MERRIMACK PHARMACEUTICALS INC
Form 10-K
March 20, 2013

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

FORM 10-K

(Mark One)

ý **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended December 31, 2012

or

o **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the transition period from to
Commission file number 001-35409

Merrimack Pharmaceuticals, Inc.
(Exact name of registrant as specified in its charter)

Delaware	**04-3210530**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)
One Kendall Square, Suite B7201 Cambridge, MA	**02139**
(Address of principal executive offices)	(Zip Code)

Registrant's telephone number, including area code: **(617) 441-1000**

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	**Name of each exchange on which registered**
Common Stock, $0.01 par value	NASDAQ Global Market

Securities registered pursuant to Section 12(g) of the Act: **None**

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. o Yes ý No

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. o Yes ý No

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. ý Yes o No

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate website, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). ý Yes o No

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. o

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

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

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). o Yes ý No

Aggregate market value of the voting and non-voting common equity held by non-affiliates of the registrant, based on the last sale price for such stock on June 30, 2012: $630,064,672.

As of February 28, 2013, there were 95,901,025 shares of Common Stock, $0.01 par value per share, outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

The registrant intends to file a definitive proxy statement pursuant to Regulation 14A in connection with its 2013 Annual Meeting of Stockholders. Portions of such proxy statement are incorporated by reference into Part III of this Annual Report on Form 10-K.

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FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains forward-looking statements that involve substantial risks and uncertainties. All statements, other than statements of historical facts, contained in this Annual Report on Form 10-K, 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 Annual Report on Form 10-K 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 collaborations with PharmaEngine, Inc. related to MM-398 and 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 Annual Report on Form 10-K, particularly in Part I, Item 1A. Risk Factors, that 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 Annual Report on Form 10-K and the documents that we have filed as exhibits to this Annual Report on Form 10-K 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, whether as a result of new information, future events or otherwise, except as required by law.

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PART I

Item 1. 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 six programs in clinical development. In our most advanced program, we are conducting a 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 six 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 six 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, MM-151 and MM-141.

MM-398 is a novel, stable nanotherapeutic encapsulation, or enclosed sphere carrying an active drug, of the marketed chemotherapy drug irinotecan. MM-398 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 Phase 3 clinical trial of MM-398 in patients with metastatic pancreatic cancer whose cancer has progressed on treatment with the chemotherapy drug gemcitabine. 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 September 2011, the European Medicines Agency, or EMA, granted MM-398 orphan medicinal product designation for the treatment of pancreatic cancer. We believe that MM-398 may have potential uses in a number of other solid tumor 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 signals that are critical in cell growth and function. Signaling of this receptor is often implicated in cancer. A monoclonal

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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 molecule. Research suggests that ErbB3 signaling is often critical to the growth and survival of tumors, and that the use of ErbB3 signaling as a resistance mechanism by cancer cells to a variety of cancer therapies often occurs across patient populations and tumor types. MM-121 is designed to inhibit cancer growth directly, restore a tumor's sensitivity to drugs to which it has become resistant, and delay the development of resistance by a tumor to other agents. In collaboration with Sanofi, we are conducting a research and development 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 ovarian, breast and lung cancers. There are multiple ongoing Phase 1 and Phase 2 clinical trials of MM-121.

MM-111 is a bispecific antibody designed to inhibit ErbB3 signaling in 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 receptors. 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 preparing to initiate a Phase 2 clinical trial of MM-111 and are currently conducting multiple Phase 1 clinical trials of MM-111 in 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 than 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 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.

MM-141 is a fully human tetravalent bispecific antibody designed to inhibit signaling of the PI3K/AKT/mTOR pathway initiated by the insulin-like growth factor 1 receptor, or IGF-1R, and ErbB3. A tetravalent bispecific antibody is a single molecule that has four binding sites, two for each of two different target cell surface receptors. PI3K/AKT/mTOR signaling is often activated in cancers in response to stress induced by chemotherapies or targeted anti-cancer medicines and is believed to play a significant role in promoting tumor cell survival. We are conducting a Phase 1 clinical trial of MM-141 in patients with solid tumors as a monotherapy and in a combination therapy setting.

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

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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 processes that drive the functioning of living organisms. The core of our approach to systems biology is to apply multidisciplinary and multitechnology capabilities to build functional and predictive computational models of biological systems, such as cell signaling networks, that allow us to engineer treatments that are directed at the mechanisms of disease.

Network Biology Compared to Traditional Molecular Biology

Traditionally, the search for new drugs has been based on the identification of individual molecules in diseased cells that appear to be abnormal relative to individual molecules in healthy cells. Using traditional biomedical research methods, researchers label as "targets" the molecules that appear to be abnormal, typically either in amount, which is commonly referred to as expression, or make-up, which is commonly referred to as mutation status. These researchers then seek to validate a target by creating cells that either lack the target, overexpress the target, or express an abnormal version of the target to

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

Network Biology Methods

The goal of Network Biology is to understand how systems dynamics govern cell behavior. The methodology underpinning Network Biology is an integrated, multidisciplinary technology platform that incorporates biology, simulation and mathematics to enable the construction of computational models of cell signaling pathways. To execute Network Biology, we have developed an expertise in generating kinetic data, describing molecular changes or interactions over time, to illuminate the dynamic interactions that occur within biological systems. Our data sets differ from traditional data sets in that they focus on quantitative measures of signaling, and not qualitative measures of molecular activity and interaction. Our data also focus on time, and not simply intensity, as a critical variable in understanding the impact of a signal.

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

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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. Once constructed, we then test the model for accuracy in many different and varied experimental settings. We use the model to make predictions of network behavior within a cell under a varied set of experimental conditions. Following this, we test these predictions in actual laboratory experiments and use the data to refine and validate the model.

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

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

Following the validation of a comprehensive model of a cell signaling network, we are able to use the model for drug discovery. Contrary to traditional methods, our discovery work takes place *in silico*, or using the model for simulation. One example of our discovery approach is to execute a sensitivity analysis across an entire signaling 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 ErbB3, the target of 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 includes 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 700 biochemical reactions representing the ErbB signal transduction 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

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dysfunction in these networks leads to and perpetuates disease. We believe that Network Biology may provide broader insight into disease and the potential therapeutic alternatives for physicians and patients. In particular, we believe that Network Biology may provide three key benefits:

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

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

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

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

As an example, the results of one of our Critical Network Identification experiments revealed that, while there are many different types of cancer reflecting diverse genetic backgrounds, these cancers rely on a relatively limited number of cell signaling networks for growth and survival. We believe that developing drugs that effectively inhibit these signaling mechanisms, independent of the type or nature of the stressor, may provide an improved basis of treatment.

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

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

As discussed above, a Critical Network Identification screen confirmed that one of these networks, the ErbB pathway, is a significant survival network utilized by tumor cells. This pathway is made up of four receptors: EGFR (ErbB1), ErbB2 (HER2), ErbB3 and ErbB4. Several currently approved therapies are directed at targets in the ErbB pathway. In particular, EGFR (ErbB1) and ErbB2 (HER2) have been the focus of modern pharmaceutical efforts due to their overexpression or abnormal function due to mutation 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 in the ErbB pathway. 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), and it rarely harbors mutations that could impact its normal function.

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Thus, despite being aware of the existence of ErbB3, scientists previously largely ignored ErbB3 as a drug target. 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 assessment of the nature of the tumor, rather than simply identifying the qualitative overexpression of a protein. We are also of the view that cancer continues to alter its means of growth and survival over time, often in response to the additional stress of drug treatments. As a result, we believe that frequent assessment of patients' cancers during treatment are helpful to gain insight into which resistance mechanism a cancer defers to once treatment has altered the tumor's mechanism of growth and survival.

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

a therapeutic designed to work in tumors with a specific molecular profile;

diagnostics that measure the biochemical and biophysical properties that characterize the molecular profiles of tumors; and

analytical algorithms to translate quantitative diagnostic data into treatment information.

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

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active transport of the nanotherapeutics into the cell. The model also led directly to our efforts to use our nanoliposome technology to diagnose the biophysical characteristics of a tumor as a means of guiding the choice of a therapeutic and the appropriate dose.

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

- improve patient outcomes by providing improved therapeutics along with the diagnostic information to guide physician treatment decisions;
- reduce the overall costs of treating and caring for cancer patients; and
- provide a basis for seeking favorable reimbursement of approved drugs from payors because of the benefits to patients.

Network Biology's Potential Impact on the Drug Development Process

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

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

A multidisciplinary, integrated approach to understanding complex biology

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

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

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

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Another example of our use of simulation capabilities to identify novel biology and design a therapy is our product candidate MM-151. MM-151 is an oligoclonal antibody mixture directed at inhibiting EGFR (ErbB1) signaling. EGFR (ErbB1) is one of four cell surface receptors in the ErbB network. EGFR (ErbB1) is overexpressed in several types of solid tumors, including lung and colorectal cancer. Currently, there are several approved products that target EGFR (ErbB1). Unfortunately, these therapies are limited in their efficacy because they have relatively low response rates in patients who overexpress EGFR (ErbB1). Further, even when they are effective, tumors often develop resistance. Our model of the ErbB network revealed that current drugs failed to account for a high degree of signal amplification downstream of EGFR (ErbB1). Only tumors with low amplification, even when EGFR (ErbB1) was overexpressed, were impacted by the current therapies. Moreover, we noted that the current therapies were only effective at blocking signaling when initiated by low affinity ligands that bind to EGFR (ErbB1). Noting the importance of understanding amplification and the role of high affinity ligands as a potential escape route for tumors, we sought to develop a comprehensive EGFR (ErbB1) inhibitor. Using the model, we identified key specifications of an optimal inhibitor and set about engineering MM-151.

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

- assess our product candidates within a broad range of biological conditions so that we can make informed judgments as to which indications and patient populations 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 six different designs of our six 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, an oligoclonal antibody consisting of a mixture of three different antibodies, and a tetravalent bispecific antibody designed to simultaneously bind to two different target cell surface receptors. Each of these product candidates is designed with specific characteristics that we believe are well suited for the type of disease mechanism that we are targeting.

Application of Network Biology Beyond Cancer

We believe that our Network Biology approach is applicable to a broad range of therapeutic areas beyond cancer, including bone and joint conditions, infectious disease, inflammation, central nervous system disease and other areas of medicine with high unmet needs. While we may pursue some of these disease areas directly ourselves, because of the potential of very broad applicability of our Network Biology approach, our plan is to pursue many or all of these other areas through collaborations, licenses and other arrangements with third parties. As an example, in 2010, we established Silver Creek Pharmaceuticals, Inc., or Silver Creek, to apply our Network Biology approach

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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 six most advanced therapeutic product candidates. All of these product candidates are designed for intravenous administration.

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

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Program	Indication	Stage of development	Commercial rights
MM-111 (ErbB3 and ErbB2 (HER2) targeted bispecific antibody)	M-111 plus paclitaxel with or without trastuzumab in gastric cancers	Phase 2 planned	Merrimack worldwide
	MMM-111 plus trastuzumab in ErbB2 (HER2) positive breast cancer	Phase 1 ongoing	
	MM-111 plus multiple anti-cancer therapies in ErbB2 (HER2) positive solid tumors	Phase 1 ongoing	
	Monotherapy in ErbB2 (HER2) positive solid tumors	Phase 1 complete	
MM-302 (ErbB2 (HER2) targeted nanotherapeutic encapsulation of doxorubicin)	Monotherapy and MM-302 plus trastuzumab in ErbB2 (HER2) positive breast cancer	Phase 1 ongoing	Merrimack worldwide
MM-151 (EGFR (ErbB1) targeted oligoclonal antibody)	Monotherapy in solid tumors	Phase 1 ongoing	Merrimack worldwide
MM-141 (IGF-1R and ErbB3 targeted tetravalent antibody)	Monotherapy and MM-141 plus everolimus and docetaxel in solid tumors	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 some of the solid tumor cancers for which we are developing therapeutic product candidates and companion diagnostics. The U.S. estimated annual incidence and five year relative survival rates are based on information from the American Cancer Society, *Cancer Fact & Figures 2013*. 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

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percentage of cancer patients who are alive after a designated time period relative to persons without cancer.

Tumor type	U.S. annual incidence	Five year relative survival rate	Selected marketed therapies
Breast	234,580	89%	trastuzumab (Herceptin®); docetaxel (Taxotere®); paclitaxel (Taxol®, Abraxane®); capecitabine (Xeloda®); anastrazole (Arimidex®); letrozole (Femara®); exemestane (Aromasin®); ado-trastuzumab emtansine (Kadcyla®); everolimus (Afinitor®)
Lung and bronchus	228,190	16%	docetaxel (Taxotere); gemcitabine (Gemzar®); pemetrexed (Alimta®); gefitinib (Iressa®); erlotinib (Tarceva®); bevacizumab (Avastin®); paclitaxel (Taxol)
Colorectal	142,820	64%	oxaliplatin (Eloxatin®); irinotecan (Camptosar®); bevacizumab (Avastin); cetuximab (Erbitux®); panitumumab (Vectibix®)
Pancreatic	45,220	6%	gemcitabine (Gemzar); erlotinib (Tarceva)
Liver	30,640	15%	sorafenib (Nexavar®)
Brain and other nervous system cancers	23,130	36%	temozolomide (Temodar®); carmustine (BiCNU®); polifeprosan 20 with carmustine implant (Gliadel®); bevacizumab (Avastin)
Ovarian	22,240	44%	liposomal doxorubicin (Doxil®); bevacizumab (Avastin); paclitaxel (Taxol, Abraxane)
Gastric	21,600	27%	capecitabine (Xeloda); trastuzumab (Herceptin); docetaxel (Taxotere)

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): time to death from the initiation of treatment.

Complete response (CR): disappearance of all target tumors and non-target tumors.

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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 sum of measured tumor diameters 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) and no new tumors.

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 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 Phase 3 clinical trial of MM-398 in patients with metastatic pancreatic cancer whose cancer has progressed on 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 EMA 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 believe that MM-398 may have potential uses in a number 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%. Celgene Corporation also recently announced results from a Phase 3 clinical trial comparing gemcitabine to gemcitabine in combination with albumin-bound paclitaxel in treatment-naïve patients with metastatic pancreatic cancer, which found a statistically significant improvement in overall survival in patients receiving the combination regimen. The results of this trial may cause some health care professionals to modify their clinical practice and adopt this regimen as a first-line treatment.

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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, without further treatment, metastatic pancreatic cancer patients whose cancer progressed while on gemcitabine on average can expect to live approximately two months. If these patients receive additional treatment, they typically receive chemotherapy combinations containing one or more of gemcitabine, capecitabine, oxaliplatin, irinotecan, 5-FU or leucovorin.

There are a number of agents currently being tested in combination regimens as therapies 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 that 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, and higher rates of hospitalization, compared to patients treated 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 ingredient of MM-398, irinotecan, is a well known and widely used chemotherapy. Irinotecan is a pro-drug of the active agent 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 and is rapidly cleared. Dosing with irinotecan, as with other chemotherapies, is limited by severe adverse effects that, in turn, limit efficacy. In addition, as with other chemotherapies, the efficacy of irinotecan is limited by tumor resistance mechanisms.

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

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

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

MM-398 is designed for the irinotecan inside the molecule to be converted into SN-38 locally by tumor-resident macrophages, rather than being converted in the liver, as occurs with free irinotecan. We believe that MM-398 utilizes tumor macrophages to both break down the nanotherapeutic and convert the irinotecan into SN-38 in the local tumor environment, resulting in a sustained pool of SN-38 in the tumor. 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.

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Clinical development of MM-398

We are planning to pursue two approaches in the ongoing clinical development of MM-398:

Identify specific patients and tumor types that will respond to MM-398. In clinical practice, the chemotherapy drug irinotecan is used as a monotherapy or combination therapy in multiple cancer indications, including pancreatic, colorectal, lung, ovarian, stomach, breast, leukemia, lymphoma and cervical cancers. It has been difficult for clinicians to predict which patients will respond best to irinotecan, however. One of our clinical development strategies is to identify biomarkers based on drug deposition, activation and tumor sensitivity that will predict which patients are most likely to derive a greater benefit from MM-398 than from conventional chemotherapy.

Expand into new indications. The use of chemotherapies, including irinotecan, 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 Phase 3 clinical trial of MM-398 in patients with metastatic pancreatic cancer whose cancer has progressed on treatment with gemcitabine. The trial is designed to compare the efficacy of MM-398, alone or in combination with 5-FU and leucovorin, against a common control arm of the combination of 5-FU and leucovorin, which is one of the drug combinations that clinicians use to treat patients with metastatic pancreatic cancer whose cancer progresses after treatment with gemcitabine. We expect this trial to enroll approximately 405 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 or the combination of MM-398 with 5-FU and leucovorin against the combination of 5-FU and leucovorin. The secondary endpoints of this trial are objective response rate (ORR) and progression free survival (PFS).

Phase 2 clinical trial

MM-398 was evaluated in an open label, single arm Phase 2 clinical trial in 40 patients with metastatic pancreatic cancer whose cancer had progressed on treatment with gemcitabine. Patients received 120 mg/m^2 of MM-398 every three weeks. The trial was conducted at three sites, two in Taiwan and a third at the University of California, San Francisco, and was conducted by PharmaEngine.

The primary efficacy endpoint of this trial was the three month survival rate. The hypothesis was that absent further therapies, 40% of the 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).

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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 results as of May 31, 2011, as reported at the 2011 Annual Meeting of the American Society of Clinical Oncology:

16 patients survived longer than six months and eight of those patients, or 20% overall, survived for greater than one year. Two additional patients reached the one year time point after May 31, 2011, for a 25% one year survival rate. Although cross-trial comparisons must be interpreted with caution as numerous factors may be different between studies, gemcitabine was approved as a first-line treatment for pancreatic cancer based on a one year survival rate of 18%.

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

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

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

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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 in second-line metastatic colorectal cancer, which is being conducted by GERCOR, a cooperative research group of physicians based in France. This trial was initially designed to compare the efficacy of a regimen of 5-FU, leucovorin and MM-398 and FOLFIRI, which is a regimen of 5-FU, leucovorin and irinotecan. Roche recently announced results from a Phase 3 clinical trial in second-line metastatic colorectal cancer being conducted in Europe comparing chemotherapy to chemotherapy plus bevacizumab. The results of this trial by Roche have caused some medical institutions and physicians in France to modify their clinical practice. As a result, GERCOR amended the Phase 2 clinical trial of MM-398 to include bevacizumab in both arms. The amended trial resumed accrual of patients in July 2012 and is currently ongoing. We expect this trial to enroll up to 88 patients at approximately six sites in France. The primary efficacy endpoint of this trial is objective response rate (ORR). Secondary endpoints include progression free survival (PFS) and overall survival (OS). The safety data from this trial will be evaluated after the first ten patients are dosed in each arm after the addition of bevacizumab.

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 whose cancer has progressed on 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 evaluated in a randomized, blinded Phase 2 clinical trial comparing the efficacy of MM-398 to each of irinotecan and docetaxel 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.

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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 most common grade 3 and grade 4 hematological adverse events observed in each of the MM-398, irinotecan and docetaxel groups were, respectively: neutropenia (11.4%, 15.9%, 15.9%), febrile neutropenia (6.8%, 11.3%, 4.6%) and anemia (4.5%, 4.5%, 6.8%). The most common grade 3 and grade 4 non-hematological adverse events observed in each of the MM-398, irinotecan and docetaxel groups were, respectively: diarrhea (27.3%, 18.2%, 2.3%), nausea (11.4%, 4.6, 0.0%), vomiting (4.6%, 13.6%, 6.8%) and anorexia (6.8%, 6.8%, 0.0%).

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 by 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.

Phase 1 clinical trial

We are currently conducting a translational study designed to identify predictive biomarkers associated with MM-398 in advanced colorectal, lung and triple-negative breast cancers. A translational study is a clinical trial where biomarker investigation is performed, with a goal of identifying biomarkers that predict patients' response to the therapy. Specifically, this study aims to establish the

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feasibility of collecting specialized magnetic resonance-based images (MRI) and tissue-based biomarkers for the purpose of estimating drug delivery to the tumor and patient response to MM-398. We are conducting this trial at one site in the United States.

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 targeted therapies. We believe that MM-121 was the first ErbB3 inhibitor to enter clinical development. We are developing a companion diagnostic that is focused on multiple biomarker assays to determine whether a tumor is dependent on ErbB3 signaling and amenable to treatment with MM-121. We are performing initial research on this assay in our ongoing MM-121 clinical trial program to determine whether to pursue its validation in future clinical trials. We have established a worldwide collaboration with Sanofi for the development and commercialization of MM-121. We are developing MM-121 for a wide range of solid tumor indications, including ovarian, breast and lung 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 the cancer setting.

In designing MM-121, we:

- generated a human antibody antagonist as opposed to a small molecule 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;
- 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 in order to potentially reduce drug associated toxicities.

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, colon and pancreatic cancers. Our preliminary study of several hundred tumor samples suggests that MM-121 may be able to target ErbB3 signaling that is relevant in 30% or more of cancer patients with these types of tumors.

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;

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the ability to delay the development of resistance to other agents, based on research by us and others demonstrating that ErbB3 signaling is upregulated in response to treatment with other therapies; and

the ability to restore sensitivity to drugs, based on our preclinical research involving several cell types and xenograft models that are resistant to targeted therapies or chemotherapies.

Clinical development of MM-121

We and Sanofi are conducting a broad clinical program to test MM-121 in combination with a range of other therapies across a wide spectrum of solid tumor patient populations. The goal of this program is to explore the effect and efficacy of MM-121 in combination with other targeted ErbB agents, such as erlotinib, chemotherapies, such as paclitaxel, and anti-hormonal agents, such as exemestane. 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 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. Enrollment in this trial is complete with a total of 223 patients enrolled. 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). The secondary endpoints include overall survival (OS), objective response rate (ORR) and duration of response.

Phase 2 clinical trial of MM-121 in combination with exemestane for hormone receptor positive 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 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 approximately 130 postmenopausal women with metastatic hormone receptor positive breast cancer who have tested negative for overexpression of ErbB2 (HER2) and whose cancer progressed on treatment with another 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). The 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. The Phase 1 portion of the trial was an open label, dose escalation study in which successive groups of patients were enrolled. The purpose of the Phase 1 portion of the trial was 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

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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 non-small cell lung cancer 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 non-small cell lung cancer patients to be included in the study are:

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

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

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

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

We are currently conducting a randomized, open label Phase 2 neoadjuvant clinical trial of 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 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 with MM-121 and/or paclitaxel, patients will receive standard treatment with doxorubicin and cyclophosphamide, two marketed chemotherapies, prior to surgical resection.

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

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

advanced ovarian and other gynecological cancers; or

metastatic ErbB2 (HER2) negative breast cancer.

We are conducting this trial at multiple sites in the United States. The purpose of the trial is to assess the safety of MM-121 in combination with paclitaxel, determine the recommended dose for a

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subsequent Phase 2 clinical trial and evaluate the potential utility of the predictive biomarkers for MM-121. The dose escalation portion of the trial is complete, and several expansion cohorts continue 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 are believed to 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 of MM-121 in advanced solid tumors

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 have completed an expansion cohort of this trial which was designed to further characterize safety and explore clinical biomarkers. The patients in the expansion cohort were biopsied before and after dosing. This trial focused on enrolling patients with ErbB2 (HER2) negative breast cancer, ovarian cancer and other tumor types in which the ErbB3 pathway may play an important role. The

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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.

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.

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 inhibit ErbB3 signaling in cancer cells that overexpress the ErbB2 (HER2) cell surface receptor, which are also referred to as ErbB2 (HER2) positive. 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 preparing to initiate a Phase 2 clinical trial of MM-111 and are currently conducting multiple Phase 1 clinical trials in combination therapy settings. 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.

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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 may more effectively inhibit 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 in patients that express high levels of ErbB2. MM-111 is designed to utilize an ErbB2 (HER2) targeting arm to greatly increase the local concentration of the ErbB3 therapeutic arm on the surface of ErbB2 (HER2) positive tumor cells, thus enabling the molecule to disrupt the high affinity complex and inhibit signaling.

We believe that MM-111 may be particularly effective in combination with both ErbB2 (HER2) targeted and conventional chemotherapies, as MM-111 may be able to enhance anti-tumor activity, delay the development of resistance to other agents and restore sensitivity to drugs to which a tumor has become resistant.

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

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

Clinical development of MM-111

We are conducting a clinical program to evaluate MM-111 as a monotherapy and in combination with a range of other therapies across ErbB2 (HER2) positive solid tumors. We are currently 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.

Phase 2 clinical trial of MM-111 in combination with paclitaxel with or without trastuzumab for gastric cancers

We are preparing to initiate a randomized, open label Phase 2 clinical trial of MM-111 with paclitaxel with or without trastuzumab in patients with gastric, gastroesophageal junction and esophageal cancers. We expect to enroll patients in this trial at approximately 40 to 60 sites in North America, Europe, Africa and Asia. The primary efficacy endpoint of this trial is progression free survival (PFS). The secondary endpoints include overall survival (OS), objective response rate (ORR)

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and duration of response. We expect this trial to enroll up to 180 patients in parallel across the following two patient populations:

Group A: patients who have traditional ErbB2 (HER2) positive tumors, meaning that their tumors measure HER2 3+ or HER2 2+/FISH+ using conventional cancer testing methods, will receive either MM-111, paclitaxel and trastuzumab or paclitaxel and trastuzumab; and

Group B: patients who have non-traditional ErbB2 (HER2) positive tumors, meaning that their tumors measure HER2 2+/FISH- using conventional cancer testing methods, will receive either MM-111 and paclitaxel or paclitaxel alone.

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 in 16 patients at approximately three sites in the United States.

Phase 1 clinical trial of MM-111 in combination with multiple anti-cancer therapies 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 85 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 five combination therapies with MM-111:

capecitibine, cisplatin and trastuzumab;

lapatinib with or without trastuzumab;

paclitaxel and trastuzumab;

lapatinib, paclitaxel and trastuzumab; and

docetaxel and trastuzumab.

This trial also will assess the pharmacokinetics of MM-111 with each combination, safety and tolerability of each combination and the anti-tumor activity of each combination as indicated by objective response rate (ORR), duration of response and progression free survival (PFS). Exploratory endpoints include an analysis of serum and tissue markers and their correlation with anti-tumor activity. 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.

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

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

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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 are currently being reviewed.

Preclinical development of MM-111

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

MM-111 was active in several ErbB2 (HER2) positive xenograft models, including breast, lung and gastric cancer. Tumor size was reduced in all tumor types.

In cell-based and animal model tests, the anti-proliferative activity of MM-111 resulted in a tumor shrinkage that positively correlated with ErbB2 (HER2) expression levels. MM-111 had a synergistic effect on the inhibition of tumor growth in a breast cancer xenograft model when combined with trastuzumab or lapatinib or both. 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 cancers.

In cell-based and animal models, MM-111 had a synergistic effect on the growth of heregulin expressing models of breast and gastric cancer in combination with paclitaxel, or trastuzumab and paclitaxel. These data suggest that there is a potential benefit of adding MM-111 to paclitaxel-based regimens, especially in patients that overexpress heregulin.

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

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patients have tumors that will exhibit high uptake of MM-302. We also plan to pursue the use of MM-302 as an earlier line of therapy in the adjuvant setting, which means use in conjunction with radiotherapy or surgery, and the neoadjuvant setting. In addition, we plan to pursue the use of MM-302 as a therapy for other ErbB2 (HER2) positive tumors.

Doxorubicin is a marketed chemotherapy that is a member of the anthracycline class of chemotherapies. The addition of anthracyclines to the treatment of both solid and liquid tumors has historically improved outcomes for patients. Specifically, anthracyclines have served as the backbone of breast cancer therapy for decades. Free doxorubicin is currently approved and used in adjuvant and neoadjuvant breast cancer alone and in combination with other chemotherapies and targeted agents. Consistent clinical benefit has been observed with anthracycline-based regimens in breast cancer. However, significant adverse events, including acute and chronic heart dysfunction, have limited their use.

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

Design and potential advantages of MM-302

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

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

MM-302 is designed to utilize nanotherapeutic encapsulation to protect the heart from cardiac adverse events associated with free doxorubicin.

The specific size and stability characteristics of MM-302 are designed to enable the preferential deposition of the drug within tumors relative to normal tissue. Specifically, we believe that, as a nanotherapeutic, MM-302 is able to utilize the EPR effect to selectively enter, and subsequently be trapped in, tumors with leaky vasculature.

MM-302 is designed with attached antibodies so as to use the ErbB2 (HER2) receptor as a binding mechanism to induce the internalization of the nanotherapeutic encapsulated drug particle, and thereby provide drug delivery directly into the cell and increase the potential efficacy of doxorubicin.

MM-302 is designed with an ErbB2 (HER2) antibody that binds to but does not shut down the signaling activity of ErbB2 (HER2). We believe that this will minimize the severity and frequency of adverse events associated with suppressing ErbB2 (HER2) and allow for more clinical benefit for patients with lower levels of ErbB2 (HER2) than is provided by current ErbB2 (HER2) directed treatments.

MM-302 may provide anti-tumor benefit for patients who have failed other ErbB2 (HER2) targeted therapies, but who have not been exposed to anthracyclines.

Based on our preclinical research, we believe that MM-302 may synergize effectively in combination with a number of approved therapies, such as trastuzumab and possibly lapatinib,

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chemotherapy, hormonal therapy and our own drugs, MM-111 and MM-121. The current concerns about the severity and frequency of adverse events associated with doxorubicin and liposomal doxorubicin prevent them from being used in many combination regimens.

Clinical development of MM-302

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

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

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

Phase 1 clinical trial of MM-302 in ErbB2 (HER2) positive breast cancer

We are conducting an open label, dose escalation Phase 1 clinical trial of MM-302 in patients with advanced ErbB2 (HER2) positive breast cancer. The purpose of this trial is to assess the safety of MM-302 and identify the maximum tolerated dose. Enrollment in the monotherapy portion of this trial is complete with a total 34 patients enrolled at four sites in the United States. To date, MM-302 has been well tolerated 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.

We recently amended this trial to evaluate MM-302 in combination with trastuzumab. We expect to enroll between 15 and 30 additional patients in this portion of the trial at four sites in the United States.

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.

Pretreatment of mice with cyclophosphamide significantly enhanced the amount of MM-302 that targeted the tumor and resulted in increased anti-tumor activity compared to treatment with either MM-302 or cyclophosphamide alone.

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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 lung, breast, colorectal, pancreatic and head and neck 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 and panitumumab, often develop resistance to these therapies. We hypothesize that this resistance often results from the production by the tumor of a different type of ligand that binds to EGFR (ErbB1). Because MM-151 is designed to block a full range of EGFR (ErbB1) ligands, we believe that resistance to treatment with MM-151 may be delayed or reduced compared to 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).

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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 non-small cell lung, colorectal, breast and head and neck cancers. 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 of MM-151 in solid tumors

We are conducting an open label, dose escalation Phase 1 clinical trial of MM-151 in patients with solid tumors. The trial protocol calls for enrollment of approximately 63 patients at four sites in the United States. The purpose of this trial is to assess the initial safety and tolerability of escalating doses of MM-151 in 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).

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 animal models. Furthermore, MM-151 exhibited better activity than cetuximab at reducing cell growth lung cancer models with acquired resistance to erlotinib.

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.

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MM-141

Overview

MM-141 is a fully human tetravalent bispecific antibody designed to inhibit signaling of the PI3K/AKT/mTOR pathway triggered by the IGF-1R and ErbB3 cell surface receptors. A tetravalent bispecific antibody is a single molecule that has four binding sites, two for each of two different target cell surface receptors. PI3K/AKT/mTOR signaling is often activated in cancers in response to stress induced by chemotherapies or targeted anti-cancer medicines and is believed to play a significant role in promoting tumor cell survival. We are conducting a Phase 1 clinical trial of MM-141 as a monotherapy and in combination with everolimus and docetaxel in patients with solid tumors.

Design and potential advantages of MM-141

We designed MM-141 to suppress the PI3K/AKT/mTOR signaling pathway by reducing the levels of IGF-1R and ErbB3 receptor complexes that trigger the pathway. Based on our preclinical research, we believe that MM-141 offers the following advantages compared to antibodies that solely target IGF-1R or ErbB3:

- MM-141 is a tetravalent antibody that binds to both IGF-1R and ErbB3 with high affinity and avidity.
- MM-141 is designed to block pro-survival signaling of major activators of PI3K/AKT/mTOR, such as heregulin, IGF-1 and IGF-2.
- MM-141 is designed to block mutual compensation in IGF-1R and ErbB3 mediated activation of PI3K/AKT/mTOR by co-inhibiting both targets.
- MM-141 is designed to degrade IGF-1R and ErbB3 containing receptor complexes that are commonly activated in tumors in response to PI3K/AKT/mTOR inhibition by a small molecule or an antibody.
- We do not believe that MM-141 activates the immune system, which minimizes the chance of off-target adverse events.

Clinical development of MM-141

Based on the role of ErbB3 and IGF-1R in tumor growth and survival, we believe that MM-141 is potentially applicable to a broad range of tumors, including lung, prostate, breast, liver and pancreatic cancers. Research suggests that ErbB3 and IGF-1R mediated activation of PI3K/AKT/mTOR is associated with the development of resistance to various anti-cancer therapies. Thus, we believe that MM-141 may be effective in treating solid tumors that are dependent on PI3K/AKT/mTOR and in which this pro-survival pathway is activated as a resistance mechanism to standard of care anti-cancer therapies.

Phase 1 clinical trial of MM-141 in solid tumors

We are conducting an open label, dose escalation Phase 1 clinical trial of MM-141 as a monotherapy and in combination with everolimus and docetaxel in patients with solid tumors. The trial protocol calls for enrollment of between 30 and 120 patients at four sites in the United States and France. The purpose of this trial is to assess the safety of MM-141 and identify the recommended Phase 2 dose.

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Preclinical development of MM-141

We have conducted a comprehensive program of preclinical testing of MM-141, including several *in vitro* analyses and *in vivo* xenograft studies. Key findings from this preclinical program include the following:

- MM-141 blocked the binding of IGF-1, IGF-2 and heregulin to IGF-1R and ErbB3.
- MM-141 induced the degradation of receptor complexes that contain IGF-1R and ErbB3.
- MM-141 suppressed tumor growth in mouse xenograft models of pancreatic cancer, Ewing's sarcoma, prostate cancer, breast cancer and renal cell carcinoma.
- MM-141 overcame acquired ErbB3-mediated resistance to IGF-1R antibody inhibitors.
- MM-141 increased the activity of targeted small molecule inhibitors of the mTOR and MEK enzymes.
- MM-141 increased the activity of docetaxel, gemcitabine and MM-398.

Companion diagnostic development

We are conducting preclinical research on a companion diagnostic for MM-141 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 monitoring the levels of circulating ligands for IGF-1R and ErbB3. In addition, we are studying the roles of activating mutations in the PI3K/AKT/mTOR and other pathways in modulating response to MM-141.

Preclinical Product Candidates

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

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.

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Multispecific 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 distinct epitopes on two or more 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 to encapsulate active drug payloads. Nanoscale objects typically, though not exclusively, have dimensions on the order of 100 nanometers or smaller. We believe that nanotherapeutics offer the following potentially favorable attributes:

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

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

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

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

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

Manufacturing

We manufacture drug substance for use in our clinical trials and research and development efforts for all of our therapeutic product candidates using current good manufacturing practices, or cGMP, at our approximately 8,500 square foot multi-product facility located at our corporate headquarters in Cambridge, Massachusetts. We have the capabilities to manufacture antibodies, nanotherapeutics and antibody-targeted nanotherapeutics.

Our manufacturing facility:

is comprised of multiple 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 January 31, 2013, we employed approximately 54 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.

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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.

We manufacture our antibody and nanotherapeutic product candidates using commercially 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 filed a chemistry manufacturing and controls amendment, or CMC amendment, with the FDA in October 2011 and are currently using 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 now manufactures according to 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 product on behalf of third party pharmaceutical companies. We have no current agreements or commitments for any such arrangements.

Sales and Marketing

As our lead product candidates are still in clinical development, we are only in the planning stages of establishing our sales, marketing and 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 commercial 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

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approval. We believe that such an organization will be able to address the community of oncologists who are the key specialists in treating solid tumors, including the lung, breast, ovarian, pancreatic, colorectal and head and neck cancers for which our product candidates are being developed. Outside the United States and Europe, we expect to enter into distribution and other marketing arrangements with third parties for any of our product candidates that obtain marketing approval.

We also plan to build a marketing and sales management organization to create and implement marketing strategies for any products that we market through our own sales organization and to oversee and support our sales force. The responsibilities of the marketing organization would include developing educational initiatives with respect to approved products and establishing relationships with thought leaders in relevant fields of medicine.

We plan to tightly integrate the marketing of our therapeutics and companion diagnostics. As we expect to pair various types of diagnostics with our therapeutics, it is likely that the sales and marketing tactics and business model employed for our various diagnostics may differ from one another.

Competition

The biotechnology and pharmaceutical industries are characterized by rapidly advancing technologies, intense competition and a strong emphasis on proprietary products. While we believe that our Network Biology technologies, integrated research, clinical and manufacturing capabilities, development experience and scientific knowledge provide us with competitive advantages, we face potential competition from many different sources, including major pharmaceutical, specialty pharmaceutical and biotechnology companies, academic institutions and governmental agencies and public and private research institutions. Any product candidates that we successfully develop and commercialize will compete with existing therapies and new therapies that may become available in the future.

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

The key competitive factors affecting the success of all of our product candidates, if approved, are likely to be their efficacy, safety, convenience, price, the effectiveness of companion diagnostics in guiding the use of related therapeutics, the level of generic competition and the availability of reimbursement from government and other third party payors.

Our commercial opportunity could be reduced or eliminated if our competitors develop and commercialize products that are safer, more effective, have fewer or less severe side effects, are more convenient or are less expensive than any products that we may develop. Our competitors also may obtain FDA or other regulatory approval for their products more rapidly than we may obtain approval for ours. In addition, our ability to compete may be affected because in many cases insurers or other third party payors seek to encourage the use of generic products. There are many generic products currently on the market for the indications that we are pursuing, and additional products are expected to become available on a generic basis over the coming years. If our therapeutic product candidates are approved, we expect that they will be priced at a significant premium over competitive generic products.

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The most common methods of treating patients with cancer are surgery, radiation and drug therapy, including chemotherapy and targeted drug therapy. As discussed under " Cancer Solid Tumor Market," there are a variety of available drug therapies marketed for solid tumors. In many cases, these drugs are administered in combination to enhance efficacy. Some of these drugs are branded and subject to patent protection, and others are available on a generic basis, including the active ingredients in MM-398 and MM-302. Many of these approved drugs are well established therapies and are widely accepted by physicians, patients and third party payors. In general, although there has been considerable progress over the past few decades in the treatment of solid tumors and the currently marketed therapies provide benefits to many patients, these therapies all are limited to some extent in their efficacy and frequency of adverse events, and none of them are successful in treating all patients. As a result, the level of morbidity and mortality from solid tumor cancers remains high.

In addition to the marketed therapies highlighted under " Cancer Solid Tumor Market," there are also a number of products in late stage clinical development to treat solid tumors. These products in development may provide efficacy, safety, convenience and other benefits that are not provided by currently marketed therapies. As a result, they may provide significant competition for any of our product candidates for which we obtain market approval.

Collaboration and License Agreements

We are party to a number of collaboration agreements for the development and commercialization of our product candidates and license agreements under which we license patents, patent applications and other intellectual property. We consider the following collaboration and license agreements to be material to our business.

Sanofi

In September 2009, after MM-121 entered Phase 1 clinical development, we entered into a license and collaboration agreement with Sanofi for the development and commercialization of MM-121. Under the agreement, we granted Sanofi an exclusive, worldwide, royalty-bearing right and license, with the right to grant sublicenses, under our patent rights and know-how to develop and commercialize the monoclonal antibody MM-121 and an MM-121 companion diagnostic. We retained the right, but not the obligation, to participate in the 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 $25 million to date 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 United States. In general, Sanofi's obligation to pay us royalties continues on a product-by-product and country-by-country basis until the latest of the expiration of the patent rights covering the product in such country, the expiration of all data and regulatory exclusivity applicable to the product in such country or ten

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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 Item 3. Legal Proceedings in this Annual Report on Form 10-K 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 our initial public offering of common stock, or IPO, 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 granted a waiver allowing Sanofi to purchase up to 6,300,000 shares of our common stock.

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.

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In June 2012, we entered into a right of review agreement with Sanofi pursuant to which, if we determine to enter into negotiations with a third party regarding any license, option, collaboration, joint venture or similar transaction involving any therapeutic or companion diagnostic product candidate in our pipeline, we will notify Sanofi of such opportunity. Following such notice, Sanofi will have a specified period of time to review the opportunity and determine whether to exercise an additional right to exclusively negotiate an agreement with us with respect to such opportunity for a specified period of time. If Sanofi does not exercise such right of negotiation, we may enter into negotiations with third parties with respect to the opportunity, provided that we may only enter into an agreement with a third party with respect to those countries that were initially offered to Sanofi. On the other hand, if Sanofi does exercise such right of negotiation but we and Sanofi do not reach a mutually acceptable agreement during the negotiation period, we may enter into negotiations with third parties with respect to the opportunity, provided that we may not enter into an agreement within a specified period of time following the end of the negotiation period if either (i) the agreement involves countries that were not previously offered to Sanofi or (ii) the terms and conditions of such agreement are materially more favorable to the third party than what was previously offered by Sanofi. If we propose to enter into any third party agreement described in the provisos of the preceding two sentences, we must first offer the same terms and conditions to Sanofi. In addition, if we intend to spin out certain of our research and development activities to a newly established, partially owned subsidiary, we will notify Sanofi prior to the initial fundraising for such spin-out. Following such notice, Sanofi will be entitled to review the proposed investment terms, although the final terms and participants of such investment will be determined solely by the board of directors of the spin-out. The right of review terminates on April 1, 2017.

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 have paid PharmaEngine a $10 million upfront license fee and 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 a diligence obligation to initiate a second Phase 3 clinical trial of MM-398 in a different solid tumor indication within a timeframe specified in the agreement.

Multiple 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

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approving changes to the development plan, providing overall strategic direction with respect to development of MM-398 under the development plan and overseeing other committees. The steering committee is also responsible for resolving any disputes arising under the agreement at the steering committee or that are referred to it by any of the other committees. If a matter is unresolved by the steering committee, it may be referred for resolution to executive officers from both companies. We have final decision making authority on any such matter not resolved by the executive officers that relates to the worldwide development of MM-398 or commercialization of MM-398 outside of Taiwan. The development committee is responsible for recommending to the steering committee changes to the development plan and overseeing the progress of the development program and monitoring the parties' compliance with their respective obligations under the development plan.

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 and a component of MM-141 were identified under this agreement, and we have obtained the required target licenses from Dyax by exercising our product license options and paying the applicable license fees. We are obligated to use commercially

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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.

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

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commercialization of licensed products. In addition, we are required to meet specific development, regulatory and commercialization milestones within timeframes specified in the agreement. We have sole responsibility for the development and commercialization of products under the licensed technology. However, the agreement provides that the Regents may require us to sublicense our exclusive rights for the application or use of licensed products covered by any exclusively licensed technology that we are not currently pursuing.

We are required to pay to the Regents an annual license maintenance fee of between $20,000 and $30,000 until the first commercial sale of a licensed product and are responsible for all development costs. In addition, we are required to pay to the Regents up to an aggregate of $725,000 per therapeutic product, other than the second therapeutic product, for which we are responsible for up to an aggregate of $906,250, based on the achievement of specified development and regulatory milestones. The Regents are also entitled to royalties in the low single digits based on net sales of products covered by the licensed technology. A minimum annual royalty is due to the Regents commencing in the earlier of the year of the first commercial sale of a licensed product or 2015. The minimum annual royalty increases from $100,000 in the first year it is payable to $500,000 in the fifth year and thereafter for the life of the patents. If we sublicense the rights granted to us under the licensed technology to a third party, then we are also obligated to pay to the Regents a portion of the sublicensing income related to the licensed technology.

If not terminated earlier, this agreement terminates upon the later of nine years from the market introduction of the last licensed product that contains the licensed biological materials or the expiration of all patent rights licensed under this agreement. At such time, we will have a perpetual, fully paid, world-wide, non-exclusive license. The Regents may terminate the agreement in the event of an uncured material breach by us. We may terminate the agreement on a country-by-country basis at any time upon 60 days' prior written notice.

2000 agreement

In November 2000, we entered into a separate exclusive license agreement with the Regents. Under the agreement, the Regents granted us a royalty-bearing world-wide right and license under certain patent rights for the development and commercialization of products that are covered by the licensed patent rights, including MM-302. The agreement requires that we diligently pursue the development, manufacture and commercialization of licensed products. In addition, we are required to meet specified development, regulatory and commercialization milestones within timeframes specified in the agreement. We have the sole responsibility for the development and commercialization of products under the licensed technology.

We are required to pay to the Regents an annual license maintenance fee of $95,000 until the first commercial sale of a licensed product. We also are responsible for all development costs and have agreed to spend a minimum of $150,000 per year for such costs. In addition, we are responsible for up to an aggregate of $700,000 per product upon the achievement of specified development and regulatory milestones. The Regents are also entitled to royalties in the low single digits based on net sales of products covered by the licensed technology. If we sublicense the rights granted to us under the licensed technology to a third party, then we are also obligated to pay to the Regents a portion of the sublicensing income related to the licensed technology.

If not terminated earlier, this agreement terminates upon the expiration or abandonment of all patents licensed under this agreement. The Regents may terminate the agreement in the event of an uncured material breach by us. We may terminate the agreement on a country-by-country basis at any time upon 60 days' prior written notice.

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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, MM-111 and MM-141. Under the agreement, we may be 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 six most advanced product candidates, other than MM-398. Under this agreement, we are required to make aggregate milestone payments of up to €1.0 million per licensed product and pay royalties of less than one percent on net sales of licensed products. The obligation to pay royalties with respect to each product sold in a country continues until the expiration of the patent rights covering the product in such country.

Intellectual Property

We aggressively strive to protect the proprietary technology that we believe is important to our business, including seeking and maintaining patents intended to cover our products and compositions, their methods of use and processes for their manufacture, as well as our diagnostic and drug discovery technologies and any other inventions that are commercially important to the development of our business. We also rely on trade secrets to protect aspects of our business that are not amenable to, or that we do not consider appropriate for, patent protection, such as our proprietary network modeling programs and large scale protein and liposome production methods.

Our success will significantly depend on our ability to obtain and maintain patent and other proprietary protection for commercially important technology, inventions and know-how related to our business, defend and enforce our patents, preserve the confidentiality of our trade secrets and operate without infringing the valid and enforceable patents and proprietary rights of third parties. We also rely on know-how, continuing technological innovation and in-licensing opportunities to develop and maintain our proprietary position.

We seek to obtain domestic and international patent protection, and endeavor to promptly file patent applications for new commercially valuable inventions once the experimental data necessary for an application become available. We generally file international applications under the Patent Cooperation Treaty, or PCT, within one year after the filing of a U.S. provisional application.

As of January 31, 2013, we owned 15 issued U.S. patents and one allowed U.S. patent application, two issued patents in Europe, 14 issued patents and two allowed patent applications in other jurisdictions, as well as 30 pending U.S. provisional and non-provisional patent applications and 175 pending foreign patent applications in Europe and 42 other jurisdictions. As of January 31, 2013, we also co-owned 32 pending foreign patent applications with Sanofi, as well as one U.S. non-provisional and seven foreign patent applications with Silver Creek. As of January 31, 2013, we had licenses to 39 U.S. patents and seven 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.

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The patent portfolios for our six most advanced product candidates as of January 31, 2013 are summarized below.

MM-398

Our MM-398 patent portfolio is wholly owned by us and includes two issued U.S. patents and two pending U.S. patent applications covering the composition of and methods of making and using MM-398, all of which expire or, if issued, will expire in 2025 except for one U.S. patent that expires in 2028. Related international patent applications have issued or been allowed in four countries and are pending in Europe and a number of other countries. These international patents and patent applications, if issued, will expire in 2025. Our MM-398 portfolio further includes one pending U.S. provisional dosage and administration patent application.

MM-121

Our MM-121 patent portfolio is wholly owned by us, with the exception of:

- five PCT method of use applications that are eligible for worldwide filings, along with 27 related pending foreign applications, all of which are co-owned with Sanofi and, if issued, will expire in 2032 and 2033; and

- one family of U.S. patents broadly covering anti-ErbB3 antibodies, the last of which will expire in 2016 that are licensed non-exclusively from the U.S. Public Health Service, a division of the U.S. Department of Health and Human Services.

Our wholly owned MM-121 portfolio includes a U.S. composition of matter patent, an issued foreign patent, two related pending U.S. patent applications and related international patent applications pending in Europe and 24 other jurisdictions that expire or, if issued, will expire in 2028. Pending method of use and diagnostic patents in this portfolio also include one U.S. provisional patent application and three PCT applications that are eligible for worldwide filings that, if issued, will expire in 2032 and 2033, and three U.S. patent applications and related pending foreign applications in Europe and 16 other jurisdictions that, if issued, will expire in 2029.

MM-111

Our MM-111 patent portfolio includes three 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 and 2031. This portfolio also includes four provisional U.S. applications that may be used to establish non-provisional applications that, if issued, will expire in 2033. For three of these four U.S. provisional applications, we intend to submit a single consolidated worldwide filing. This portfolio also includes 22 related patent applications pending in Europe and a number of other jurisdictions that, if issued, will expire between 2028 and 2032.

In addition, this portfolio includes the following patents licensed from the Regents:

- an exclusively licensed family of patents and patent applications that expire or, if issued, will expire in 2023, including three issued U.S. composition of matter patents, a pending U.S. and European divisional application, an issued European composition of matter patent that has been validated in 15 European Patent Organization countries, two issued foreign patents and related applications pending in a number of other countries; and

- a non-exclusively licensed family of patents and a patent application that expire or, if issued, will expire in 2016, including granted U.S. and European composition of matter patents and an application pending in Canada.

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MM-302

Our MM-302 patent portfolio includes one wholly owned PCT dosage and administration patent application eligible for worldwide filings that, if issued, will expire in 2031, and one U.S. provisional combination therapy application that may be used to establish non-provisional applications that, if issued, will expire in 2033. This portfolio also includes the following exclusively licensed issued U.S. patents:

six composition of matter patents that expire between 2014 and 2019; and

one method of use patent that expires in 2019.

In addition, this portfolio includes the following exclusively licensed European patents:

a composition of matter patent that expires in 2019;

a composition of matter and method patent that expires in 2019; and

a composition of matter patent that expires in 2014.

Our licensed MM-302 patent portfolio further includes several foreign composition of matter patents and patent applications that expire or, if issued, will expire between 2014 and 2017.

All of the licensed patents and patent applications related to MM-302 are licensed from the Regents.

MM-151

Our MM-151 patent portfolio is wholly owned, and includes one PCT application covering compositions, methods of use and diagnostics that is eligible for worldwide filings that, if issued, will expire in 2032. This portfolio also consists of one pending U.S. composition of matter and method of use patent application and eight related pending foreign applications that, if issued, will expire in 2031, and one U.S. and related European patent diagnostic patent application that, if issued, will expire in 2032.

MM-141

Our MM-141 patent portfolio is wholly owned, and consists of two pending patent applications. One of these pending applications covers the principle and methods of co-targeting IGF-1R and ErbB3 in human disease and is pending in the US, Europe, Canada, Australia and Japan, and if issued will expire no sooner than 2030. The other pending application is an international application that remains eligible for worldwide filing in all PCT countries and covers compositions, methods of use, disease indications and drug combination regimens related to MM-141, and if issued will expire no sooner than 2032.

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

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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 two 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 Item 3. Legal Proceedings in this Annual Report on Form 10-K. We have obtained favorable interim decisions in both oppositions, which are now under appeal. The ultimate outcome of these 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-151and MM-141.

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 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 preferred stock at a price per share of $1.00 to other investors for an aggregate purchase price of $4,189,904. In addition, on December 21, 2012, Silver Creek entered into a Note Purchase Agreement pursuant to which it issued convertible notes to various lenders, which did not include us, in aggregate principal amounts of $1.6 million on December 21, 2012 and of $280,000 on February 11, 2013. The convertible notes bear interest at 6% and will mature and convert, along with accrued interest, into Silver Creek Series A preferred stock on December 31, 2013. If at any time prior to maturity Silver Creek enters into a qualifying equity financing, defined as a sale or series of related sales of equity securities prior to the maturity date and resulting in at least $4.0 million of gross proceeds, the notes will automatically convert into that financing at a 25% discount. As of January 31,

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2013, we owned approximately 74% of the outstanding capital stock of Silver Creek, making Silver Creek a majority owned subsidiary of ours.

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

Government Regulation

Government authorities in the United States, at the federal, state and local level, and in other countries extensively regulate, among other things, the research, development, testing, manufacture, including any manufacturing changes, packaging, storage, recordkeeping, labeling, advertising, promotion, distribution, marketing, post-approval monitoring and reporting, import and export of pharmaceutical products, biological products and medical devices, such as those we are developing.

United States drug and biological product approval process

In the United States, the FDA regulates drugs and biological products under the Federal Food, Drug, and Cosmetic Act, or FDCA, the Public Health Service Act, or PHSA, and implementing regulations. The process of obtaining regulatory approvals and the subsequent compliance with appropriate federal, state, local and foreign statutes and regulations requires the expenditure of substantial time and financial resources. Failure to comply with the applicable United States requirements at any time during the product development process, approval process or after approval may subject an applicant to a variety of administrative or judicial sanctions, such as the FDA's refusal to approve pending applications, withdrawal of an approval, imposition of a clinical hold, issuance of untitled or warning letters, product recalls, product seizures, total or partial suspension of production or distribution injunctions, fines, refusals of government contracts, restitution, disgorgement of profits, civil penalties and criminal prosecution.

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 investigational new drug application, or 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.

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We expect that all of our clinical product candidates, other than MM-398, will be subject to review as biological products under BLA standards. We expect that MM-398 will be subject to review as a drug under NDA standards. MM-302 contains both drug and biological components. We believe that this combination product will be subject to review as a biological product, pursuant to a BLA. However, it is possible that the FDA could consider MM-302 subject to review pursuant to an NDA.

Preclinical studies

Preclinical studies include laboratory evaluation of product chemistry and formulation, as well as *in vitro* and animal studies to assess the potential for adverse events and in some cases to establish a rationale for therapeutic use. The conduct of preclinical studies is subject to federal regulations and requirements, including GLP regulations. An IND sponsor must submit the results of the preclinical tests, together with manufacturing information, analytical data, any available clinical data or literature and a proposed protocol 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 healthy volunteers or patients 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 may also require the clinical trial at the site to be halted, either temporarily or permanently, for failure to comply with the IRB's requirements, or may impose other conditions. 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, side effects associated with increasing doses, pharmacological action , 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 common 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, typically at geographically dispersed clinical trial

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sites, to generate sufficient data to statistically confirm the efficacy and safety of the product for approval, to permit the FDA to evaluate the overall risk-benefit profile of the product and to provide adequate information for the labeling of the product.

Progress reports detailing the results of the clinical trials must be submitted at least annually to the FDA and more frequently if serious adverse events occur. Phase 1, Phase 2 and Phase 3 clinical trials may not be completed successfully within any specified period, or at all. Furthermore, the FDA or the sponsor may suspend or terminate a clinical trial at any time on various grounds, including a finding that the research subjects are being exposed to an unacceptable health risk. Similarly, an IRB can suspend or terminate approval of a clinical trial at its institution if the clinical trial is not being conducted in accordance with the IRB's requirements or if the drug has been associated with unexpected serious harm to patients.

Disclosure of clinical trial information

Sponsors of clinical trials of FDA regulated products, including drugs, are required to register and disclose certain clinical trial information. Information related to the product, patient population, phase of investigation, study sites and investigators, and other aspects of the clinical trial is then made public on the ClinicalTrials.gov website as part of the registration. Sponsors are also obligated to discuss the results of their clinical trials after completion. Disclosure of the results of these trials can be delayed until the new product or new indication being studied has been approved. Competitors may use this publicly available information to gain knowledge regarding the progress of development programs.

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 pharmacology 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. FDA approval of the NDA or BLA is required before marketing of the product may begin in the United States. Under federal law, the submission of most NDAs and BLAs is additionally subject to a substantial application user fee, currently exceeding $1,958,000, and the sponsor of an approved NDA or BLA is also subject to annual product and establishment user fees, currently exceeding $98,000 per product and $526,000 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 receipt before accepting them for filing based on the agency's threshold determination that 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 to twelve 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 to eight months. The review process may be extended by the FDA for three additional months to consider certain late-submitted 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.

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Before approving an NDA or BLA, the FDA typically will inspect the facility or facilities where the product is manufactured. The FDA will not approve an application unless it determines that the manufacturing processes and facilities are in compliance with cGMP requirements and adequate to assure consistent production of the product within required specifications. In addition, before approving an NDA or BLA, the FDA will typically inspect one or more clinical sites to assure compliance with GCP and integrity of the clinical data submitted.

The testing and approval process requires substantial time, effort and financial resources, and each may take many years to complete. Data obtained from clinical activities are not always conclusive and may be susceptible to varying interpretations, which could delay, limit or prevent regulatory approval. The FDA may not grant approval on a timely basis, or at all. We may encounter difficulties or unanticipated costs in our efforts to develop our product candidates and secure necessary governmental approvals, which could delay or preclude us from marketing our products.

After the FDA's evaluation of the NDA or BLA and inspection of the manufacturing facilities, the FDA may issue an approval letter or a complete response letter. An approval letter authorizes commercial marketing of the drug or biological product with specific prescribing information for specific indications. A complete response letter generally outlines the deficiencies in the submission and may require substantial additional testing or information in order for the FDA to reconsider the application. If and when those deficiencies have been addressed to the FDA's satisfaction in a resubmission of the NDA, the FDA will issue an approval letter. The FDA has committed to reviewing such resubmissions in two or six months depending on the type of information included. Even with submission of this additional information, the FDA ultimately may decide that the application does not satisfy the regulatory criteria for approval.

Even if the FDA approves a product, it may limit the approved indications for use for the product, require that contraindications, warnings or precautions be included in the product labeling, require that post-approval studies, including Phase 4 clinical trials, be conducted to further assess a drug's safety after approval, require testing and surveillance programs to monitor the product after commercialization, or impose other conditions, including distribution restrictions or other risk management mechanisms, which can materially affect the potential market and profitability of the product. The FDA may prevent or limit further marketing of a product based on the results of post-market studies or surveillance programs. After approval, some types of changes to the approved product, such as changes in indications, manufacturing changes and labeling, 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 disease or 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

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may be withdrawn by the FDA if the FDA believes that the designation is no longer supported by data emerging in the clinical trial process.

Priority review

Under FDA policies, a product candidate may be eligible for priority review, or review within a six to eight month time frame from the time a complete application is accepted for filing. Products regulated by the FDA's Center for Drug Evaluation and Research, or CDER, are eligible for priority review if they provide a significant improvement compared to marketed products in the treatment, diagnosis or prevention of a disease. Products regulated by the FDA's Center for Biologics Evaluation and Research are eligible for priority review if they provide a significant improvement in the safety or effectiveness of the treatment, diagnosis or prevention of a serious or life-threatening disease. A fast track designated product candidate would ordinarily meet the FDA's criteria for priority review.

Accelerated approval

Under the FDA's accelerated approval regulations, the FDA may approve a drug or biologic for a serious or life-threatening illness that provides meaningful therapeutic benefit to patients over existing treatments based upon a surrogate endpoint that is reasonably likely to predict clinical benefit. In clinical trials, a surrogate endpoint is a measurement of laboratory or clinical signs of a disease or condition that substitutes for a direct measurement of how a patient feels, functions or survives. Surrogate endpoints can often be measured more easily or more rapidly than clinical endpoints. A product candidate approved on this basis is subject to rigorous post-marketing compliance requirements, including the completion of Phase 4 or post-approval clinical trials to confirm the effect on the clinical endpoint. Failure to conduct required post-approval studies, or confirm a clinical benefit during post-marketing studies, would allow the FDA to withdraw the drug from the market on an expedited basis. All promotional materials for drug candidates approved under accelerated regulations are subject to prior review by the FDA.

Orphan drugs

Under the Orphan Drug Act, the FDA may grant orphan drug designation to drugs or biologics intended to treat a rare disease or condition, which is generally defined as a disease or condition that affects fewer than 200,000 individuals in the United States. Orphan drug designation must be requested before submitting an NDA or BLA. After the FDA grants orphan drug designation, the generic identity of the drug or biologic and its potential orphan use are disclosed publicly by the FDA. Orphan drug designation does not convey any advantage in, or shorten the duration of, the regulatory review and approval process. The first NDA or BLA applicant to receive FDA approval for a particular active ingredient to treat a particular disease with FDA orphan drug designation is entitled to a seven-year exclusive marketing period in the United States for that product, for that indication. During the seven-year exclusivity period, the FDA may not approve any other applications to market the same drug or biologic for the same orphan indication, except in limited circumstances, such as a showing of clinical superiority to the product with orphan drug exclusivity in that it is shown to be safer, more effective or makes a major contribution to patient care. Orphan drug exclusivity does not prevent the FDA from approving a different drug or biologic for the same disease or condition, or the same drug or biologic for a different disease or condition. Among the other benefits of orphan drug designation are tax credits for certain research and a waiver of the NDA or BLA application user fee.

Pediatric information

Under the Pediatric Research Equity Act of 2003, 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

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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 whose claims 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. Other than the requirement for bioequivalence testing, 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 ANDA applicant does not challenge the listed patents, the ANDA application will not be approved until all the listed patents claiming the referenced product have expired.

If the ANDA applicant has provided a Paragraph IV certification to the FDA, the applicant must also send notice of the Paragraph IV certification to the NDA and patent holders once the ANDA has been accepted for filing by the FDA. The NDA and patent holders may then initiate a patent infringement lawsuit in response to the notice of the Paragraph IV certification. The filing of a patent infringement lawsuit within 45 days after the receipt of a Paragraph IV certification automatically prevents the FDA from approving the ANDA until the earlier of 30 months, expiration of the patent, settlement of the lawsuit or a decision in the infringement case that is favorable to the ANDA applicant.

The ANDA also will not be approved until any applicable non-patent exclusivity, such as exclusivity for obtaining approval of a new chemical entity, listed in the Orange Book for the referenced product has expired. Federal law provides a period of five years following approval of a drug containing no previously approved active ingredients during which ANDAs for generic versions of those drugs cannot be received by the FDA 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. If there is

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no listed patent in the Orange Book, there may not be a Paragraph IV certification, and thus, no ANDA may be filed before the expiration of the exclusivity period. 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 agrees to conduct and report on pediatric studies identified by the FDA in a written request within the statutory timeframes. Applications under the BPCA are treated as priority applications, with all the benefits that designation confers.

Patent term extension

After NDA approval, owners of relevant drug patents may apply for up to a five year patent term extension. The allowable patent term extension is calculated as half of the drug's testing phase, based on the time between IND application and NDA submission, and all of the review phase, based on the time between NDA submission and approval up to a maximum of five years. The time can be shortened if the FDA determines that the applicant did not pursue approval with due diligence. The total patent term after the extension may not exceed 14 years.

For patents that might expire during the application phase, the patent owner may request an interim patent term extension. An interim patent term extension increases the patent term by one year and may be renewed up to four times. For each interim patent term extension granted, the post-approval patent term extension is reduced by one year. The director of the United States Patent and Trademark Office must determine that approval of the drug covered by the patent for which a patent term extension is being sought is likely. Interim patent term extensions are not available for a drug for which an NDA has not been submitted.

Section 505(b)(2) new drug applications

Most drug products obtain FDA marketing approval pursuant to an NDA or an ANDA. A third alternative is a special type of NDA, commonly referred to as a Section 505(b)(2) NDA, which enables the applicant to rely, in part, on the FDA's previous approval of a similar product, or published literature, in support of its application.

505(b)(2) NDAs often provide an alternate path to FDA approval for new or improved formulations or new uses of previously approved products. Section 505(b)(2) permits the filing of an NDA where at least some of the information required for approval comes from studies not conducted by or for the applicant and for which the applicant has not obtained a right of reference. If the 505(b)(2) applicant can establish that reliance on the FDA's previous approval is scientifically appropriate, it may eliminate the need to conduct certain preclinical or clinical studies of the new product. The FDA may also require companies to perform additional studies or measurements to support the change from the approved product. The FDA may then approve the new product candidate for all or some of the label indications for which the referenced product has been approved, as well as for any new indication sought by the Section 505(b)(2) applicant.

To the extent that the Section 505(b)(2) applicant is relying on studies conducted for an already approved product, the applicant is required to certify to the FDA concerning any patents listed for the approved product in the Orange Book to the same extent that an ANDA applicant would. As a result, approval of a 505(b)(2) NDA can be stalled until all the listed patents claiming the referenced product have expired, until any non-patent exclusivity, such as exclusivity for obtaining approval of a new chemical entity, listed in the Orange Book for the referenced product has expired, and, in the case of a

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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

A combination product is a product comprised of (i) two or more regulated components (i.e., drug/device, biologic/device, drug/biologic, or drug/device/biologic) that are physically, chemically, or otherwise combined or mixed and produced as a single entity; (ii) two or more separate products packaged together in a single package or as a unit and comprised of drug and device products, device and biological products, or biological and drug products; (iii) a drug, device, or biological product packaged separately that according to its investigational plan or proposed labeling is intended for use only with an approved individually specified drug, device, or biological product where both are required to achieve the intended use, indication, or effect and where, upon approval of the proposed product, the labeling of the approved product would need to be changed (e.g., to reflect a change in intended use, dosage form, strength, route of administration, or significant change in dose); or (iv) any investigational drug, device, or biological product packaged separately that according to its proposed labeling is for use only with another individually specified investigational drug, device, or biological product where both are required to achieve the intended use, indication, or effect.

The FDA is divided into various branches, or Centers, by product type. Different Centers typically review drug, biologic, or device applications. In order to review an application for a combination product, the FDA must decide which Center should be responsible for the review. FDA regulations require that the FDA determine the combination product's primary mode of action, or PMOA, which is the single mode of a combination product that provides the most important therapeutic action of the combination product. The Center that regulates that portion of the product that generates the PMOA becomes the lead evaluator. If there are two independent modes of action, neither of which is subordinate to the other, the FDA makes a determination as to which Center to assign the product based on consistency with other combination products raising similar types of safety and effectiveness questions or to the Center with the most expertise in evaluating the most significant safety and effectiveness questions raised by the combination product. When evaluating an application, a lead Center may consult other Centers but still retain complete reviewing authority, or it may collaborate with another Center, by which the lead Center assigns review of a specific section of the application to another Center, delegating its review authority for that section. Typically, the FDA requires a single marketing application submitted to the Center selected to be the lead evaluator, although the agency has the discretion to require separate applications to more than one Center. One reason to submit multiple evaluations is if the applicant wishes to receive some benefit that accrues only from approval under a particular type of application, like new drug product exclusivity. If multiple applications are submitted, each application may be evaluated by a different lead Center.

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. Biosimilarity sufficient to reference a prior FDA-approved product requires that there be no differences in conditions of use, route of administration, dosage form, and strength, and no clinically meaningful differences between the biological product and the reference product in

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terms of safety, purity, and potency. Biosimilarity must be shown through analytical studies, animal studies, and at least one clinical study, absent a waiver by the Secretary of the U.S. Department of Health & Human Services. A biosimilar product may be deemed interchangeable with a prior approved product if it meets the higher hurdle of demonstrating that it can be expected to produce the same clinical results as the reference product and, for products administered multiple times, the biologic and the reference biologic may be switched after one has been previously administered without increasing safety risks or risks of diminished efficacy relative to exclusive use of the reference biologic. No biosimilar or interchangeable products have been approved under the BPCIA to date. Complexities associated with the larger, and often more complex, structures of biological products, as well as the process by which such products are manufactured, pose significant hurdles to implementation which are still being evaluated by the FDA.

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.

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

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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.

Breakthrough therapy designation

The FDA is also required to expedite the development and review of the application for approval of drugs that are intended to treat a serious or life-threatening disease or condition where preliminary clinical evidence indicates that the drug may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints. Under the breakthrough therapy program, the sponsor of a new drug candidate may request that the FDA designate the drug candidate for a specific indication as a breakthrough therapy concurrent with, or after, the filing of the IND for the drug candidate. The FDA must determine if the drug candidate qualifies for breakthrough therapy designation within 60 days of receipt of the sponsor's request.

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 guidance that, when finalized, would address issues critical to developing *in vitro* companion diagnostics, such as biomarker qualification, establishing clinical validity, the use of retrospective data, the appropriate patient population and when the FDA will require that the device and the drug be approved simultaneously. The draft guidance issued in July 2011 states that if safe and effective use of a therapeutic depends on an *in vitro* diagnostic, then the FDA generally will require approval or clearance of the diagnostic at the same time that the FDA approves the therapeutic. Although still in draft, this guidance represents the FDA's current practice. The FDA has yet to issue final guidance, and it is unclear when 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 and Radiological Health.

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 (or be a Class I exempt device that does not require pre-market review) 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

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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 design control, testing, control, documentation and other quality assurance procedures.

Upon submission, the FDA determines if the PMA application is sufficiently complete to permit a substantive review, and, if so, the FDA accepts the application for filing. The FDA then commences an in-depth review of the PMA application. The entire process typically takes one to three years, but may take longer. The review time is often significantly extended as a result of the FDA asking for more information or clarification of information already provided. The FDA also may respond with a not approvable determination based on deficiencies in the application and require additional clinical trials that are often expensive and time-consuming and can substantially delay approval.

During the review period, an FDA advisory committee, typically a panel of clinicians, likely will be convened to review the application and recommend to the FDA whether, or upon what conditions, the device should be approved. Although the FDA is not bound by the advisory panel decision, the panel's recommendation is important to the FDA's overall decision making process.

If the FDA's evaluation of the PMA application is favorable, the FDA typically issues an approvable letter requiring the applicant's agreement to specific conditions, such as changes in labeling, or specific additional information, such as submission of final labeling, in order to secure final approval of the PMA. If the FDA concludes that the applicable criteria have been met, the FDA will issue a PMA for the approved indications, which can be more limited than those originally sought by the manufacturer. The PMA can include post-approval conditions that the FDA believes necessary to ensure the safety and effectiveness of the device, including, among other things, restrictions on labeling, promotion, sale and distribution. Failure to comply with the conditions of approval can result in material adverse enforcement action, including the loss or withdrawal of the approval.

Even after approval of a PMA, a new PMA or PMA supplement may be required in the event of a modification to the device, its labeling or its manufacturing process. Supplements to a PMA often require the submission of the same type of information required for an original PMA, except that the supplement is generally limited to the information needed to support the proposed change from the product covered by the original PMA.

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Clinical trials

A clinical trial is almost always required to support a PMA application.

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 (companion diagnostics), we believe that the FDA would consider the investigation to present significant risk and require an IDE.

An IDE application must be supported by appropriate data, such as laboratory test results, showing that it is safe to test the device in humans and that the testing protocol is scientifically sound. The FDA typically grants IDE approval for a specified number of patients. A nonsignificant risk device does not require FDA approval of an IDE. Both significant risk and nonsignificant risk investigational devices require approval from IRBs at the study centers where the device will be used.

During the trial, the sponsor must comply with the FDA's IDE requirements for investigator selection, trial monitoring, reporting and record keeping. The investigators must obtain patient informed consent, rigorously follow the investigational plan and study protocol, control the disposition of investigational devices and comply with all reporting and record keeping requirements. Prior to granting PMA approval, the FDA typically inspects the records relating to the conduct of the study and the clinical data supporting the PMA application for compliance with applicable requirements.

Although the QSR does not fully apply to investigational devices, the requirement for controls on design and development does apply. The sponsor also must manufacture the investigational device in conformity with the quality controls described in the IDE application and any conditions of IDE approval that the FDA may impose with respect to manufacturing.

Post-market

After a device is on the market, numerous regulatory requirements apply. These requirements include: the QSR, labeling regulations, the FDA's general prohibition against promoting products for unapproved or "off label" uses, the Medical Device Reporting regulation, which requires that manufacturers report to the FDA if their device may have caused or contributed to a death or serious injury or malfunctioned in a way that would likely cause or contribute to a death or serious injury if it were to recur, and the Reports of Corrections and Removals regulation, which requires manufacturers to report recalls and field actions to the FDA if initiated to reduce a risk to health posed by the device or to remedy a violation of the FDCA.

The FDA enforces these requirements by inspection and market surveillance. If the FDA finds a violation, it can institute a wide variety of enforcement actions, ranging from a public warning letter to more severe sanctions such as: fines, injunctions and civil penalties; recall or seizure of products; operating restrictions, partial suspension or total shutdown of production; refusing requests for PMA approval of new products; withdrawing PMA approvals already granted; and criminal prosecution.

Other regulatory requirements

Any drug or biological products manufactured or distributed by us pursuant to FDA approvals are subject to pervasive and continuing regulation by the FDA, including, among other things, requirements relating to recordkeeping, periodic reporting, product sampling and distribution, advertising and promotion and reporting of adverse experiences with the product. After approval, most changes to the approved product, such as adding new indications or other labeling claims are subject to prior FDA review and approval.

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The FDA may impose a number of post-approval requirements as a condition of approval of an NDA or BLA. For example, the FDA may require post-marketing testing, including phase 4 clinical trials, and surveillance to further assess and monitor the product's safety and effectiveness after commercialization. Regulatory approval of oncology products often requires that patients in clinical trials be followed for long periods to determine the overall survival benefit of the drug or biologic.

In addition, drug and biologic manufacturers and other entities involved in the manufacture and distribution of approved drugs and biological products are required to register their establishments with the FDA and state agencies, and are subject to periodic unannounced inspections by the FDA and these state agencies for compliance with cGMP requirements. Changes to the manufacturing process are strictly regulated and often require prior FDA approval before being implemented. FDA regulations also require investigation and correction of any deviations from cGMP and impose reporting and documentation requirements upon us and any third party manufacturers that we may decide to use. Accordingly, manufacturers must continue to expend time, money and effort in the areas of production and quality control to maintain cGMP compliance.

Once an approval is granted, the FDA may withdraw the approval if compliance with regulatory requirements and standards is not maintained or if problems occur after the product reaches the market. Later discovery of previously unknown problems with a product, including adverse events of unanticipated severity or frequency, or with manufacturing processes, or failure to comply with regulatory requirements, may result in revisions to the approved labeling to add new safety information, imposition of post-market studies or clinical trials to assess new safety risks or imposition of distribution or other restrictions under a Risk Evaluation and Mitigation Strategy program. Other potential consequences include, among other things:

- restrictions on the marketing or manufacturing of the product, complete withdrawal of the product from the market or product recalls;
- fines, untitled and 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 prosecution.

The FDA strictly regulates marketing, labeling, advertising and promotion of products that are placed on the market. Drugs and biologics may be promoted only for the approved indications and in accordance with the provisions of the approved label. The FDA and other agencies actively enforce the laws and regulations prohibiting the promotion of off label uses, and a company that is found to have improperly promoted off label uses may be subject to significant liability.

Additional provisions

Anti-kickback and false claims laws

In addition to FDA restrictions on marketing of pharmaceutical products, several other types of state and federal laws have been applied to restrict certain marketing practices in the pharmaceutical industry in recent years. These laws include anti-kickback statutes and false claims statutes. The federal healthcare program anti-kickback statute prohibits, among other things, knowingly and willfully offering, paying, soliciting or receiving remuneration to induce or in return for purchasing, leasing, ordering or arranging for the purchase, lease or order of any healthcare item or service reimbursable under Medicare, Medicaid or other federally financed healthcare programs. This statute has been interpreted to apply to arrangements between pharmaceutical manufacturers on the one hand and prescribers, purchasers and formulary managers on the other. Violations of the anti-kickback statute are punishable

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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 therapeutic or diagnostic 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 and obtaining advice from the Scientific Advice Working Party of the EMA in the European Union for MM-398 for the treatment of pancreatic cancer, we have not initiated any discussions with the EMA or any other foreign regulatory authorities with respect to seeking regulatory approval for any of our products in Europe or in any other country outside the United States.

The 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

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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 BPCIA and the Food and Drug Administration Safety and Innovation Act, or FDASIA, were enacted in 2010 and 2012, respectively. The FDASIA is a broad, sweeping law that establishes new user fee programs and provides the FDA with new authority in the areas of drugs, biologics and medical devices. In particular, the FDASIA provides the FDA with new inspection authorities. A drug or biologic will be considered adulterated, with possible resulting civil and criminal penalties, if the owner or operator of the establishment where it is made, processed, packed or held delays, denies, limits or refuses inspection. The FDASIA also replaces the biennial inspection schedule for drugs and biologics with a risk-based inspection schedule. The law grants the FDA authority to require a drug or biologics manufacturer to provide, in advance or instead of an inspection, and at the manufacturer's expense, any records or other information that the agency may otherwise inspect at the facility. The FDASIA also permits the FDA to share inspection information with foreign governments under certain circumstances. The FDASIA also provides the FDA with additional authority to exercise against manufacturers of drugs or biologics that are not adhering to pediatric study requirements, which apply even if the manufacturer is not seeking to market the drug or biologic to pediatric patients. As of April 2013, the FDA must issue non-compliance letters to companies who do not meet the pediatric study requirements. The company has an opportunity to respond, and the non-compliance letter and company response will become publicly available. The FDASIA is complex and has yet to be interpreted and implemented by the FDA. 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. As a result, its ultimate impact, implementation and meaning are subject to uncertainty.

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

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specific drug products on an approved list, or formulary, which might not include all of the approved drugs for a particular indication.

In order to secure coverage and reimbursement for any product that might be approved for sale, we may need to conduct expensive pharmacoeconomic studies in order to demonstrate the medical necessity and cost-effectiveness of the product, in addition to the costs required to obtain FDA or other comparable regulatory approvals. Our product candidates may not be considered medically necessary or cost-effective. A payor's decision to provide coverage for a drug product does not imply that an adequate reimbursement rate will be approved. Third party reimbursement may not be sufficient to enable us to maintain price levels high enough to realize an appropriate return on our investment in product development.

The containment of healthcare costs has become a priority of federal, state and foreign governments, and the prices of drugs have been a focus in this effort. Third party payors are increasingly challenging the prices charged for medical products and services and examining the medical necessity and cost-effectiveness of medical products and services, in addition to their safety and efficacy. If these third party payors do not consider our products to be cost-effective compared to other available therapies, they may not cover our products after approval as a benefit under their plans or, if they do, the level of payment may not be sufficient to allow us to sell our products at a profit. The U.S. government, state legislatures and foreign governments have shown significant interest in implementing cost containment programs to limit the growth of government-paid health care costs, including price controls, restrictions on reimbursement and requirements for substitution of generic products for branded prescription drugs. Adoption of such controls and measures, and tightening of restrictive policies in jurisdictions with existing controls and measures, could limit payments for pharmaceuticals such as the drug candidates that we are developing and could adversely affect our net revenue and results.

Pricing and reimbursement schemes vary widely from country to country. Some countries provide that drug products may be marketed only after a reimbursement price has been agreed. Some countries may require the completion of additional studies that compare the cost-effectiveness of a particular product candidate to currently available therapies. For example, the European Union provides options for its member states to restrict the range of drug products for which their national health insurance systems provide reimbursement and to control the prices of medicinal products for human use. European Union member states may approve a specific price for a drug product or may instead adopt a system of direct or indirect controls on the profitability of the company placing the drug product on the market. Other member states allow companies to fix their own prices for drug products, but monitor and control company profits. The downward pressure on health care costs in general, particularly prescription drugs, has become very intense. As a result, increasingly high barriers are being erected to the entry of new products. In addition, in some countries, cross-border imports from low-priced markets exert competitive pressure that may reduce pricing within a country. There can be no assurance that any country that has price controls or reimbursement limitations for drug products will allow favorable reimbursement and pricing arrangements for any of our products.

The marketability of any products for which we receive regulatory approval for commercial sale may suffer if the government and third party payors fail to provide adequate coverage and reimbursement. In addition, an increasing emphasis on managed care in the United States has increased and we expect will continue to increase the pressure on drug pricing. Coverage policies, third party reimbursement rates and drug pricing regulation may change at any time. In particular, the Patient Protection and Affordable Care Act was enacted in the United States in March 2010 and contains provisions that may reduce the profitability of drug products, including, for example, increased rebates for drugs sold to Medicaid programs, extension of Medicaid rebates to Medicaid managed care plans, mandatory discounts for certain Medicare Part D beneficiaries and annual fees based on pharmaceutical companies' share of sales to federal health care programs. Even if favorable coverage

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and reimbursement status is attained for one or more products for which we receive regulatory approval, less favorable coverage policies and reimbursement rates may be implemented in the future.

Employees

As of January 31, 2013, we had 230 full-time employees, including a total of 83 employees with M.D. or Ph.D. degrees. Of these full-time employees, 190 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.

Our Corporate Information

We were incorporated under the laws of the State of Delaware in July 2010. Our principal executive offices are located at One Kendall Square, Suite B7201, Cambridge, MA 02139, and our telephone number is (617) 441-1000.

Information Available on the Internet

We maintain a website with the address *www.merrimackpharma.com*. We are not including the information contained on our website as a part of, or incorporating it by reference into, this Annual Report on Form 10-K. Our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and all amendments to those reports, are available to you free of charge through the "SEC Filings" section of our website as soon as reasonably practicable after those materials have been electronically filed with, or furnished to, the SEC. We also make available on our website our corporate governance guidelines, the charters for our audit committee, corporate governance and nominating committee, organization and compensation committee and executive committee, and our code of business conduct and ethics, which applies to our directors, officers and employees, and such information is available in print and free of charge to any of our stockholders who requests it. In addition, we intend to disclose on our website any amendments to, or waivers from, our code of business conduct and ethics that are required to be publicly disclosed pursuant to rules of the SEC.

Item 1A. Risk Factors

Risks Related to Our Financial Position and Need for Additional Capital

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

Since inception, we have incurred significant operating losses. Our net loss was $91.8 million for the year ended December 31, 2012, $79.7 million for the year ended December 31, 2011 and $50.2 million for the year ended December 31, 2010. As of December 31, 2012, we had an accumulated deficit of $442.1 million. To date, we have financed our operations primarily through private placements of our convertible preferred stock, collaborations, an IPO, a secured debt financing and, to a lesser extent, through government grants, the monetization of tax credits and a convertible debt financing. We have devoted substantially all of our efforts to research and development, including clinical trials. We have not completed development of or commercialized 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 clinical trials of our six most advanced product candidates;
- continue the research and development of our other product candidates;
- seek to discover additional product candidates;

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seek regulatory approvals for our product candidates that successfully complete clinical trials;

establish a sales, marketing and distribution infrastructure and scale up manufacturing capabilities to commercialize products for which we may obtain regulatory approval; and

add operational, financial and management information systems and personnel, including personnel to support our product development and planned commercialization efforts.

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

Our substantial indebtedness may limit cash flow available to invest in the ongoing needs of our business.

On November 8, 2012, we entered into a Loan and Security Agreement, or Loan Agreement, with Hercules Technology Growth Capital, Inc., or Hercules. The Loan Agreement provided for an initial term loan advance of $25.0 million, which closed on November 8, 2012, and an additional term loan advance of $15.0 million, which closed on December 14, 2012. We could in the future incur additional indebtedness beyond such amount.

Our substantial debt combined with our other financial obligations and contractual commitments could have significant adverse consequences, including:

requiring us to dedicate a substantial portion of cash flow from operations to the payment of interest on, and principal of, our debt, which will reduce the amounts available to fund working capital, capital expenditures, product development efforts and other general corporate purposes;

increasing our vulnerability to adverse changes in general economic, industry and market conditions;

obligating us to restrictive covenants that may reduce our ability to take certain corporate actions or obtain further debt or equity financing;

limiting our flexibility in planning for, or reacting to, changes in our business and the industry in which we compete; and

placing us at a competitive disadvantage compared to our competitors that have less debt or better debt servicing options.

In addition, we are vulnerable to increases in the market rate of interest because our currently outstanding secured debt bears interest at a variable rate. If the market rate of interest increases, we will have to pay additional interest on our outstanding debt, which would reduce cash available for our other business needs.

We intend to satisfy our current and future debt service obligations with our existing cash and cash equivalents and funds from external sources. However, we may not have sufficient funds or may be unable to arrange for additional financing to pay the amounts due under our existing debt. Funds from external sources may not be available on acceptable terms, if at all. In addition, a failure to comply

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with the covenants under our existing debt instruments could result in an event of default under those instruments. In the event of an acceleration of amounts due under our debt instruments as a result of an event of default, including upon the occurrence of an event that would reasonably be expected to have a material adverse effect on our business, operations, properties, assets or condition or a failure to pay any amount due, we may not have sufficient funds or may be unable to arrange for additional financing to repay our indebtedness or to make any accelerated payments, and the lenders could seek to enforce security interests in the collateral securing such indebtedness. In addition, the covenants under our existing debt instruments and the pledge of our assets as collateral limit our ability to obtain additional debt financing.

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 will need substantial additional funding in connection with our continuing operations. 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, in connection with seeking and possibly obtaining regulatory approval of any of our product candidates, we expect to incur significant commercialization expenses for product sales, marketing, manufacturing and distribution. 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 our existing unrestricted cash and cash equivalents and available-for-sale securities on hand as of December 31, 2012, anticipated interest income, and research and development and manufacturing funding under our license and collaboration agreement with Sanofi related to MM-121 will enable us to fund our operating expenses and capital expenditure requirements into 2014. Our future capital requirements will depend on many factors, including:

- the progress and results of the clinical trials of our six 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.

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. Other sources of funds may not be available or, if available, may not be available on terms satisfactory to us and could result in significant stockholder dilution. On February 1, 2013, we filed a registration statement on Form S-3 with the SEC to allow the issuance of our securities from time to time in one or more offerings of up to $200,000,000 in aggregate dollar amount. This registration statement was declared effective by the SEC on February 8, 2013. 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. Additional 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, and these covenants may also require us to attain certain levels of financial performance and we may not be able to do so; any such failure may result in the acceleration of such debt and the foreclosure by our creditors on the collateral we used to secure the debt. The debt issued in a debt financing would also be senior to our outstanding shares of capital stock upon our liquidation. Our existing indebtedness and the pledge of our assets as collateral limit our ability to obtain additional debt financing. 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.

Our investments are subject to risks that could result in losses.

We invest our cash in a variety of financial instruments, principally securities issued by the U.S. government and its agencies, investment grade corporate bonds, including commercial paper, and money market instruments. All of these investments are subject to credit, liquidity, market and interest rate risk. Such risks, including the failure or severe financial distress of the financial institutions that hold our cash, cash equivalents and investments, may result in a loss of liquidity, impairment to our investments, realization of substantial future losses, or a complete loss of the investments in the long-term, which may have a material adverse effect on our business, results of operations, liquidity and financial condition. In order to manage the risk to our investments, we maintain an investment policy that, among other things, limits the amount that we may invest in any one issue or any single issuer and requires us to only invest in high credit quality securities.

Risks Related to the Development and Commercialization of Our Product Candidates

We depend heavily on the success of our six 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 five other most advanced product candidates for the

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treatment of various types of cancer. All of our therapeutic product candidates are still in preclinical and clinical development. Our ability to generate product revenues, which we do not expect will occur for at least the next several years, if ever, will depend heavily on the successful development and eventual commercialization of these product candidates. The success of our product candidates, which include both our therapeutic product candidates and companion diagnostic candidates, will depend on several factors, including the following:

- successful enrollment in, and completion of, preclinical studies and clinical trials;
- receipt of marketing approvals from the FDA and similar regulatory authorities outside the United States for our product candidates, including our companion diagnostics;
- establishing commercial manufacturing capabilities, either by building such facilities ourselves or making arrangements with third party manufacturers;
- launching commercial sales of the product, whether alone or in collaboration with others;
- acceptance of the product by patients, the medical community and third party payors;
- effectively competing with other therapies;
- a continued acceptable safety profile of the product following approval; and
- qualifying for, maintaining, enforcing and defending intellectual property rights and claims.

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

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

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

For example, the favorable results from a Phase 2 clinical trial of MM-398 in patients with metastatic pancreatic cancer may not be predictive of success in our Phase 3 clinical trial of MM-398 for the same indication, in particular because the trials have different efficacy endpoints and the Phase 2 trial was a single arm study that did not compare MM-398 to other therapies. Our Phase 3 trial, as amended, is designed to compare the efficacy of each of MM-398 as a monotherapy and MM-398 in combination with 5-FU and leucovorin against a common control of the combination of 5-FU and leucovorin. This Phase 3 trial is 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.

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

- regulators or institutional review boards may not authorize us or our investigators to commence a clinical trial or conduct a clinical trial at a prospective trial site;
- clinical trials of our product candidates may produce negative or inconclusive results, and we may decide, or regulators may require us, to conduct additional clinical trials or abandon product development programs;
- the number of patients required for clinical trials of our product candidates may be larger than we anticipate, enrollment in these clinical trials may be insufficient or slower than we anticipate or patients may drop out of these clinical trials at a higher rate than we anticipate;
- our third party contractors may fail to comply with regulatory requirements or meet their contractual obligations to us in a timely manner, or at all;
- we might have to suspend or terminate clinical trials of our product candidates for various reasons, including a finding that the patients are being exposed to unacceptable health risks;
- regulators or institutional review boards may require that we or our investigators suspend or terminate clinical research for various reasons, including noncompliance with regulatory requirements;
- the cost of clinical trials of our product candidates may be greater than we anticipate;
- the supply or quality of our product candidates, companion diagnostics 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 third parties.

In addition, MM-398 is currently being evaluated in a Phase 2 clinical trial in second-line metastatic colorectal cancer, which is being conducted by GERCOR, a cooperative research group of physicians based in France. This trial was initially designed as a randomized, non-comparative trial evaluating a regimen of 5-FU, leucovorin and MM-398 and FOLFIRI, which is a regimen of 5-FU, leucovorin and irinotecan. Roche recently announced results from a Phase 3 clinical trial in second-line metastatic colorectal cancer being conducted in Europe comparing chemotherapy to chemotherapy plus bevacizumab. The results of this trial by Roche have caused some medical institutions and physicians in France to modify their clinical practice. As a result, GERCOR amended the Phase 2 clinical trial of MM-398 to include bevacizumab in both arms. The amended trial resumed accrual of patients in July 2012 and is currently ongoing.

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;

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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;

be subject to restrictions on how the product is distributed or used; or

be unable to obtain reimbursement for use of the product.

In particular, it is possible that the FDA and other regulatory agencies may not consider the results of our Phase 3 clinical trial of MM-398 for the treatment of patients with metastatic pancreatic cancer, once completed, to be sufficient for approval of MM-398 for this indication. In general, the FDA suggests two adequate and well-controlled clinical trials to demonstrate effectiveness because a conclusion based on two persuasive studies will be more secure. Although the FDA informed us that the original design of our 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 Phase 3 clinical trial, the FDA may nonetheless require that we conduct additional clinical trials, possibly using a different design.

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.

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 or investigational therapies, our product candidates may exacerbate adverse events associated with the other therapy. If our product candidates, either alone or in combination with other therapies, result in undesirable side effects or have characteristics that are unexpected, we may need to modify or abandon their development.

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

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

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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 receptor positive 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, regulatory 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 are generally expected to 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, development and manufacture. If we, or any third parties that we engage to assist us, are unable to successfully develop companion diagnostics for our therapeutic product candidates, or experience delays in doing so, the development of our therapeutic product candidates may be adversely affected, our therapeutic product candidates may not receive marketing approval and we may not realize the full commercial potential of any therapeutics that receive marketing approval. As a result, our business would be harmed, possibly materially.

Even if any of our product candidates, including our six 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 six 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 that may be uncertain or subjective, including:

- the prevalence and severity of any side effects;
- efficacy and potential advantages compared to alternative treatments;

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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 have an option to co-promote MM-121 in the United States with Sanofi, which otherwise holds worldwide commercialization rights to this product candidate.

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

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

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

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

The development and commercialization of new therapeutic and diagnostic products is highly competitive. We face competition with respect to our current product candidates, and will face competition with respect to any products that we may seek to develop or commercialize in the future, from major pharmaceutical companies, specialty pharmaceutical companies and biotechnology companies worldwide. Several large pharmaceutical and biotechnology companies currently market and

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sell products for the treatment of the solid tumor indications for which we are developing our product candidates. Potential competitors also include academic institutions, government agencies and other public and private research organizations that conduct research, seek patent protection and establish collaborative arrangements for research, development, manufacturing and commercialization. Many of these competitors are attempting to develop therapeutics for our target indications.

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

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

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

Even 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

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provide them with predetermined discounts from list prices and are challenging the prices charged for medical products. We cannot be sure that reimbursement will be available for any product that we commercialize and, if reimbursement is available, what the level of reimbursement will be. Reimbursement may impact the demand for, or the price of, any product for which we obtain marketing approval. Obtaining reimbursement for our products may be particularly difficult because of the higher prices often associated with products administered under the supervision of a physician. If reimbursement is not available or is available only to limited levels, we may not be able to successfully commercialize any product candidate that we successfully develop.

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

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

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

decreased demand for any product candidates or products that we may develop;

injury to our reputation and significant negative media attention;

withdrawal of patients from clinical trials;

significant costs to defend the related litigation;

substantial monetary awards to patients;

loss of revenue; and

the inability to commercialize any products that we may develop.

We currently hold $10.0 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 or every liability that may arise.

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

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

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

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

If we do not accurately evaluate the commercial potential or target market for a particular product candidate, we may relinquish valuable rights to that product candidate through collaboration, licensing or other royalty arrangements in cases in which it would have otherwise been more 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 established 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

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also store certain low level radioactive waste at our facilities until the materials can be properly disposed of. We cannot eliminate the risk of contamination or injury from these materials. In the event of contamination or injury resulting from our use of hazardous materials, we could be held liable for any resulting damages, and any liability could exceed our resources. We also could incur significant costs associated with civil or criminal fines and penalties.

Although we maintain workers' compensation insurance to cover us for costs and expenses we may incur due to injuries to our employees resulting from the use of hazardous materials, this insurance may not provide adequate coverage against potential liabilities. We do not maintain insurance for environmental liability or toxic tort claims that may be asserted against us in connection with our storage or disposal of biological, hazardous or radioactive materials.

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

Fluctuations in foreign currency exchange rates could substantially increase the costs of our clinical trial programs.

A significant portion of our clinical trial activities are conducted outside of the United States, and associated costs may be incurred in the local currency of the country in which the trial is being conducted, which costs could be subject to fluctuations in foreign exchange rates. At present, we do not engage in hedging transactions to protect against uncertainty in future exchange rates between particular foreign currencies and the U.S. dollar. A decline in the value of the U.S. dollar against currencies in geographies in which we conduct clinical trials could be expected to have a negative impact on our research and development costs. We cannot predict the impact of foreign currency fluctuations, and foreign currency fluctuations in the future may adversely affect our development costs.

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 or unwilling 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 license and collaboration 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 license and 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 at any time. We have little control over the amount, timing and quality 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.

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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.

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 are also a party to a right of review agreement with Sanofi pursuant to which, if we determine to enter into negotiations with a third party

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regarding any license, option, collaboration, joint venture or similar transaction involving any therapeutic or companion diagnostic product candidate in our pipeline, we will notify Sanofi of such opportunity. Following such notice, Sanofi will have a specified period of time to review the opportunity and determine whether to exercise an additional right to exclusively negotiate an agreement with us with respect to such opportunity for a specified period of time. In addition, in specified circumstances, if we subsequently propose to enter into any third party agreement, we must first offer the same terms and conditions to Sanofi. Our right of review agreement with Sanofi could discourage other companies from engaging with us in discussions or negotiations regarding collaboration agreements.

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 or cause us to incur additional costs, producing additional losses and depriving us of potential product revenue.

Risks Related to the Manufacturing of Our Product Candidates

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

We have a manufacturing facility located at our corporate headquarters in Cambridge, Massachusetts. We manufacture drug substance at this facility that we use for research and development purposes and for clinical trials of our product candidates. We do not have experience in

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

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

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

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

We currently rely on third party manufacturers for some aspects of the production of our product candidates for preclinical testing and clinical trials, including fill-finish and labeling activities. In addition, while we believe that our existing manufacturing facility, 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.

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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, 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. Because there are a limited number of manufacturers that operate under cGMP or QSR regulations and that might be capable of manufacturing for us, we may not have access to such manufacturers.

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 may be a number of potential long-term replacements to each supplier, we may incur added costs and delays in identifying and qualifying any such replacements.

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

We rely on third parties to perform various tasks related to the manufacturing of our product candidates. Compliance by such third parties with regulations of the FDA or other regulatory bodies cannot be assured, which could adversely impact our clinical trials.

A former fill-finish third party contractor that we 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 resulted in a few patients missing one or two doses of MM-121.

The MM-111 that was being used in our clinical trials was also filled and packaged by this same contractor. The FDA 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

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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 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 we could experience similar issues with other contractors.

Risks Related to Our Intellectual Property

If we fail to fulfill our obligations under 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-302, MM-141, 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 license and 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

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not result in patents being issued which protect our technology or products or which effectively prevent others from commercializing competitive technologies and products. Changes in either the patent laws or interpretation of the patent laws in the United States and other countries may diminish the value of our patents or narrow the scope of our patent protection. The laws of foreign countries may not protect our rights to the same extent as the laws of the United States. Publications of discoveries in the scientific literature often lag behind the actual discoveries, and patent applications in the United States and other jurisdictions are typically not published until 18 months after filing, or in some cases not at all. Therefore, we cannot be certain that we or our licensors were the first to make the inventions claimed in our owned and licensed patents or pending patent applications, or that we or our licensors were the first to file for patent protection of such inventions. Assuming the other requirements for patentability are met, the first to file a patent application is entitled to the patent. Under the America Invents Act enacted in 2011, the United States moved to this first to file system in early 2013 from the previous system under which the first to make the claimed invention was entitled to the patent. We may become involved in opposition, interference or derivation 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 initiate infringement lawsuits, 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 enforceable 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 or derivation 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 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-151 and MM-141. These patents expire in 2018. Genentech has asserted infringement claims against several pharmaceutical and biotechnology companies based on these patents. If these patents were determined to be valid and cover our product candidates, we would need to obtain a license to the patented technology, which may cause us to incur licensing related costs. However, a license to these patents may not be available on commercially reasonable terms, or at all. Our failure to obtain a license to these patents could delay or prevent our development and commercialization of our product candidates in the United States.

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

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

We are currently engaged in two 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 two 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 Part I, Item 3. Legal Proceedings in this Annual Report on Form 10-K. We have

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obtained favorable interim decisions in both oppositions, although both decisions are now under appeal. The ultimate outcome of these 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, MM-111 or MM-141, we may not be able to commercialize MM-121, MM-111 or MM-141 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 license and 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 one 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 one of these European patents in the United States that may be relevant to our development and commercialization of MM-121. If these patents were determined to be valid and construed to cover MM-121, our development and commercialization of MM-121 in the United States could be delayed or prevented.

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

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

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

In addition to our patented technology and products, we rely on trade secrets, including unpatented know-how, technology and other proprietary information, to maintain our competitive position. We seek to protect these trade secrets, in part, by entering into non-disclosure and confidentiality agreements with parties that have access to them, such as our employees, corporate collaborators, outside scientific collaborators, sponsored researchers, contract manufacturers, consultants, advisors and other third parties. We also enter into confidentiality and invention or patent assignment agreements with our employees and consultants. In addition, any of these parties may breach the agreements and disclose our proprietary information, and we may not be able to obtain adequate remedies for such breaches. Enforcing a claim that a party illegally disclosed or misappropriated a trade secret is difficult, expensive and time-consuming, and the outcome is unpredictable. In addition, some courts inside and outside the United States are less willing or

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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 six 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, import, export, sampling and marketing 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 regulatory approval requires the submission of extensive preclinical and clinical data and supporting information to the FDA and other regulatory agencies for each therapeutic indication to establish the product candidate's safety and efficacy. Securing regulatory approval also requires the submission of information about the product manufacturing process to, and inspection of manufacturing facilities by, the FDA or other regulatory agencies. 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, changes in regulatory review for each submitted product application or approval of other products for the same indication may cause delays in the approval or rejection of an application. Regulatory agencies have 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.

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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 Diagnostics and Radiological Health. 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 in its current format, 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 cannot yet know what the FDA will require for any of these tests. For four of our six most advanced product candidates, MM-121, MM-111, MM-151 and MM-141, 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 also investigating possible *in vitro* companion diagnostics, we are currently developing *in vivo* companion diagnostics in the form of imaging agents that may help identify patients likely to benefit from the therapy. Imaging agents are regulated as drugs by the FDA's Center for Drug Evaluation and Research and, as such, are generally subject to the regulatory requirements applicable to other new drug candidates. Although the FDA has not issued guidance with respect to the simultaneous approval of *in vivo* diagnostics and therapeutics, it is possible that the FDA will apply a standard similar to that for *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 six 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 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 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

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

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

With the enactment of the 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 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 BLA. The BPCIA 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:

- a potential competitor could seek and obtain approval of its own BLA during our exclusivity period instead of seeking approval of a biosimilar version;

- 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; and

- there have been proposals to decrease the reference product exclusivity from 12 years to seven years. Congress has not yet enacted any such decrease, however.

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.

In addition, a drug product approved under an NDA, such as MM-398 if it were to be approved, could face generic competition earlier than expected. The enactment of the Generic Drug User Fee Amendments of 2012 as part of the FDASIA established a user fee program that will generate hundreds of millions of dollars in funding for the FDA's generic drug review program. Funding from the user fee program, along with performance goals that the FDA negotiated with the generic drug industry, could significantly decrease the timeframe for FDA review of generic drug applications.

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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, including sometimes additional testing in children. The time required to obtain approval in foreign countries may differ substantially from that required to obtain FDA approval. The regulatory approval process outside the United States generally includes all of the risks associated with obtaining FDA approval. In addition, in many countries outside the United States, it is required that the product be approved for reimbursement before the product can be sold 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;

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suspension or withdrawal of regulatory approvals;

refusal to permit the import or export of our products;

product seizure; or

injunctions or the imposition of civil or criminal penalties.

The FDASIA provides the FDA with new inspection authorities. A drug or biologic will be considered adulterated, with possible resulting civil and criminal penalties, if the owner or operator of the establishment where it is made, processed, packed or held delays, denies, limits or refuses inspection. The FDASIA also replaces the biennial inspection schedule for drugs and biologics with a risk-based inspection schedule. The law grants the FDA authority to require a drug or biologics manufacturer to provide, in advance or instead of an inspection, and at the manufacturer's expense, any records or other information that the agency may otherwise inspect at the facility. The FDASIA also permits the FDA to share inspection information with foreign governments under certain circumstances. The FDASIA is complex and has yet to be interpreted and implemented by the FDA. As a result, its ultimate impact, implementation and meaning are subject to uncertainty.

The FDASIA also provides the FDA with additional authority to exercise against manufacturers of drugs or biologics that are not adhering to pediatric study requirements, which apply even if the manufacturer is not seeking to market the drug or biologic to pediatric patients. As of April 2013, the FDA must issue non-compliance letters to companies who do not meet the pediatric study requirements. The company has an opportunity to respond, and the non-compliance letter and company response will become publicly available.

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;

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

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

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

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

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

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

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

Moreover, 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

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revises the definition of "average manufacturer price" for reporting purposes, which could increase the amount of Medicaid drug rebates to states. Further, the new law imposes a significant annual fee on companies that manufacture or import branded prescription drug products. Substantial new provisions affecting compliance have also been enacted, which may affect our business practices with health care practitioners. We will not know the full effects of the Health Care Reform Law until applicable federal and state agencies issue regulations or guidance under the new law. Although it is too early to determine the effect of the Health Care Reform Law, the new law appears likely to continue the pressure on pharmaceutical pricing, especially under the Medicare program, and may also increase our regulatory burdens and operating costs.

Most recently, on July 9, 2012, President Obama signed the FDASIA into law. The broad, sweeping law establishes new user fee programs and provides the FDA with new authority in the areas of drugs, biologics and medical devices. We are not certain what the full impact of these changes will be on our business, particularly as the FDA will need to publish regulations and issue guidances to implement the new legislation. We are not sure whether additional legislative changes will be enacted, or whether other 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 expected 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 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, manufacturing, 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, manufacturing, regulatory affairs and sales

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and marketing. To manage our anticipated future growth, we must continue to implement and improve our managerial, operational and financial systems, expand our facilities and continue to recruit and train additional qualified personnel. Due to our limited financial resources and the limited experience of our management team in managing a company with such anticipated growth, we may not be able to effectively manage the expansion of our operations or recruit and train additional qualified personnel. The physical expansion of our operations may lead to significant costs and may divert our management and business development resources. Any inability to manage growth could delay the execution of our business plans or disrupt our operations.

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

As part of our business strategy, we may enter into business combinations and acquisitions. Although we acquired Hermes 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

Our executive officers, directors and principal stockholders maintain the ability to control or significantly influence all matters submitted to stockholders for approval.

Our executive officers, directors and stockholders who own more than 5% of our outstanding common stock, in the aggregate, beneficially own a large portion of our capital stock. As a result, if these stockholders were to choose to act together, they would be able to control or significantly influence all matters submitted to our stockholders for approval, as well as our management and affairs. For example, these persons, if they choose to act together, will control or significantly influence the election of directors and approval of any merger, consolidation or sale of all or substantially all of our assets. This concentration of voting power could allow, delay or prevent an acquisition of our company on terms that other stockholders may desire.

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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 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.

Our stock price has been and may in the future be volatile, which could cause purchasers of our common stock to incur substantial losses.

Our stock price has been and in the future may be subject to substantial price volatility. 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, our stockholders could incur substantial losses. 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;

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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.

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.

Future sales of shares of our common stock, including shares issued upon the exercise of currently outstanding options and warrants, could negatively affect our stock price.

A substantial portion of our outstanding common stock can be traded without restriction at any time. Some of these shares are currently restricted as a result of securities laws, but will be able to be sold, subject to any applicable volume limitations under federal securities laws with respect to affiliate sales, in the near future. As such, 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 such shares, could reduce the market price of our common stock. In addition, we have a significant number of shares that are subject to outstanding options and warrants. The exercise of these options and warrants and the subsequent sale of the underlying common stock could cause a further decline in our stock price. These sales also might make it difficult for us to sell equity securities in the future at a time and at a price that we deem appropriate.

Furthermore, on February 1, 2013, we filed a registration statement on Form S-3 with the SEC to allow the issuance of our securities from time to time in one or more offerings of up to $200,000,000 in aggregate dollar amount. This registration statement was declared effective by the SEC on February 8, 2013. Any sale of additional shares of our common stock or other securities could reduce the market price of our common stock.

We are an "emerging growth company" and our election to delay adoption of new or revised accounting standards applicable to public companies may result in our financial statements not being comparable to those of other public companies. As a result of this and other reduced disclosure requirements applicable to emerging growth companies, our common stock may be less attractive to investors.

We are an "emerging growth company," as defined in the JOBS Act, and may remain an emerging growth company for up to five years, until December 31, 2017, although if the market value of our common stock that is held by non-affiliates exceeds $700 million as of any June 30 before that time or if we have annual gross revenues of $1 billion or more in any fiscal year, we would cease to be an emerging growth company as of December 31 of the applicable year. For so long as we remain an emerging growth company, we are permitted and intend to rely on exemptions from certain reporting requirements that are applicable to other public companies that are not emerging growth companies. These exemptions include but are not limited to not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act of 2002, not being required to comply with any requirement that may be adopted by the Public Company Accounting Oversight Board

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regarding mandatory audit firm rotation or a supplement to the auditor's report providing additional information about the audit and the financial statements, reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements, and exemptions from the requirements of holding a non-binding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved.

Among other provisions, the JOBS Act provides that an emerging growth company can take advantage of the extended transition period provided in Section 7(a)(2)(B) of the Securities Act of 1933, as amended, or the Securities Act, for complying with new or revised accounting standards. This allows an emerging growth company to delay the adoption of certain accounting standards until those standards would otherwise apply to private companies. We have elected to delay such adoption of new or revised accounting standards, and as a result, we may not comply with new or revised accounting standards on the relevant dates on which adoption of such standards is required for public companies that are not emerging growth companies. As a result of such election, our financial statements may not be comparable to the financial statements of other public companies.

We cannot predict whether investors will find our common stock less attractive because we will rely on these exemptions. If some investors find our common stock less attractive as a result, there may be a less active trading market for our common stock and our stock price may be more volatile.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

Our principal facilities consist of approximately 118,000 square feet of research, manufacturing and office space located at One Kendall Square in Cambridge, Massachusetts. The lease on all this space expires in June 2019. We retain an option to renew the lease on all of our current space for an additional period of either one or five years.

The facilities of our Silver Creek subsidiary consist of approximately 1,715 square feet of research and office space located in San Francisco, California. The lease on this space expires in September 2013, subject to an option to extend the lease for six additional months.

Item 3. Legal Proceedings

We are currently engaged in two 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 both oppositions, although both decisions are now under appeal. The ultimate outcome of these oppositions remains uncertain.

We filed our notice of opposition in the first proceeding, opposing a patent (EP 0896586) held by Genentech, Inc., or 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, MM-111 or MM-141, 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, MM-111 or MM-141. 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.

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We filed our notice of opposition in the second proceeding, opposing a patent (EP 1187634) held by Zensun (Shanghai) Science and Technology Ltd., or Zensun, in September 2008 on the grounds of added matter, insufficient disclosure, lack of novelty and lack of inventive step. If the issued claims of the Zensun patent were determined to be valid and construed to cover MM-111, our development and commercialization of MM-111 in Europe could be delayed or prevented. In August 2010, the European Patent Office issued a written decision revoking Zensun's patent. Zensun has appealed this decision. Pending the outcome of this appeal, the original issued claims of the Zensun patent remain in effect. Each party has submitted written statements regarding the appeal to the European Patent Office. No date has been set for a hearing for the appeal.

We are not currently a party to any other material legal proceedings.

Item 4. Mine Safety Disclosures

Not applicable.

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PART II

Item 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities

Our common stock has been publicly traded on the NASDAQ Global Market under the symbol "MACK" since our IPO on March 29, 2012. Prior to that time, there was no public market for our common stock. As a result, the following table sets forth the high and low sales closing prices of our common stock as reported on the NASDAQ Global Market for each quarter in the year ended December 31, 2012.

2012	High	Low
First Quarter (beginning March 29, 2012)	$ 6.19	$ 6.04
Second Quarter	$ 8.67	$ 5.67
Third Quarter	$ 10.94	$ 7.11
Fourth Quarter	$ 9.06	$ 5.95

Holders

As of February 28, 2013, there were approximately 240 holders of record of our common stock. This number does not include beneficial owners whose shares are held by nominees in street name.

Dividends

We have never declared or paid cash dividends on our common stock, and we do not expect to pay any cash dividends on our common stock in the foreseeable future.

Securities Authorized for Issuance under Equity Compensation Plans

The following table contains information about our equity compensation plans as of December 31, 2012. As of December 31, 2012, we had three equity compensation plans, all of which were approved by our stockholders: our 1999 stock option plan, as amended, our 2008 stock incentive plan, as amended, and our 2011 stock incentive plan.

Equity Compensation Plan Information

Plan category	Number of securities to be issued upon exercise of outstanding options, warrants and rights (a)	Weighted-average exercise price of outstanding options, warrants and rights (b)	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a)) (c)
Equity compensation plans approved by security holders	18,066,073	$ 3.4959	1,258,642
Equity compensation plans not approved by security holders			
Total	18,066,073	$ 3.4959	1,258,642

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Corporate Performance Graph

The following performance graph and related information shall not be deemed to be "soliciting material" or to be "filed" with the SEC for purposes of Section 18 of the Exchange Act, nor shall such information be incorporated by reference into any future filing under the Securities Exchange Act of 1934, or the Exchange Act, except to the extent that we specifically incorporate it by reference into such filing.

The following graph compares the performance of our common stock to The NASDAQ Composite Index and to The NASDAQ Biotechnology Index from March 29, 2012 (the first date that shares of our common stock were publicly traded) through December 31, 2012. The comparison assumes $100 was invested after the market closed on March 29, 2012 in our common stock and in each of the foregoing indices, and it assumes reinvestment of dividends, if any. The stock price performance included in this graph is not necessarily indicative of future stock price performance.

COMPARISON OF 9-MONTH CUMULATIVE TOTAL RETURN
Among The NASDAQ Composite Index, The NASDAQ Biotechnology Index and Merrimack Pharmaceuticals, Inc.

Use of Proceeds from Registered Securities

Our IPO was effected through a registration statement on Form S-1 (File No. 333-175427), which was declared effective by the SEC on March 27, 2012. We received net proceeds from the offering of approximately $98.1 million, after deducting underwriting discounts and commissions and other offering expenses but prior to the payment of accrued dividends on our Series B convertible preferred stock.

As of December 31, 2012, we have used approximately $4.2 million of the proceeds from the offering to pay dividends on our Series B convertible preferred stock and estimate that we have used additional proceeds as follows:

- approximately $14.1 million to fund our ongoing clinical program for MM-398;
- approximately $11.8 million to fund our ongoing clinical program for MM-111;
- approximately $5.3 million to fund our ongoing clinical program for MM-302;

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approximately $4.1 million to fund our ongoing clinical program for MM-151;

approximately $5.8 million to fund our ongoing clinical program for MM-141;

approximately $20.1 million to fund other research and development efforts; and

approximately $3.4 million to fund working capital, capital expenditures and other general corporate purposes.

The above estimates of proceeds used do not allocate working capital impacts resulting from the timing of payments for corporate purposes to our clinical programs or our other research and development efforts.

We have invested the unused proceeds from the offering in a variety of capital preservation investments, including money market funds and short-term, investment grade, interest-bearing corporate debt and U.S. government and U.S. government agencies securities. There has been no material change in our planned use of proceeds from the offering as described in our final prospectus filed with the SEC pursuant to Rule 424(b) under the Securities Act.

Item 6. Selected 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 Annual Report on Form 10-K and the "Management's Discussion and Analysis of Financial Condition and Results of Operations" section of this Annual Report on Form 10-K. We have derived the consolidated statements of comprehensive loss data for the years ended December 31, 2010, 2011 and 2012 and the consolidated balance sheet data as of December 31, 2011 and 2012 from our audited consolidated financial statements included in this Annual Report on Form 10-K. We have derived the consolidated statements of comprehensive loss data for the years ended December 31, 2008 and 2009 and the consolidated balance sheet data as of December 31, 2008, 2009 and 2010 from our audited consolidated financial

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statements not included in this Annual Report on Form 10-K. Our historical results for any prior period are not necessarily indicative of results to be expected in any future period.

	Years ended December 31,				
(in thousands, except per share amounts)	**2008**	**2009(1)**	**2010(2)**	**2011(2)**	**2012(2)**
Consolidated statements of comprehensive loss data					
Collaboration revenues	$ 365	$ 2,148	$ 20,305	$ 34,215	$ 48,921
Operating expenses:					
Research and development	34,528	37,658	58,278	100,630	125,858
General and administrative	8,836	12,178	11,381	14,454	15,805
Contingent consideration			(178)		
Total operating expenses	43,364	49,836	69,481	115,084	141,663
Loss from operations	(42,999)	(47,688)	(49,176)	(80,869)	(92,742)
Other income and expenses:					
Interest income	1,243	81	74	56	184
Interest expense	(4,403)	(4,909)	(3,726)	(13)	(553)
Other, net	607	41	2,669	1,150	1,357
Net loss before income taxes	(45,552)	(52,475)	(50,159)	(79,676)	(91,754)
Benefit from income taxes		3,402			
Net loss	(45,552)	(49,073)	(50,159)	(79,676)	(91,754)
Less net loss attributable to non-controlling interest			(55)	(453)	(477)
Net loss attributable to Merrimack Pharmaceuticals, Inc.	(45,552)	(49,073)	(50,104)	(79,223)	(91,277)
Net loss per share available to common stockholders basic and diluted(3)	$ (8.17)	$ (7.28)	$ (5.57)	$ (7.67)	$ (1.28)
Weighted-average common shares used in computing net loss per share available to common stockholders basic and diluted(4)	6,199	7,387	10,994	11,343	72,831

(1) In 2009, we acquired Hermes BioSciences, Inc.

(2) In 2010, 2011 and 2012, we consolidated Silver Creek.

(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.

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(4) In April 2012, we closed our IPO, which resulted in the sale of approximately 15.0 million shares of common stock and the conversion of all shares of outstanding convertible preferred stock into approximately 66.3 million shares of common stock.

	As of December 31,				
(in thousands)	**2008**	**2009**	**2010**	**2011**	**2012(1)**
Consolidated balance sheet data					
Cash and cash equivalents	$ 44,974	$ 58,387	$ 30,713	$ 50,454	$ 37,714
Available-for-sale securities					72,238
Total assets	50,867	82,156	57,577	85,299	148,974
Loans payable					39,855
Capital lease obligations	2,329	1,355	491	48	
Derivative liability					196
Deferred revenues		60,937	73,782	85,745	80,464
Convertible preferred stock warrants	568	578	652	1,516	
Total liabilities	72,596	141,645	85,257	106,990	155,394
Non-controlling interest			1,027	574	97
Convertible preferred stock	132,739	131,273	191,257	268,225	
Total stockholders deficit	(154,468)	(190,762)	(219,964)	(290,490)	(6,517)

(1) Upon closing of our IPO in April 2012, all outstanding shares of our convertible preferred stock were converted into 66.3 million shares of common stock, all outstanding warrants to purchase shares of convertible preferred stock were converted into warrants to purchase shares of common stock and approximately $4.3 million of cash dividends became payable to the holders of Series B convertible preferred stock.

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations

The following discussion of our financial condition and results of operations should be read in conjunction with our financial statements and the notes to those financial statements appearing elsewhere in this Annual Report on Form 10-K. This discussion contains forward-looking statements that involve significant risks and uncertainties. As a result of many factors, such as those set forth in Part I, Item 1A. Risk Factors of this Annual Report on Form 10-K, which are incorporated herein by reference, our actual results may differ materially from those anticipated in these forward-looking statements.

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 six programs in clinical development. In our most advanced program, we are conducting a 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,

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an IPO, a secured debt financing and, to a lesser extent, through government grants, the monetization of tax credits and a convertible debt financing. Through December 31, 2012, we have received $268.2 million from the sale of convertible preferred stock and warrants, $98.1 million of net proceeds from the sale of common stock during our IPO, $39.6 million of net proceeds from a secured debt financing and $176.0 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, 2012, we had unrestricted cash and cash equivalents and available-for-sale securities of $110.0 million.

In April 2012, we closed our IPO pursuant to a registration statement on Form S-1, as amended. We sold an aggregate of 15,042,459 shares of common stock under the registration statement at a public offering price of $7.00 per share, including 742,459 shares pursuant to the exercise by the underwriters of an over-allotment option. Net proceeds were approximately $98.1 million, after deducting underwriting discounts and commissions and other offering expenses but prior to the payment of dividends on our Series B convertible preferred stock. At the time of our IPO, our convertible preferred stock and warrants to purchase convertible preferred stock automatically converted to common stock and warrants to purchase common stock.

On November 8, 2012, we entered into a Loan Agreement with Hercules. The Loan Agreement provided for an initial term loan advance of $25.0 million, which closed on November 8, 2012, and an additional term loan advance of $15.0 million, which closed on December 14, 2012, and resulted in aggregate net proceeds of $39.6 million.

We expect that our existing unrestricted cash and cash equivalents and available-for-sale securities on hand as of December 31, 2012, anticipated interest income, and research and development and manufacturing funding under our license and collaboration agreement with Sanofi related to MM-121 will enable us to fund our operating expenses and capital expenditure requirements into 2014.

We have never been profitable and, as of December 31, 2012, we had an accumulated deficit of $442.1 million. Our net loss was $91.8 million for the year ended December 31, 2012, $79.7 million for the year ended December 31, 2011 and $50.2 million for the year ended December 31, 2010. We expect to continue to incur significant expenses and increasing operating losses for at least the next several years. We expect our research and development expenses to increase in connection with our ongoing activities, particularly as we continue the research, development and clinical trials of our product candidates, including multiple simultaneous clinical trials for certain product candidates, some of which we expect will be entering late stage clinical development. In addition, in connection with seeking and possibly 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.

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

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Strategic Partnerships, Licenses and Collaborations

Sanofi

In September 2009, we entered into a license and collaboration agreement 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 $25.0 million, up to $60.0 million in potential sales milestone payments and tiered, escalating royalties beginning in the sub-teen double digits based on net sales of MM-121 in the United States and beginning in the high single digits based on net sales of MM-121 outside the United States. We have the right, but not the obligation, to co-promote and commercialize MM-121 in the United States and 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 has assumed responsibility for all manufacturing of MM-121 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.

In addition, in June 2012, we entered into a right of review agreement with Sanofi pursuant to which, if we determine to enter into negotiations with a third party regarding any license, option, collaboration, joint venture or similar transaction involving any therapeutic or companion diagnostic product candidate in our pipeline, we will notify Sanofi of such opportunity. Following such notice, Sanofi will have a specified period of time to review the opportunity and determine whether to exercise an additional right to exclusively negotiate an agreement with us with respect to such opportunity for a specified period of time. In addition, in specified circumstances, if we subsequently propose to enter into any third party agreement, we must first offer the same terms and conditions to Sanofi. The right of review terminates on April 1, 2017.

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, 2010, 2011 and 2012, we recognized revenue based on the following components of the Sanofi agreement:

	Years ended December 31,		
(in thousands)	**2010**	**2011**	**2012**
Upfront payment	$ 5,000	$ 5,000	$ 5,000
Milestone payments	949	2,616	2,975
Development services	13,279	25,053	36,905
Manufacturing services and other	630	1,456	3,307
Total	**$ 19,858**	**$ 34,125**	**$ 48,187**

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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 became eligible to receive from GTC potential development and sales milestone payments as well as tiered royalties based on a percentage of net sales of MM-093, while GTC became responsible for all development and commercialization costs for MM-093. At the time of the agreement, we assigned a fair value of $1.5 million for the shares returned to us and were recognizing this as revenue over the expected development term, which was estimated to be 19 years from the effective date of our agreement with GTC. To date, we have not received any milestone or royalty payments from GTC.

In December 2012, GTC notified us of their intent to terminate the license agreement in three months in accordance with the terms of the license agreement. The expected development term ended on March 19, 2013 when we received GTC's final notice of termination. This change in estimated expected development term resulted in $657,000 of additional revenue recognition during the fourth quarter of 2012. The remaining $553,000 of deferred revenue that was recorded as of December 31, 2012 related to this agreement will be recognized during the first quarter of 2013.

During the years ended December 31, 2010, 2011 and 2012, we recognized revenue based on the following component of the GTC agreement:

	Years ended December 31,		
(in thousands)	**2010**	**2011**	**2012**
Upfront consideration	$ 76	$ 76	$ 733

Silver Creek Pharmaceuticals, Inc.

In 2010, we established Silver Creek as a subsidiary. 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. As of December 31, 2011 and 2012, we owned approximately 74% of the outstanding capital stock of Silver Creek. We concluded that Silver Creek is a variable interest entity and that we are the primary beneficiary. We have the ability to direct the activities of Silver Creek through our ownership percentage and through the board of directors seats controlled by us and our de facto agents, and therefore, we consolidate Silver Creek for financial reporting purposes.

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

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commercialization right. Upon entering into the May 2011 agreement with PharmaEngine, we paid PharmaEngine a $10.0 million upfront license fee. In addition, we made 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 and was paid in the first quarter of 2012. We may be required to make up to an aggregate of $75.0 million in additional development and regulatory milestone payments and $130.0 million in additional sales milestone payments to PharmaEngine upon the achievement of specified development, regulatory and annual net sales milestones. PharmaEngine is also entitled to tiered royalties on net sales of MM-398 in Europe and certain countries in Asia. The royalty rates under the agreement range from high single digits up to the low teens as a percentage of our net sales of MM-398 in these territories. Under the May 2011 agreement, we are responsible for all future development costs of MM-398 except those required specifically for regulatory approval in Taiwan. During the years ended December 31, 2011 and 2012, we recognized research and development expense of $11.2 million and $6.2 million, respectively, under the May 2011 agreement with PharmaEngine.

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

Financial Operations Overview

Revenues

We have not yet generated any revenue from product sales. All of our revenue to date has been derived from license fees, milestone payments and research, development, manufacturing and other payments received from collaborations, primarily with Sanofi and, to a lesser extent, from 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, conduct of 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

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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 six most advanced product candidates, MM-398, MM-121, MM-111, MM-302, MM-151 and MM-141, 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 six most advanced product candidates on a per project basis. Accordingly, we allocate internal employee-related and infrastructure costs, as well as third party costs, to each of these programs. We do not allocate to particular development programs either stock compensation expense or expenses related to preclinical programs. Costs that are not directly attributable to specific clinical programs or early preclinical activities, such as general laboratory supplies, wages related to shared laboratory services, travel and employee training and development, are not allocated and are considered general research and discovery expenses.

The following table summarizes our principal product development programs, including the latest 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	Years ended December 31, 2010	2011	2012
MM-398	Cancer	Phase 3	$ 163	$ 18,999	$ 22,321
MM-121	Cancer	Phase 2	18,014	32,347	37,173
MM-111	Cancer	Phase 1/Phase 2 planned	15,938	10,091	14,249
MM-302	Cancer	Phase 1	4,974	5,126	7,126
MM-151	Cancer	Phase 1	2,452	10,047	7,236
MM-141	Cancer	Phase 1	1,587	2,875	8,963
Preclinical, general research and discovery			12,364	17,548	24,556
Stock compensation			2,786	3,597	4,234
Total research and development expense			$ 58,278	$ 100,630	$ 125,858

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;

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our ability to market, commercialize and achieve market acceptance for any of our product candidates that we are developing or may develop in the future;

future clinical trial results;

the terms and timing of regulatory approvals; and

the expense of filing, prosecuting, defending and enforcing any patent claims and other intellectual property rights.

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

MM-398

MM-398 is currently being evaluated in a Phase 3 clinical trial in patients with metastatic pancreatic cancer whose cancer has progressed on treatment with gemcitabine. During the second quarter of 2012, we amended the trial design for our Phase 3 clinical trial. Our current estimate of the remaining external costs associated with completing the Phase 3 clinical trial is between $15.0 million and $20.0 million. During the fourth quarter of 2012, we initiated a Phase 1 translational study to identify predictive biomarkers associated with MM-398. A translational study is a clinical trial where biomarker investigation is performed, with a goal of identifying biomarkers that predict patients' response to the therapy. In addition, several investigator sponsored trials are ongoing in which the majority of the total clinical trial costs are paid for by the investigators. Investigator sponsored trials include a Phase 2 clinical trial in colorectal cancer and a Phase 1 clinical trial in glioma.

In May 2011, we made an upfront license payment of $10.0 million to PharmaEngine. In the first quarter of 2012, we made a milestone payment of $5.0 million to PharmaEngine in connection with dosing the first patient in our Phase 3 trial. 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.

MM-121

We have entered into a license and collaboration agreement with Sanofi related to MM-121. Under the terms of the agreement, we are currently responsible for executing clinical trials 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 has assumed responsibility for all manufacturing of MM-121 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 three Phase 1 clinical trials of MM-121 in multiple cancer types. During the year ended December 31, 2010, we received a $10.0 million milestone

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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 year ended December 31, 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 year ended December 31, 2012, we received 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.

MM-111

We are currently preparing to initiate a Phase 2 clinical trial in gastric cancer and conducting two Phase 1 clinical trials 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. During the first quarter of 2012, we made a $1.5 million payment under our collaboration agreement with Adimab.

MM-141

We are currently conducting one Phase 1 clinical trial of MM-141 in solid tumors. During the fourth quarter of 2012, we made payments of $1.4 million under our collaboration agreement with Dyax.

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, professional fees for legal services, including patent-related expenses, pre-commercialization 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 develop and commercialize our clinical products.

Interest income and interest expense

Interest income consists of interest earned on our cash and cash equivalents and available-for-sale securities. Interest expense consists of expense incurred to finance equipment and office furniture and fixtures, interest on debt, amortization of debt discount and noncash interest expense recognized on proceeds received from Series F convertible preferred stock investors.

As more fully described in Note 14 to our consolidated financial statements appearing at the end of this Annual Report on Form 10-K, 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

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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 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 (expense) primarily consists of gains and losses on the change in value and time to expiration of convertible 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 the rules and regulations of the Securities and Exchange Commission, or the SEC, and generally accepted accounting principles in the United States, or GAAP. 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, lease accounting, valuation of derivative liabilities, useful lives with respect to long-lived assets and intangibles, valuation of stock options, convertible preferred stock warrants, contingencies, accrued expenses and other, 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 Annual Report on Form 10-K, 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.

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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.

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, 2012. Our existing 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.

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

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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Marketable securities

Our holdings of marketable securities may consist of U.S. government agencies securities, commercial paper, corporate notes and bonds and certificates of deposit, which are maintained by an investment manager and have expected average maturity dates in excess of three months. We classify these investments as available-for-sale. Available-for-sale securities are carried at fair value, with the unrealized gains and losses included in other comprehensive income (loss) as a component of stockholders' equity until realized. Realized gains and losses are recognized in interest income. Any premium or discount arising at purchase is amortized and/or accreted to interest income.

Goodwill

Goodwill represents the difference between the purchase price and the fair value of the tangible and identifiable intangible net assets acquired. Goodwill is not amortized but is evaluated for impairment within our single reporting unit on an annual basis, during the third quarter, or more frequently if an event occurs or circumstances change that would more-likely-than-not reduce the fair value of our reporting unit below its carrying amount. This evaluation included a qualitative assessment to determine whether further impairment testing of goodwill is necessary. This determination requires us to make significant estimates, judgments and assumptions. Significant changes to these estimates, judgments and assumptions could materially change the outcome of our impairment assessment.

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 GAAP. There have been no material changes in estimates for the periods presented.

Contractual matter

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 had requested that we

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assume financial responsibility for the MM-121 material that was pulled from clinical trial sites. We and Sanofi have since agreed that, beginning in April 2012 and throughout 2013, we will reimburse Sanofi approximately $1.2 million of previously billed amounts. Our revenue recognition model for manufacturing services performed under the license and collaboration agreement with Sanofi is to recognize these services over the period of performance, which is currently estimated to be 12 years from the effective date of the agreement. Removal of these previously billed amounts from our revenue recognition model and establishing this contractual liability resulted in an earnings reduction of $0.2 million for the year ended December 31, 2012.

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. As of December 31, 2012, there was $15,924,000 of total unrecognized compensation cost related to nonvested stock awards, and we expect to recognize those costs over weighted average periods of approximately 2.1 years.

The fair value of options granted in 2010, 2011 and 2012 were estimated at the date of grant using the following assumptions:

	Years ended December 31,		
	2010	**2011**	**2012**
Risk-free interest rate	1.7 - 2.8%	1.3 - 2.5%	0.7 - 1.1%
Expected dividend yield	0%	0%	0%
Expected term	5 - 5.9 years	5 - 5.9 years	5 - 5.9 years
Expected volatility	73 - 77%	71 - 73%	66 - 72%

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

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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.

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 prior to our IPO in April 2012, the fair value for purposes of determining the exercise price for stock option grants was determined by our board of directors, with the assistance and upon the recommendation of management, in good faith based on a number of objective and subjective factors including:

- the prices of our convertible preferred stock sold to or exchanged between outside investors in arm's length transactions, and the rights, preferences and privileges of the convertible preferred stock as compared to those of our common stock, including the liquidation preferences of the convertible preferred stock;
- our results of operations, financial position and the status of research and development efforts, including clinical trial data for the various compounds under development;
- the composition of, and changes to, our management team and board of directors;
- the lack of liquidity of our common stock as a private company;
- the material risks related to our business;
- achievement of enterprise milestones, including results of clinical trials and entering into license and collaboration 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.

In connection with the preparation of the consolidated financial statements for the years ended December 31, 2010, 2011 and 2012, prior to our IPO in April 2012, our board of directors also considered valuations provided by management in determining the fair value of our common stock. Such valuations were prepared as of October 6, 2009, August 24, 2010 and March 31, July 31 and October 17, 2011, and valued our common stock at $2.12, $2.69, $5.54, $6.37 and $6.78 per share, respectively. These valuations were used to estimate the fair value of our common stock at each option grant date and in calculating stock-based compensation expense. These estimates involved significant judgment and inherent uncertainties. Changes to these estimates or the underlying assumptions could materially change stock-based compensation expense for the periods presented.

JOBS Act

On April 5, 2012, the Jumpstart Our Business Startups Act, or the JOBS Act, was enacted. Among other provisions, the JOBS Act provides that an "emerging growth company" can take advantage of the extended transition period provided in Section 7(a)(2)(B) of the Securities Act for complying with new or revised accounting standards. This allows an emerging growth company to delay the adoption of certain accounting standards until those standards would otherwise apply to private companies. We have elected to delay such adoption of new or revised accounting standards, and as a result, we may

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not comply with new or revised accounting standards on the relevant dates on which adoption of such standards is required for public companies that are not emerging growth companies. Additionally, we are in the process of evaluating the benefits of relying on other exemptions and reduced reporting requirements provided by the JOBS Act.

Subject to certain conditions set forth in the JOBS Act, as an emerging growth company, we intend to rely on certain of these exemptions, including not being required to provide an auditor's attestation report on our system of internal controls over financial reporting pursuant to Section 404 of the Sarbanes-Oxley Act of 2002 and comply with any requirement that may be adopted by the Public Company Accounting Oversight Board regarding mandatory audit firm rotation or a supplement to the auditor's report providing additional information about the audit and the financial statements. We may remain an emerging growth company for up to five years, until December 31, 2017, although if the market value of our common stock that is held by non-affiliates exceeds $700.0 million as of any June 30 before that time or if we have annual gross revenues of $1.0 billion or more in any fiscal year, we would cease to be an emerging growth company as of December 31 of the applicable year.

Results of Operations

Comparison of the years ended December 31, 2011 and 2012

	Years ended December 31,	
(in thousands)	**2011**	**2012**
Collaboration revenues	$ 34,215	$ 48,921
Research and development expenses	100,630	125,858
General and administrative expenses	14,454	15,805
Loss from operations	(80,869)	(92,742)
Interest income	56	184
Interest expense	(13)	(553)
Other income	1,150	1,357
Net loss	(79,676)	(91,754)

Collaboration revenues

Collaboration revenues for 2012 were $48.9 million, compared to $34.2 million for 2011, an increase of $14.7 million, or 43%. This increase resulted from increases in development services, milestone and manufacturing revenues recognized under our collaboration agreement with Sanofi.

Research and development expenses

Research and development expenses for 2012 were $125.9 million, compared to $100.6 million for 2011, an increase of $25.3 million, or 25%. This increase was primarily attributable to:

- $7.0 million of increased spending on preclinical, general research and discovery due to new preclinical programs in our pipeline, increased costs associated with each preclinical program as these programs approach clinical development and the timing of manufacturing activities;
- $6.1 million of increased MM-141 spending due to IND-enabling activities and initiating and executing a new clinical trial, including $1.4 million in fees under our agreement with Dyax, which occurred during 2012;
- $4.8 million of increased MM-121 spending primarily due to increased enrollment and costs associated with clinical trials;

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$4.2 million of increased MM-111 spending primarily due to costs associated with preparing and initiating our planned Phase 2 clinical trial and costs associated with on-going clinical trials;

$3.3 million of increased MM-398 spending due to $13.3 million of increased costs primarily attributable to our ongoing Phase 3 clinical trial, partially offset by the absence of a $10.0 million license payment made to PharmaEngine in 2011;

$2.1 million of increased MM-302 spending due to increased preclinical diagnostic-related costs and clinical trial activities; and

$0.6 million of increased stock compensation expense due to increased headcount.

These increases were partially offset by $2.8 million of decreased MM-151 spending primarily due to the absence of IND-enabling activities that occurred in 2011, partially offset by an increase of $0.3 million in payments made to collaborators and increased costs associated with a new clinical trial that occurred in 2012.

General and administrative expenses

General and administrative expenses for 2012 were $15.8 million, compared to $14.5 million for 2011, an increase of $1.3 million, or 9%. This increase was primarily attributable to increases in labor and labor-related costs, rent, insurance and pre-commercialization costs, partially offset by decreased depreciation expense.

Interest income

Interest income for 2012 was $0.2 million, compared to $0.1 million for 2011, an increase of $0.1 or 100%. Interest income was earned on available-for-sale securities purchased with proceeds from our IPO in April 2012.

Interest expense

Interest expense for 2012 was $0.5 million, compared to minimal expense recognized for 2011. This increase was primarily related to the Loan Agreement that we entered into with Hercules in November 2012.

Other income

Other income for 2012 was $1.4 million, which was comprised of $0.6 million of benefit from the remeasurement of fair value of our convertible preferred stock warrants and $0.8 related to the amortization of Massachusetts Life Sciences Center, or MLSC, tax incentives. Other income for 2011 was $1.2 million, which was comprised of a $1.8 million cash settlement from a former service provider and $0.3 million of recognized income related to the amortization of MLSC tax incentives, partially offset by $0.9 million expense from the remeasurement of fair value of our convertible preferred stock warrants.

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Comparison of the years ended December 31, 2010 and 2011

	Years ended December 31,	
(in thousands)	**2010**	**2011**
Collaboration 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	(50,159)	(79,676)

Collaboration revenues

Collaboration 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 development services, milestone and manufacturing revenues recognized under our license and collaboration agreement with Sanofi.

Research and development expenses

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.

General and administrative expenses

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.

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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, combined with $0.8 million of additional expense from the change in fair value of convertible preferred stock warrants, partially offset by a $1.8 million cash settlement from a former service provider recognized in 2011.

Liquidity and Capital Resources

Sources of liquidity

We have financed our operations to date primarily through private placements of our convertible preferred stock, collaborations, an IPO, a secured debt financing, and, to a lesser extent, through government grants, the monetization of tax credits and a convertible debt financing. Through December 31, 2012, we have received $268.2 million from the sale of convertible preferred stock and warrants, $98.1 million of net proceeds from the sale of common stock during our IPO, $39.6 million of net proceeds from a secured debt financing and $176.0 million of upfront license fees, milestone payments, reimbursement of development and manufacturing services and other payments from our collaborations. As of December 31, 2012, we had unrestricted cash and cash equivalents and available-for-sale securities of $110.0 million.

During the first quarter of 2012, we made a $1.5 million payment under our collaboration agreement with Adimab and an antibody discovery related payment of $0.4 million. Also during the first quarter of 2012, we received 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 made an aggregate of $1.4 million of payments under our collaboration agreement with Dyax during the fourth quarter of 2012.

In April 2012, we closed our IPO pursuant to a registration statement on Form S-1, as amended. We sold an aggregate of 15,042,459 shares of common stock under the registration statement at a public offering price of $7.00 per share, including 742,459 shares pursuant to the exercise by the underwriters of an over-allotment option. Net proceeds were approximately $98.1 million, after deducting underwriting discounts and commissions and other offering expenses but prior to the payment of dividends on our Series B convertible preferred stock. At the time of our IPO, our convertible preferred stock and warrants to purchase convertible preferred stock automatically converted to common stock and warrants to purchase common stock.

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On November 8, 2012, we entered into a Loan Agreement with Hercules. The Loan Agreement provided for an initial term loan advance of $25.0 million, which closed on November 8, 2012, and an additional term loan advance of $15.0 million, which closed on December 14, 2012.

As of December 31, 2012, within our unrestricted cash and cash equivalents, $2.0 million was cash and cash equivalents held by Silver Creek, which is consolidated for financial reporting purposes. The $2.0 million held by Silver Creek is designated for the operations of Silver Creek.

Cash flows

The following table provides information regarding our cash flows for the years ended December 31, 2010, 2011 and 2012.

	Years ended December 31,		
(in thousands)	**2010**	**2011**	**2012**
Cash used in operating activities	$ (26,369)	$ (52,817)	$ (79,816)
Cash used in investing activities	(4,900)	(3,747)	(75,221)
Cash provided by financing activities	3,595	76,305	142,297
Net (decrease) increase in cash and cash equivalents	$ (27,674)	$ 19,741	$ (12,740)

We invest primarily in U.S. government agencies securities, commercial paper, corporate notes and bonds and certificates of deposit. Our investment objectives are primarily to assure liquidity and preservation of capital and secondarily to obtain investment income. All of our investments in debt securities are recorded at fair value and are available-for-sale. Fair value is determined based on quoted market prices and models using observable data inputs. We have not recorded any impairment charges to our fixed income marketable securities as of December 31, 2012.

Operating activities

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, and changes in operating assets and liabilities of $12.1 million, which includes receipt of a $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, and changes in operating assets and liabilities of $14.4 million, which includes receipt of a $10.0 million milestone payment under the collaborative agreement with Sanofi. Cash used in operating activities of $79.8 million during the year ended December 31, 2012 was primarily a result of our $91.8 million net loss, partially offset by non-cash items of $10.0 million and changes in operating assets and liabilities of $2.0 million, which includes receipt of a $5.0 million milestone payment under our license and collaboration agreement with Sanofi.

Investing activities

Cash used in investing activities of $4.9 million and $3.7 million for the years ended December 31, 2010 and 2011, respectively, was primarily due to the purchase of plant, property and equipment. Cash used in investing activities of $75.2 million for the year ended December 31, 2012 is primarily due to the purchase of available-for-sale securities of $115.7 million, which was partially offset by maturities and sales of available-for-sale securities of $43.9 million, as well as $3.2 million related to the purchase of property and equipment and other investing activities.

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Financing activities

Cash provided by financing activities of $3.6 million for the year ended December 31, 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. Cash provided by financing activities of $142.3 million for the year ended December 31, 2012 was primarily a result of $100.0 million from our IPO, net of offering costs, which closed in April 2012, $41.1 million from us entering into the Loan Agreement with Hercules in November 2012 and Silver Creek entering into the convertible note payable, net of offering costs, and $5.4 million from the issuance of common stock upon the exercise of stock options, partially offset by the payment of $4.2 million of dividends on our Series B convertible preferred stock.

Funding requirements

As of December 31, 2012, we had unrestricted cash and cash equivalents and available-for-sale securities of $110.0 million.

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

We expect that our existing unrestricted cash and cash equivalents and available-for-sale securities on hand as of December 31, 2012, anticipated interest income, and research and development and manufacturing funding under our license and collaboration agreement with Sanofi related to MM-121 will enable us to fund our operating expenses and capital expenditure requirements into 2014. 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 utilize 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 six most advanced product candidates;
- the success of our collaborations with Sanofi related to MM-121 and with PharmaEngine related to MM-398;

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- 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 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, the ownership interest of our stockholders will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect the rights of our stockholders. 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. For example, 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.

Credit facility

On November 8, 2012, we entered into a Loan Agreement with Hercules pursuant to which we received loans in the aggregate principal amount of $40.0 million. The term loans bear interest at an annual rate equal to the greater of 10.55% and 10.55% plus the prime rate of interest minus 5.25%, but may not exceed 12.55%. The Loan Agreement provides for interest-only payments for twelve months and repayment of the aggregate outstanding principal balance of the loan in monthly installments starting on December 1, 2013 and continuing through May 1, 2016. If we receive aggregate gross proceeds of at least $75 million in one or more transactions prior to December 1, 2013, including pursuant to a financing or collaboration, we may elect to extend the interest-only period by six months so that the aggregate outstanding principal balance of the loans would be repaid in monthly installment starting on June 1, 2014 and continuing through November 1, 2016. Upon full repayment or maturity of the loans payable, we are required to pay Hercules a $1.2 million fee. The loans are secured by a lien on all of our personal property, as of, or acquired after, the date of the Loan Agreement, except for intellectual property. As of December 31, 2012, the principal balance outstanding was $40.0 million, and no further amounts may be drawn against this Loan Agreement.

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Contractual obligations and commitments

The following table summarizes our contractual obligations as of December 31, 2012:

(in thousands)	Total	Less than 1 year	1 to 3 years	3 to 5 years	More than 5 years
Short and long-term loans payable(1)	$ 50,530	$ 5,439	$ 36,260	$ 8,831	$
Convertible note payable(2)	1,571	1,571			
Operating lease obligations	30,359	4,319	9,040	9,573	7,427
Series B dividends	28	28			
Contractual liability(3)	1,028	1,028			
License and collaboration, antibody and technology licensing costs(4)	1,589	209	565	815	
Total contractual cash obligations	$ 85,105	$ 12,594	$ 45,865	$ 19,219	$ 7,427

(1) Short and long-term loans payable includes obligated principal and interest payments under the Loan Agreement with Hercules.

(2) On December 21, 2012, Silver Creek entered into a Note Purchase Agreement with certain lenders. The notes issued pursuant to the Note Purchase Agreement bear interest at 6% and mature and convert, along with accrued interest, into Silver Creek Series A preferred stock on December 31, 2013. If Silver Creek enters into a qualifying equity financing prior to December 31, 2013, the notes will automatically convert into that financing at a 25% discount.

(3) Reimbursement of previously billed manufacturing costs under our license and collaboration agreement with Sanofi.

(4) License and collaboration, antibody and technology licensing costs include milestone and annual license maintenance fee payments. We have not included annual license maintenance fees or minimum royalty payments after December 31, 2017, as we cannot estimate if they will occur.

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 an incremental 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 an incremental 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 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.

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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 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. 3 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, 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, MM-111 and MM-141 and pay royalties in the low single digits on net sales of licensed products. The term of the agreement extends until the expiration of the licensed patent rights, which is 2016.

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

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

Off-Balance Sheet Arrangements

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

Tax Loss Carryforwards

At December 31, 2012, we had net operating loss carryforwards for federal and state income tax purposes of $210.9 million and $155.5 million, respectively. Included in the federal and state net operating loss carryforwards is approximately $10.3 million of deduction related to the exercise of stock options. This amount represents an excess tax benefit, which will be realized when it results in reduction of cash taxes in accordance with Accounting Standards Codification 718. This excess tax benefit will be directly credited to additional paid-in capital when it is realized. Our existing federal and state net operating loss carryforwards have begun to expire and will continue to expire through 2032. We also have available research and development credits for federal and state income tax purposes of approximately $11.1 million and $4.8 million, respectively. The federal and state research and development credits will begin to expire in 2022 and 2024, respectively. As of December 31, 2012, we

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also have available investment tax credits for state income tax purposes of $0.4 million, which have begun to expire and will continue to expire through 2013. We have evaluated the positive and negative evidence bearing upon the realizability of our deferred tax assets, which are comprised principally of net operating loss carryforwards, deferred revenue and capitalized research and development expenses. Under the applicable accounting standards, we have considered our history of losses and concluded that it is more likely than not that we will not recognize the benefits of federal and state deferred tax assets. Accordingly, we have established a full valuation allowance against the deferred tax assets.

Utilization of the net operating loss and research and development credit carryforwards may be subject to a substantial annual limitation under Section 382 of the Internal Revenue Code of 1986, as amended (the "Internal Revenue Code"), due to ownership change limitations that have occurred previously or that could occur in the future. These ownership changes may limit the amount of net operating loss and research and development credit carryforwards that can be utilized annually to offset future taxable income and tax. We have not currently completed an evaluation of ownership changes through December 31, 2012 to assess whether utilization of our net operating loss or research and development credit carryforwards would be subject to an annual limitation under Section 382 of the Internal Revenue Code. To the extent an ownership change occurs in the future, the net operating loss and credit carryforwards may be subject to limitation.

Recent Accounting Pronouncements

In June 2011, the FASB issued an amendment to the accounting guidance for presentation of comprehensive income. Under the amended guidance, a company may present the total of comprehensive income, the components of net income and the components of other comprehensive income either in a single continuous statement of comprehensive income or in two separate but consecutive statements. In either case, a company is required to present each component of net income along with total net income, each component of other comprehensive income along with a total for other comprehensive income and a total amount for comprehensive income. This amendment is effective for fiscal years beginning after December 15, 2011 and is applied retrospectively. We adopted this amendment on January 1, 2012. Other than a change in presentation, the adoption of this guidance did not have a material impact on our consolidated financial statements.

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.

In July 2012, the FASB issued ASU No. 2012-02, *Testing Indefinite-Lived Intangible Assets for Impairment*, or ASU 2012-02. ASU 2012-02 is intended to reduce the cost and complexity of testing indefinite-lived intangible assets other than goodwill for impairment. It allows companies to perform a "qualitative" assessment to determine whether further impairment testing of indefinite-lived intangible assets is necessary. ASU 2012-02 is effective for annual and interim impairment tests performed for fiscal years beginning after September 15, 2012, with early adoption permitted. We adopted ASU 2012-02 in the third quarter of 2012 upon our annual impairment testing of indefinite-lived intangible assets.

In February 2013, the FASB issued amendments to the accounting guidance for presentation of comprehensive income to improve the reporting of reclassifications out of accumulated other

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comprehensive income. The amendments do not change the current requirements for reporting net income or other comprehensive income, but do require an entity to provide information about the amounts reclassified out of accumulated other comprehensive income by component. In addition, an entity is required to present, either on the face of the statement where the net income is presented or in the notes, significant amounts reclassified out of accumulated other comprehensive income by the respective line items of net income but only if the amount reclassified is required under GAAP to be reclassified to net income in its entirety in the same reporting period. For other amounts that are not required under GAAP to be reclassified in their entirety to net income, an entity is required to cross-reference to other disclosures required under GAAP that provide additional detail about these amounts. For public companies, these amendments are effective prospectively for reporting periods beginning after December 15, 2012. Other than a change in presentation, we do not believe the adoption of this guidance will have a material impact on our consolidated financial statements.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

We invest in a variety of financial instruments, principally cash deposits, money market funds, securities issued by the U.S. government and its agencies and corporate debt securities. 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 1% change in interest rates would not have a material effect on the fair market value of our portfolio. We have the ability and intention to hold our investments until maturity, and therefore, 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 currently have any auction rate or mortgage-backed securities. We do not believe our cash, cash equivalents and available-for-sale investments have significant risk of default or illiquidity, however we cannot provide absolute assurance that in the future our investments will not be subject to adverse changes in market value.

On November 8, 2012, we entered into a long-term debt agreement for term loans that bears interest at variable rates. We have an aggregate principal amount of $40.0 million outstanding under this facility. Interest is payable at an annual rate equal to the greater of 10.55% and 10.55% plus the prime rate of interest minus 5.25%, but may not exceed 12.55%. As a result of the 12.55% maximum annual interest rate, we have limited exposure to changes in interest rates on borrowings under this facility. For each 1% increase in the interest rate on the outstanding debt amount, subject to a maximum 2% increase, we would have an increase in future cash outflows of approximately $0.4 million over the next twelve month period.

Item 8. Financial Statements and Supplementary Data

Our consolidated financial statements, together with the report of our independent registered public accounting firm, appear on pages F-1 through F-37 of this Annual Report on Form 10-K.

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure

None.

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Item 9A. Controls and Procedures

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our Chief Executive Officer and Chief Financial Officer, evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2012. The term "disclosure controls and procedures," as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act means controls and other procedures of a company that are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the SEC's rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to the company's management, including its principal executive and principal financial officers, as appropriate to allow timely decisions regarding required disclosure. Management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Based on the evaluation of our disclosure controls and procedures as of December 31, 2012, our Chief Executive Officer and Chief Financial Officer concluded that, as of such date, our disclosure controls and procedures were effective at the reasonable assurance level.

Management's Annual Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting for the company. Internal control over financial reporting is defined in Rule 13a-15(f) or 15d-15(f) promulgated under the Exchange Act as a process designed by, or under the supervision of, the company's principal executive and principal financial officers and effected by the company's board of directors, management and other personnel, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with GAAP and includes those policies and procedures that:

Pertain to the maintenance of records that in reasonable detail accurately and fairly reflect the transactions and dispositions of the assets of the company;

Provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with GAAP, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and

Provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Therefore, even those systems determined to be effective can provide only reasonable assurance with respect to financial statement preparation and presentation. Projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Our management assessed the effectiveness of our internal control over financial reporting as of December 31, 2012. In making this assessment, management used the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission in Internal Control Integrated

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Framework. Based on its assessment, management concluded that, as of December 31, 2012, our internal control over financial reporting is effective based on those criteria.

This Annual Report on Form 10-K does not include an attestation report of our independent registered public accounting firm regarding internal control over financial reporting. Management's report was not subject to attestation by our independent registered public accounting firm pursuant to an exemption under Section 989G of the Dodd-Frank Wall Street Reform and Consumer Protection Act.

Changes in Internal Control Over Financial Reporting

No change in our internal control over financial reporting occurred during the fiscal quarter ended December 31, 2012 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information

On March 19, 2013, the holders of a majority of the Registrable Shares under the Fifth Amended and Restated Investor Rights Agreement, dated as of April 6, 2011, between us and various holders of our capital stock, amended such agreement to provide that the provisions related to demand, Form S-3 and incidental registration rights terminate as of the date that we file this Annual Report on Form 10-K. The Fifth Amended and Restated Investor Rights Agreement had provided certain holders of our common stock, certain holders of our Series B convertible preferred stock, Series C convertible preferred stock, Series D convertible preferred stock, Series E convertible preferred stock, Series F convertible preferred stock and Series G convertible preferred stock prior to our IPO and certain holders of warrants to purchase our common stock, including some of our directors and entities affiliated with our directors, with the right to demand, under certain circumstances, that we file a registration statement covering their shares or request that their shares be covered by a registration statement that we are otherwise filing.

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PART III

Item 10. Directors, Executive Officers and Corporate Governance

The information required by this Item 10 will be included under the captions "Executive Officers," "Director Nomination Process," "Board Policies," "Code of Business Conduct and Ethics," "Board Meetings and Attendance" and "Section 16(a) Beneficial Ownership Reporting Compliance" in our definitive proxy statement to be filed with the SEC with respect to our 2013 Annual Meeting of Stockholders and is incorporated herein by reference.

Item 11. Executive Compensation

The information required by this Item 11 will be included under the captions "Executive and Director Compensation Processes," "Compensation Discussion and Analysis," "Summary Compensation Table," "Grants of Plan-Based Awards Table," "Option Exercises and Stock Vested Table," "Employment Agreements," "Potential Payments Upon Termination or Change in Control" and "Compensation Committee Interlocks and Insider Participation" in our definitive proxy statement to be filed with the SEC with respect to our 2013 Annual Meeting of Stockholders and is incorporated herein by reference.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters

The information required by this Item 12 will be included under the captions "Security Ownership of Certain Beneficial Owners and Management" and "Securities Authorized for Issuance Under Our Equity Compensation Plans" in our definitive proxy statement to be filed with the SEC with respect to our 2013 Annual Meeting of Stockholders and is incorporated herein by reference.

Item 13. Certain Relationships and Related Transactions, and Director Independence

The information required by this Item 13 will be included, as applicable, under the captions "Employment Agreements," "Potential Payments Upon Termination or Change in Control," "Board Determination of Independence" and "Related Person Transactions" in our definitive proxy statement to be filed with the SEC with respect to our 2013 Annual Meeting of Stockholders and is incorporated herein by reference.

Item 14. Principal Accounting Fees and Services

The information required by this Item 14 will be included under the captions "Audit Fees and Services" and "Pre-Approval Policies and Procedures" in our definitive proxy statement to be filed with the SEC with respect to our 2013 Annual Meeting of Stockholders and is incorporated herein by reference.

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PART IV

Item 15. Exhibits and Financial Statement Schedules

(1) Financial Statements

Our consolidated financial statements are set forth on pages F-1 through F-37 of this Annual Report on Form 10-K and are incorporated herein by reference.

(2) Financial Statement Schedules

Schedules have been omitted since they are either not required or not applicable or the information is otherwise included herein.

(3) Exhibits

The exhibits filed as part of this Annual Report on Form 10-K are listed in the Exhibit Index immediately preceding such Exhibits, which Exhibit Index is incorporated herein by reference.

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SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

MERRIMACK PHARMACEUTICALS, INC.

Date: March 20, 2013 By: /s/ ROBERT J. MULROY

Robert J. Mulroy
President and Chief Executive Officer

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

Signature	Title	Date
/s/ ROBERT J. MULROY Robert J. Mulroy	President, Chief Executive Officer and Director (Principal Executive Officer)	March 20, 2013
/s/ WILLIAM A. SULLIVAN William A. Sullivan	Chief Financial Officer and Treasurer (Principal Financial and Accounting Officer)	March 20, 2013
/s/ GARY L. CROCKER Gary L. Crocker	Chairman of the Board	March 20, 2013
/s/ JAMES VAN B. DRESSER James van B. Dresser	Director	March 20, 2013
/s/ GORDON J. FEHR Gordon J. Fehr	Director	March 20, 2013
/s/ JOHN MENDELSOHN, M.D. John Mendelsohn, M.D.	Director	March 20, 2013
/s/ SARAH E. NASH Sarah E. Nash	Director	March 20, 2013
/s/ MICHAEL E. PORTER, PH.D. Michael E. Porter, Ph.D.	Director	March 20, 2013

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Signature	Title	Date
/s/ JAMES H. QUIGLEY James H. Quigley	Director	March 20, 2013
/s/ ANTHONY J. SINSKEY, SC.D. Anthony J. Sinskey, Sc.D.	Director	March 20, 2013

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MERRIMACK PHARMACEUTICALS, INC.
INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

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Report of Independent Registered Public Accounting Firm

To the Board of Directors and Stockholders of
Merrimack Pharmaceuticals, Inc.

In our opinion, the accompanying consolidated balance sheets and the related consolidated statements of comprehensive loss, statements of convertible preferred stock, non-controlling interest and stockholders' deficit, and statements of cash flows present fairly, in all material respects, the financial position of Merrimack Pharmaceuticals, Inc. and its subsidiaries at December 31, 2012 and December 31, 2011, and the results of their operations and their cash flows for each of the three years in the period ended December 31, 2012 in conformity with accounting principles generally accepted in the United States of America. These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits of these statements in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

/s/ PricewaterhouseCoopers LLP

Boston, Massachusetts
March 20, 2013

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Merrimack Pharmaceuticals, Inc.

Consolidated Balance Sheets

(in thousands, except par value amounts)	December 31, 2011	December 31, 2012
Assets		
Current assets:		
Cash and cash equivalents	$ 50,454	$ 37,714
Available-for-sale securities		72,238
Restricted cash		100
Accounts receivable	7,426	9,267
Deferred financing costs	1,946	32
Prepaid expenses and other current assets	5,763	8,950
Total current assets	65,589	128,301
Restricted cash	381	528
Property and equipment, net	6,206	6,297
Other assets	23	1,068
Intangible assets, net	2,485	2,165
In-process research and development	7,010	7,010
Goodwill	3,605	3,605
Total assets	$ 85,299	$ 148,974
Liabilities, Convertible Preferred Stock, Non-controlling Interest and Stockholders' Deficit		
Current liabilities:		
Accounts payable, accrued expenses and other	$ 17,511	$ 24,936
Capital lease obligations	48	
Deferred revenues	7,712	9,350
Deferred rent	125	1,153
Deferred tax incentives	755	512
Derivative liability		196
Loans payable		2,373
Total current liabilities	26,151	38,520
Deferred revenues	78,033	71,114
Deferred rent	23	6,323
Deferred tax incentives	1,267	755
Convertible preferred stock warrants	1,516	
Loans payable		37,482
Accrued interest		1,200
Total liabilities	$ 106,990	$ 155,394
Commitments and contingencies (Note 19)		
Convertible preferred stock	268,225	
Non-controlling interest	574	97
Stockholders' deficit:		
Preferred stock, $0.01 par value: no shares and 10,000 shares authorized at December 31, 2011 and 2012, respectively; no shares issued or outstanding at December 31, 2011 or 2012		
Common stock, $0.01 par value: 138,500 and 200,000 shares authorized at December 31, 2011 and 2012, respectively, 11,834 and 95,825 issued and outstanding at December 31, 2011 and 2012, respectively	118	958
Additional paid-in capital	60,231	434,679
Accumulated other comprehensive loss		(38)
Accumulated deficit	(350,839)	(442,116)

Total stockholders' deficit	$ (290,490)	$ (6,517)
Total liabilities, convertible preferred stock, non-controlling interest and stockholders' deficit	$ 85,299	$ 148,974

The accompanying notes are an integral part of these consolidated financial statements.

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Merrimack Pharmaceuticals, Inc.

Consolidated Statements of Comprehensive Loss

	Years ended December 31,		
(in thousands, except per share amounts)	**2010**	**2011**	**2012**
Collaboration revenues	$ 20,305	$ 34,215	$ 48,921
Operating expenses			
Research and development	58,278	100,630	125,858
General and administrative	11,381	14,454	15,805
Contingent consideration	(178)		
Total operating expenses	69,481	115,084	141,663
Loss from operations	(49,176)	(80,869)	(92,742)
Other income and expenses			
Interest income	74	56	184
Interest expense	(3,726)	(13)	(553)
Other, net	2,669	1,150	1,357
Net loss	(50,159)	(79,676)	(91,754)
Less net loss attributable to non-controlling interest	(55)	(453)	(477)
Net loss attributable to Merrimack Pharmaceuticals, Inc.	$ (50,104)	$ (79,223)	$ (91,277)
Other comprehensive loss:			
Unrealized loss on available-for-sale securities			(38)
Other comprehensive loss			(38)
Comprehensive loss	$ (50,104)	$ (79,223)	$ (91,315)
Net loss per share available to common stockholders basic and diluted	$ (5.57)	$ (7.67)	$ (1.28)
Weighted-average common shares used in computing net loss per share available to common stockholders basic and diluted	10,994	11,343	72,831

The accompanying notes are an integral part of these consolidated financial statements.

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Merrimack Pharmaceuticals, Inc.

Consolidated Statements of Convertible Preferred Stock, Non-controlling Interest and Stockholders' Deficit

(in thousands)	Series B-G convertible preferred stock Shares	Amount	Non-controlling interest	Common stock Shares	Amount	Additional paid-in capital	Accumulated Other Comprehensive Loss	Accumulated deficit	Total stockholders' deficit
Balance at December 31, 2009	41,368	$ 131,273	$	10,868	$ 17,364	$ 13,386	$	$ (221,512)	$ (190,762)
Exercise of stock options				205	294				294
Stock-based compensation						4,551			4,551
Issuance of Series F stock	11,776	59,973							
Issuance of Series C stock as a result of warrant exercises	4	11							
Series F amount interest						12,974			12,974
Change in par value					(17,547)	17,547			
Ownership change in non-controlling interest			1,082			3,083			3,083
Loss attributable to non-controlling interest			(55)					55	55
Net loss								(50,159)	(50,159)
Balance at December 31, 2010	53,148	$ 191,257	$ 1,027	11,073	$ 111	51,541	$	$ (271,616)	$ (219,964)
Exercise of stock options				467	4	1,025			1,029
Exercise of common stock warrants				294	3	713			716
Stock-based compensation						6,952			6,952
Issuance of Series G stock	11,000	76,949							
Issuance of Series C stock as a result of warrant exercises	3	19							
Loss attributable to non-controlling interest			(453)					453	453
Net loss								(79,676)	(79,676)
Balance at December 31, 2011	64,151	$ 268,225	$ 574	11,834	$ 118	$ 60,231	$	$ (350,839)	$ (290,490)
Exercise of stock options				2,622	26	5,374			5,400
Exercise of common stock warrants				71	1	26			27
Stock-based compensation						6,889			6,889
Conversion of convertible preferred stock into common stock	(64,151)	(268,225)		66,256	663	267,562			268,225
Initial public offering, net of offering costs				15,042	150	97,931			98,081
Series B dividends declared						(4,263)			(4,263)
Conversion of convertible preferred stock warrants to common stock warrants						929			929
Other comprehensive loss							(38)		(38)
Loss attributable to non-controlling interest			(477)					477	477
Net loss								(91,754)	(91,754)
Balance at December 31, 2012		$	$ 97	95,825	$ 958	$ 434,679	$ (38)	$ (442,116)	$ (6,517)

The accompanying notes are an integral part of these consolidated financial statements.

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Merrimack Pharmaceuticals, Inc.

Consolidated Statements of Cash Flows

	Years ended December 31,		
(in thousands)	**2010**	**2011**	**2012**
Cash flows from operating activities			
Net loss	$ (50,159)	$ (79,676)	$ (91,754)
Adjustments to reconcile net loss to net cash (used in) provided by operating activities			
Non-cash interest expense	3,673		78
Remeasurement of convertible preferred stock warrants	(104)	864	(587)
Depreciation and amortization	3,628	4,596	3,664
Stock-based compensation	4,551	6,952	6,889
Gain on disposal of property and equipment	(26)		-
Changes in operating assets and liabilities			
Purchased premiums and interest on available-for-sale securities			(2,354)
Accounts receivable	(1,975)	(3,681)	(1,841)
Prepaid expenses and other current assets	(571)	(3,933)	(2,477)
Accounts payable, accrued expenses and other	194	8,815	6,985
Deferred revenues	12,845	11,963	(5,281)
Deferred rent and tax incentives	1,567	1,264	7,892
Other assets and liabilities, net	8	19	(1,030)
Net cash used in operating activities	(26,369)	(52,817)	(79,816)
Cash flows from investing activities			
Purchase of available-for-sale securities			(115,665)
Proceeds from maturities and sales of available-for-sale securities			43,880
Purchase of property and equipment	(5,025)	(3,754)	(3,189)
Proceeds from sale of property and equipment	26		
Assignment of restricted cash			(628)
Release of restricted cash	95		381
Other investing activities, net	4	7	
Net cash used in investing activities	(4,900)	(3,747)	(75,221)
Cash flows from financing activities			
Proceeds from initial public offering, net of offering costs			100,025
Proceeds from issuance of convertible preferred stock, net of offering costs		76,949	
Proceeds from issuance of common stock	294	1,745	5,427
Principal payment on capital lease obligations	(864)	(443)	(48)
Proceeds from issuance of loans payable, net of issuance costs			41,128
Payments of dividends on Series B convertible preferred stock			(4,235)
Proceeds from issuance of convertible preferred stock of Silver Creek Pharmaceuticals, Inc.	4,165		
Deferred financing costs		(1,946)	
Net cash provided by financing activities	3,595	76,305	142,297
Net (decrease) increase in cash and cash equivalents	(27,674)	19,741	(12,740)
Cash and cash equivalents, beginning of period	58,387	30,713	50,454
Cash and cash equivalents, end of period	$ 30,713	$ 50,454	$ 37,714
Noncash financing and investing activities			
Accrued interest on Series F amount relieved to additional paid-in capital (Note 14)	$ 12,974	$	$
Issuance of shares from Series F amount (Note 14)	59,973		
Conversion of convertible preferred stock to common stock			268,225
Conversion of convertible preferred stock warrants to common stock warrants			929
Issuance of derivative liability			196
Changes in property and equipment in accounts payable and accrued expenses			412
Disposals of fully depreciated assets			671

Reclassification of deferred financing costs to stockholders' equity	25		2,748
Dividends on Series B convertible preferred stock declared but not paid			28
Supplemental disclosure of cash flows			
Cash paid for interest	$ 55	$ 13	$ 169

The accompanying notes are an integral part of these consolidated financial statements.

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Merrimack Pharmaceuticals, Inc.

Notes to Consolidated Financial Statements

December 31, 2010, 2011 and 2012

1. Nature of the Business

Merrimack Pharmaceuticals, Inc. (the "Company") is a biopharmaceutical company discovering, developing and preparing to commercialize innovative medicines consisting of novel therapeutics paired with companion diagnostics. The Company has six targeted therapeutic oncology candidates in clinical development (MM-398, MM-121, MM-111, MM-302, MM-151 and MM-141), multiple product candidates in preclinical development and a discovery effort advancing additional candidate medicines. The Company's discovery and development effort is driven by Network Biology, which is its proprietary systems biology-based approach to biomedical research. The Company was incorporated in the Commonwealth of Massachusetts in 1993 and reincorporated in the State of Delaware in October 2010.

The Company is subject to risks and uncertainties common to companies in the biopharmaceutical industry, including, but not limited to, ability to secure additional capital to fund operations, development by competitors of new technological innovations, dependence on collaborative arrangements, protection of proprietary technology, compliance with government regulations and dependence on key personnel. Product candidates currently under development will require significant additional research and development efforts, including extensive preclinical and clinical testing and regulatory approval prior to commercialization. These efforts require significant amounts of additional capital, adequate personnel infrastructure and extensive compliance reporting capabilities.

The Company has incurred significant losses and has not generated revenue from commercial sales. The accompanying consolidated financial statements have been prepared on a basis which assumes that the Company will continue as a going concern and which contemplates the realization of assets and satisfaction of liabilities and commitments in the normal course of business.

In April 2012, the Company closed the initial public offering of its common stock pursuant to a registration statement on Form S-1, as amended. The Company sold an aggregate of 15,042,459 shares of common stock under the registration statement at a public offering price of $7.00 per share, including 742,459 shares pursuant to the exercise by the underwriters of an over-allotment option. Net proceeds were approximately $98.1 million, after deducting underwriting discounts and commissions and other offering expenses but prior to the payment of dividends on the Company's Series B convertible preferred stock. At the time of the initial public offering, the Company's convertible preferred stock and warrants to purchase convertible preferred stock automatically converted to common stock and warrants to purchase common stock, as discussed more fully in Note 3.

On November 8, 2012, the Company entered into a Loan and Security Agreement (the "Loan Agreement"), with Hercules Technology Growth Capital, Inc. ("Hercules"). As more fully discussed in Note 12, the Loan Agreement provides for an initial term loan advance of $25.0 million, which closed on November 8, 2012, and an additional term loan of $15.0 million, which closed on December 14, 2012, which resulted in aggregate net proceeds of $39.6 million during the fourth quarter of 2012.

The Company may seek additional funding through public or private debt or equity financings or through existing or new collaboration arrangements. The Company may not be able to obtain financing on acceptable terms, or at all, and the Company may not be able to enter into additional collaborative arrangements. The terms of any financing may adversely affect the holdings or the rights of the Company's stockholders. Arrangements with collaborators or others may require the Company to relinquish rights to certain of its technologies or product candidates. If the Company is unable to

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Merrimack Pharmaceuticals, Inc.

Notes to Consolidated Financial Statements (Continued)

December 31, 2010, 2011 and 2012

1. Nature of the Business (Continued)

obtain funding, the Company could be forced to delay, reduce or eliminate its research and development programs or commercialization efforts, which could adversely affect its business prospects.

2. Summary of Significant Accounting Policies

Significant accounting policies followed by the Company in the preparation of its consolidated financial statements are as follows:

Basis of Presentation and Consolidation

The accompanying consolidated financial statements have been prepared under U.S. generally accepted accounting principles ("GAAP") and include the accounts of the Company and its wholly owned subsidiaries. The Company's wholly owned subsidiaries include Hermes BioSciences, Inc. ("Hermes"), which was merged with and into the Company during 2011, and Merrimack Pharmaceuticals (Bermuda) Ltd., which was incorporated during 2011. The Company also consolidates its 74% majority-owned subsidiary Silver Creek Pharmaceuticals, Inc. ("Silver Creek"). All intercompany transactions and balances have been eliminated in consolidation.

Use of Estimates

GAAP requires the Company's management to make estimates and judgments that may affect the reported amounts of assets, liabilities, revenues, expenses and related disclosures. The Company bases estimates and judgments on historical experience and on various other factors that it believes to be reasonable under the circumstances. The significant estimates in these consolidated financial statements include revenue recognition, periods of meaningful use of licensed products, lease accounting, useful lives with respect to long-lived assets and intangibles and the valuation of stock options, convertible preferred stock warrants, contingencies, accrued expenses, intangible assets, goodwill, in-process research and development, derivative liability and tax valuation reserves. The Company's actual results may differ from these estimates under different assumptions or conditions. The Company evaluates its estimates on an ongoing basis. Changes in estimates are reflected in reported results in the period in which they become known by the Company's management.

Segment and Geographic Information

Operating segments are defined as components of an enterprise engaging in business activities for which discrete financial information is available and regularly reviewed by the chief operating decision maker in deciding how to allocate resources and in assessing performance. The Company views its operations and manages its business in one operating segment and the Company operates in only one geographic segment.

Cash, Cash Equivalents and Restricted Cash

Cash and cash equivalents are short-term, highly liquid investments with original maturities of three months or less at the date of purchase. Investments qualifying as cash equivalents primarily consist of money market funds, commercial paper, corporate notes and bonds and certificates of deposit.

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Merrimack Pharmaceuticals, Inc.

Notes to Consolidated Financial Statements (Continued)

December 31, 2010, 2011 and 2012

2. Summary of Significant Accounting Policies (Continued)

Cash accounts with any type of restriction are classified as restricted cash. If restrictions are expected to be lifted in the next twelve months, the restricted cash account is classified as current. As of December 31, 2011 and 2012, the Company recorded restricted cash of $381,000 and $628,000, respectively, which were primarily related to the Company's facility lease.

Available-for-Sale Securities

Marketable securities may consist of U.S. government agencies securities, commercial paper, corporate notes and bonds and certificates of deposit, which are maintained by an investment manager and have expected average maturity dates in excess of three months. The Company classifies these investments as available-for-sale. Available-for-sale securities are carried at fair value, with the unrealized gains and losses included in other comprehensive income (loss) as a component of stockholders' equity until realized. Realized gains and losses are recognized in interest income. Any premium or discount arising at purchase is amortized and/or accreted to interest income.

Concentration of Credit Risk

Financial instruments that subject the Company to credit risk consist primarily of cash and cash equivalents, available-for-sale securities and accounts receivable. The Company places its cash deposits in accredited financial institutions and, therefore, the Company's management believes these funds are subject to minimal credit risk. The Company invests cash equivalents and available-for-sale securities in money market funds, U.S. government agencies securities and various corporate debt securities. Credit risk in these securities is reduced as a result of the Company's investment policy to limit the amount invested in any one issue or any single issuer and to only invest in high credit quality securities. The Company has no significant off-balance sheet concentrations of credit risk such as foreign currency exchange contracts, option contracts or other hedging arrangements. For the years ended December 31, 2011 and 2012, Sanofi represented greater than 99% and 98% of collaboration revenues, respectively. As of December 31, 2011 and 2012, Sanofi represented greater than 99% of accounts receivable.

Property and Equipment

Property and equipment, including leasehold improvements, are recorded at cost and depreciated when placed into service using the straight-line method, based on their estimated useful lives as follows:

Asset classification	Estimated useful life (in years)
Lab equipment	3 - 7
IT equipment	3 - 7
Leaseholds improvements	Lesser of useful life or lease term
Furniture and fixtures	3 - 7

Costs for capital assets not yet placed into service have been capitalized as construction-in-progress and will be depreciated in accordance with the above guidelines once placed into service. Costs for repairs and maintenance are expensed as incurred, while major betterments are capitalized. The Company capitalizes interest cost incurred on funds used to construct property and equipment. The capitalized interest is recorded as part of the asset to which it relates and is depreciated over the asset's estimated useful life. Upon retirement or sale, the cost of assets disposed of and the related

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Merrimack Pharmaceuticals, Inc.

Notes to Consolidated Financial Statements (Continued)

December 31, 2010, 2011 and 2012

2. Summary of Significant Accounting Policies (Continued)

accumulated depreciation are removed from the accounts and any resulting gain or loss is reflected in earnings.

The Company reviews its long-lived assets for impairment whenever events or changes in business circumstances indicate that the carrying amount of assets may not be fully recoverable or that the useful lives of these assets are no longer appropriate. Each impairment test is based on a comparison of the undiscounted cash flow to the recorded value of the asset. If impairment is indicated, the asset will be written down to its estimated fair value on a discounted cash flow basis.

Non-controlling Interest

Non-controlling interest represents the non-controlling stockholders' proportionate share of preferred stock and net loss of the Company's majority-owned consolidated subsidiary Silver Creek. On August 20, 2010, the Company acquired a controlling interest in Silver Creek (Note 8). The non-controlling stockholders' proportionate share of the preferred stock in Silver Creek is reflected as non-controlling interest in the Company's consolidated balance sheets as of December 31, 2011 and 2012, respectively, as a component of mezzanine equity.

The Company's financial statement activity related to Silver Creek during these periods was as follows:

(in thousands)	Non-controlling Interest
Balance at December 31, 2009	$
Acquisition of Silver Creek preferred stock	1,082
Net loss attributable to Silver Creek	(55)
Balance at December 31, 2010	$ 1,027
Net loss attributable to Silver Creek	(453)
Balance at December 31, 2011	$ 574
Net loss attributable to Silver Creek	(477)
Balance at December 31, 2012	$ 97

Derivative Liability

On December 21, 2012, the Company's majority-owned subsidiary Silver Creek entered into a Note Purchase Agreement with certain lenders, as discussed more fully in Note 12. The principal and accrued interest are convertible into the next qualifying series of preferred stock at a discount or into existing preferred stock upon maturity of the notes on December 31, 2013, whichever occurs first. The Company determined that the underlying convertible note represented share-settled debt and the potential conversion of the notes into the next qualifying series of preferred stock at a discount met the definition of a derivative. The Company estimated the value of the derivative liability issued in connection with the convertible note payable at $196,000 as of both December 21, 2012 and December 31, 2012. The derivative is classified as a liability on the Company's consolidated balance sheet and will be remeasured at subsequent reporting periods with changes in fair value are recognized in earnings.

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Merrimack Pharmaceuticals, Inc.

Notes to Consolidated Financial Statements (Continued)

December 31, 2010, 2011 and 2012

2. Summary of Significant Accounting Policies (Continued)

Revenue Recognition

The Company enters into biopharmaceutical product development agreements with collaborative partners for the research and development of therapeutic and diagnostic products. The terms of the agreements may include nonrefundable signing and licensing fees, funding for research, development and manufacturing, milestone payments and royalties on any product sales derived from collaborations. These multiple element arrangements are analyzed to determine whether the deliverables can be separated or whether they must be accounted for as a single unit of accounting.

In January 2011, the Company 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. 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. The Company 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. The Company did not enter into any significant multiple element arrangements or materially modify any of its existing multiple element arrangements during the years ended December 31, 2011 and 2012. The Company's 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.

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

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Merrimack Pharmaceuticals, Inc.

Notes to Consolidated Financial Statements (Continued)

December 31, 2010, 2011 and 2012

2. Summary of Significant Accounting Policies (Continued)

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

Royalty revenue will be recognized upon the sale of the related products provided the Company has no remaining performance obligations under the arrangement.

Research and Development Expenses

Research and development expenses are charged to expense as incurred. Research and development expenses comprise costs incurred in performing research and development activities, including personnel-related costs, stock-based compensation, facilities, research-related overhead, clinical trial costs, contracted services, manufacturing, license fees and other external costs. The Company accounts for nonrefundable advance payments for goods and services that will be used in future research and development activities as expenses when the service has been performed or when the goods have been received rather than when the payment is made.

Stock-Based Compensation

The Company expenses the fair value of employee stock options over the vesting period. Compensation expense is measured using the fair value of the award at the grant date, net of estimated forfeitures, and is adjusted annually to reflect actual forfeitures. The fair value of each stock-based award is estimated using the Black-Scholes option valuation model and is expensed straight-line over the vesting period.

The Company records stock options issued to nonemployees at fair value, periodically remeasures to reflect the current fair value at each reporting period, and recognizes expense over the related service period. When applicable, these equity instruments are accounted for based on the fair value of the consideration received or the fair value of the equity instrument issued, whichever is more reliably measurable.

Convertible Preferred Stock and Convertible Preferred Stock Warrants

Convertible preferred stock is initially recorded at the proceeds received, net of issuance costs and warrants, where applicable. As described in Note 3, in April 2012, the Company closed the initial public offering of its common stock. Upon closing, all outstanding shares of the Company's convertible preferred stock were converted into 66,255,529 shares of common stock. Also upon closing, the Company's restated certificate of incorporation became effective and authorized 10.0 million shares of $0.01 par value undesignated preferred stock.

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Merrimack Pharmaceuticals, Inc.

Notes to Consolidated Financial Statements (Continued)

December 31, 2010, 2011 and 2012

2. Summary of Significant Accounting Policies (Continued)

The Company accounts for freestanding warrants as liabilities at their fair value. The Company measures the fair value of the convertible preferred stock warrants at the end of each reporting period and records the change in fair value to other income (expense). For the years ended December 31, 2010, 2011, and 2012, the Company recorded other income (expense) related to this re-measurement of $(74,000), $(864,000) and $587,000, respectively. As described in Note 3, in April 2012, the Company closed the initial public offering of its common stock. Upon closing, all outstanding warrants to purchase shares of convertible preferred stock were converted into warrants to purchase shares of common stock and reclassified to stockholders' equity.

Comprehensive Loss

Comprehensive loss is defined as the change in equity of a business enterprise during a period from transactions, and other events and circumstances, from non-owner sources and currently consists of net loss and changes in unrealized gains and losses on available-for-sale securities.

Other Income (Expense)

The Company records gains and losses on the remeasurement of fair value of convertible preferred stock warrants, the recognition of federal and state sponsored tax incentives and other one-time income or expense-related items in other income (expense).

In January 2010, the Massachusetts Life Sciences Center ("MLSC"), an independent agency of the Commonwealth of Massachusetts, awarded the Company $1,500,000 of tax incentives under its Life Sciences Tax Incentive Program. These incentives allowed the Company to monetize approximately $1,350,000 of state research and development tax credits. The Company received this monetization in 2010. In exchange for these incentives, the Company pledged to hire an incremental 50 employees and retain these employees until at least December 31, 2014. Failure to do so could result in the repayment of a portion of these incentives. The Company deferred and is amortizing the benefit of this monetization on a straight-line basis over the five-year performance period, with a cumulative catch-up in the period the pledge is achieved. For the years ended December 31, 2010, 2011 and 2012, the Company recognized $270,000 of benefit in other income in each period.

In October 2010, the Company received grants totaling $2,445,000 under the Federal Qualifying Therapeutic Discovery Projects program as provided for under Section 48D of the Internal Revenue Code, enacted as part of the Patient Protection and Affordable Care Act of 2010. The Company received $1,941,000 during 2010 and $504,000 during the first quarter of 2011 related to these grants. For the year ended December 31, 2010, the Company recognized $2,445,000 as other income related to these grants.

In January 2011, the MLSC awarded the Company an additional $1,347,000 of tax incentives under its Life Sciences Tax Incentive Program, which allowed the Company to monetize approximately $1,212,000 of state research and development tax credits. The Company received this monetization in the second quarter of 2011. In exchange for these incentives, the Company pledged to hire an incremental 50 employees and retain these employees until at least December 31, 2015. Failure to do so could result in the repayment of a portion of these incentives. The Company deferred and is amortizing the benefit of this monetization on a straight-line basis over the five-year performance

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Merrimack Pharmaceuticals, Inc.

Notes to Consolidated Financial Statements (Continued)

December 31, 2010, 2011 and 2012

2. Summary of Significant Accounting Policies (Continued)

period, with a cumulative catch-up in the period the pledge is achieved. For the years ended December 31, 2010 and 2011, the Company did not recognize any benefit in other income. For the year ended December 31, 2012, the Company recognized $484,000 of benefit in other income.

Additionally, other income recognized during the year ended December 31, 2011 included the impact of a cash settlement of $1.8 million from a former service provider.

Deferred Financing Costs

The Company capitalizes certain legal, accounting and other fees that are directly associated with in-process debt and equity financings as current assets until such financings occur. In the case of an equity financing, after occurrence, these costs are recorded in equity or mezzanine equity, net of proceeds received. In the case of a debt financing, these costs are recorded as assets and amortized over the term of the debt.

As of December 31, 2011, the Company recorded deferred financing costs of $1,946,000 on the accompanying consolidated balance sheet in contemplation of an initial public offering. As discussed in Note 3, in April 2012, the Company closed the initial public offering of its common stock. Upon closing, $2,748,000 of deferred financing costs were netted against the equity proceeds within stockholders' equity.

Income Taxes

The Company accounts for income taxes under the asset and liability method. Under this method, deferred tax assets and liabilities are recognized for the estimated future tax consequences attributable to differences between financial statement carrying amounts of existing assets and liabilities and their respective tax bases. Deferred tax assets and liabilities are measured using enacted rates in effect for the year in which these temporary differences are expected to be recovered or settled. Valuation allowances are provided if based on the weight of available evidence, it is more likely than not that some or all of the deferred tax assets will not be realized.

The Company provides reserves for potential payments of tax to various tax authorities related to uncertain tax positions and other issues. Reserves are based on a determination of whether and how much of a tax benefit taken by the Company in its tax filing is more likely than not to be realized following resolution of any potential contingencies present related to the tax benefit. Potential interest and penalties associated with such uncertain tax positions are recorded as components of income tax expense. To date, the Company has not taken any uncertain tax positions or recorded any reserves, interest or penalties.

Goodwill and Intangible Assets

Goodwill and indefinite-lived intangible assets, including in-process research and development ("IPR&D"), are evaluated for impairment on an annual basis or more frequently if an indicator of impairment is present. No impairment of goodwill or indefinite-lived intangible assets resulted from the Company's most recent evaluation which occurred in the third quarter of 2012. The Company's next annual impairment evaluation will be made in the third quarter of 2013 unless indicators arise that would require the Company to evaluate at an earlier date. The Company commences amortization of

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Merrimack Pharmaceuticals, Inc.

Notes to Consolidated Financial Statements (Continued)

December 31, 2010, 2011 and 2012

2. Summary of Significant Accounting Policies (Continued)

indefinite-lived intangible assets once the assets have reached technological feasibility or are determined to have an alternative future use and amortizes the assets over their estimated future life.

The Company's evaluation of goodwill and IPR&D impairment included a qualitative assessment to determine whether further impairment testing of goodwill and indefinite-lived intangible assets was necessary. It was determined that it was not more likely than not that an impairment existed, and therefore, that further impairment evaluation was not necessary. This determination required management to make significant estimates, judgments and assumptions as to development activities and future commercial potential of IPR&D and to assess the impact of significant events, milestones and changes to expectations and activities that may have occurred since the last impairment evaluation. Specifically, management considered estimated time and cost until the expected commencement of commercial activities, estimates of expected future revenues and cash flows, estimates of probabilities of success of the Company's IPR&D and discount rates. Significant changes to these estimates, judgments and assumptions could materially change the outcome of management's impairment assessment.

The Company commences amortization of indefinite-lived intangible assets, such as IPR&D, once the assets have reached technological feasibility or are determined to have an alternative future use and amortizes the assets over their estimated future life. Amortization of IPR&D has not commenced as of December 31, 2012.

Definite-lived intangible assets, such as core technology, are evaluated for impairment whenever events or circumstances indicate that the carrying value may not be fully recoverable. Definite-lived intangible assets are separate from goodwill and indefinite-lived intangible assets and are deemed to have a definite life. The Company amortizes these assets over their estimated useful life. The Company has not recorded any impairment charges related to definite-lived intangible assets.

Reclassifications

Certain prior year amounts have been reclassified to conform with the current year presentation.

Recent Accounting Pronouncements

In June 2011, the Financial Accounting Standards Board ("FASB") issued an amendment to the accounting guidance for presentation of comprehensive income. Under the amended guidance, a company may present the total of comprehensive income, the components of net income and the components of other comprehensive income either in a single continuous statement of comprehensive income or in two separate but consecutive statements. In either case, a company is required to present each component of net income along with total net income, each component of other comprehensive income along with a total for other comprehensive income and a total amount for comprehensive income. For public companies, the amendment is effective for fiscal years, and interim periods within those years, beginning after December 15, 2011, and shall be applied retrospectively. The Company adopted this amendment on January 1, 2012. Other than a change in presentation, the adoption of this guidance did not have a material impact on the Company's consolidated financial statements.

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

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Merrimack Pharmaceuticals, Inc.

Notes to Consolidated Financial Statements (Continued)

December 31, 2010, 2011 and 2012

2. Summary of Significant Accounting Policies (Continued)

likely than not that the fair value of a reporting unit is less than its carrying amount. If, after assessing the totality of events or circumstances, an entity determines it is not more likely than not that the fair value reporting of a reporting unit is less than the carrying amount, then performing the two-step impairment test is unnecessary. The changes are effective for annual and interim goodwill impairment tests performed for fiscal years beginning after December 15, 2011, however, early adoption is permitted. The Company adopted this authoritative guidance on January 1, 2012 with no impact.

In July 2012, the FASB issued ASU No. 2012-02, *Testing Indefinite-Lived Intangible Assets for Impairment* ("ASU 2012-02"). ASU 2012-02 is intended to reduce the cost and complexity of testing indefinite-lived intangible assets other than goodwill for impairment. It allows companies to perform a "qualitative" assessment to determine whether further impairment testing of indefinite-lived intangible assets is necessary, similar in approach to the goodwill impairment test. ASU 2012-02 is effective for annual and interim impairment tests performed for fiscal years beginning after September 15, 2012. Early adoption is permitted, and the Company adopted ASU 2012-02 in the third quarter of 2012 upon its annual impairment testing of indefinite-lived intangible assets with no impact.

In February 2013, the FASB issued amendments to the accounting guidance for presentation of comprehensive income to improve the reporting of reclassifications out of accumulated other comprehensive income. The amendments do not change the current requirements for reporting net income or other comprehensive income, but do require an entity to provide information about the amounts reclassified out of accumulated other comprehensive income by component. In addition, an entity is required to present, either on the face of the statement where the net income is presented or in the notes, significant amounts reclassified out of accumulated other comprehensive income by the respective line items of net income but only if the amount reclassified is required under GAAP to be reclassified to net income in its entirety in the same reporting period. For other amounts that are not required under GAAP to be reclassified in their entirety to net income, an entity is required to cross-reference to other disclosures required under GAAP that provide additional detail about these amounts. For public companies, these amendments are effective prospectively for reporting periods beginning after December 15, 2012. Other than a change in presentation, the Company does not believe the adoption of this guidance will have a material impact on our consolidated financial statements.

3. Initial Public Offering

In April 2012, the Company closed the initial public offering of its common stock pursuant to a registration statement on Form S-1, as amended. The Company sold an aggregate of 15,042,459 shares of common stock under the registration statement at a public offering price of $7.00 per share, including 742,459 shares pursuant to the exercise by the underwriters of an over-allotment option. Net proceeds were approximately $98.1 million, after deducting underwriting discounts and commissions and other offering expenses but prior to the payment of dividends on the Company's Series B convertible preferred stock.

Upon closing the initial public offering, all outstanding shares of the Company's convertible preferred stock were converted into 66,255,529 shares of common stock, all outstanding warrants to purchase shares of convertible preferred stock were converted into warrants to purchase shares of common stock and approximately $4.3 million of cash dividends became payable to the holders of Series B convertible preferred stock.

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Merrimack Pharmaceuticals, Inc.

Notes to Consolidated Financial Statements (Continued)

December 31, 2010, 2011 and 2012

4. Marketable Securities

Available-for-sale securities, all of which have maturities of twelve months or less, as of December 31, 2012 consisted of the following:

	Amortized Cost	Unrealized Gains	Unrealized Losses	Fair Value
	(in thousands)			
December 31, 2012:				
Certificate of deposit	$ 240	$	$	$ 240
Commercial paper	12,479		(14)	12,465
Corporate debt securities	59,557	3	(27)	59,533
Total	$ 72,276	$ 3	$ (41)	$ 72,238

The aggregate fair value of securities held by the Company in an unrealized loss position for less than 12 months as of December 31, 2012 was $51.4 million, representing 18 securities. To determine whether an other-than-temporary impairment exists, the Company performs an analysis to assess whether it intends to sell, or whether it would more likely than not be required to sell, the security before the expected recovery of the amortized cost basis. Where the Company intends to sell a security, or may be required to do so, the security's decline in fair value is deemed to be other-than-temporary and the full amount of the unrealized loss is recognized on the statement of comprehensive loss as an other-than-temporary impairment charge. When this is not the case, the Company performs additional analysis on all securities to evaluate losses associated with the creditworthiness of the security. Credit losses are identified where the Company does not expect to receive cash flows, based on using a single best estimate, sufficient to recover the amortized cost basis of a security and amount of the loss recognized in other income (expense).

Marketable securities in an unrealized loss position as of December 31, 2012 consisted of the following:

	Aggregate Fair Value	Unrealized Losses
	(in thousands)	
December 31, 2012:		
Commercial paper	12,465	(14)
Corporate debt securities	38,899	(27)
	$ 51,364	(41)

The Company does not intend to sell and it is not more likely than not that the Company will be required to sell the above investments before recovery of the amortized cost basis, which may be maturity. The Company determined that there was no material change in the credit risk of the above investments. As a result, the Company determined it did not hold any investments with an other-than-temporary-impairment as of December 31, 2012.

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Merrimack Pharmaceuticals, Inc.

Notes to Consolidated Financial Statements (Continued)

December 31, 2010, 2011 and 2012

5. Net Loss Per Common Share

Basic net loss per share is calculated by dividing the net loss available to common stockholders by the weighted-average number of common shares outstanding during the period, without consideration for common stock equivalents. Diluted net loss per share is computed by dividing the net loss available to common stockholders by the weighted-average number of common share equivalents outstanding for the period determined using the treasury-stock method. For purposes of this calculation, convertible preferred stock, stock options and warrants are considered to be common stock equivalents and are only included in the calculation of diluted net loss per share when their effect is dilutive.

The following table presents the computation of basic and diluted net loss per share available to common stockholders:

	Years ended December 31,		
(in thousands, except per share amount)	**2010**	**2011**	**2012**
Net Loss Per Share:			
Numerator:			
Net loss attributable to Merrimack Pharmaceuticals, Inc.	$ (50,104)	$ (79,223)	$ (91,277)
Plus: Unaccreted dividends on convertible preferred stock	(11,185)	(7,789)	(2,107)
Net loss available to common stockholders basic and diluted	(61,289)	(87,012)	(93,384)
Denominator:			
Weighted-average common shares basic and diluted	10,994	11,343	72,831
Net loss per share available to common stockholders basic and diluted	$ (5.57)	$ (7.67)	$ (1.28)

The following common stock equivalents of potentially dilutive securities have been excluded from the computation of diluted weighted average shares outstanding as of December 31, 2010, 2011 and 2012 as the Company recorded a net loss in all periods and, therefore, they would be anti-dilutive:

	Years ended December 31,		
(in thousands)	**2010**	**2011**	**2012**
Convertible preferred stock	55,253	66,256	
Options to purchase common stock	16,214	17,617	18,066
Convertible preferred stock warrants	306	302	
Common stock warrants	2,937	2,640	2,842

6. License and Collaboration Agreements

Sanofi

On September 30, 2009, the Company entered into a license and collaboration agreement with Sanofi for the development and commercialization of a drug candidate being developed by the Company under the name MM-121. The agreement became effective on November 10, 2009 and Sanofi paid the Company a nonrefundable, noncreditable upfront license fee of $60.0 million. During the years ended 2010, 2011 and 2012, the Company received milestone payments of $10.0 million, $10.0 million and $5.0 million, respectively. These milestone payments were associated with dosing the first patients in Phase 2 clinical trials in breast, non-small cell lung and ovarian cancers. The Company is eligible to

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Merrimack Pharmaceuticals, Inc.

Notes to Consolidated Financial Statements (Continued)

December 31, 2010, 2011 and 2012

6. License and Collaboration Agreements (Continued)

receive additional future development, regulatory and sales milestone payments as well as future royalty payments depending on the success of MM-121.

Under the agreement, Sanofi is responsible for all MM-121 development and manufacturing costs. The Company has the right, but not the obligation, to co-promote and commercialize MM-121 in the United States and to participate in the development of MM-121 through Phase 2 proof of concept trials. Sanofi reimburses the Company for direct costs incurred in development and compensates the Company for its internal development efforts based on a full time equivalent ("FTE") rate. Also as part of the agreement, the Company was required to manufacture certain quantities of MM-121 and, at Sanofi's and the Company's option, may continue to manufacture additional quantities of MM-121 in the future. Sanofi reimburses the Company for direct costs incurred in manufacturing and compensates the Company for its internal manufacturing efforts based on an FTE rate. The Company satisfied its manufacturing obligations during 2010 and has elected to continue to manufacture quantities of MM-121.

The Company applied revenue recognition guidance to determine whether the performance obligations under this collaboration including the license, the right to future technology, back-up compounds, participation on steering committees, development services and manufacturing services could be accounted for separately or as a single unit of accounting. The Company determined that its development services performance obligation is considered a separate unit of accounting as it is set at the Company's option, has stand-alone value and the FTE rate is considered fair value. Therefore, the Company recognizes cost reimbursements for MM-121 development services as incurred. The Company determined that the license, the right to future technology, back-up compounds, participation on steering committees and manufacturing services performance obligations represented a single unit of accounting. As the Company cannot reasonably estimate its level of effort over the collaboration, the Company recognizes revenue from the upfront payment, milestone payment and manufacturing services payments using the contingency-adjusted performance model over the expected development period, which is currently estimated to be 12 years from the effective date of the agreement. Under this model, when a milestone is earned or manufacturing services are rendered and product is delivered, revenue is immediately recognized on a pro-rata basis in the period the milestone was achieved or product was delivered based on the time elapsed from the effective date of the agreement. Thereafter, the remaining portion is recognized on a straight-line basis over the remaining development period.

During the years ended December 31, 2010, 2011 and 2012, the Company recognized revenue based on the following components of the Sanofi agreement:

	Years ended December 31,		
(in thousands)	**2010**	**2011**	**2012**
Upfront payment	$ 5,000	$ 5,000	$ 5,000
Milestone payment	949	2,616	2,975
Development services	13,279	25,053	36,905
Manufacturing services and other	630	1,456	3,307
Total	$ 19,858	$ 34,125	$ 48,187

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Merrimack Pharmaceuticals, Inc.

Notes to Consolidated Financial Statements (Continued)

December 31, 2010, 2011 and 2012

6. License and Collaboration Agreements (Continued)

As of December 31, 2011 and 2012, the Company maintained the following assets and liabilities related to the Sanofi agreement:

	December 31,	
(in thousands)	**2011**	**2012**
Accounts receivable, billed	$ 4,478	$ 1,577
Accounts receivable, unbilled	2,925	7,690
Deferred revenues	84,466	79,913

GTC Biotherapeutics, Inc.

In July 2009, the Company entered into a license agreement with GTC Biotherapeutics, Inc. ("GTC") for the development of MM-093 by GTC. As consideration, GTC returned 662,000 shares of the Company's Series C convertible preferred stock to the Company. The Company determined the fair value of the consideration transferred to be $1,469,000. The Company applied revenue recognition guidance to determine that the performance obligations under this agreement, including the license, the right to future technology, and manufacturing support should be accounted for as a single unit of accounting. The consideration received is being recognized on a straight-line basis over the expected performance period, which was originally estimated to be 19 years from the effective date of the agreement.

During the fourth quarter of 2012, GTC notified the Company of their intent to terminate the license agreement in three months in accordance with the terms of the license agreement. The expected development term of the license agreement ended on March 19, 2013 when the Company received GTC's final notice of termination. This change in the estimate of expected development term resulted in $657,000 of additional revenue recognized during the fourth quarter of 2012.

During the years ended December 31, 2010, 2011 and 2012 the Company recognized revenue of $76,000, $76,000 and $733,000, respectively. As of December 31, 2010, 2011 and 2012, the Company had $1,356,000, $1,279,000 and $553,000 of deferred revenue, respectively.

PharmaEngine, Inc.

On May 5, 2011, the Company entered into an assignment, sublicense and collaboration agreement with PharmaEngine, Inc. ("PharmaEngine") under which the Company reacquired rights in Europe and certain countries in Asia to a drug being developed under the name MM-398. In exchange, the Company agreed to pay PharmaEngine a nonrefundable, noncreditable upfront payment of $10.0 million and will be required to make up to an aggregate of $80.0 million in development and regulatory milestone payments and $130.0 million in sales milestone payments upon the achievement of specified development, regulatory and annual net sales milestones. During the first quarter of 2012, the Company paid a milestone of $5.0 million under the collaboration agreement with PharmaEngine in connection with dosing the first patient in a Phase 3 clinical trial of MM-398 in pancreatic cancer. PharmaEngine is also entitled to tiered royalties on net sales of MM-398 in Europe and certain countries in Asia. The Company is responsible for all future development costs of MM-398 except those required specifically for regulatory approval in Taiwan.

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Merrimack Pharmaceuticals, Inc.

Notes to Consolidated Financial Statements (Continued)

December 31, 2010, 2011 and 2012

6. License and Collaboration Agreements (Continued)

During the years ended December 31, 2011 and 2012, the Company recognized research and development expenses of $11.2 million and $6.2 million, respectively, related to the agreement with PharmaEngine. As of December 31, 2011 and 2012, the Company had amounts payable of $280,000 and $345,000, respectively, related to the agreement with PharmaEngine.

7. Fair Value of Financial Instruments

The carrying amounts of cash and cash equivalents, available-for-sale securities, prepaid expenses, accounts receivable, accounts payable and accrued expenses and other short-term assets and liabilities approximate fair value due to the short-term nature of these instruments. A derivative liability and convertible preferred stock warrants are also carried at fair value.

Fair value is an exit price, representing the amount that would be received from the sale of an asset or paid to transfer a liability in an orderly transaction between market participants. Fair value is determined based on observable and unobservable inputs. Observable inputs reflect readily obtainable data from independent sources, while unobservable inputs reflect certain market assumptions. As a basis for considering such assumptions, GAAP establishes a three-tier value hierarchy, which prioritizes the inputs used to develop the assumptions and for measuring fair value as follows: (Level 1) observable inputs such as quoted prices in active markets for identical assets; (Level 2) inputs other than the quoted prices in active markets that are observable either directly or indirectly; and (Level 3) unobservable inputs in which there is little or no market data, which requires the Company to develop its own assumptions. This hierarchy requires the Company to use observable market data, when available, and to minimize the use of unobservable inputs when determining fair value.

The following tables show assets and liabilities measured at fair value on a recurring basis as of December 31, 2011 and 2012 and the input categories associated with those assets and liabilities:

As of December 31, 2011 **(in thousands)**	**Level 1**	**Level 2**	**Level 3**
Assets:			
Cash equivalents U.S. treasury securities	$ 35,076	$	$
Liabilities:			
Convertible preferred stock warrants			1,516

As of December 31, 2012 **(in thousands)**	**Level 1**	**Level 2**	**Level 3**
Assets:			
Cash equivalents money market funds	$ 25,668	$	$
Cash equivalents certificates of deposit		480	
Cash equivalents corporate debt securities		5,017	
Investments certificates of deposit		240	
Investments commercial paper		12,465	
Investments corporate debt securities		59,533	
Liabilities:			
Derivative liability			196

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Merrimack Pharmaceuticals, Inc.

Notes to Consolidated Financial Statements (Continued)

December 31, 2010, 2011 and 2012

7. Fair Value of Financial Instruments (Continued)

The Company's investment portfolio consists of investments classified as cash equivalents and available-for-sale securities. All highly liquid investments with an original maturity of three months or less when purchased are considered to be cash equivalents. The Company's cash and cash equivalents are invested in U.S. treasury and various corporate debt securities that approximate their face value. All marketable securities with an original maturity when purchased of greater than three months are classified as available-for-sale. Available-for-sale securities are carried at fair value, with the unrealized gains and losses reported in other comprehensive income (loss). The amortized cost of securities in this category is adjusted for amortization of premiums and accretion of discounts to maturity. The fair value of the convertible preferred stock warrants as of December 31, 2011 was determined using the Black-Scholes option valuation model. The fair value of the derivative liability as of December 31, 2012 was determined using a probability-weighted valuation based upon the likelihood of Silver Creek achieving a qualified financing, as described in Note 12.

The following table provides a roll-forward of the fair value of the liabilities categorized as Level 3 instruments, for the year ended December 31, 2012:

(in thousands)	Convertible preferred stock warrants	Derivative Liability
Balance, December 31, 2011	$ 1,516	$
Unrealized gain included in other income (expense)	(587)	
Reclassification to common stock warrants	(929)	
Portion of convertible note allocated to derivative		196
Balance, December 31, 2012	$	$ 196

8. Consolidated Subsidiaries

Hermes BioSciences, Inc.

On October 6, 2009, (the "Acquisition Date"), the Company completed the acquisition of all outstanding shares of Hermes, a privately-held biotechnology company developing lipidic nano-carriers to allow for targeted delivery of small molecule drugs, including chemotherapies, with the goal of improving cancer treatment safety and efficacy.

As consideration for the acquisition, the Company issued 4,383,000 shares of common stock with an estimated fair value of $9,292,000 based on an internal valuation prepared by the Company. The acquisition also included a contingent consideration arrangement that required additional shares to be issued by the Company to Hermes' former stockholders based on the occurrence and timing of certain potential future financing events. The range of additional shares that the Company could have been required to issue on the Acquisition Date as contingent consideration was between 0 and 1,100,000 and issuance could have occurred up to 24 months after the Acquisition Date. The estimated fair value of the contingent consideration recognized on the Acquisition Date of $178,000 was determined by performing a probability weighted analysis of the likelihood of occurrence of potential future financing events. That estimate was based on significant inputs not observable in the market, or Level 3 inputs. Key assumptions included management's estimates of the probabilities of such potential future financing events occurring.

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Merrimack Pharmaceuticals, Inc.

Notes to Consolidated Financial Statements (Continued)

December 31, 2010, 2011 and 2012

8. Consolidated Subsidiaries (Continued)

As of December 31, 2010, 400,000 additional shares could have been issued as contingent consideration. However, the Company determined a zero probability that the contingent consideration would ultimately be paid and recognized a gain of $178,000 for the year ended December 31, 2010. On July 8, 2011, the Company satisfied the contingent consideration triggering event, which reduced the shares that could be issued from 400,000 to zero.

Silver Creek Pharmaceuticals, Inc.

Silver Creek was incorporated on June 22, 2010 and commenced operations on August 20, 2010. On August 20, 2010, the Company purchased 12,000,000 shares of Silver Creek Series A preferred stock in exchange for technology licenses. On August 20, 2010 and December 17, 2010, Silver Creek issued a total of 4,190,000 shares of Silver Creek Series A preferred stock to other investors in exchange for $4,165,000, net of $25,000 of issuance costs. The Company consolidated Silver Creek on August 20, 2010, as the Company concluded that Silver Creek is a variable interest entity and the Company is the primary beneficiary. The Company has the ability to direct the activities of Silver Creek through its ownership percentage and through the board of director seats controlled by the Company and its related parties and de facto agents. As of December 31, 2011 and 2012, the Company owned 74% of the voting stock of Silver Creek and, as of December 31, 2011 and 2012, the Company recorded a non-controlling interest of $574,000 and $97,000, respectively, as a component of mezzanine equity on the Company's consolidated balance sheets based on the terms of the Silver Creek Series A preferred stock.

As of December 31, 2011, the Company consolidated Silver Creek total assets and total liabilities of $2,302,000 and $39,000, respectively. As of December 31, 2012, the Company consolidated Silver Creek total assets and total liabilities of $2,202,000 and $1,763,000, respectively.

As of December 31, 2011 and 2012, employees and directors of the Company owned approximately 6% of Silver Creek Series A preferred stock.

Merrimack Pharmaceuticals (Bermuda) Ltd.

Merrimack Pharmaceuticals (Bermuda) Ltd. was incorporated in Bermuda during 2011, is wholly owned by the Company and holds certain intellectual property rights with respect to MM-398.

9. Goodwill and Intangible Assets, Net

As part of the acquisition of Hermes, the Company recognized acquired IPR&D of $7,010,000 related to several development programs: an antibody-targeted nanotherapeutic that contains a chemotherapy drug, a nanotherapeutic that contains a chemotherapy drug and other programs in the amounts of $2,800,000, $3,400,000 and $810,000, respectively. The Company also acquired intangible assets of $3,200,000 related to core nano-carrier technology. These values were determined at the time of acquisition by estimating the costs to develop the acquired IPR&D into commercially viable products, estimating the net cash flows from such projects and discounting the net cash flows back to their present values. The probability of success factors and discount rates used for each project considered the uncertainty surrounding the successful development of the acquired IPR&D.

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Merrimack Pharmaceuticals, Inc.

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December 31, 2010, 2011 and 2012

9. Goodwill and Intangible Assets, Net (Continued)

As of December 31, 2011 and 2012, none of the IPR&D projects have reached technological feasibility nor do they have any alternative future use. Therefore, the Company has not commenced amortization of those assets. The core technology asset is being amortized on a straight-line basis over a period of ten years, which is management's best estimate of the useful life of this technology. Accordingly, the full value of the IPR&D recorded at the Acquisition Date remained unchanged as of December 31, 2011 and 2012.

Changes in the carrying value of goodwill, IPR&D and intangible assets for the years ended December 31, 2010, 2011 and 2012 were as follows:

(in thousands)	Intangible assets	IPR&D	Goodwill
Balance, December 31, 2009	3,125	7,010	3,605
Amortization	(320)		
Balance, December 31, 2010	2,805	7,010	3,605
Amortization	(320)		
Balance, December 31, 2011	$ 2,485	$ 7,010	$ 3,605
Amortization	(320)		
Balance, December 31, 2012	2,165	7,010	3,605

Definite-lived intangible assets subject to amortization consist of core technology acquired from Hermes. The Company commenced amortization of these assets as of the Acquisition Date on a straight-line basis over a period of ten years, which is the estimated useful life of this technology. Amortization expense is expected to be as follows for the next five-year period:

Years Ended December 31,	(in thousands)
2013	$ 320
2014	320
2015	320
2016	320
2017	320

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Merrimack Pharmaceuticals, Inc.

Notes to Consolidated Financial Statements (Continued)

December 31, 2010, 2011 and 2012

10. Property and Equipment, Net

Property and equipment consisted of the following:

	December 31,	
(in thousands)	**2011**	**2012**
Lab equipment	$ 11,757	$ 12,616
IT equipment	2,204	2,346
Leasehold improvements	7,698	8,200
Furniture and fixtures	329	330
Construction in process	348	1,774
	22,336	25,266
Less: Accumulated depreciation and amortization	(16,130)	(18,969)
	$ 6,206	$ 6,297

Depreciation expense was $4,059,000, $5,006,000 and $3,510,000 for the years ended December 31, 2010, 2011 and 2012, respectively.

During 2010, the Company sold fully depreciated fixed assets of $26,000, resulting in a gain on disposal. No fixed assets were disposed of or sold during 2011. During 2012, the Company disposed of $671,000 of fully depreciated assets.

In August 2004, the Company entered into an equipment financing agreement with a leasing company. The agreement involved the sale of some of the Company's fixed assets to and the leasing of those assets back from the leasing company. The Company's option to draw further on this lease facility expired during 2008. Property and equipment under capital leases as of December 31, 2011 and 2012 was $4,114,000 and $0, respectively. For the years ended December 31, 2010, 2011 and 2012, depreciation of property and equipment under capital lease totaled $409,000, $26,000 and $0, respectively.

There were no recognized impairment charges related to fixed assets in the years ended December 31, 2010, 2011 or 2012.

11. Accounts Payables, Accrued Expenses and Other

Accounts payable, accrued expenses and other as of December 31, 2011 and 2012 consisted of the following:

	December 31,	
(in thousands)	**2011**	**2012**
Accounts payable	4,656	283
Accrued goods and services	$ 9,189	$ 17,615
Accrued payroll and related benefits	3,666	5,853
Accrued interest		306
Accrued dividends payable		28
Contractual liability (Note 19)		851
Total accounts payable, accrued expenses and other	$ 17,511	$ 24,936

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Merrimack Pharmaceuticals, Inc.

Notes to Consolidated Financial Statements (Continued)

December 31, 2010, 2011 and 2012

12. Debt

Loans Payable

On November 8, 2012, the Company entered into the Loan Agreement with Hercules that provided for an initial term loan advance of $25.0 million, which closed on November 8, 2012, and an additional term loan of $15.0 million, which closed on December 14, 2012. The term loans bear interest at an annual rate equal to the greater of 10.55% and 10.55% plus the prime rate of interest minus 5.25%, but may not exceed 12.55%. Net proceeds from both advances received during the fourth quarter of 2012 were $39.6 million.

The Loan Agreement provides for interest-only payments for twelve months and repayment of the aggregate outstanding principal balance of the loans in monthly installments starting on December 1, 2013 and continuing through May 1, 2016. If the Company receives aggregate gross proceeds of at least $75 million in one or more transactions prior to December 1, 2013, including pursuant to a financing or collaboration, the Company may elect to extend the interest-only period by six months so that the aggregate outstanding principal balance of the loans would be repaid in monthly installments starting on June 1, 2014 and continuing through November 1, 2016. At the Company's option, the Company may elect to prepay all or any part of the outstanding term loans without penalty.

Upon full repayment or maturity of the loans, the Company is required to pay Hercules a fee of $1.2 million, which has been recorded as a discount to the loans and as a long-term liability on the consolidated balance sheets. Additionally, the Company reimbursed Hercules for costs incurred related to the loans of $396,000, which has been reflected as a discount to the carrying value of the loans. The Company is amortizing these loan discounts totaling $1.6 million to interest expense over the term of the loans using the effective interest method. For the year ended December 31, 2012, cash and noncash interest expense related to the Hercules loans payable was $475,000 and $78,000, respectively.

In connection with the Loan Agreement, the Company granted Hercules a security interest in all of the Company's personal property now owned or hereafter acquired, excluding intellectual property but including the proceeds from the sale, if any, of intellectual property, and a negative pledge on intellectual property. The Loan Agreement also contains certain representations, warranties and non-financial covenants of the Company. In addition, the Loan Agreement grants Hercules an option to purchase up to an aggregate of $1.0 million of the Company's equity securities sold to institutional accredited investors in a private financing within one year after the closing of the Loan Agreement upon the same terms and conditions afforded to such investors.

The Loan Agreement defines events of default to include the occurrence of an event that results in a material adverse effect upon the Company's business, operations, properties, assets or condition (financial or otherwise); the Company's ability to perform its obligations when due in accordance with the terms of the Loan Agreement, or upon the ability of Hercules to enforce any of its rights or remedies with respect to such obligations; or the collateral under the Loan Agreement or Hercules' liens on such collateral or the priority of such liens. As of December 31, 2012, there have been no events of default under the Loan Agreement. As of December 31, 2012, the Company has recorded loans payable related to the Loan Agreement of $38.5 million.

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December 31, 2010, 2011 and 2012

12. Debt (Continued)

Future minimum payments under the loans payable outstanding as of December 31, 2012 are as follows:

Years Ending December 31: **(in thousands)**	
2013	$ 5,439
2014	18,138
2015	18,123
2016	8,830
	$ 50,530
Less interest	(9,330)
Less unamortized discount	(2,720)
Less current portion	(998)
Loans payable, net of current portion	$ 37,482

The carrying value of the loans payable approximates fair value.

Silver Creek Convertible Note

On December 21, 2012, the Company's majority-owned subsidiary Silver Creek entered into a Note Purchase Agreement with certain lenders. The notes issued pursuant to the Note Purchase Agreement bear interest at 6%. The notes mature and convert, along with accrued interest, into Silver Creek Series A preferred stock on December 31, 2013. If at any time prior to maturity Silver Creek enters into a qualifying equity financing, defined as a sale or series of related sales of equity securities prior to the maturity date and resulting in at least $4.0 million of gross proceeds, the notes will automatically convert into the next qualifying equity financing at a 25% discount. The Company determined that this convertible feature met the definition of a derivative and required separate accounting treatment. The derivative was estimated to be valued at $196,000 at December 21, 2012 and December 31, 2012 using a probability-weighted model, and was recorded as derivative liability on the consolidated balance sheets.

	December 31, 2012 **(in thousands)**
Total convertible note outstanding	$ 1,571
Unamortized discount	(196)
Net carrying amount of the convertible note	1,375

13. Convertible Preferred Stock

At December 31, 2011, each share of the convertible preferred stock was convertible at the option of the holder into common stock of the Company based on a defined conversion ratio, adjustable for certain standard anti-dilution adjustments. Upon the Company's firm commitment underwritten public offering of shares of common stock with a per share offering price equal to or greater than the greater of $4.40 or 250% of the conversion price then in effect for the Series C convertible preferred stock,

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13. Convertible Preferred Stock (Continued)

which results in aggregate gross proceeds to the Company of at least $50 million, then all outstanding shares of convertible preferred stock automatically convert to shares of common stock, with dividends of approximately $4.3 million on the Series B convertible preferred stock to be declared and paid in cash.

	Convertible Preferred Stock			
	Carrying Value	Shares Outstanding	Liquidation Preference	Conversion Price
Series B	$ 14,046	3,874	$ 4.40	$ 2.85
Series C	24,459	14,424	$ 1.89	$ 1.89
Series D	28,267	8,086	$ 3.50	$ 3.50
Series E	64,531	14,991	$ 4.50	$ 4.50
Series F	59,973	11,776	$ 5.10	$ 5.10
Series G	76,949	11,000	$ 7.00	$ 7.00
Balance at December 31, 2011	$ 268,225	64,151		

In April 2012, the Company completed an initial public offering of its common stock, upon which all outstanding shares of the Company's convertible preferred stock were converted into 66,255,529 shares of common stock and $4.3 million of dividends on the Company's Series B convertible preferred stock became payable.

14. Series F Amount

During 2010, management determined that the Company may not have obtained all of the stockholder approvals required with respect to the Restated Articles of Organization that it filed with the Secretary of the Commonwealth of the Commonwealth of Massachusetts (the "Massachusetts Secretary") on November 2, 2007 (the "2007 Restated Articles"). Among other changes, the 2007 Restated Articles were intended to authorize the 11,776,000 shares of Series F convertible preferred stock (the "Series F") that the Company agreed to issue to purchasers in 2007 and 2008. In addition, the Company filed Articles of Amendment to the 2007 Restated Articles with the Massachusetts Secretary on November 5, 2009 (the "2009 Amendment") that the Company believes were ineffective as a result of the failure to obtain the requisite stockholder approvals for the 2007 Restated Articles. As a result, the Series F was not legally issued convertible preferred stock, but rather an unsettled obligation to issue Series F.

In order to properly authorize and issue the Series F, in July and August 2010, the board of directors and stockholders of the Company, respectively, approved new Restated Articles of Organization (the "2010 Restated Articles") that provided for the amendments contemplated by the 2007 Restated Articles and the 2009 Amendment. In order to provide the purchasers with shares of Series F having the economic benefit of the accruing dividends to which they would have been entitled had the Series F been properly authorized and issued as originally intended, the 2010 Restated Articles authorized the Series F in sub-series, with each sub-series corresponding to a closing date in 2007 or 2008. The preferences, limitations and relative rights of the shares of each sub-series of Series F authorized by the 2010 Restated Articles are the same as to the preferences, limitations and relative rights of the shares of Series F intended to be authorized by the 2007 Restated Articles and the 2009

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14. Series F Amount (Continued)

Amendment. The 2010 Restated Articles were filed with the Massachusetts Secretary of State on October 6, 2010.

Following the filing of the 2010 Restated Articles, the Company entered into an Exchange Agreement with each individual and entity that originally agreed to purchase shares of Series F in 2007 or 2008. Pursuant to the Exchange Agreements, the Company agreed to exchange the rights to receive the shares of Series F that it had agreed to issue in 2007 and 2008 for the same number of shares of the applicable sub-series of Series F authorized by the 2010 Restated Articles. Such exchanges were completed on October 6, 2010.

The Company recorded imputed noncash interest expense related to Series F for financial reporting purposes of $3,673,000 for the year ended December 31, 2010 due to the delayed delivery of Series F. Upon completion of the exchanges of Series F on October 6, 2010, the Company issued 11,776,000 shares of Series F. The Series F amount was relieved and the initial investment of $5.10 per share was recorded as convertible preferred stock and the accrued noncash interest expense of $12,974,000 was recorded as additional paid-in capital during the fourth quarter of 2010.

15. Stock Warrants

The following is a description of the common and convertible preferred stock warrant activity of the Company:

(in thousands, except per share amounts)	Warrants for the purchase of common stock	Weighted average exercise price	Warrants for the purchase of convertible preferred stock	Weighted average exercise price
Balance December 31, 2009	2,937	2.35	317	$ 3.42
Exercised			(11)	$ 1.89
Balance December 31, 2010	2,937	2.93	306	$ 3.48
Expired	(1)	2.47		
Exercised	(296)	2.46	(4)	$ 1.89
Balance December 31, 2011	2,640	$ 2.98	302	$ 3.50
Conversion	302	$ 3.50	(302)	$ 3.50
Expired				
Exercised	(100)	$ 2.63		
Balance December 31, 2012	2,842	$ 3.05		

During 2012, warrants to purchase 100,000 shares of common stock were cashless exercised and 71,000 shares of common stock were issued.

During 2010, 2,596,000 warrants held by a related party stockholder were modified to extend the expiration dates by 4 years and increase the exercise prices from $2.12 and $2.47 to $3.00 per share. The modification was valued using a Black-Scholes option valuation model and the Company accounted for the $1,803,000 of incremental value within additional paid-in capital.

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16. Common Stock

During 2010, the Company changed the par value of its common stock from no par to $0.01 par and recognized a $17,547,000 reduction to common stock and a corresponding increase to additional paid-in capital. During the first quarter of 2012, the Company amended its certificate of incorporation to increase the number of authorized shares of common stock to 200.0 million shares of $0.01 par value common stock. As of December 31, 2011 and 2012, the Company had 138.5 million shares and 200.0 million shares, respectively, of $0.01 par value common stock authorized. There were 11,834,000 and 95,825,000 shares of common stock issued and outstanding as of December 31, 2011 and 2012, respectively. The shares reserved for future issuance as of December 31, 2011 and 2012 consisted of the following:

(in thousands)	December 31, 2011	December 31, 2012
Conversion of Series B, Series C, Series D, Series E, Series F and Series G convertible preferred stock	66,256	
Convertible preferred stock warrants	302	
Common stock warrants	2,640	2,842
Options to purchase common stock	17,617	18,066
	86,815	20,908

17. Stock-Based Compensation

Prior to 2008, the Company granted equity awards to employees, officers and consultants under the 1999 Stock Option Plan (as amended, the "1999 Plan"). In 2008, the Company adopted the 2008 Stock Incentive Plan (as amended, the "2008 Plan") for employees, officers, directors, consultants and advisors and decided that no additional shares of common stock would be issued under the 1999 Plan. As of December 31, 2011, there were 830,000 shares of common stock available to be issued under the 2008 Plan. The 2011 Stock Incentive Plan (the "2011 Plan") became effective upon closing of the Company's initial public offering in April 2012. Upon effectiveness of the 2011 Plan, no further awards were available to be issued under the 2008 Plan. The 2011 Plan is administered by the Board of Directors of the Company and permits the Company to grant incentive and non-qualified stock options, stock appreciation rights, restricted stock, restricted stock units and other stock-based awards. The 2011 Plan increased the total number of shares of common stock available to be issued by 3.5 million, and additional awards become available for grant by reason of the forfeiture, cancellation, expiration or termination of existing awards. As of December 31, 2012, there were 1.3 million shares of common stock available to be issued under the 2011 Plan.

During the years ended December 31, 2010, 2011 and 2012, the Company issued options to purchase 2.9 million, 2.3 million and 3.3 million shares of common stock, respectively. These options generally vest over a three-year period for employees. Prior to the closing of the Company's initial public offering in April 2012, options previously granted to directors had vested immediately. After the closing of the Company's initial public offering in April 2012, options granted to directors vest over a one-year period. During the years ended December 31, 2010, 2011 and 2012, the Company also issued options to purchase less than 0.1 million shares of common stock to non-employees in each period. The

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Merrimack Pharmaceuticals, Inc.

Notes to Consolidated Financial Statements (Continued)

December 31, 2010, 2011 and 2012

17. Stock-Based Compensation (Continued)

assumptions used to estimate the fair value of options granted to non-employees at the date of grant were materially consistent with those used for employee and director grants.

The Company recognized stock-based compensation expense as follows:

	Years ended December 31,		
(in thousands)	**2010**	**2011**	**2012**
Employee awards:			
Research and development	$ 2,787	$ 3,597	$ 4,234
General and administrative	1,706	2,875	2,510
Stock-based compensation for employee awards	4,493	6,472	6,744
Stock-based compensation for nonemployee awards	58	480	145
Total stock-based compensation	$ 4,551	$ 6,952	$ 6,889

The fair value of options granted in 2010, 2011 and 2012 were estimated at the date of grant using the following assumptions:

	Years ended December 31,		
	2010	**2011**	**2012**
Risk-free interest rate	1.7 - 2.8%	1.3 - 2.5%	0.7 - 1.1%
Expected dividend yield	0%	0%	0%
Expected term	5 - 5.9 years	5 - 5.9 years	5 - 5.9 years
Expected volatility	73 - 77%	71 - 73%	66 - 72%

The Company uses the simplified method to calculate the expected term, as it does not have sufficient historical exercise data to provide a reasonable basis upon which to estimate expected term. The computation of expected volatility is based on the historical volatility of comparable companies from a representative peer group selected based on industry and market capitalization. The risk-free interest rate is based on a treasury instrument whose term is consistent with the expected life of the stock options. Management estimates expected forfeitures based on historical experience and recognizes compensation costs only for those equity awards expected to vest.

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Merrimack Pharmaceuticals, Inc.

Notes to Consolidated Financial Statements (Continued)

December 31, 2010, 2011 and 2012

17. Stock-Based Compensation (Continued)

The following table summarizes stock option activity:

	Shares	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term	Aggregate Intrinsic Value
Outstanding at December 31, 2011	17,617	$ 2.56		
Granted	3,251	$ 7.45		
Exercised	(2,622)	$ 2.06		
Cancelled	(180)	$ 4.34		
Outstanding at December 31, 2012	18,066	$ 3.50	6.54	$ 51,486
Vested and expected to vest at December 31, 2012	17,741	$ 3.43	6.49	$ 51,434
Exercisable at December 31, 2012	13,616	$ 2.52	5.70	$ 49,155

The aggregate intrinsic value was calculated as the difference between the exercise price of the stock options and the fair value of the underlying common stock as of the respective balance sheet date. The aggregate intrinsic value of options exercised in 2010, 2011 and 2012 was $145,000, $1,392,000 and $13,721,000, respectively.

As of December 31, 2012, there was $15,924,000 of total unrecognized compensation cost related to nonvested stock awards. As of December 31, 2012, the Company expects to recognize those costs over weighted average periods of approximately 2.1 years.

18. Income Taxes

As a result of losses incurred, the Company did not provide for any income taxes in the years ended December 31, 2010, 2011 and 2012. A reconciliation of the Company's effective tax rate to the statutory federal income tax rate is as follows:

	Years ended December 31,		
	2010	2011	2012
Federal statutory rate	35.0%	35.0%	35.0%
State taxes, net of Federal benefit	4.6	4.2	4.5
Permanent differences	(2.6)	(0.4)	(0.2)
Stock compensation	(2.9)	(1.2)	(0.3)
Change in valuation allowance	(39.2)	(36.3)	(35.5)
Tax credits	5.1	3.9	1.1
Foreign rate differentials		(4.4)	(4.1)
Other		(0.8)	(0.5)
	%	%	%

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Merrimack Pharmaceuticals, Inc.

Notes to Consolidated Financial Statements (Continued)

December 31, 2010, 2011 and 2012

18. Income Taxes (Continued)

Temporary differences that give rise to significant net deferred tax assets as of December 31, 2011 and 2012 are as follows:

(in thousands)	2011	2012
Deferred tax assets		
Net operating losses	$ 40,633	$ 77,806
Capitalized research and development expenses	47,640	40,083
Credit carryforwards	13,380	14,398
Depreciation	2,337	2,931
Deferred compensation	4,450	5,068
Deferred revenues	26,462	29,936
Accrued expenses	676	1,184
Other	922	1,934
Total gross deferred tax asset	136,500	173,340
Intangible assets	(3,817)	(3,689)
Valuation allowance	(132,683)	(169,651)
Net deferred taxes	$	$

At December 31, 2012, the Company had net operating loss carryforwards for federal and state income tax purposes of $210.9 million and $155.5 million, respectively. Included in the federal and state net operating loss carryforwards is approximately $10.3 million of deduction related to the exercise of stock options. This amount represents an excess tax benefit, which will be realized when it results in reduction of cash taxes in accordance with Accounting Standards Codification 718. This excess tax benefit will be directly credited to additional paid-in capital when it is realized. The Company's existing federal and state net operating loss carryforwards have begun to expire and will continue to expire through 2032. The Company also has available research and development credits for federal and state income tax purposes of approximately $11.1 million and $4.8 million, respectively. The federal and state research and development credits will begin to expire in 2022 and 2024, respectively. As of December 31, 2012, the Company also had available investment tax credits for state income tax purposes of $0.4 million, which have begun to expire and will continue to expire through 2013. The Company's management has evaluated the positive and negative evidence bearing upon the realizability of its deferred tax assets, which are comprised principally of net operating loss carryforwards, deferred revenue and capitalized research and development expenses. Under the applicable accounting standards, management has considered the Company's history of losses and concluded that it is more likely than not that the Company will not recognize the benefits of federal and state deferred tax assets. Accordingly, the Company has established a full valuation allowance against the deferred tax assets.

Utilization of the net operating loss and research and development credit carryforwards may be subject to a substantial annual limitation under Section 382 of the Internal Revenue Code of 1986, as amended (the "Internal Revenue Code"), due to ownership change limitations that have occurred previously or that could occur in the future. These ownership changes may limit the amount of net operating loss and research and development credit carryforwards that can be utilized annually to offset

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Merrimack Pharmaceuticals, Inc.

Notes to Consolidated Financial Statements (Continued)

December 31, 2010, 2011 and 2012

18. Income Taxes (Continued)

future taxable income and tax. The Company has not currently completed an evaluation of ownership changes through December 31, 2012 to assess whether utilization of the Company's net operating loss or research and development credit carryforwards would be subject to an annual limitation under Section 382 of the Internal Revenue Code. To the extent an ownership change occurs in the future, the net operating loss and credit carryforwards may be subject to limitation.

The Company concluded that there are no significant uncertain tax positions requiring recognition in the consolidated financial statements. The Company's evaluation was performed for the tax years ended December 31, 2009 through 2012, the tax years which remain subject to examination by major tax jurisdictions as of December 31, 2012. However, to the extent the Company utilizes net operating losses from years prior to 2009, the statute remains open to the extent of the net operating losses utilized. The Company annually files a federal income tax return and a state income tax return in Massachusetts. The Company's policy is to recognize interest and penalties for uncertain tax positions as a component of income tax expense. The Company has not recognized any interest and penalties historically through December 31, 2012.

The change in the valuation allowance against the deferred tax assets in the years ended December 31, 2010, 2011 and 2012 was as follows:

(in thousands)	Balance at beginning of period	Additions	Deductions	Balance at end of period
December 31, 2010	$ 81,420	22,461		$ 103,881
December 31, 2011	$ 103,881	28,802		$ 132,683
December 31, 2012	$ 132,683	36,968		$ 169,651

19. Commitments and Contingencies

Operating Leases

The Company leases its office, laboratory and manufacturing space under noncancelable operating leases. Total rent expense under these operating leases was $2,846,000, $3,235,000 and $4,317,000 for the years ended December 31, 2010, 2011 and 2012, respectively.

During March 2012, the Company entered into a facility lease amendment to further expand its office, laboratory and manufacturing space. The amendment leased additional space for a seven-year term effective March 2012. The aggregate additional rent due over the seven-year term of the lease amendment is approximately $2.7 million. As part of this amendment, the landlord agreed to reimburse the Company for a portion of tenant improvements made to the facility, up to a total of $0.5 million.

During August 2012, the Company entered into an Indenture of Lease (the "Amended Lease"), which amended and restated its facility lease, including all previous amendments. Under the Amended Lease, the Company retained its existing office, laboratory and manufacturing space at its existing facility and agreed to occupy approximately 23,000 square feet of additional space, for a total of 109,000 square feet (the "Leased Space"), all of which is leased until June 30, 2019. The aggregate minimum lease payments due over the seven-year term of the Amended Lease are approximately $31.5 million. As part of the Amended Lease, the landlord agreed to reimburse the Company for a

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Merrimack Pharmaceuticals, Inc.

Notes to Consolidated Financial Statements (Continued)

December 31, 2010, 2011 and 2012

19. Commitments and Contingencies (Continued)

portion of tenant improvements made to the facility, up to approximately $6.6 million, with approximately $4.6 million reimbursable in 2012 and $1.0 million reimbursable in each of 2013 and 2014. As a result, the Company recorded amounts receivable from the landlord of $5.6 million in prepaid expenses and other current assets and $1.0 million in other non-current assets, with a corresponding and offsetting entry recorded to deferred rent. As of December 31, 2012, the Company has received $0.6 million of these tenant improvement reimbursements. Tenant improvements recorded in deferred rent are amortized over the term of the lease as reductions to rent expense. The Amended Lease expires on June 30, 2019. The Company retains an option to renew the Amended Lease with respect to all of the Leased Space for an additional period of either one or five years.

Future minimum lease payments under noncancelable operating leases at December 31, 2012 are as follows:

Years ended December 31,	(in thousands)
2013	4,319
2014	4,439
2015	4,601
2016	4,735
2017	4,838
2018 and thereafter	7,427

Contingencies

Contractual Matter

The Company manufactures MM-121 under a license and collaboration agreement with Sanofi. Under this agreement, Sanofi reimburses the Company for direct costs incurred in manufacturing. During 2009 and 2010, the Company utilized a third party contractor to perform fill-finish manufacturing services. This third party contractor experienced U.S. Food and Drug Administration ("FDA") inspection issues with its quality control process that resulted in a formal warning letter from the FDA. Following a review by Sanofi and the Company, some MM-121 was pulled from clinical trial sites and replaced with MM-121 that was filled by a different contractor. Sanofi had requested that the Company assume financial responsibility for the MM-121 material that was pulled from clinical trial sites. The Company and Sanofi have since agreed that, beginning in April 2012 and throughout 2013, the Company will reimburse Sanofi approximately $1.2 million of previously billed amounts. The Company's revenue recognition model for manufacturing services performed under the license and collaboration agreement with Sanofi is to recognize these services over the period of performance, which is currently estimated to be 12 years from the effective date of the agreement. Removal of these previously billed amounts from the revenue recognition model and establishing this contractual liability resulted in an earnings reduction of $0.2 million for the year ended December 31, 2012. The Company has accrued $0.9 million related to this contractual matter as of December 31, 2012.

20. Related Party Transactions

In connection with the initial public offering of the Company's common stock, Sanofi, a collaborator, purchased 5,217,391 shares of the Company's common stock in April 2012.

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Merrimack Pharmaceuticals, Inc.

Notes to Consolidated Financial Statements (Continued)

December 31, 2010, 2011 and 2012

20. Related Party Transactions (Continued)

In June 2012, the Company entered into a Right of Review Agreement (the "Agreement") with Sanofi pursuant to which, if the Company determines to enter into negotiations with a third party regarding any license, option, collaboration, joint venture or similar transaction involving any therapeutic or companion diagnostic product candidate in the Company's pipeline (an "Opportunity"), the Company will notify Sanofi of such Opportunity. Following such notice, Sanofi will have a specified period of time to determine whether to exercise an additional right to exclusively negotiate an agreement with the Company with respect to such Opportunity for a specified period of time. In addition, in specified circumstances, if the Company subsequently proposes to enter into any third party agreement, the Company must first offer the same terms and conditions to Sanofi. The Agreement terminates on April 1, 2017.

In December 2012, Silver Creek entered into a $1.6 million convertible note payable, of which $0.3 million was with directors, officers, scientific advisory board members and related parties of the Company.

21. Retirement Plan

On May 31, 2002, the Company established a 401(k) defined contribution savings plan for its employees who meet certain service period and age requirements. Contributions are permitted up to the maximum allowed under the Internal Revenue Code of each covered employee's salary. The savings plan permits the Company to contribute at its discretion. For the years ended December 31, 2010, 2011 and 2012, the Company made contributions of $380,000, $487,000 and $581,000, respectively, to the plan.

22. Selected Quarterly Financial Data (Unaudited)

The following table contains quarterly financial information for 2011 and 2012. The Company believes that the following information reflects all normal recurring adjustments necessary for a fair statement of the information for the periods presented. The operating results for any quarter are not necessarily indicative of results for any future period.

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
	(in thousands, except per share data)			
2011				
Collaboration revenues	$ 6,461	$ 6,595	$ 8,582	$ 12,577
Total operating expenses	21,102	36,019	27,219	30,744
Net loss	(13,535)	(29,196)	(18,724)	(18,221)
Net loss attributable to Merrimack Pharmaceuticals, Inc.	(13,457)	(29,051)	(18,599)	(18,116)
Net loss per share available to common stockholders basic and diluted	$ (1.34)	$ (2.76)	$ (1.81)	$ (1.76)

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Merrimack Pharmaceuticals, Inc.

Notes to Consolidated Financial Statements (Continued)

December 31, 2010, 2011 and 2012

22. Selected Quarterly Financial Data (Unaudited) (Continued)

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
	(in thousands, except per share data)			
2012				
Collaboration revenues	$ 11,344	$ 12,063	$ 11,323	$ 14,191
Total operating expenses	35,379	32,368	35,197	38,719
Net loss	(23,402)	(20,139)	(23,320)	(24,893)
Net loss attributable to Merrimack Pharmaceuticals, Inc.	(23,284)	(20,026)	(23,199)	(24,768)
Net loss per share available to common stockholders basic and diluted	$ (2.14)	$ (0.22)	$ (0.25)	$ (0.26)

23. Subsequent Events

In January 2013, the Company received notice of award of $0.5 million of tax incentives from the MLSC, which will allow the Company to monetize approximately $0.4 million of state research and development tax credits. In exchange for these incentives, the Company pledged to hire an incremental 20 employees and to maintain the additional headcount through at least December 31, 2017. Failure to do so could result in the Company being required to repay some or all of these incentives.

In February 2013, the Company registered 3,353,882 additional shares of common stock related to the 2011 Plan.

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EXHIBIT INDEX

Exhibit Number	Description of Exhibit
3.1	Restated Certificate of Incorporation of the Registrant (incorporated by reference to Exhibit 4.1 to the Registrant's Registration Statement on Form S-8 filed on April 27, 2012)
3.2	Amended and Restated Bylaws of the Registrant (incorporated by reference to Exhibit 3.5 to the Registrant's Registration Statement on Form S-1, as amended, filed on January 13, 2012)
4.1	Specimen certificate evidencing shares of common stock (incorporated by reference to Exhibit 4.1 to the Registrant's Registration Statement on Form S-1, as amended, filed on October 26, 2011)
4.2*	Fifth Amended and Restated Investor Rights Agreement, dated April 6, 2011, by and among the Registrant and the other parties thereto, as amended on March 19, 2013
4.3	Warrant to purchase shares of Series D Convertible Preferred Stock, dated April 6, 2005, issued by the Registrant to Hercules Technology Growth Capital, Inc. (incorporated by reference to Exhibit 4.3 to the Registrant's Registration Statement on Form S-1, as amended, filed on July 8, 2011)
4.4	Form of warrant to purchase shares of Common Stock issued by the Registrant to General Electric Capital Corporation (incorporated by reference to Exhibit 4.6 to the Registrant's Registration Statement on Form S-1, as amended, filed on July 8, 2011)
4.5	Form of warrant to purchase shares of Common Stock issued by the Registrant to various parties expiring on December 10, 2015 (incorporated by reference to Exhibit 4.7 to the Registrant's Registration Statement on Form S-1, as amended, filed on July 8, 2011)
4.6	Form of warrant to purchase shares of Common Stock issued by the Registrant to various parties expiring on December 17, 2015 (incorporated by reference to Exhibit 4.8 to the Registrant's Registration Statement on Form S-1, as amended, filed on July 8, 2011)
4.7	Form of warrant to purchase shares of Common Stock issued by the Registrant to various parties expiring on March 10, 2016 (incorporated by reference to Exhibit 4.9 to the Registrant's Registration Statement on Form S-1, as amended, filed on July 8, 2011)
10.1#	1999 Stock Option Plan (incorporated by reference to Exhibit 10.1 to the Registrant's Registration Statement on Form S-1, as amended, filed on July 8, 2011)
10.2#	2008 Stock Incentive Plan (incorporated by reference to Exhibit 10.2 to the Registrant's Registration Statement on Form S-1, as amended, filed on July 8, 2011)
10.3#	2011 Stock Incentive Plan (incorporated by reference to Exhibit 10.3 to the Registrant's Registration Statement on Form S-1, as amended, filed on January 13, 2012)
10.4#	Form of Incentive Stock Option Agreement under 2011 Stock Incentive Plan (incorporated by reference to Exhibit 10.4 to the Registrant's Registration Statement on Form S-1, as amended, filed on January 13, 2012)
10.5#	Form of Non-Qualified Stock Option Agreement under 2011 Stock Incentive Plan (incorporated by reference to Exhibit 10.5 to the Registrant's Registration Statement on Form S-1, as amended, filed on January 13, 2012)
10.6#	Amended and Restated Employment Agreement, dated as of August 16, 2011, by and between the Registrant and Fazal R. Khan (incorporated by reference to Exhibit 10.6 to the Registrant's Registration Statement on Form S-1, as amended, filed on August 19, 2011)

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Exhibit Number	Description of Exhibit
10.7#	Employment Agreement, dated as of September 30, 2011, by and between the Registrant and William M. McClements (incorporated by reference to Exhibit 10.26 to the Registrant's Registration Statement on Form S-1, as amended, filed on January 13, 2012)
10.8#	Amended and Restated Employment Agreement, dated as of August 16, 2011, by and between the Registrant and Robert J. Mulroy (incorporated by reference to Exhibit 10.7 to the Registrant's Registration Statement on Form S-1, as amended, filed on August 19, 2011)
10.9#	Amended and Restated Employment Agreement, dated as of August 16, 2011, by and between the Registrant and Ulrik B. Nielsen (incorporated by reference to Exhibit 10.8 to the Registrant's Registration Statement on Form S-1, as amended, filed on August 19, 2011)
10.10#	Amended and Restated Employment Agreement, dated as of August 16, 2011, by and between the Registrant and Clet M. Niyikiza (incorporated by reference to Exhibit 10.9 to the Registrant's Registration Statement on Form S-1, as amended, filed on August 19, 2011)
10.11#	Amended and Restated Employment Agreement, dated as of August 16, 2011, by and between the Registrant and Edward J. Stewart (incorporated by reference to Exhibit 10.10 to the Registrant's Registration Statement on Form S-1, as amended, filed on August 19, 2011)
10.12#	Amended and Restated Employment Agreement, dated as of August 16, 2011, by and between the Registrant and William A. Sullivan (incorporated by reference to Exhibit 10.11 to the Registrant's Registration Statement on Form S-1, as amended, filed on August 19, 2011)
10.13#	Form of Indemnification Agreement between the Registrant and each director and executive officer (incorporated by reference to Exhibit 10.12 to the Registrant's Registration Statement on Form S-1, as amended, filed on August 19, 2011)
10.14*	Indenture of Lease, dated as of August 24, 2012, by and between the Registrant and RB Kendall Fee, LLC, as amended on March 18, 2013
10.15*	Sublease, dated as of August 20, 2010, by and between Silver Creek Pharmaceuticals, Inc. and FibroGen, Inc., as amended on January 20, 2011, May 4, 2011, May 26, 2011, August 1, 2011 and November 2, 2012
10.16	Patent License Agreement, dated as of February 20, 2008, by and between the Registrant and the United States Public Health Service (incorporated by reference to Exhibit 10.15 to the Registrant's Registration Statement on Form S-1, as amended, filed on October 26, 2011)
10.17	License Agreement, dated as of September 26, 2005, by and between the Registrant (as successor-in-interest to Hermes BioSciences, Inc.) and Merrimack Pharmaceuticals (Bermuda) Ltd. (as assignee from PharmaEngine, Inc.), as amended on June 30, 2011 (incorporated by reference to Exhibit 10.16 to the Registrant's Registration Statement on Form S-1, as amended, filed on October 26, 2011)
10.18	Assignment, Sublicense and Collaboration Agreement, dated as of May 5, 2011, by and between Merrimack Pharmaceuticals (Bermuda) Ltd. and PharmaEngine, Inc. (incorporated by reference to Exhibit 10.17 to the Registrant's Registration Statement on Form S-1, as amended, filed on October 26, 2011)

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Exhibit Number	Description of Exhibit
10.19	License and Collaboration Agreement, dated as of September 30, 2009, by and between the Registrant and Sanofi, as amended on February 18, 2011 (incorporated by reference to Exhibit 10.18 to the Registrant's Registration Statement on Form S-1, as amended, filed on October 26, 2011)
10.20	Right of Review Agreement, dated as of June 14, 2012, by and between the Registrant and Sanofi (incorporated by reference to Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q filed on August 14, 2012)
10.20	Commercial License Agreement, dated as of June 6, 2008, by and between the Registrant and Selexis SA (incorporated by reference to Exhibit 10.19 to the Registrant's Registration Statement on Form S-1, as amended, filed on July 8, 2011)
10.21	Exclusive License Agreement, dated as of November 1, 2000, by and between the Registrant (as successor-in-interest to Hermes BioSciences, Inc.) and The Regents of the University of California, as amended on October 6, 2003, September 13, 2006, June 6, 2007 and September 28, 2007 (incorporated by reference to Exhibit 10.20 to the Registrant's Registration Statement on Form S-1, as amended, filed on October 26, 2011)
10.22	Exclusive License Agreement, dated as of March 16, 2005, by and between the Registrant and The Regents of the University of California, as amended on November 17, 2009 (incorporated by reference to Exhibit 10.21 to the Registrant's Registration Statement on Form S-1, as amended, filed on October 26, 2011)
10.23	Collaboration Agreement, dated as of November 16, 2009, by and between the Registrant and Adimab LLC, as amended on April 27, 2010, June 2, 2010 and October 11, 2011 (incorporated by reference to Exhibit 10.22 to the Registrant's Registration Statement on Form S-1, as amended, filed on October 26, 2011)
10.24	Sublicense Agreement, dated as of June 30, 2008, by and between the Registrant and Dyax Corp. (incorporated by reference to Exhibit 10.23 to the Registrant's Registration Statement on Form S-1, as amended, filed on July 8, 2011)
10.25	Amended and Restated Collaboration Agreement, dated as of January 24, 2007, by and between the Registrant and Dyax Corp., as amended on July 31, 2008 and November 6, 2009 (incorporated by reference to Exhibit 10.24 to the Registrant's Registration Statement on Form S-1, as amended, filed on October 26, 2011)
10.26*	Amendment to Amended and Restated Collaboration Agreement, dated as of January 18, 2012, by and between the Registrant and Dyax Corp.
10.27	Loan and Security Agreement, dated as of November 8, 2012, by and between the Registrant and Hercules Technology Growth Capital, Inc. (incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed on November 14, 2012)
21.1*	Subsidiaries of the Registrant
23.1*	Consent of PricewaterhouseCoopers LLP, an independent registered public accounting firm
31.1*	Certification of Principal Executive Officer pursuant to Rule 13a-14(a) or Rule 15d-14(a) of the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
31.2*	Certification of Principal Financial Officer pursuant to Rule 13a-14(a) or Rule 15d-14(a) of the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
32.1*	Certification of Principal Executive Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002

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Exhibit Number	Description of Exhibit
32.2*	Certification of Principal Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
101.INS+	XBRL Instance Document
101.SCH+	XBRL Taxonomy Extension Schema Document
101.CAL+	XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF+	XBRL Taxonomy Extension Definition Linkbase Document
101.LAB+	XBRL Taxonomy Extension Label Linkbase Database
101.PRE+	XBRL Taxonomy Extension Presentation Linkbase Document

*
Filed herewith.

#
Management contract or compensatory plan, contract or agreement.

Confidential treatment requested as to portions of the exhibit. Confidential materials omitted and filed separately with the Securities and Exchange Commission.

+
Furnished herewith.