identified by us. We have directed the underwriters to reserve up to approximately $36.5 million in shares of our common stock for such sales at the initial public offering price.

Entities affiliated with Fidelity Investments, one of our existing principal stockholders, also have indicated an interest in purchasing an aggregate of up to approximately $28.7 million in shares of our common stock in this offering at the initial public offering price. However, because indications of interest are not binding agreements or commitments to purchase, these entities may determine to purchase fewer shares than they have indicated an interest in purchasing or not to purchase any shares in this offering.

We have granted the underwriters an option for a period of 30 days to purchase up to 2,145,000 additional shares of common stock.

Investing in our common stock involves a high degree of risk. See "Risk factors" beginning on page 11.

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 April 3, 2012.

J.P. Morgan

BofA Merrill Lynch

Cowen and Company **Oppenheimer & Co.**

March 28, 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.

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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

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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 and expect to receive an additional $5 million in the first quarter of 2012 for achieving three 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.

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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.

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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

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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, which has raised substantial doubt about our ability to continue as a going concern, and we 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 $79.7 million for the year ended December 31, 2011, $50.2 million for the year ended December 31, 2010 and $49.1 million for the year ended

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December 31, 2009. As of December 31, 2011, we had an accumulated deficit of $350.8 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.

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The offering

Common stock offered by us	14,300,000 shares
Common stock to be outstanding after this offering	92,396,254 shares
Over-allotment option	The underwriters have an option for a period of 30 days to purchase up to 2,145,000 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.
NASDAQ Global Market symbol	MACK

The number of shares of our common stock to be outstanding after this offering is based on 11,840,725 actual shares of our common stock outstanding as of February 29, 2012 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:

- 17,598,547 shares of our common stock issuable upon the exercise of stock options outstanding as of February 29, 2012 at a weighted average exercise price of $2.56 per share;
- 848,476 additional shares of our common stock available for future issuance as of February 29, 2012 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
- 2,933,239 shares of our common stock issuable upon the exercise of warrants outstanding as of February 29, 2012 at a weighted average exercise price of $3.04 per share.

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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 2,145,000 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 February 29, 2012 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.

The underwriters will not receive any underwriting discount or commission on the sale of shares of our common stock in this offering to certain investors identified by us. We have directed the underwriters to reserve up to approximately $36.5 million in shares of our common stock for such sales at the initial public offering price. Sanofi has indicated an interest in purchasing this entire amount. However, because indications of interest are not binding agreements or commitments to purchase, Sanofi may determine to purchase fewer shares than it has indicated an interest in purchasing or not to purchase any shares in this offering.

Separately, entities affiliated with Fidelity Investments, one of our existing principal stockholders, also have indicated an interest in purchasing an aggregate of up to approximately $28.7 million in shares of our common stock in this offering at the initial public offering price. However, because indications of interest are not binding agreements or commitments to purchase, these entities may determine to purchase fewer shares than they have indicated an interest in purchasing or not to purchase any shares in this offering.

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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, 2009, 2010 and 2011 from our audited consolidated financial statements included in this prospectus. Our historical results for any prior period are not necessarily indicative of results to be expected in any future period.

	Year ended December 31,		
(in thousands, except per share data)	**2009(1)**	**2010(2)**	**2011(2)**
Consolidated statements of operations data:			
Research and development revenues	$ 2,148	$ 20,305	$ 34,215
Operating expenses:			
Research and development	37,658	58,278	100,630
General and administrative	12,178	11,381	14,454
Contingent consideration		(178)	
Total operating expenses	49,836	69,481	115,084
Loss from operations	(47,688)	(49,176)	(80,869)
Other income and expenses:			
Interest income	81	74	56
Interest expense	(4,909)	(3,726)	(13)
Other, net	41	2,669	1,150
Net loss before income taxes and non-controlling interest	(52,475)	(50,159)	(79,676)
Benefit from income taxes	3,402		
Net loss	(49,073)	(50,159)	(79,676)
Less net loss attributable to non-controlling interest		(55)	(453)
Net loss attributable to Merrimack Pharmaceuticals, Inc.	$ (49,073)	$ (50,104)	$ (79,223)
Net loss per share available to common stockholders basic and diluted(3)	$ (7.28)	$ (5.57)	$ (7.67)
Weighted-average common shares used in computing net loss per share available to common stockholders basic and diluted	7,387	10,994	11,343
Pro forma net loss per share available to common stockholders basic and diluted (unaudited)(4)			$ (1.04)
Weighted-average common shares used in computing pro forma net loss per share available to common stockholders basic and diluted (unaudited)(5)			75,313

(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 66,255,529 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.

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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 66,255,529 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 302,143 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 14,300,000 shares of our common stock in this offering at the initial public offering price of $7.00 per share, after deducting 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 December 31, 2011 (in thousands)	**Actual**	**Pro forma**	**Pro forma as adjusted**
		(unaudited)	
Consolidated balance sheet data:			
Cash and cash equivalents	$ 50,454	$ 50,454	$ 139,658
Total assets	85,299	85,299	174,503
Deferred revenue	85,745	85,745	85,745
Convertible preferred stock warrants liability	1,516		
Total liabilities	106,990	109,737	105,474
Non-controlling interest	574	574	574
Convertible preferred stock	268,225		
Total stockholders' (deficit) equity	$ (290,490)	$ (25,012)	$ 68,455

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Risk factors

Risks related to our financial position and need for additional capital

We have incurred significant losses since our inception, which has raised substantial doubt about our ability to continue as a going concern. 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 $79.7 million for the year ended December 31, 2011, $50.2 million for the year ended December 31, 2010 and $49.1 million for the year ended December 31, 2009. As of December 31, 2011, we had an accumulated deficit of $350.8 million. Our operating losses since inception and the insufficiency of our existing capital resources to fund our planned operations for a twelve month period raise substantial doubt about our ability to continue as a going concern. As a result, our independent registered public accounting firm included an explanatory paragraph in its report on our financial statements as of and for the year ended December 31, 2011 with respect to this uncertainty.

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

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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 into the second half 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.

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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;

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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;

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- 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.

In addition, we are currently evaluating MM-398 in a Phase 2 clinical trial in colorectal cancer that is being conducted by GERCOR, a cooperative research group of physicians based in France. This trial is comparing a regimen of fluorouracil, or 5-FU, leucovorin and MM-398 to FOLFIRI, which is a regimen of 5-FU, leucovorin and irinotecan. Roche recently announced positive top-line results from a Phase 3 clinical trial in second-line metastatic colorectal cancer being conducted in France comparing chemotherapy to chemotherapy plus Avastin. The results of this trial by Roche could impact clinical practice in France, including the use of the FOLFIRI regimen, which could affect enrollment in our Phase 2 clinical trial of MM-398. We are currently evaluating what impact, if any, these results will have on our clinical trial and any action we may need to take.

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

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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

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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.

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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.

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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

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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

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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

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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

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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.

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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.

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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.

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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.

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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

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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

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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 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 restricted our ability to enroll new patients in these trials, until MM-111 material filled and packaged by a new third party contractor that we engaged was available. This restocking is complete and resulted in a short delay in the dosing of a few patients without any patients missing a dose.

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.

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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

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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.

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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.

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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.

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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

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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

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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.

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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

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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

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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.

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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

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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

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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 33% of our capital stock, excluding any shares of our common stock that these stockholders may purchase in the offering. 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,

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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

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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 the initial public offering price of $7.00 per share, you will experience immediate dilution of $6.39 per share, representing the difference between our pro forma net tangible book value per share after giving effect to this offering and the initial public offering price. In addition, purchasers of common stock in this offering will have contributed approximately 25% of the aggregate price paid by all purchasers of our stock but will own only approximately 15% 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 was determined through negotiations with the underwriters. Although our common stock has been approved for listing 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.

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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 92,396,254 shares of common stock based on the number of shares outstanding as of February 29, 2012. 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, 78,096,254 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 69,489,001 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.

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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.

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Use of proceeds

We estimate that the net proceeds from our issuance and sale of 14,300,000 shares of our common stock in this offering will be approximately $93.5 million, based on the initial public offering price of $7.00 per share, after deducting 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 $107.5 million.

As of December 31, 2011, we had cash and cash equivalents of approximately $50.5 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 December 31, 2011, as follows:

- approximately $30.0 million to $40.0 million to fund our ongoing clinical program for MM-398, including approximately $12.0 million to $16.0 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 $16.0 million to $22.0 million to fund our ongoing clinical program for MM-111;

- approximately $14.0 million to $18.0 million to fund our ongoing clinical program for MM-302;

- approximately $11.0 million to $15.0 million to fund our ongoing clinical program for MM-151;

- approximately $30.0 million to $45.0 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 enrollment in the Phase 3 clinical trial of MM-398 in metastatic pancreatic cancer.

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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 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.

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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.

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Capitalization

The following table sets forth our cash and cash equivalents and capitalization as of December 31, 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 66,255,529 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 302,143 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 14,300,000 shares of our common stock in this offering at the initial public offering price of $7.00 per share, after deducting 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.

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As of December 31, 2011 (in thousands, except par value amounts)	Actual	Pro forma	Pro forma as adjusted
		(unaudited)	
Cash and cash equivalents	$ 50,454	$ 50,454	$ 139,658
Convertible preferred stock warrants liability	$ 1,516	$	$
Accrued dividends		4,263	
Non-controlling Interest	$ 574	$ 574	$ 574
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, 14,424 shares issued and outstanding, actual; no shares authorized, issued or outstanding, pro forma and pro forma as adjusted	24,459		
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	76,949		

shares issued and outstanding, actual; no shares authorized, issued or outstanding, pro forma and pro forma as adjusted			
Total convertible preferred stock	268,225		
Stockholders' deficit:			
Common stock, $0.01 par value per share: 138,500 shares authorized, 11,834 shares issued and outstanding, actual; 200,000 shares authorized, 78,090 shares issued and outstanding, pro forma; and 200,000 shares authorized, 92,390 shares issued and outstanding, pro forma as adjusted	118	781	924
Additional paid-in capital	60,231	325,046	418,370
Accumulated deficit	(350,839)	(350,839)	(350,839)
Total stockholders' (deficit) equity	(290,490)	(25,012)	68,455
Total capitalization	$ (21,691)	$ (24,438)	$ 69,029

The table above does not include:

- 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;

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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 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

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.

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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 December 31, 2011 was $(34.8) million, or $(2.94) 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 December 31, 2011 was $(37.5) million, or $(0.48) 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 66,255,529 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 302,143 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 14,300,000 shares of our common stock in this offering at the initial public offering price of $7.00 per share, after deducting 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 December 31, 2011 would have been $55.9 million, or $0.61 per share. This represents an immediate increase in pro forma net tangible book value per share of $1.09 to existing stockholders and immediate dilution of $6.39 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:

Initial public offering price per share		$7.00
Historical net tangible book value per share as of December 31, 2011	$(2.94)	
Increase attributable to the conversion of outstanding preferred stock, reclassification of preferred stock warrants and payment of accrued dividends	2.46	
Pro forma net tangible book value per share as of December 31, 2011	(0.48)	
Increase in net tangible book value per share attributable to new investors	1.09	
Pro forma net tangible book value per share after this offering		0.61
Dilution per share to new investors		$6.39

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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 December 31, 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 the initial public offering price of $7.00 per share, before deducting 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	78,090,012	85%	$305,505,963	75%	$3.91
New investors	14,300,000	15%	100,100,000	25%	7.00
Total	92,390,012	100%	$405,605,963	100%	

The table above is based on actual shares 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 table above 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 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
- 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.

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 83% 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 16,445,000, or approximately 17% of the total number of shares of our common stock outstanding after this offering.

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Entities affiliated with Fidelity Investments, one of our existing principal stockholders, have indicated an interest in purchasing an aggregate of up to approximately $28.7 million in shares of our common stock in this offering at the initial public offering price. However, because indications of interest are not binding agreements or commitments to purchase, these entities may determine to purchase fewer shares than they have indicated an interest in purchasing or not to purchase any shares in this offering. The foregoing discussion and tables do not reflect any potential purchases by these entities.

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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, 2009, 2010 and 2011 and the consolidated balance sheet data as of December 31, 2010 and 2011 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, 2007 and 2008 and the consolidated balance sheet data as of December 31, 2007, 2008 and 2009 from our audited consolidated financial statements not included in this prospectus. Our historical results for any prior period are not necessarily indicative of results to be expected in any future period.

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(in thousands, except per share amounts)	Year ended December 31, 2007	2008	2009(1)	2010(2)	2011(2)
Consolidated statement of operations					
Research and development revenues	$ 344	$ 365	$ 2,148	$ 20,305	$ 34,215
Operating expenses:					
Research and development	26,109	34,528	37,658	58,278	100,630
General and administrative	6,482	8,836	12,178	11,381	14,454
Contingent consideration				(178)	
Total operating expenses	32,591	43,364	49,836	69,481	115,084
Loss from operations	(32,247)	(42,999)	(47,688)	(49,176)	(80,869)
Other income and expenses:					
Interest income	2,305	1,243	81	74	56
Interest expense	(1,710)	(4,403)	(4,909)	(3,726)	(13)
Other, net	(37)	607	41	2,669	1,150
Net loss before income taxes and non-controlling interest	(31,689)	(45,552)	(52,475)	(50,159)	(79,676)
Benefit from income taxes			3,402		
Net loss before non-controlling interest	(31,689)	(45,552)	(49,073)	(50,159)	(79,676)
Less net loss attributable to non-controlling interest				(55)	(453)
Net loss attributable to Merrimack Pharmaceuticals, Inc.	(31,689)	(45,552)	(49,073)	(50,104)	(79,223)
Net loss per share available to common stockholders basic and diluted(3)	$ (6.01)	$ (8.17)	$ (7.28)	$ (5.57)	$ (7.67)
Weighted-average common shares used in computing net loss per share available to common stockholders basic and diluted	6,177	6,199	7,387	10,994	11,343
Pro forma net loss per share available to common stockholders basic and diluted (unaudited)(4)					$ (1.04)
Weighted-average common shares used in computing pro forma net loss per share available to common stockholders basic and diluted (unaudited)(5)					75,313

(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 66,255,529 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.

				As of December 31,	
(in thousands)	**2007**	**2008**	**2009**	**2010**	**2011**
Consolidated balance sheet data					
Cash and cash equivalents	$ 40,286	$ 44,974	$ 58,387	$ 30,713	$ 50,454
Total assets	67,312	50,867	82,156	57,577	85,299
Deferred revenue			60,937	73,782	85,745
Convertible preferred stock warrants liability	1,082	568	578	652	1,516
Total liabilities	45,996	72,596	141,645	85,257	106,990
Non-controlling interest				1,027	574
Convertible preferred stock	132,739	132,739	131,273	191,257	268,225
Total stockholders deficit	$ (111,423)	$ (154,468)	$ (190,762)	$ (219,964)	$ (290,490)

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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 December 31, 2011, we have received $268.2 million from the sale of convertible preferred stock and warrants and $133.4 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 into the second half of 2013.

We have never been profitable and, as of December 31, 2011, we had an accumulated deficit of $350.8 million. Our net loss was $79.7 million for the year ended December 31, 2011, $50.2 million for the year ended December 31, 2010 and $49.1 million for the year ended December 31, 2009. 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

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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. 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.

As of December 31, 2011, we had cash and cash equivalents of $50.5 million. Our present capital resources are not sufficient to fund our planned operations for a twelve month period, and therefore, raise substantial doubt about our ability to continue as a going concern. We will, during 2012, require significant additional funding to continue our operations. Failure to receive additional funding could cause us to cease operations, in part or in full. We are currently pursuing this offering to raise the additional capital needed to continue planned operations.

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 and expect to receive an additional $5.0 million in the first quarter of 2012, 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.

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

	Year ended December 31,		
(in thousands)	**2009**	**2010**	**2011**
Upfront payment	$ 694	$ 5,000	$ 5,000
Milestone payments		949	2,616
Development services	1,410	13,279	25,053
Manufacturing services and other		630	1,456
Total	**$ 2,104**	**$ 19,858**	**$ 34,125**

Based on our approved 2012 MM-121 development plan with Sanofi, we expect that revenue recognized under this agreement will increase for the year ended December 31, 2012 when compared to the year ended December 31, 2011. However, we anticipate the year over year percentage increase will be lower than the year over year percentage increases observed in prior years.

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, 2010 and 2011, we recognized revenue based on the following component of the GTC agreement:

	Year ended December 31,		
(in thousands)	**2009**	**2010**	**2011**
Upfront consideration	$ 37	$ 76	$ 76

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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 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 and we expect to pay in the second 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 year ended December 31, 2011, we recognized research and development expense of $11.2 million under the May 2011 agreement with PharmaEngine, which consisted of a $10.0 million upfront license fee and $1.2 million of research and development expense reimbursement.

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

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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

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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, 2009	2010	2011
MM-398	Cancer	Phase 3	$	$ 163	$ 18,999
MM-121	Cancer	Phase 2	12,328	18,014	32,347
MM-111	Cancer	Phase 1/Phase 2 planned	7,462	15,938	10,091
MM-302	Cancer	Phase 1	940	4,974	5,126
MM-151	Cancer	Phase 1	3,960	2,452	10,047
MM-093	Autoimmune	Outlicensed	432	6	
Other preclinical			5,149	8,926	13,191
General research and discovery			5,445	5,019	7,232
Stock compensation			1,942	2,786	3,597
Total research and development expense			$ 37,658	$ 58,278	$ 100,630

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.

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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 and we expect to pay during the second 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 five 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 dosing the first patient in 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 dosing the first patient in a proof of concept Phase 2 clinical trial of MM-121 in non-small cell lung cancer. During the first quarter of 2012,

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we earned a $5.0 million milestone payment from Sanofi for dosing the first patient in a proof of concept Phase 2 clinical trial of MM-121 in ovarian cancer. We expect to receive this payment in the second 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, pre-commercial consulting costs, 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 12 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 $4,805,000 for the year ended December 31, 2009, and $3,673,000 for the year ended December 31, 2010, which we collectively refer to as the series F amount. Upon completion of the exchanges of series F

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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.

In January 2011, we adopted new authoritative guidance on revenue recognition for multiple element arrangements. This guidance, which applies to multiple element arrangements entered into or materially modified on or after January 1, 2011, amends the criteria for separating and allocating consideration in a multiple element arrangement by modifying the fair value requirements for revenue recognition and eliminating the use of the residual method. The fair value of deliverables under the arrangement may be derived using a best estimate of selling price if vendor specific objective evidence and third-party evidence are not available.

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Deliverables under the arrangement will be separate units of accounting provided that a delivered item has value to the customer on a stand-alone basis and if the arrangement does not include a general right of return relative to the delivered item and delivery or performance of the undelivered item is considered probable and substantially in the control of the vendor. We also adopted guidance that permits the recognition of 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 certain criteria and is considered to be substantive. We did not enter into any significant multiple element arrangements or materially modify any of our existing multiple element arrangements during the year ended December 31, 2011. Our existing license and collaboration agreements continue to be accounted for under previously issued revenue recognition guidance for multiple element arrangements and milestone revenue recognition, as described below.

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

Whenever we determined that an arrangement should be accounted for as a single unit of accounting, we determined the period over which the performance obligations would be performed and revenue would be recognized. If we could not reasonably estimate the timing and the level of effort to complete our performance obligations under the arrangement, then we recognized revenue under the arrangement on a straight-line basis over the period that we expected to complete our performance obligations, which is reassessed at each subsequent reporting period.

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.

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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 December 31, 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

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revenue of between $0 and $0.9 million in the accompanying consolidated statement of operations.

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.

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The following table sets forth information with respect to stock options granted from January 1, 2008 through the date hereof:

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

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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

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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.

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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.

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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

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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

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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.

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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

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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.

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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.

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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 March 23, 2012, we and our underwriters determined the estimated price for this offering of $7.00 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 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 price 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 estimated price for this offering was 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 for this offering necessarily assumed 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.

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Since November 2, 2011, we 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:

- in November 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;
- in February 2012, we dosed the first patient in a Phase 2 trial of MM-121 in ovarian cancer; 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.

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Results of operations

Comparison of the years ended December 31, 2010 and 2011

Year ended December 31, **(in thousands)**	**2010**	**2011**
Research and development revenues	$ 20,305	$ 34,215
Research and development expenses	58,278	100,630
General and administrative expenses	11,381	14,454
Contingent consideration	(178)	
Loss from operations	(49,176)	(80,869)
Interest income	74	56
Interest expense	(3,726)	(13)
Other income	2,669	1,150
Net loss before income taxes and non-controlling interest	(50,159)	(79,676)
Benefit from income taxes		
Net loss	$ (50,159)	$ (79,676)

Research and development revenues

Revenues for 2011 were $34.2 million, compared to $20.3 million for 2010, an increase of $13.9 million, or 68%. This increase resulted from increases in milestone, manufacturing and research and development revenues recognized under the collaboration agreement with Sanofi.

Research and development expense

Research and development expenses for 2011 were $100.6 million, compared to $58.3 million for 2010, an increase of $42.3 million, or 73%. This increase was primarily attributable to:

- $18.9 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;
- $14.3 million of increased MM-121 spending due to initiation of two new clinical trials and increased spending on ongoing clinical trials;
- $7.6 million of increased MM-151 spending due to increased toxicology and other preclinical costs incurred in preparation of initiating a Phase 1 clinical trial, including a $1.2 million license fee under our agreement with Adimab;
- $6.5 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; and
- $0.8 million of increased stock compensation expense due to increased headcount.

These increases were partially offset by a decrease of $5.8 million in MM-111 spending due to the timing of clinical and manufacturing costs.

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General and administrative expense

General and administrative expenses for 2011 were $14.5 million, compared to $11.4 million for 2010, an increase of $3.1 million, or 27%. 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 2011 was $0, compared to a benefit of $0.2 million for 2010. The benefit in 2010 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 both 2011 and 2010 was $0.1 million. Interest income was related to interest earned on our money market investments.

Interest expense

Interest expense for 2011 was minimal, compared to $3.7 million for 2010. This decrease was primarily 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 2011 was $1.2 million, compared to $2.7 million for 2010, a decrease of $1.5 million, or 56%. This decrease was primarily due to the receipt of a $2.4 million grant awarded under the federal Qualifying Therapeutic Discovery Project program, which was recognized in 2010 and did not occur in 2011, coupled with $0.8 million of additional expense from the change in fair value of preferred stock warrants, partially offset by a $1.8 million cash settlement from a former service provider recognized in 2011.

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)

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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.

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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.

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 December 31, 2011, we have received $268.2 million from the sale of convertible preferred stock and warrants and $133.4 million of upfront license fees, milestone payments, reimbursement of research and development costs and manufacturing services and other payments from our collaborations.

As of December 31, 2011, we had consolidated cash and cash equivalents of approximately $50.5 million, of which $2.1 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 have earned and expect to receive payment of a $5.0 million milestone under our license and collaboration agreement with Sanofi in the first quarter of 2012.

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

We primarily invest cash and cash equivalents in money market funds backed by the U.S. treasury and U.S. federal agencies.

Cash flows

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

	Year ended December 31,		
(in thousands)	**2009**	**2010**	**2011**
Cash provided by (used in) operating activities	$ 19,055	$ (26,369)	$ (52,817)
Cash used in investing activities	(4,851)	(4,900)	(3,747)
Cash (used in) provided by financing activities	(791)	3,595	76,305
Net increase (decrease) in cash and cash equivalents	$ 13,413	$ (27,674)	$ 19,741

Operating activities

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

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$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 $52.8 million during the year ended December 31, 2011 was primarily a result of our net loss of $79.7 million partially offset by non-cash items of $12.4 million, changes in operating assets and liabilities of $4.4 million and receipt of a $10.0 million milestone payment under the collaborative agreement with Sanofi.

Investing activities

Investing activities used cash of $4.9 million for both the years ended December 31, 2009 and 2010 and used cash of $3.7 million for the year ended December 31, 2011. Cash used in investing activities during 2009, 2010 and 2011 was primarily due to the purchase of plant, property and equipment.

Financing activities

Financing activities used cash of $0.8 million for the year ended December 31, 2009, and provided cash of $3.6 million and $78.3 million for the years ended December 31, 2010 and 2011, respectively. 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 $76.3 million for the year ended December 31, 2011 was primarily a result of $76.9 million of proceeds received from the series G convertible preferred stock financing, net of offering costs, $1.7 million of proceeds from the issuance of common stock from the exercise of warrants and stock options, partially offset by deferred financing costs of $1.9 million and the payment of capital leases of $0.4 million.

Funding requirements

As of December 31, 2011, we had cash and cash equivalents of $50.5 million. Our present capital resources are not sufficient to fund our planned operations for a twelve month period, and therefore, raise substantial doubt about our ability to continue as a going concern. We will, during 2012, require significant additional funding to continue our operations. Failure to receive additional funding could cause us to cease operations, in part or in full. We are currently pursuing this offering to raise the additional capital needed to continue planned operations.

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;

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- 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 into the second half 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

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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 December 31, 2011:

(in thousands)	**Total**	**Less than 1 year**	**1 to 3 years**	**3 to 5 years**	**More than 5 years**
Capital lease obligations(1)	$ 49	$ 49	$	$	$
Operating lease obligations(2)	6,693	2,899	3,312	482	
License and collaboration, antibody and technology licensing costs(3)(4)(5)(6)	625	180	230	215	
Total contractual cash obligations	$ 7,367	$ 3,128	$ 3,542	$ 697	$

(1) Capital lease obligations include obligated interest payments.

(2) Operating lease obligations do not include the costs associated with an amendment to our existing office, laboratory and manufacturing space lease, which was executed during the first quarter of 2012. This amendment increases operating lease obligations by approximately $2.8 million in the aggregate over the next seven years.

(3) License and collaboration, antibody and technology licensing costs include a €50,000 milestone payment related to an agreement with Selexis SA to be paid in the second quarter of 2012. License and collaboration, 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 December 31, 2015, as we cannot estimate if they will occur.

(4) License and collaboration, antibody and technology licensing costs do not include a payment under our collaboration agreement with Adimab LLC for $1.5 million, which became payable and we paid during the first quarter of 2012.

(5) License and collaboration, antibody and technology licensing costs do not include antibody discovery efforts performed by a third party of $400,000, which became payable in the first quarter of 2012. We expect to make this payment in the second quarter of 2012.

(6) 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 and we expect to pay in the second quarter of 2012. This

$5.0 million milestone payment has not been included in the above table, as the payment obligation was triggered in 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.

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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.

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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, 2011, we had federal net operating loss carryforwards of $108.3 million and state net operating loss carryforwards of $65.7 million, which began to expire in 2012. As of December 31, 2011, we had federal research and development and investment tax credit carryforwards of $11.1 million and state research and development and investment tax credit carryforwards of $3.5 million, which also began to expire in 2012. 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 $103.9 million as of December 31, 2010 and $132.7 million as December 31, 2011. 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.

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Recent accounting pronouncements

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.

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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

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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

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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.

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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

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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

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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,

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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.

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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

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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).

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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

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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	Monotherapy in pancreatic	Phase 3 ongoing	Merrimack worldwide, except Taiwan
encapsulation of irinotecan)	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	

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Program	Indication	Stage of development	Commercial rights
MM-111 (ErbB3 and ErbB2 (HER2) targeted bispecific antibody)	MM-111 plus targeted therapies and/or chemotherapies in ErbB2 (HER2) positive cancers	Phase 2 planned	Merrimack worldwide
	Monotherapy in ErbB2 (HER2) positive indications	Phase 1 complete	
	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.

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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.

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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%.

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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

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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).

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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%.

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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

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88 patients with second-line metastatic colorectal cancer. We are currently recruiting patients at approximately six sites in France. As of February 29, 2012, the trial had enrolled 20 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. To date, 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, and preliminary signs of anti-tumor activity have been observed in certain patients. Consistent with the design of this Phase 1 clinical trial to principally test for safety and dosage tolerance, this Phase 1 trial was not designed to test for statistical significance of anti-tumor activity.

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

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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%)

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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 addition, preliminary signs of anti-tumor activity were observed in certain patients. Consistent with the design of this Phase 1 clinical trial to principally test for safety and dosage tolerance, this Phase 1 trial was not designed to test for statistical significance of anti-tumor activity.

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

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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.

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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 with a total of 32 patients enrolled. Clinical activity observed in this trial included one patient with a partial response (PR) and 14 patients with stable disease (SD). The most common toxicities observed of any grade were diarrhea (82%), rash (64%) and fatigue (64%). Consistent with the design of this Phase 1 clinical trial to principally test for safety and dosage tolerance, this Phase 1 trial was not designed to test for statistical significance of anti-tumor activity.

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;

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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 conducting 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

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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. The dose escalation portion of the trial is complete, and an expansion cohort continues to enroll patients. To date, preliminary data regarding safety and anti-tumor activity from this trial suggest that further investigation of the combination of MM-121 and paclitaxel is warranted in Phase 2 clinical development, which we are currently pursuing in multiple indications. Consistent with the design of this Phase 1 clinical trial to principally test for safety and dosage tolerance, this Phase 1 trial was not designed to test for statistical significance of anti-tumor activity.

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)

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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

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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.

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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

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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 trials that combine MM-111 with targeted therapies and/or chemotherapies in patients with advanced ErbB2 (HER2) positive cancers. Subject to completing our ongoing Phase 1 clinical trials of MM-111, we plan to initiate Phase 2 clinical development of MM-111 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 have completed an open label, dose escalation Phase 1 clinical trial of MM-111 in patients with ErbB2 (HER2) positive solid tumors. We enrolled 20 patients in this trial at four sites in the United States. The purpose of this trial was to assess the safety and clinical activity of MM-111, to determine the maximum tolerated dose or the maximum feasible dose of MM-111 and to identify any dose limiting adverse events. We also designed the trial to assess objective response rate (ORR) and progression free survival (PFS). The final data from this trial is currently being reviewed.

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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 February 29, 2012, 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, capecitibine and trastuzumab;
- lapatinib and trastuzumab;
- paclitaxel and trastuzumab; and
- lapatinib and letrozole at the discretion of the investigator in hormone receptor positive patients.

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 February 29, 2012, we had enrolled and dosed 33 patients in this trial. To date, the combination of MM-111 and each of the first three treatment regimens described above has been well tolerated in this trial, and preliminary signs of anti-tumor activity have been observed in certain patients receiving each of these treatment regimens. Consistent with the design of this Phase 1 clinical trial to principally test for safety and dosage tolerance, this Phase 1 trial was not designed to test for statistical significance of anti-tumor activity. We only recently began enrolling patients in this trial who are receiving the fourth treatment regimen described above.

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.

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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

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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

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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 February 29, 2012, we had enrolled and dosed ten 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.

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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

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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.

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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

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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

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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 February 29, 2012, we employed approximately 50 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 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 restricted our ability to enroll new patients in these trials, until MM-111 material filled and packaged by

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a new third party contractor that we engaged was available. This restocking is complete and resulted in a short delay in the dosing of a few patients without any patients missing a dose.

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.

We are considering arrangements to use our manufacturing capabilities to manufacture drug substance on behalf of third party pharmaceutical companies. We have no current agreements or commitments for any such arrangements.

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.

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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.

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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

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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 and expect to receive an additional $5 million in the first quarter of 2012 based on our achievement of three 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

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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. Notwithstanding these limitations, we have granted a waiver allowing Sanofi to purchase up to 6,300,000 shares of our common stock.

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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.

We are discussing with Sanofi an arrangement pursuant to which, if we choose within a specified period of time to partner any of our product candidates, Sanofi would have a right to review a potential partnership with us with respect to such product candidate before we enter into negotiations with any other potential partners.

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 and are required to make a $5 million milestone payment. In addition, PharmaEngine is eligible to receive up to an aggregate of $205 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

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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

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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, of which we have paid $1.5 million with respect to the first therapeutic area, 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.

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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

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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.

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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 February 29, 2012, we owned 17 issued U.S. patents, two issued patents in Europe and 12 issued patents in other jurisdictions, as well as 28 pending U.S. provisional and non-provisional patent applications and 160 pending foreign patent applications in Europe and 42 other jurisdictions. As of February 29, 2012, we also co-owned 11 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 February 29, 2012, we had licenses to 37 U.S. patents and eight 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 February 29, 2012 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 February 1, 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, absent further delays, the patent issuing from this allowed application would receive a patent term adjustment that would extend the term of the patent for 773 days, such that, once issued, the patent would not expire before June 2027. The other pending U.S. application, if issued, will expire in 2025. Related international patent applications have issued 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 one PCT application and 11 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 or 2033, 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

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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 one PCT application 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 four 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 or 2033. For two of these four U.S. provisional applications, we intend to submit a single consolidated worldwide filing.

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 one provisional U.S. application that may be used to establish non-provisional applications that if issued, will expire in 2032, and three PCT applications that, if issued, will expire in 2031 or 2032. 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 has been allowed 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.

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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.

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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 February 29, 2012, 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.

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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

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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

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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

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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.

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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.

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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

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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

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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 12½ 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.

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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 12½ 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

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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.

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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

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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.

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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

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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

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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

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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

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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 February 29, 2012, we had 218 full-time employees, including a total of 79 employees with M.D. or Ph.D. degrees. Of these full-time employees, 181 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 85,000 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, and the lease on approximately 8,000 square feet of this space expires in 2019. 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. We retain an option to renew the lease on all of our current space through April 2020.

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

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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.

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Management

The following table sets forth the name, age and position of each of our executive officers and directors as of February 29, 2012.

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.

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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

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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

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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

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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;

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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.

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. Our audit committee's responsibilities 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;

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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. Our corporate governance and nominating committee's responsibilities 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. Our organization and compensation committee's responsibilities 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;

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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. Our executive committee has, 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.

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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;

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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

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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

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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.

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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.

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We expect that, in the first half 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.

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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;

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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 half 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.

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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

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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

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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

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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.

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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) *President and Chief Executive Officer*	2011 2010	451,886 432,253	181,000	 217,776	12,913 12,892	645,799 662,921
William A. Sullivan *Chief Financial Officer and Treasurer*	2011 2010	245,400 205,485	181,000 260,714	 76,800	9,282 5,496	435,682 548,495
Fazal R. Khan(5) *Senior Vice President of Manufacturing*	2011	317,603	362,000		11,167	690,770
Ulrik B. Nielsen *Senior Vice President and Chief Scientific Officer*	2011 2010	299,334 287,370	362,000 334,125	 105,596	9,287 8,985	670,621 736,076
Clet M. Niyikiza *Executive Vice President of Development*	2011 2010	339,163 329,892	362,000 230,852	 121,402	1,246 2,184	702,409 684,330

(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