

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

Amendment No. 2  
FORM S-1  
REGISTRATION STATEMENT  
UNDER  
THE SECURITIES ACT OF 1933

**Idera Pharmaceuticals, Inc.**

(Exact name of registrant as specified in its charter)

Delaware  
(State or other jurisdiction of  
incorporation or organization)

2836  
(Primary Standard Industrial  
Classification Code Number)

04-3072298  
(I.R.S. Employer  
Identification Number)

167 Sidney Street  
Cambridge, Massachusetts 02139  
(617) 679-5500

(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

Sudhir Agrawal, D. Phil.  
Chairman of the Board of Directors, President  
and Chief Executive Officer  
Idera Pharmaceuticals, Inc.  
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(617) 679-5500

(Name, address, including zip code, and telephone number, including area code, of agent for service)

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**Approximate date of commencement of proposed sale to the public:** As soon as practical after this Registration Statement becomes effective.

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

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

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

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

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

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

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

SUBJECT TO COMPLETION, DATED MAY 1, 2013

PRELIMINARY PROSPECTUS

## Idera Pharmaceuticals, Inc.

### \$15,000,000 Common Stock



## Warrants to Purchase Common Stock

We are offering \$15,000,000 of shares of our common stock and warrants to purchase up to \_\_\_\_\_ shares of our common stock (and the shares of common stock that are issuable from time to time upon exercise of the warrants). Each share of common stock is being sold together with a warrant to purchase up to \_\_\_\_\_ shares of our common stock at an exercise price of \$ \_\_\_\_\_ per share. The shares of common stock and warrants are immediately separable and will be issued separately in this offering.

We are also offering to those purchasers, which propose to purchase shares of common stock in this offering that would result in the purchaser, together with its affiliates and certain related parties, beneficially owning more than 9.9% of our outstanding common stock following the consummation of this offering, the opportunity to purchase, in lieu of the shares of our common stock that would result in ownership in excess of 9.9%, warrants to purchase such excess shares of our common stock. The purchase price for each such pre-funded warrant would equal the per share public offering price for the common stock in this offering less the \$0.01 per share exercise price of each such pre-funded warrant, and the exercise price of these pre-funded warrants would equal \$0.01 per share. Purchasers of these pre-funded warrants would receive the warrants described above together with the pre-funded warrants as if such purchasers had purchased shares of our common stock in this offering.

Our common stock is listed on the Nasdaq Capital Market under the symbol "IDRA." The last sale price of our common stock on April 29, 2013, as reported by the Nasdaq Capital Market, was \$0.73 per share. We do not intend to list the warrants on the Nasdaq Capital Market, any other national securities exchange or any other nationally recognized trading system.

Investing in our common stock involves risks. Please read carefully the section entitled "[Risk Factors](#)" beginning on page 8 of this prospectus.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined if this prospectus is truthful or complete. Any representation to the contrary is a criminal offense.

	Per Share	Per Warrant	Per Pre-Funded Warrant	Total
Public Offering Price	\$	\$	\$	\$
Underwriting Discounts and Commissions(1)	\$	\$	\$	\$
Proceeds to Us, Before Expenses	\$	\$	\$	\$

(1) In addition to underwriting discounts and commissions payable by us, we have agreed to reimburse the underwriters for expenses up to \$150,000. See "Underwriting."

The above summary of offering proceeds to us does not give effect to any issuance of the pre-funded warrants or any exercise of the warrants being issued in this offering.

Certain of our existing principal stockholders and their affiliated entities have indicated an interest in purchasing up to \$2.5 million of shares of our common stock and warrants to purchase shares of our common stock in this offering at the public offering price. However, because indications of interest are not binding agreements or commitments to purchase, the underwriters could determine to sell more, less or no shares and warrants to any of these existing principal stockholders and any of these existing principal stockholders could determine to purchase more, less or no shares and warrants in this offering.

The underwriter expects to deliver the shares of common stock and warrants against payment on or about \_\_\_\_\_, 2013.

# Piper Jaffray

Prospectus dated \_\_\_\_\_, 2013

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You should rely only on the information contained in this prospectus or in any free writing prospectus we may authorize to be delivered or made available to you. We have not authorized anyone to provide you with different information. We are offering to sell, and seeking offers to buy, shares of our common stock and warrants only in jurisdictions where offers and sales are permitted. The information in this prospectus is accurate only as of the date of this prospectus, regardless of the time of delivery of this prospectus or any sale of shares of our common stock or warrants.

For investors outside the United States: We have not and the underwriters have not done anything that would permit this offering or possession or distribution of this prospectus in any jurisdiction where action for that purpose is required, other than in the United States. Persons outside the United States who come into possession of this prospectus must inform themselves about, and observe any restrictions relating to, the offering of the shares of common stock and the distribution of this prospectus outside the United States.

## PROSPECTUS SUMMARY

*This summary highlights information contained elsewhere in this prospectus. This summary does not contain all of the information you should consider before investing in our securities. You should read this entire prospectus carefully, especially the “Risk Factors” section beginning on page 8 and our financial statements and the related notes appearing at the end of this prospectus, before making an investment decision.*

*As used in this prospectus, unless the context otherwise requires, references to “we,” “us,” “our” and “Idera Pharmaceuticals” refer to the operations of Idera Pharmaceuticals, Inc.*

### Overview

We are a clinical stage biotechnology company engaged in the discovery and development of novel synthetic DNA- and RNA-based drug candidates that are designed to modulate immune responses mediated through Toll-like Receptors, or TLRs. We are focusing our development efforts on the treatment of autoimmune and inflammatory diseases. We have two drug candidates, IMO-3100, a TLR7 and TLR9 antagonist, and IMO-8400, a TLR7, TLR8, and TLR9 antagonist, in clinical development for the treatment of autoimmune and inflammatory diseases. In December 2012, we announced top-line data from a Phase 2 clinical trial of IMO-3100 in patients with moderate to severe plaque psoriasis. We believe that the results of this trial provide clinical proof of concept for our approach of targeting specific TLRs for the treatment of psoriasis and potentially other autoimmune and inflammatory diseases.

TLRs are specific receptors present in immune system cells. Using a chemistry-based approach, we have created synthetic DNA- and RNA-based compounds that are targeted to TLR3, TLR7, TLR8, and TLR9. A TLR antagonist is a compound that blocks activation of an immune response through the targeted TLR. A TLR agonist is a compound that stimulates an immune response through the targeted TLR.

We believe that the modulation of immune responses through TLRs provides a rationale for the development of drug candidates to treat a broad range of diseases, including autoimmune and inflammatory diseases, cancer and respiratory diseases, and for use as vaccine adjuvants. We are a party to a collaboration alliance with Merck Sharp & Dohme Corp. (formerly Merck & Co., Inc.), or Merck & Co., for the use of agonists of TLR7, TLR8, and TLR9 as adjuvants in the development of vaccines for cancer, infectious diseases, and Alzheimer’s disease. We are seeking to enter into additional collaborative alliances with third parties with respect to our TLR-targeted programs in oncology, hematological malignancies, respiratory diseases, and the use of TLR3 agonists as vaccine adjuvants.

***Autoimmune and Inflammatory Disease Program.*** In December 2012, we announced top-line data from a randomized double-blinded, placebo-controlled Phase 2 clinical trial of IMO-3100 that we conducted in 44 adult patients with moderate to severe plaque psoriasis. In this Phase 2 trial, patients received doses of IMO-3100 once weekly for four weeks. In addition, in this Phase 2 trial, IMO-3100 showed clinical activity in patients with psoriasis. We believe that the results of this trial provide clinical proof of concept for our approach of targeting specific TLRs for the treatment of psoriasis and potentially other autoimmune and inflammatory diseases.

We are conducting a Phase 1 clinical trial to evaluate the safety and pharmacodynamics of IMO-8400 in healthy subjects. The first portion of the trial involved escalating single doses of IMO-8400 and the

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second portion of the trial involved four weekly doses of IMO-8400. We completed dosing in the escalating single-dose portion of this trial in the first quarter of 2013. In this portion of the trial, IMO-8400 was well-tolerated and showed target engagement of TLR7, TLR8, and TLR9 in these subjects. In the second quarter of 2013, we completed dosing in the multiple-dose portion of the trial. We anticipate data from the multiple-dose portion of this trial later in the second quarter of 2013.

Based on the clinical activity of IMO-3100 observed in our four-week Phase 2 clinical trial of IMO-3100 in patients with psoriasis, we have determined that the next step in our development program is to conduct a Phase 2 clinical trial in patients with psoriasis with a treatment period of up to 12 weeks. Based on our evaluation of the comparative profiles of IMO-3100 and IMO-8400, including the engagement of TLR8 by IMO-8400, we have determined to focus our resources on the development of IMO-8400 and to conduct this trial in patients with psoriasis with IMO-8400. We expect that we could initiate this trial as early as the second quarter of 2013 and could have top-line data by the end of 2013. However, we do not plan to initiate this trial unless and until we have completed this offering and raised the necessary proceeds to fund this trial and until we have confirmed the successful completion of our ongoing Phase 1 trial of IMO-8400.

We are also planning to initiate a signal-seeking Phase 2 clinical trial of IMO-8400 in patients with lupus and are considering conducting a proof-of-concept study of IMO-8400 in an orphan autoimmune disease indication. We expect to select the orphan autoimmune disease indication for further exploration in the second half of 2013. However, our plans to conduct the Phase 2 clinical trial of IMO-8400 in patients with lupus and the proof-of-concept study are subject to successful completion of our ongoing Phase 1 trial of IMO-8400 and our ability to raise additional funding beyond the proceeds of this offering to fund the conduct of this Phase 2 trial and proof-of-concept study. We expect to seek such funding through public or private equity offerings, debt financings, collaborations and licensing arrangements or other sources.

***Vaccine Adjuvant Collaboration.*** In January 2012, we announced that Merck & Co. had selected several of our TLR7, TLR8 or TLR9 agonists for evaluation and use as vaccine adjuvant candidates in the fields of cancer, infectious diseases, and Alzheimer's disease.

***Additional Programs.*** In addition to our TLR program in autoimmune and inflammatory diseases, and our collaboration with Merck & Co. for the use of TLR7, TLR8, and TLR9 agonists as vaccine adjuvants, we have identified TLR drug candidates for applications in the treatment of cancer, hematological malignancies and respiratory diseases, and created TLR3 agonists for use as vaccine adjuvants. We have also created gene silencing oligonucleotides, or GSOs, which are designed to inhibit the production of disease-associated proteins by targeting RNA. We believe our GSO technology provides us with a platform from which drug candidates for multiple disease indications can be developed. We are seeking to enter into collaborations with third parties to advance these drug candidates and technology platform. Except in connection with collaborations, we do not plan to expend any additional resources on these programs.

### **Risk Factors**

Our business is subject to numerous risks and uncertainties. As a clinical stage biotechnology company, we face many risks inherent in our business and our industry generally, including the risks and uncertainties described below. You should carefully consider all of the information set forth in this prospectus and, in particular, the information under the heading "Risk Factors," prior to making an investment in our securities.

- We are heavily dependent on the development of our clinical stage lead TLR-targeted drug candidates, IMO-3100 and IMO-8400, and on our collaborative alliance with Merck & Co.
- We need to raise substantial additional funds to conduct research and development, including preclinical testing and clinical trials of our drug candidates, and to fund our operations. Additional financing may not be available to us in the timeframe or amounts that we need, on terms that are acceptable to us or at all. Our independent auditors have expressed substantial doubt about our ability to continue as a going concern.
- Our common stock would be delisted from the Nasdaq Capital Market on May 22, 2013 if we fail to satisfy the continued listing requirements by such date.
- We have incurred substantial losses and expect to continue to incur losses, and we may not be successful in reversing this trend.
- We may not be able to successfully develop and commercialize our drug candidates if our clinical trials are unsuccessful, or if they are delayed or terminated.
- We may not be able to obtain marketing approval for products resulting from our development efforts.
- The value of our technology and products is dependent on our ability to protect our intellectual property rights.

### **Our Corporate Information**

Our executive offices are located at 167 Sidney Street, Cambridge, MA 02139, our telephone number is (617) 679-5500 and our Internet address is [www.iderapharma.com](http://www.iderapharma.com). The information on our website is not incorporated by reference in this prospectus and should not be considered to be part of this prospectus. Our website address is included in this prospectus as an inactive technical reference only.

Idera® and IMO® are our trademarks. All other trademarks and service marks appearing in this registration statement are the property of their respective owners.

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**The Offering**

Common stock offered by us	\$15,000,000 of shares of common stock. Each share of common stock is being sold together with a warrant to purchase up to _____ shares of our common stock.
Warrants offered by us	Warrants to purchase up to _____ shares of our common stock. Each warrant will have an exercise price of \$ _____ per share, will be exercisable upon issuance and will expire from the date of issuance. This prospectus also relates to the offering of shares of common stock issuable upon exercise of the warrants.
Pre-funded warrants offered by us	If the issuance of shares of our common stock to a purchaser in this offering would result in such purchaser, together with its affiliates and certain related parties, beneficially owning more than 9.9% of our outstanding common stock following the consummation of this offering, then such purchaser may purchase, in lieu of the shares of our common stock that would result in such excess ownership, a warrant to purchase shares of our common stock for a purchase price per share of common stock subject to such warrant equal to the per share public offering price for the common stock in this offering less the \$0.01 per share exercise price of such warrant. Each pre-funded warrant will have an exercise price of \$0.01 per share, will be exercisable upon issuance and will expire _____ from the date of issuance. Purchasers of these pre-funded warrants would receive the warrants described above as if such purchasers were buying shares of our common stock in this offering. This prospectus also relates to the offering of the shares of common stock issuable upon exercise of these pre-funded warrants.
Common stock to be outstanding after this offering	_____ shares.
Use of proceeds	We intend to use the net proceeds to us from this offering, together with our existing cash resources, to fund our planned Phase 2 clinical trial of IMO-8400 in patients with psoriasis and for working capital and other general corporate purposes. See "Use of Proceeds" for more information.
Risk factors	You should read the "Risk Factors" section and other information included in this prospectus for a discussion of factors to consider carefully before deciding to invest in shares of our common stock.



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Nasdaq Capital Market listing

Our common stock is listed on the Nasdaq Capital Market under the symbol "IDRA." We do not intend to list the warrants or pre-funded warrants on the Nasdaq Capital Market, any other nationally recognized securities exchange or any other nationally recognized trading system.

The number of shares of our common stock to be outstanding after this offering set forth above is based on 27,642,969 shares of our common stock outstanding as of December 31, 2012.

Certain of our existing principal stockholders and their affiliated entities have indicated an interest in purchasing up to \$2.5 million of shares of our common stock and warrants to purchase shares of our common stock in this offering at the public offering price. However, because indications of interest are not binding agreements or commitments to purchase, the underwriters could determine to sell more, less or no shares and warrants to any of these existing principal stockholders and any of these existing principal stockholders could determine to purchase more, less or no shares and warrants in this offering.

Unless otherwise indicated, all information in this prospectus, including the number of shares of our common stock to be outstanding after this offering set forth above, excludes the shares of common stock issuable upon exercise of the warrants being offered by us in this offering and also excludes the following:

- 5,657,256 shares of common stock issuable upon exercise of stock options outstanding as of December 31, 2012, at a weighted-average exercise price of \$4.96 per share;
- 2,413,469 shares of common stock reserved as of December 31, 2012 for future issuance under our equity incentive plans;
- 1,926 shares of common stock reserved as of December 31, 2012 for issuance upon any conversion of our outstanding Series A convertible preferred stock, or Series A preferred stock;
- 6,266,175 shares of common stock reserved as of December 31, 2012 for issuance upon any conversion of our outstanding Series D redeemable convertible preferred stock, or Series D preferred stock;
- 8,484,840 shares of common stock reserved as of December 31, 2012 for issuance upon any conversion of our outstanding Series E convertible preferred stock, or Series E preferred stock; and
- 12,923,892 shares of common stock issuable upon exercise of warrants outstanding as of December 31, 2012, at a weighted average exercise price of \$1.24 per share.

In addition, unless otherwise indicated, this prospectus also reflects and assumes the following:

- no exercise of outstanding options or warrants; and
- no issuance of pre-funded warrants.

### Summary Financial Data

The following table sets forth a summary of our historical financial data at the date and for the periods indicated. The summary historical financial data presented below for the years ended December 31, 2012, 2011 and 2010 and as of December 31, 2012 have been derived from our audited financial statements, which are included elsewhere in this prospectus. The summary historical financial data presented below for the years ended December 31, 2009 and 2008 are derived from audited financial statements, which are not included in this prospectus. Our historical results are not necessarily indicative of results to be expected in any future period.

The summary historical financial data presented below should be read in conjunction with “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and our financial statements and the related notes thereto, which are included elsewhere in this prospectus. The summary historical financial data in this section is not intended to replace our financial statements or the related notes thereto.

	Year Ended December 31,				
	2012	2011	2010	2009	2008
	(In thousands, except per share data)				
Alliance revenue	\$ 51	\$ 53	\$ 16,110	\$ 34,518	\$ 26,450
Operating expenses:					
Research and development	13,673	17,969	24,226	18,570	16,152
General and administrative	6,279	7,939	9,867	8,561	9,798
Total operating expenses	19,952	25,908	34,093	27,131	25,950
(Loss) income from operations	(19,901)	(25,855)	(17,983)	7,387	500
Other income (expense):					
Decrease in fair value of warrant liability	675	1,974	—	—	—
Investment income, net	9	30	116	145	1,344
Interest expense	—	—	(2)	(3)	(92)
Foreign currency exchange (loss) gain	(23)	75	(94)	(27)	(267)
(Loss) income before income taxes	(19,240)	(23,776)	(17,963)	7,502	1,485
Income tax benefit	—	—	—	44	24
Net (loss) income	\$ (19,240)	\$ (23,776)	\$ (17,963)	\$ 7,546	\$ 1,509
Preferred stock accretion and dividends	3,210	4,548	—	—	—
Net (loss) income applicable to common stockholders	\$ (22,450)	\$ (28,324)	\$ (17,963)	\$ 7,546	\$ 1,509
Basic net (loss) income per share applicable to common stockholders	\$ (0.81)	\$ (1.03)	\$ (0.71)	\$ 0.32	\$ 0.07
Diluted net (loss) income per share applicable to common stockholders	\$ (0.81)	\$ (1.03)	\$ (0.71)	\$ 0.31	\$ 0.06
Shares used in computing basic net (loss) income per common share applicable to common stockholders <sup>(1)</sup>	27,639	27,623	25,139	23,420	22,655
Shares used in computing diluted net (loss) income per common share applicable to common stockholders <sup>(1)</sup>	27,639	27,623	25,139	24,079	25,331

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	As of December 31, 2012	
	Actual	As Adjusted <sup>(2)</sup> (unaudited)
(In thousands)		
<b>Balance Sheet Data:</b>		
Cash, cash equivalents and investments	\$ 10,096	\$ 23,369
Working capital	6,163	19,436
Total assets	10,823	24,096
Capital lease obligations	12	12
Redeemable preferred stock	5,921	5,921
Accumulated deficit	(394,658)	(394,658)
Total stockholders' equity	706	13,979

<sup>1)</sup> Computed on the basis described in Note 11 of notes to financial statements appearing elsewhere in this prospectus.

<sup>2)</sup> As adjusted to reflect our issuance and sale in this offering of \$15,000,000 of shares of common stock and warrants to purchase \_\_\_\_\_ shares of our common stock at an assumed combined public offering price of \$0.73 per share of common stock and related warrant, which price was the last reported sale price of our common stock on the Nasdaq Capital Market on April 29, 2013, after deducting the estimated underwriting discounts and commissions and estimated offering expenses payable by us and excluding the proceeds, if any, from the exercise of the warrants issued pursuant to this offering.

## RISK FACTORS

*Investing in our securities involves a high degree of risk. You should carefully consider the risks described below, together with all of the other information included in this prospectus, before making an investment decision. Our business, financial condition and results of operations could be materially and adversely affected by any of these risks or uncertainties. In that case, the market price of our common stock could decline, and you may lose all or part of your investment.*

### **Risks Relating to Our Financial Results and Need for Financing**

***We will need additional financing, which may be difficult to obtain. Our failure to obtain necessary financing or doing so on unattractive terms could result in the termination of our operations and the sale and license of our assets or otherwise adversely affect our research and development programs and other operations.***

We had cash and cash equivalents of approximately \$10.1 million at December 31, 2012. We believe that without the proceeds of this offering our existing cash and cash equivalents would only be sufficient to fund our operations at least into the third quarter of 2013 based on our current operating plan, including the completion of our ongoing Phase 1 clinical trial of IMO-8400 in healthy subjects that we initiated in the fourth quarter of 2012, and preparations for the further advancement of our autoimmune and inflammatory disease program. We believe, however, that the net proceeds of this offering, together with our existing cash and cash equivalents, will enable us to fund our operations at least through the fourth quarter of 2014. Specifically, we believe that our available funds following this offering will be sufficient to enable us to conduct our planned Phase 2 clinical trial of IMO-8400 in patients with psoriasis and to plan for further clinical development of IMO-8400. We expect that these funds will not be sufficient to enable us to conduct, and we do not plan to conduct, any other clinical development of IMO-8400 or to conduct any other development of our other product candidates or technologies, including IMO-3100. It is also possible that we will not achieve the progress that we expect with respect to IMO-8400 because the actual costs and timing of clinical development activities are difficult to predict and are subject to substantial risks and delays.

We expect that we will require substantial additional funds beyond the proceeds of this offering to conduct research and development, including preclinical testing and clinical trials of our drug candidates and to fund our operations. We are seeking and expect to continue to seek additional funding through collaborations, the sale or license of assets or financings of equity or debt securities. We believe that the key factors that will affect our ability to obtain funding are:

- the results of our clinical and preclinical development programs, including the top-line results of the Phase 2 trial of IMO-3100 and anticipated results of the ongoing Phase 1 clinical trial of IMO-8400;
- developments related to our existing collaboration with Merck & Co.;
- our ability to maintain the listing of our common stock on the Nasdaq Capital Market or an alternative national securities exchange;
- the cost, timing, and outcome of regulatory reviews;
- competitive and potentially competitive products and technologies and investors' receptivity to our drug candidates and the technology underlying them in light of competitive products and technologies;
- the receptivity of the capital markets to financings by biotechnology companies generally and companies with drug candidates and technologies such as ours specifically; and
- our ability to enter into additional collaborations with biotechnology and pharmaceutical companies and the success of such collaborations.

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In addition, increases in expenses or delays in clinical development may adversely impact our cash position and require additional funds or further cost reductions.

Additional financing may not be available to us when we need it or may not be available to us on favorable or acceptable terms or at all. We could be required to seek funds through collaborative alliances or through other means that may require us to relinquish rights to some of our technologies, drug candidates or drugs that we would otherwise pursue on our own. In addition, if we raise additional funds by issuing equity securities, our then existing stockholders will experience dilution. The terms of any financing may adversely affect the holdings or the rights of existing stockholders. An equity financing that involves existing stockholders may cause a concentration of ownership. 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 are likely to include rights that are senior to the holders of our common stock. Any additional debt financing or equity that we raise may contain terms, such as liquidation and other preferences, or liens or other restrictions on our assets, which are not favorable to us or our stockholders.

If we are unable to obtain adequate funding on a timely basis or at all, we will be required to terminate, modify or delay preclinical or clinical trials of one or more of our drug candidates, significantly curtail or terminate discovery or development programs for new drug candidates, relinquish rights to portions of our technology, drug candidates and/or products or terminate our operations and pursue a liquidation of the company through a sale or license of assets or a possible bankruptcy.

***Our independent auditors have expressed substantial doubt about our ability to continue as a going concern.***

We have received a report from Ernst & Young LLP, our independent registered public accounting firm, regarding our financial statements as of December 31, 2012 and for the fiscal year then ended, which included an explanatory paragraph stating that the financial statements were prepared assuming we will continue as a going concern. The report also stated that our recurring losses and negative cash flows from operations will require us to raise additional capital or obtain alternative means of financial support, or both, prior to December 31, 2013 in order to continue to fund our operations. These factors raise substantial doubt about our ability to continue as a going concern. As, without the proceeds of this offering, we only have cash resources to fund our operations into the third quarter of 2013, we will need to raise substantial additional funds in order to conduct research and development, including preclinical testing and clinical trials of our drug candidates, and to fund our operations. The going concern explanatory paragraph included in our auditor's report on our financial statements could inhibit our ability to finance our operations. If we are unable to obtain adequate funding on a timely basis or at all, we will be required to terminate, modify or delay preclinical or clinical trials of one or more of our drug candidates, significantly curtail or terminate discovery or development programs for new drug candidates, relinquish rights to portions of our technology, drug candidates and/or products or terminate our operations and pursue a liquidation of the company through a sale or license of assets or a possible bankruptcy.

***We must meet the Nasdaq Capital Market continued listing requirements or we risk delisting. If our common stock is delisted, our stock price may decline and it will likely make it more difficult for us to sell securities in a financing and for our stockholders to trade our stock.***

Our common stock began trading on the Nasdaq Capital Market on February 7, 2013. In order to continue the listing of our common stock on the Nasdaq Capital Market, we are required to satisfy the \$2.5 million stockholders' equity requirement on or before May 22, 2013 and to otherwise meet the continued listing requirements of the Nasdaq Capital Market. If we do not meet these requirements by such date, our common stock will be delisted.

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Prior to February 7, 2013, our common stock was traded on the Nasdaq Global Market where we were required to meet specified financial requirements, including requirements that we maintain a minimum closing bid price of at least \$1.00 per share for our common stock and that we maintain a minimum stockholders' equity of \$10.0 million or a minimum market value of listed securities of \$50.0 million. On June 7, 2012, we received a notification letter from the Nasdaq Listing Qualifications staff of the Nasdaq Stock Market advising us that we were not in compliance with the \$50.0 million minimum market value of listed securities requirement for continued listing on the Nasdaq Global Market pursuant to Nasdaq Listing Rule 5450(b)(2)(A). Nasdaq also noted in its letter that we did not satisfy the alternative requirement under Nasdaq Listing Rule 5450(b)(1)(A), which requires registrants to maintain a minimum of \$10.0 million in stockholders' equity. Nasdaq also stated in its letter that, in accordance with Nasdaq Listing Rule 5810(c)(3)(C), we had been provided a compliance period of 180 calendar days, or until December 4, 2012, to regain compliance with the minimum \$50.0 million market value continued listing requirement.

On December 5, 2012, we received a letter from the Listing Qualifications Staff of the Nasdaq Stock Market advising us that we had not regained compliance with the minimum \$50.0 million market value of listed securities requirement set forth in Nasdaq Listing Rule 5450(b)(2)(A) or the minimum \$10.0 million stockholders' equity alternative continued listing requirement set forth in Nasdaq Listing Rule 5450(b)(1)(A), and that, unless we requested a hearing before the Panel trading in our common stock would be suspended at the opening of business on December 14, 2012, and our common stock would be delisted from the Nasdaq Global Market. We requested a hearing before the Nasdaq Listing Qualifications Hearings Panel, or the Panel, at which we requested continued listing pending our return to compliance. Our hearing request stayed the suspension of trading and delisting of our common stock pending the conclusion of the hearing process. On February 5, 2013, the Panel granted our request to transfer the listing of our common stock from the Nasdaq Global Market to the Nasdaq Capital Market and to continue the listing of our common stock on the Nasdaq Capital Market, provided that we have satisfied the \$2.5 million stockholders' equity requirement on or before March 31, 2013, and have otherwise met the continued listing requirements of the Nasdaq Capital Market. On March 5, 2013, we received a revised determination from the Panel indicating that the Panel had extended the date by which we are required to satisfy the \$2.5 million stockholders' equity requirement for continued listing on that market and otherwise meet the continued listing requirements of the Nasdaq Capital Market from March 31, 2013 to May 22, 2013. In addition, by May 22, 2013, we are required to provide the Panel with additional information regarding our projected burn-rate and stockholders' equity through May 31, 2014.

In addition, on November 26, 2012, we received a letter from the Listing Qualifications Staff of the Nasdaq Stock Market indicating that, based on the closing bid price of our common stock for the 30 consecutive business days prior to November 26, 2012, we no longer satisfied the requirement that our common stock maintain a minimum bid price of \$1.00 per share as required by Nasdaq Listing Rule 5450(a)(1). Nasdaq stated in its letter that in accordance with Nasdaq Listing Rule 5810(c)(3)(A), we had been provided 180 calendar days, or until May 28, 2013, to regain compliance with the minimum bid price requirement. The Nasdaq letter stated that if, at any time before May 28, 2013, the closing bid price of our common stock is at or above \$1.00 per share for a minimum of 10 consecutive business days, we will be deemed to have regained compliance with the minimum bid price requirement and the matter will be closed. If we do not regain compliance with the minimum bid price requirement by May 28, 2013, Nasdaq will provide us with a written notification that our common stock is subject to delisting. We may be eligible to receive an additional 180 day grace period (for a total of 360 days from November 26, 2012) to regain compliance with the minimum bid price requirement provided that we satisfy the continued listing standard for market value of publicly held shares and all other applicable initial listing standards for the Nasdaq Capital Market, other than the minimum bid price requirement, as of May 28, 2013.

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If our common stock is delisted from Nasdaq, it may be eligible to trade on the Over-The-Counter Bulletin Board, which may be a less liquid market, or on the pink sheets. In such case, our stockholders' ability to trade, or obtain quotations of the market value of, shares of our common stock would be severely limited because of lower trading volumes and transaction delays. These factors could contribute to lower prices and larger spreads in the bid and ask prices for our securities. There can be no assurance that our common stock, if delisted from the Nasdaq Capital Market, will be listed on a national securities exchange, a national quotation service, the Over-The-Counter Bulletin Board or the pink sheets. Delisting from Nasdaq, or even the issuance of a notice of potential delisting, would also result in negative publicity, make it more difficult for us to raise additional capital, adversely affect the market liquidity of our common stock, reduce security analysts' coverage of us and diminish investor, supplier and employee confidence.

***We have incurred substantial losses and expect to continue to incur losses. We will not be successful unless we reverse this trend.***

We have incurred losses in every year since our inception, except for 2002, 2008, and 2009 when our recognition of revenues under license and collaboration agreements resulted in our reporting net income for those years. As of December 31, 2012, we had an accumulated deficit of \$394.7 million. Since January 1, 2001, we have primarily been involved in the development of our TLR pipeline. From January 1, 2001 to December 31, 2012, we incurred losses of \$134.5 million. We incurred losses of \$260.2 million prior to December 31, 2000 during which time we were primarily involved in the development of non-TLR targeted antisense technology. These losses, among other things, have had and will continue to have an adverse effect on our stockholders' equity, total assets, and working capital.

We have never had any products of our own available for commercial sale and have received no revenues from the sale of drugs. As of January 31, 2013, almost all of our revenues have been from collaborative and license agreements. We have devoted substantially all of our efforts to research and development, including clinical trials, and we have not completed development of any drug candidates. Because of the numerous risks and uncertainties associated with developing drugs, we are unable to predict the extent of any future losses, whether or when any of our drug candidates will become commercially available, or when we will become profitable, if at all. We expect to incur substantial operating losses in future periods.

**Risks Relating to Our Business, Strategy and Industry**

***We are depending heavily on the development of TLR-targeted drug candidates for the treatment of autoimmune and inflammatory diseases. If we terminate the development of the program or any of our drug candidates in the program, are unable to successfully develop and commercialize any of our drug candidates, or experience significant delays in doing so, our business may be materially harmed.***

We have invested a significant portion of our time and financial resources in the development of our clinical stage lead drug candidates, IMO-3100 and IMO-8400, as part of our autoimmune and inflammatory disease program. Based on the clinical activity of IMO-3100 observed in our four-week Phase 2 clinical trial of IMO-3100 in patients with psoriasis, we have determined that the next step in our development program is to conduct a Phase 2 clinical trial in patients with psoriasis to, among other things, evaluate the clinical activity of IMO-8400 with a treatment period of up to 12 weeks. Based on our evaluation of the comparative profiles of IMO-3100 and IMO-8400, including the engagement of TLR8 by IMO-8400, we have determined to focus our resources on the development of IMO-8400 and to conduct this trial in patients with psoriasis with IMO-8400. We expect that we could initiate this trial as early as the second quarter of 2013 and could have top-line data by the end of 2013. However, we do not plan to initiate this trial unless and until we have completed this offering and raised the necessary proceeds to fund this trial and until we have confirmed the successful completion of our ongoing Phase 1 trial of IMO-8400.

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We are also planning to initiate a signal-seeking Phase 2 clinical trial of IMO-8400 in patients with lupus and are considering conducting a proof-of-concept study of IMO-8400 in an orphan autoimmune disease indication. We expect to select the orphan autoimmune disease indication for further exploration in the second half of 2013. However, our plans to conduct the Phase 2 clinical trial of IMO-8400 in patients with lupus and the proof-of-concept study are subject to successful completion of our ongoing Phase 1 trial of IMO-8400 and our ability to raise additional funding beyond the proceeds of this offering to fund the conduct of this Phase 2 trial and proof-of-concept study. We expect to seek such funding through public or private equity offerings, debt financings, collaborations and licensing arrangements or other sources.

As such, we anticipate that our ability to generate product revenues will depend heavily on the successful development and commercialization of our drug candidates in our autoimmune and inflammatory disease program. Our ability to generate product revenues will also depend on the development and commercialization of the drug candidates being developed under our collaboration with Merck & Co. Our efforts, and the efforts of Merck & Co., to develop and commercialize these compounds are at an early stage and are subject to many challenges. We have experienced setbacks with respect to our programs for IMO-3100, IMO-2125, and IMO-2055, including:

- During the fourth quarter of 2010, we commenced additional nonclinical studies of IMO-3100 in light of some reversible immune responses that were observed in the 13-week nonclinical toxicology studies and that were inconsistent with observations made in our other nonclinical studies of IMO-3100. In June 2011, we submitted a Phase 2 protocol to the United States Food and Drug Administration, or FDA, to conduct a 12-week clinical trial of IMO-3100 in patients with psoriasis. In July 2011, the FDA placed a clinical hold on the protocol that we had submitted. In October 2011, we submitted to FDA a new Phase 2 protocol to evaluate IMO-3100 in adult patients with moderate to severe plaque psoriasis, over a four-week treatment period. In December 2011, the FDA removed the clinical hold. We subsequently initiated in the second quarter of 2012 the four-week Phase 2 clinical trial that we completed in the fourth quarter of 2012. We cannot be certain that the FDA will allow us to conduct further clinical trials of IMO-3100 for treatment periods of more than four weeks or at all without additional clinical or preclinical data.
- In April 2011, we chose to delay initiation of our planned 12-week Phase 2 randomized clinical trial of IMO-2125 plus ribavirin in treatment-naïve, genotype 1 hepatitis C virus, or HCV, patients based on preliminary observations in an ongoing 26-week chronic nonclinical toxicology study of IMO-2125 in rodents. We subsequently completed a 39-week chronic nonclinical toxicology study of IMO-2125 in non-human primates in which there were no similar observations. During the third quarter of 2011, we re-assessed and prioritized our drug development programs, and determined to discontinue further investment of internal resources on the development of IMO-2125 for the treatment of HCV.
- In July 2011, Merck KGaA, Darmstadt, Germany, or Merck KGaA, informed us that, based on increased incidence of neutropenia and electrolyte imbalances reported in its Phase 1 trial of IMO-2055 in combination with cisplatin/5-FU and cetuximab in patients with first-line squamous cell carcinoma of the head and neck, or SCCHN, and subsequent re-evaluation of its clinical development program, Merck KGaA had determined that it would not conduct further clinical development of IMO-2055. In November 2011, as part of an agreed-upon termination of our collaboration with Merck KGaA, we regained global rights to IMO-2055 and our other TLR9 agonists, including preclinical lead drug candidates selected for further evaluation under the collaboration, for the treatment of cancer. In May 2012, we announced that in the Phase 2 trial of IMO-2055 in combination with cetuximab in patients with second-line SCCHN, the combination of IMO-2055 and cetuximab did not meet the primary endpoint of the trial.



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We intend to seek to enter into collaborations with pharmaceutical companies to advance the use of our TLR candidates. Our setbacks with respect to our programs for IMO-3100, IMO-2125, and IMO-2055 could negatively impact our ability to license any of such compounds to a third party.

Our ability to successfully develop and commercialize these drug candidates, or other potential candidates, will depend on our ability to overcome these recent challenges and on several factors, including the following:

- the drug candidates demonstrating activity in clinical trials;
- the drug candidates demonstrating an acceptable safety profile in nonclinical toxicology studies and during clinical trials;
- timely enrollment in clinical trials of IMO-8400 and other drug candidates, which may be slower than anticipated, potentially resulting in significant delays;
- satisfying conditions imposed on us and/or our collaborators by the FDA or equivalent foreign regulatory authorities regarding the scope or design of clinical trials;
- the ability to demonstrate to the satisfaction of the FDA, or equivalent foreign regulatory authorities, the safety and efficacy of the drug candidates through current and future clinical trials;
- timely receipt of necessary marketing approvals from the FDA and equivalent foreign regulatory authorities;
- the ability to combine our drug candidates and the drug candidates being developed by Merck & Co. and any other collaborators safely and successfully with other therapeutic agents;
- achieving and maintaining compliance with all regulatory requirements applicable to the products;
- establishment of commercial manufacturing arrangements with third-party manufacturers;
- the successful commercial launch of the drug candidates, assuming FDA approval is obtained, whether alone or in combination with other products;
- acceptance of the products as safe and effective by patients, the medical community, and third-party payors;
- competition from other companies and their therapies;
- changes in treatment regimes;
- successful protection of our intellectual property rights from competing products in the United States and abroad; and
- a continued acceptable safety and efficacy profile of the drug candidates following marketing approval.

***If our clinical trials are unsuccessful, or if they are delayed or terminated, we may not be able to develop and commercialize our products.***

In order to obtain regulatory approvals for the commercial sale of our products, we are required to complete extensive clinical trials in humans to demonstrate the safety and efficacy of our drug candidates. Clinical trials are lengthy, complex, and expensive processes with uncertain results. We may not be able to complete any clinical trial of a potential product within any specified time period. Moreover, clinical trials may not show our potential products to be both safe and efficacious. The FDA or other equivalent foreign regulatory agencies may not allow us to complete these trials or commence and complete any other clinical trials. For example, in July 2011, the FDA placed a clinical hold on a protocol we had submitted for a proposed Phase 2 clinical trial of IMO-3100 in patients with psoriasis.

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The results from preclinical testing of a drug candidate that is under development may not be predictive of results that will be obtained in human clinical trials. In addition, the results of early human clinical trials may not be predictive of results that will be obtained in larger scale, advanced stage clinical trials. Furthermore, interim results of a clinical trial do not necessarily predict final results, and failure of any of our clinical trials can occur at any stage of testing. Companies in the biotechnology and pharmaceutical industries, including companies with greater experience in preclinical testing and clinical trials than we have, have suffered significant setbacks in clinical trials, even after demonstrating promising results in earlier trials. Moreover, effects seen in nonclinical studies, even if not observed in clinical trials, may result in limitations or restrictions on clinical trials. Numerous unforeseen events may occur during, or as a result of, preclinical testing, nonclinical testing or the clinical trial process that could delay or inhibit the ability to receive regulatory approval or to commercialize drug products.

Other companies developing drugs targeted to TLRs have experienced setbacks in clinical trials. For example in 2007, Coley Pharmaceutical Group, which since has been acquired by Pfizer, Inc., or Pfizer, discontinued four clinical trials for PF-3512676, its investigational TLR9 agonist compound, in combination with cytotoxic chemotherapy in cancer, and suspended its development of Actilon<sup>®</sup>, a TLR9 agonist, for HCV infection. In July 2007, Anadys Pharmaceuticals, Inc. and its partner Novartis Pharmaceuticals, Ltd., or Novartis, discontinued the development of ANA975, the investigational TLR7 agonist compound for HCV infection. Dynavax Technologies Corporation, or Dynavax, announced in May 2008 discontinuation of the clinical development program for TOLAMBA<sup>®</sup>, an investigational vaccine which contained a TLR9 agonist adjuvant, and in February 2013 Dynavax announced receipt of a Complete Response Letter from FDA regarding its Biological License Application for HEPLISAV<sup>®</sup>, which is an investigational hepatitis B vaccine that contains a TLR9 agonist adjuvant. These setbacks with respect to TLR-targeted drug candidates may result in enhanced scrutiny by regulators or institutional review boards, or IRBs, of clinical trials of TLR-targeted drug candidates, including our TLR-targeted drug candidates, which could result in regulators or IRBs prohibiting the commencement of clinical trials, requiring additional nonclinical studies as a precondition to commencing clinical trials or imposing restrictions on the design or scope of clinical trials that could slow enrollment of trials, increase the costs of trials or limit the significance of the results of trials. Such setbacks could also adversely impact the desire of investigators to enroll patients in, and the desire of patients to enroll in, clinical trials of TLR-targeted drug candidates.

Other events that could delay or inhibit conduct of our clinical trials include:

- regulators or IRBs may not authorize us to commence a clinical trial or conduct a clinical trial at a prospective trial site;
- nonclinical or clinical data may not be readily interpreted, which may lead to delays and/or misinterpretation;
- our nonclinical tests, including toxicology studies, or clinical trials may produce negative or inconclusive results, and we may decide, or regulators may require us, to conduct additional nonclinical testing or clinical trials or we may abandon projects that we expect may not be promising;
- the rate of enrollment or retention of patients in our clinical trials may be lower than we expect;
- we might have to suspend or terminate our clinical trials if the participating subjects experience serious adverse events or undesirable side effects or are exposed to unacceptable health risks;
- regulators or IRBs may hold, suspend or terminate clinical research for various reasons, including noncompliance with regulatory requirements, issues identified through inspections of manufacturing or clinical trial operations or clinical trial sites, or if, in their opinion, the participating subjects are being exposed to unacceptable health risks;

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- regulators may hold or suspend our clinical trials while collecting supplemental information on, or clarification of, our clinical trials or other clinical trials, including trials conducted in other countries or trials conducted by other companies;
- we, along with our collaborators and subcontractors, may not employ, in any capacity, persons who have been debarred under the FDA's Application Integrity Policy, or similar policy under foreign regulatory authorities. Employment of such debarred persons, even if inadvertent, may result in delays in the FDA's or foreign equivalent's review or approval of our products, or the rejection of data developed with the involvement of such person(s);
- the cost of our clinical trials may be greater than we currently anticipate; and
- our products may not cause the desired effects or may cause undesirable side effects or our products may have other unexpected characteristics.

The rate of completion of clinical trials is dependent in part upon the rate of enrollment of patients. For example, in our Phase 1 clinical trial of IMO-2125 in patients with chronic HCV infection who had not responded to the current standard of care therapy, completion of each cohort took longer than anticipated due to enrollment procedures. Patient accrual is a function of many factors, including:

- the size of the patient population;
- the proximity of patients to clinical sites;
- the eligibility criteria for the trial;
- the nature of the trial, including the pattern of patient enrollment;
- the existence of competitive clinical trials; and
- the availability of alternative treatments.

We do not know whether clinical trials will begin as planned, will need to be restructured or will be completed on schedule, if at all. Significant clinical trial delays also could allow our competitors to bring products to market before we do and impair our ability to commercialize our products.

***Delays in commencing clinical trials of potential products could increase our costs, delay any potential revenues, and reduce the probability that a potential product will receive regulatory approval.***

Our drug candidates and our collaborators' drug candidates will require preclinical and other nonclinical testing and extensive clinical trials prior to submission of any regulatory application for commercial sales. In conducting clinical trials, we cannot be certain that any planned clinical trial will begin on time, if at all. Delays in commencing clinical trials of potential products could increase our product development costs, delay any potential revenues, and reduce the probability that a potential product will receive regulatory approval.

Commencing clinical trials may be delayed for a number of reasons, including delays in:

- manufacturing sufficient quantities of drug candidate that satisfy the required quality standards for use in clinical trials;
- demonstrating sufficient safety to obtain regulatory approval for conducting a clinical trial;
- reaching an agreement with any collaborators on all aspects of the clinical trial;
- reaching agreement with contract research organizations, if any, and clinical trial sites on all aspects of the clinical trial;

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- resolving any objections from the FDA or any regulatory authority on an Investigational New Drug application, or IND, or proposed clinical trial design;
- obtaining IRB approval for conducting a clinical trial at a prospective site; and
- enrolling patients in order to commence the clinical trial.

### ***The technologies on which we rely are unproven and may not result in any approved and marketable products.***

Our technologies or therapeutic approaches are relatively new and unproven. We have focused our efforts on the research and development of RNA- and DNA-based compounds targeted to TLRs and on GSOs. Neither we nor any other company have obtained regulatory approval to market such compounds as therapeutic drugs, and no such products currently are being marketed. It is unknown whether the results of preclinical studies with TLR-targeted compounds will be indicative of results that may be obtained in clinical trials, and results we have obtained in the clinical trials we have conducted to date may not be predictive of results in subsequent large-scale clinical trials. Further, the chemical and pharmacological properties of RNA- and DNA-based compounds targeted to TLRs or of GSOs may not be fully recognized in preclinical studies and small-scale clinical trials, and such compounds may interact with human biological systems in unforeseen, ineffective or harmful ways that we have not yet identified.

As a result of these factors, we may never succeed in obtaining regulatory approval to market any product. Furthermore, the commercial success of any of our products for which we may obtain marketing approval from the FDA or other regulatory authorities will depend upon their acceptance by patients, the medical community, and third-party payors as clinically useful, safe, and cost-effective. In addition, if products being developed by our competitors have negative clinical trial results or otherwise are viewed negatively, the perception of our technologies and market acceptance of our products could be impacted negatively.

Our recent setbacks with respect to our TLR-targeted compounds, together with the setbacks experienced by other companies developing TLR-targeted compounds, may result in a negative perception of our technology and our TLR-targeted compounds, impact our ability to obtain marketing approval of these drug candidates and adversely affect acceptance of our technology and our TLR-targeted compounds by patients, the medical community and third-party payors.

Our efforts to educate the medical community on our potentially unique approaches may require greater resources than would be typically required for products based on conventional technologies or therapeutic approaches. The safety, efficacy, convenience, and cost-effectiveness of our products as compared to competitive products will also affect market acceptance.

### ***We face substantial competition, which may result in others discovering, developing or commercializing drugs before or more successfully than us.***

We are developing our TLR-targeted drug candidates for use in the treatment of autoimmune and inflammatory diseases and for use as vaccine adjuvants. We have two drug candidates in clinical development in our autoimmune and inflammatory disease program. We are also collaborating with Merck & Co. for the use of agonists of TLR7, TLR8, and TLR9 as vaccine adjuvants for cancer, infectious diseases and Alzheimer's disease. Finally, we are seeking to enter into collaborative alliances with pharmaceutical companies to advance our TLR-targeted programs in oncology and respiratory diseases, and for the use of TLR3 agonists as vaccine adjuvants, as well as applications of our GSO technology platform. For all of these disease areas, there are many other companies, public and private, that are actively engaged in discovery, development, and commercializing products and technologies that may compete with our drug candidates and programs, including TLR targeted compounds as well as non-TLR targeted therapies.

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Our principal competitor developing TLR-targeted compounds for autoimmune and inflammatory diseases is Dynavax, with its collaborator, GlaxoSmithKline plc., or GlaxoSmithKline. Merck & Co.'s vaccines using our TLR7, TLR8 or TLR9 agonists as adjuvants may compete with vaccines using TLR agonists as adjuvants being developed or marketed by GlaxoSmithKline, Novartis, Dynavax, VaxInnate, Inc., Intercell AG and Cytos Biotechnology AG.

We are developing drug candidates for the treatment of moderate to severe plaque psoriasis. There are a number of well-known immune suppressors and biologics that are currently being widely used for the treatment of moderate to severe plaque psoriasis, including methotrexate and cyclosporine, which are both immune suppressors, and biologics like Enbrel, which is marketed by Amgen Inc., or Amgen, Pfizer and Takeda Pharmaceutical Company Limited, Remicade, which is marketed by Janssen Biotech, Merck & Co. and Mitsubishi Tanabe Pharma, Humira, which is marketed by Abbott Laboratories, and Stelara, which is marketed by Janssen Biotech. In addition to existing treatments, we are also aware of additional compounds for the treatment of moderate to severe plaque psoriasis that are currently in late stage development, including apremilast, which is being developed by Celgene Corporation, tofacitinib, which is being developed by Pfizer, secukinumab, which is being developed by Novartis, ixekizumab, which is being developed by Eli Lilly and Company, and brodalumab, which is being developed by Amgen, AstraZeneca PLC and Kyowa Hakko Kirin Co., Ltd.

Some of these potentially competitive products have been in development or commercialized for years, in some cases by large, well established pharmaceutical companies. Many of the marketed products have been accepted by the medical community, patients, and third-party payors. Our ability to compete may be affected by the previous adoption of such products by the medical community, patients, and third-party payors. Additionally, in some instances, insurers and other third-party payors seek to encourage the use of generic products, which makes branded products, such as our drug candidates, potentially less attractive, from a cost perspective, to buyers.

We recognize that other companies, including large pharmaceutical companies, may be developing or have plans to develop products and technologies that may compete with ours. Many of our competitors have substantially greater financial, technical, and human resources than we have. In addition, many of our competitors have significantly greater experience than we have in undertaking preclinical studies and human clinical trials of new pharmaceutical products, obtaining FDA and other regulatory approvals of products for use in health care and manufacturing, and marketing and selling approved products. Our competitors may discover, develop or commercialize products or other novel technologies that are more effective, safer or less costly than any that we are developing. Our competitors may also obtain FDA or other regulatory approval for their products more rapidly than we may obtain approval for ours.

We anticipate that the competition with our products and technologies will be based on a number of factors including product efficacy, safety, availability, and price. The timing of market introduction of our products and competitive products will also affect competition among products. We expect the relative speed with which we can develop products, complete the clinical trials, and approval processes and supply commercial quantities of the products to the market to be important competitive factors. Our competitive position will also depend upon our ability to attract and retain qualified personnel, to obtain patent protection or otherwise develop proprietary products or processes, and protect our intellectual property, and to secure sufficient capital resources for the period between technological conception and commercial sales.

***Competition for technical and management personnel is intense in our industry, and we may not be able to sustain our operations or grow if we are unable to attract and retain key personnel.***

Our success is highly dependent on the retention of principal members of our technical and management staff, including Dr. Sudhir Agrawal. Dr. Agrawal serves as our Chairman of the Board of Directors,

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President and Chief Executive Officer. Dr. Agrawal has made significant contributions to the field of oligonucleotide-based drug candidates, and has led the discovery and development of our compounds targeted to TLRs. He is named as an inventor on over 400 patents and patent applications in countries around the world. Dr. Agrawal provides us with leadership for our management team and research and development activities. The loss of Dr. Agrawal's services would be detrimental to our ongoing scientific progress and the execution of our business plan.

We are a party to an employment agreement with Dr. Agrawal that expires on October 19, 2015, but automatically extends annually for additional one year periods. This agreement may be terminated by us or Dr. Agrawal for any reason or no reason at any time upon notice to the other party. We do not carry key man life insurance for Dr. Agrawal.

Furthermore, our future growth will require hiring a number of qualified technical and management personnel. Accordingly, recruiting and retaining such personnel in the future will be critical to our success. There is intense competition from other companies and research and academic institutions for qualified personnel in the areas of our activities. If we are not able to continue to attract and retain, on acceptable terms, the qualified personnel necessary for the continued development of our business, we may not be able to sustain our operations or growth.

### **Regulatory Risks**

#### ***We may not be able to obtain marketing approval for products resulting from our development efforts.***

All of the drug candidates that we are developing, or may develop in the future, will require additional research and development, extensive preclinical studies, nonclinical testing, clinical trials, and regulatory approval prior to any commercial sales. This process is lengthy, often taking a number of years, is uncertain, and is expensive. Since our inception, we have conducted clinical trials of a number of compounds. Currently two of our compounds, IMO-3100 and IMO-8400, are in clinical development. The FDA and other regulatory authorities may not approve any of our potential products for any indication.

We may need to address a number of technological challenges in order to complete development of our products. Moreover, these products may not be effective in treating any disease or may prove to have undesirable or unintended side effects, unintended alteration of the immune system over time, toxicities or other characteristics that may preclude our obtaining regulatory approval or prevent or limit commercial use. If we do not obtain necessary regulatory approvals, our business will be adversely affected.

#### ***We are subject to comprehensive regulatory requirements, which are costly and time consuming to comply with; if we fail to comply with these requirements, we could be subject to adverse consequences and penalties.***

The testing, manufacturing, labeling, advertising, promotion, export, and marketing of our products are subject to extensive regulation by governmental authorities in Europe, the United States, and elsewhere throughout the world.

In general, submission of materials requesting permission to conduct clinical trials may not result in authorization by the FDA or any equivalent foreign regulatory agency to commence clinical trials. Further, permission to continue ongoing trials may be withdrawn by the FDA or other regulatory agencies at any time after initiation, based on new information available after the initial authorization to commence clinical trials or for other reasons. In addition, submission of an application for marketing approval to the relevant regulatory agency following completion of clinical trials may not result in the regulatory agency approving the application if applicable regulatory criteria are not satisfied, and may result in the regulatory agency requiring additional testing or information.

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Even if we obtain regulatory approval for any of our product candidates, we will be subject to ongoing FDA obligations and regulatory oversight. Any regulatory approval of a product may contain limitations on the approved indicated uses for which the product may be marketed or requirements for costly post-marketing testing and surveillance to monitor the safety or efficacy of the product. Any product for which we obtain marketing approval, along with the facilities at which the product is manufactured, any post-approval clinical data, and any advertising and promotional activities for the product will be subject to continual review and periodic inspections by the FDA and other regulatory agencies.

Both before and after approval is obtained, failure to comply with regulatory requirements, or discovery of previously unknown problems with a product, including adverse events of unanticipated severity or frequency, may result in:

- the regulatory agency's delay in approving, or refusal to approve, an application for marketing of a product or a supplement to an approved application;
- restrictions on our products or the marketing or manufacturing of our products;
- withdrawal of our products from the market;
- warning letters;
- voluntary or mandatory product recalls;
- fines;
- suspension or withdrawal of regulatory approvals;
- product seizure or detention;
- refusal to permit the import or export of our products;
- injunctions or the imposition of civil penalties; and
- criminal penalties.

***We have only limited experience in regulatory affairs and our products are based on new technologies; these factors may affect our ability or the time we require to obtain necessary regulatory approvals.***

We have only limited experience in filing the applications necessary to obtain regulatory approvals. Moreover, the products that result from our research and development programs will likely be based on new technologies and new therapeutic approaches that have not been extensively tested in humans. The regulatory requirements governing these types of products may be more rigorous than for conventional drugs. As a result, we may experience a longer regulatory process in connection with obtaining regulatory approvals of any product that we develop.

***Failure to obtain regulatory approval in jurisdictions outside the United States will prevent us from marketing our products abroad.***

We intend to market our products, if approved, in markets outside the United States, which will require separate regulatory approvals and compliance with numerous and varying regulatory requirements. The approval procedures vary among such markets and may involve requirements for additional testing, and the time required to obtain approval may differ from that required to obtain FDA approval. Approval by the FDA does not ensure approval by regulatory authorities in other countries or jurisdictions, and approval by one foreign regulatory authority does not ensure approval by regulatory authorities in other foreign countries or by the FDA. The foreign regulatory approval process may include all of the risks associated with obtaining FDA approval. We may not obtain foreign regulatory approvals on a timely basis, if at all.

## Risks Relating to Collaborators

***If we are unable to establish additional collaborative alliances, our business may be materially harmed.***

Collaborators provide the necessary resources and drug development experience to advance our compounds in their programs. We are seeking to enter into collaborative alliances with pharmaceutical companies to advance our TLR-targeted programs in oncology, infectious diseases, respiratory diseases, and the use of TLR3 agonists as vaccine adjuvants, as well as applications of our GSO technology platform.

Upfront payments and milestone payments received from collaborations help to provide us with the financial resources for our internal research and development programs. Our internal programs are focused on developing TLR-targeted drug candidates for the potential treatment of autoimmune and inflammatory diseases. We believe that additional resources will be required to advance compounds in all of these areas. If we do not reach agreements with additional collaborators in the future, we may not be able to obtain the expertise and resources necessary to achieve our business objectives, our ability to advance our compounds will be jeopardized and we may fail to meet our business objectives.

We may have difficulty establishing additional collaborative alliances, particularly with respect to our TLR-targeted drug candidates and technology. Potential partners may note that our TLR collaborations with Novartis and with Merck KGaA have been terminated. Potential partners may also be reluctant to establish collaborations with respect to IMO-2125, IMO-3100, IMO-2055, and our other TLR-targeted drug candidates, given our recent setbacks with respect to these drug candidates. We also face, and expect to continue to face, significant competition in seeking appropriate collaborators.

Even if a potential partner were willing to enter into a collaborative alliance with respect to our TLR-targeted compounds or technology, the terms of such a collaborative alliance may not be on terms that are favorable to us. Moreover, collaborations are complex and time consuming to negotiate, document, and implement. We may not be successful in our efforts to establish and implement collaborations on a timely basis.

***Our existing collaboration and any collaborations we enter into in the future may not be successful.***

An important element of our business strategy includes entering into collaborative alliances with corporate collaborators, primarily large pharmaceutical companies, for the development, commercialization, marketing, and distribution of some of our drug candidates. In December 2007, we entered into an exclusive, worldwide license agreement with Merck KGaA to research, develop, and commercialize products containing our TLR9 agonists for treatment of cancer, excluding cancer vaccines. In December 2006, we entered into an exclusive license and research collaboration with Merck & Co. to research, develop, and commercialize vaccine products containing our TLR7, TLR8, and TLR9 agonists in the fields of cancer, infectious diseases, and Alzheimer's disease.

Any collaboration that we enter into may not be successful. For instance, in July 2011, Merck KGaA informed us that it had determined not to conduct further clinical development of IMO-2055, and in November 2011, we entered into an agreement with Merck KGaA terminating our collaboration with them. The success of our collaborative alliances, if any, will depend heavily on the efforts and activities of our collaborators. Our existing collaboration and any potential future collaborations have risks, including the following:

- our collaborators may control the development of the drug candidates being developed with our technologies and compounds including the timing of development;
- our collaborators may control the public release of information regarding the developments, and we may not be able to make announcements or data presentations on a schedule favorable to us;



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- disputes may arise in the future with respect to the ownership of rights to technology developed with our collaborators;
- disagreements with our collaborators could delay or terminate the research, development or commercialization of products, or result in litigation or arbitration;
- we may have difficulty enforcing the contracts if any of our collaborators fail to perform;
- our collaborators may terminate their collaborations with us, which could make it difficult for us to attract new collaborators or adversely affect the perception of us in the business or financial communities;
- our collaboration agreements are likely to be for fixed terms and subject to termination by our collaborators in the event of a material breach or lack of scientific progress by us;
- our collaborators may have the first right to maintain or defend our intellectual property rights and, although we would likely have the right to assume the maintenance and defense of our intellectual property rights if our collaborators do not, our ability to do so may be compromised by our collaborators' acts or omissions;
- our collaborators may challenge our intellectual property rights or utilize our intellectual property rights in such a way as to invite litigation that could jeopardize or invalidate our intellectual property rights or expose us to potential liability;
- our collaborators may not comply with all applicable regulatory requirements, or may fail to report safety data in accordance with all applicable regulatory requirements;
- our collaborators may change the focus of their development and commercialization efforts. Pharmaceutical and biotechnology companies historically have re-evaluated their priorities following mergers and consolidations, which have been common in recent years in these industries. For example, we have a strategic partnership with Merck & Co., which merged with Schering-Plough, which has been involved with certain TLR-targeted research and development programs. Although the merger has not affected our partnership with Merck & Co. to date, management of the combined company could determine to reduce the efforts and resources that the combined company will apply to its strategic partnership with us or terminate the strategic partnership. The ability of our products to reach their potential could be limited if our collaborators decrease or fail to increase spending relating to such products;
- our collaborators may under fund or not commit sufficient resources to the testing, marketing, distribution or development of our products; and
- our collaborators may develop alternative products either on their own or in collaboration with others, or encounter conflicts of interest or changes in business strategy or other business issues, which could adversely affect their willingness or ability to fulfill their obligations to us.

Given these risks, it is possible that any collaborative alliance into which we enter may not be successful. Collaborations with pharmaceutical companies and other third parties often are terminated or allowed to expire by the other party. For example, effective as of February 2010, Novartis terminated the research collaboration and option agreement that we entered into with it in May 2005, and in November 2011, we entered into an agreement with Merck KGaA terminating our collaboration with them. In addition, Merck & Co. may terminate its license and research collaboration agreement by giving us 90 days advance notice. The termination or expiration of our agreement with Merck & Co. or any other collaboration agreement that we enter into in the future may adversely affect us financially and could harm our business reputation.

## Risks Relating to Intellectual Property

*If we are unable to obtain patent protection for our discoveries, the value of our technology and products will be adversely affected.*

Our patent positions, and those of other drug discovery companies, are generally uncertain and involve complex legal, scientific, and factual questions. Our ability to develop and commercialize drugs depends in significant part on our ability to:

- obtain patents;
- obtain licenses to the proprietary rights of others on commercially reasonable terms;
- operate without infringing upon the proprietary rights of others;
- prevent others from infringing on our proprietary rights; and
- protect our trade secrets.

We do not know whether any of our patent applications or those patent applications that we license will result in the issuance of any patents. Our issued patents and those that may be issued in the future, or those licensed to us, may be challenged, invalidated or circumvented, and the rights granted thereunder may not provide us proprietary protection or competitive advantages against competitors with similar technology. Moreover, intellectual property laws may change and negatively impact our ability to obtain issued patents covering our technologies or to enforce any patents that issue. Because of the extensive time required for development, testing, and regulatory review of a potential product, it is possible that, before any of our products can be commercialized, any related patent may expire or remain in force for only a short period following commercialization, thus reducing any advantage provided by the patent.

Because patent applications in the United States and many foreign jurisdictions are typically not published until 18 months after filing, or in some cases not at all, and because publications of discoveries in the scientific literature often lag behind actual discoveries, neither we nor our licensors can be certain that we or they were the first to make the inventions claimed in issued patents or pending patent applications, or that we or they were the first to file for protection of the inventions set forth in these patent applications.

As of January 31, 2013, we owned more than 50 U.S. patents and patent applications and more than 100 patents and patent applications throughout the rest of the world for our TLR-targeted immune modulation technologies. These patents and patent applications include novel chemical compositions of matter and methods of use of our IMO compounds, including IMO-3100, IMO-8400 and IMO-2055. As of January 31, 2013, all of our intellectual property covering immune modulatory compositions and methods of their use is based on discoveries made solely by us. These patents expire at various dates ranging from 2017 to 2031. With respect to IMO-3100, we have issued U.S. patents that cover the chemical composition of matter of IMO-3100 and methods of its use that will expire at the earliest in 2026. With respect to IMO-8400, we have U.S. patent applications that cover the chemical composition of matter of IMO-8400 and methods of its use that will expire at the earliest in 2031. With respect to IMO-2055, we have issued U.S. patents that cover the chemical composition of matter of IMO-2055 and methods of its use, including in combination with marketed cancer products, with the earliest composition claims in the United States expiring in 2023.

As of January 31, 2013, we owned three U.S. patent applications and six worldwide patent applications for our GSO compounds and methods of their use. Patents issuing from these patent applications, if any, would expire at the earliest in 2030.

In addition to our TLR-targeted and GSO patent portfolios, we are the owner or hold licenses of patents and patent applications related to antisense technology. As of January 31, 2013, our antisense patent

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portfolio included more than 75 U.S. patents and patent applications and more than 75 patents and patent applications throughout the rest of the world. These antisense patents and patent applications include novel compositions of matter, the use of these compositions for various genes, sequences and therapeutic targets, and oral and other routes of administration. Some of the patents and patent applications in our antisense portfolio were in-licensed. These in-licensed patents expire at various dates ranging from 2013 to 2021.

***Third parties may own or control patents or patent applications and require us to seek licenses, which could increase our development and commercialization costs, or prevent us from developing or marketing products.***

Although we have many issued patents and pending patent applications in the United States and other countries, we may not have rights under certain third-party patents or patent applications related to our products. Third parties may own or control these patents and patent applications in the United States and abroad. In particular, we are aware of third-party U.S. patents that contain broad claims related to the use of certain oligonucleotides for stimulating an immune response, although we do not believe that these claims are valid. In addition, there may be other patents and patent applications related to our products of which we are not aware. Therefore, in some cases, in order to develop, manufacture, sell or import some of our products, we or our collaborators may choose to seek, or be required to seek, licenses under third-party patents issued in the United States and abroad or under third-party patents that might issue from U.S. and foreign patent applications. In such an event, we would be required to pay license fees or royalties or both to the licensor. If licenses are not available to us on acceptable terms, we or our collaborators may not be able to develop, manufacture, sell or import these products.

***We may lose our rights to patents, patent applications or technologies of third parties if our licenses from these third parties are terminated. In such an event, we might not be able to develop or commercialize products covered by the licenses.***

Currently, we have not in-licensed any patents or patent applications related to our TLR-targeted drug candidate programs or our GSO compounds and methods of their use. However, we are party to six royalty-bearing license agreements under which we have acquired rights to patents, patent applications, and technology of third parties in the field of antisense technology, which may be applicable to our TLR antisense. Under these licenses we are obligated to pay royalties on net sales by us of products or processes covered by a valid claim of a patent or patent application licensed to us. We also are required in some cases to pay a specified percentage of any sublicense income that we may receive. These licenses impose various commercialization, sublicensing, insurance, and other obligations on us.

Our failure to comply with these requirements could result in termination of the licenses. These licenses generally will otherwise remain in effect until the expiration of all valid claims of the patents covered by such licenses or upon earlier termination by the parties. The issued patents covered by these licenses expire at various dates ranging from 2013 to 2021. If one or more of these licenses is terminated, we may be delayed in our efforts, or be unable, to develop and market the products that are covered by the applicable license or licenses.

***We may become involved in expensive patent litigation or other proceedings, which could result in our incurring substantial costs and expenses or substantial liability for damages or require us to stop our development and commercialization efforts.***

There has been substantial litigation and other proceedings regarding patent and other intellectual property rights in the biotechnology industry. We may become a party to various types of patent litigation or other proceedings regarding intellectual property rights from time to time even under circumstances where we are not practicing and do not intend to practice any of the intellectual property

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involved in the proceedings. For instance, in 2002, 2003, and 2005, we became involved in interference proceedings declared by the United States Patent and Trademark Office for some of our antisense and ribozyme patents. All of these interferences have since been resolved. We are neither practicing nor intending to practice the intellectual property that is associated with any of these interference proceedings.

The cost to us of any patent litigation or other proceeding even if resolved in our favor, could be substantial. Some of our competitors may be able to sustain the cost of such litigation or proceedings more effectively than we can because of their substantially greater financial resources. If any patent litigation or other proceeding is resolved against us, we or our collaborators may be enjoined from developing, manufacturing, selling or importing our drugs without a license from the other party and we may be held liable for significant damages. We may not be able to obtain any required license on commercially acceptable terms or at all.

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. Patent litigation and other proceedings may also absorb significant management time.

#### **Risks Relating to Product Manufacturing, Marketing and Sales, and Reliance on Third Parties**

*Because we have limited manufacturing experience, and no manufacturing facilities or infrastructure, we are dependent on third-party manufacturers to manufacture drug candidates for us. If we cannot rely on third-party manufacturers, we will be required to incur significant costs and devote significant efforts to establish our own manufacturing facilities and capabilities.*

We have limited manufacturing experience and no manufacturing facilities, infrastructure or clinical or commercial scale manufacturing capabilities. In order to continue to develop our drug candidates, apply for regulatory approvals, and ultimately commercialize products, we need to develop, contract for or otherwise arrange for the necessary manufacturing capabilities.

We currently rely upon third parties to produce material for nonclinical and clinical testing purposes and expect to continue to do so in the future. We also expect to rely upon third parties to produce materials that may be required for the commercial production of our products. Our current and anticipated future dependence upon others for the manufacture of our drug candidates may adversely affect our future profit margins and our ability to develop drug candidates and commercialize any drug candidates on a timely and competitive basis. We currently do not have any long term supply contracts.

There are a limited number of manufacturers that operate under the FDA's current Good Manufacturing Practices, or cGMP, regulations capable of manufacturing our drug candidates. As a result, we may have difficulty finding manufacturers for our products with adequate capacity for our needs. If we are unable to arrange for third-party manufacturing of our drug candidates on a timely basis, or to do so on commercially reasonable terms, we may not be able to complete development of our drug candidates or market them.

Reliance on third-party manufacturers entails risks to which we would not be subject if we manufactured drug candidates ourselves, including:

- reliance on the third party for regulatory compliance and quality assurance;
- the possibility of breach of the manufacturing agreement by the third party because of factors beyond our control;
- the possibility of termination or nonrenewal of the agreement by the third party, based on its own business priorities, at a time that is costly or inconvenient for us;

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- the potential that third-party manufacturers will develop know-how owned by such third party in connection with the production of our drug candidates that becomes necessary for the manufacture of our drug candidates; and
- reliance upon third-party manufacturers to assist us in preventing inadvertent disclosure or theft of our proprietary knowledge.

Any contract manufacturers with which we enter into manufacturing arrangements will be subject to ongoing periodic, unannounced inspections by the FDA, or foreign equivalent, and corresponding state and foreign agencies or their designees to ensure compliance with cGMP requirements and other governmental regulations and corresponding foreign standards. For example, one of our contract manufacturers notified us that it had received a cGMP warning letter from the FDA in February 2011. This contract manufacturer no longer manufactures drug product for us. Any failure by our third-party manufacturers to comply with such requirements, regulations or standards could lead to a delay in the conduct of our clinical trials, or a delay in, or failure to obtain, regulatory approval of any of our drug candidates. Such failure could also result in sanctions being imposed, including fines, injunctions, civil penalties, delays, suspension or withdrawal of approvals, product seizures or recalls, imposition of operating restrictions, total or partial suspension of production or distribution, or criminal prosecution.

Additionally, contract manufacturers may not be able to manufacture our drug candidates at a cost or in quantities necessary to make them commercially viable. As of January 31, 2013, our third-party manufacturers have met our manufacturing requirements, but we cannot be assured that they will continue to do so. Furthermore, changes in the manufacturing process or procedure, including a change in the location where the drug substance or drug product is manufactured or a change of a third-party manufacturer, may require prior FDA review and approval in accordance with the FDA's cGMP and NDA/BLA regulations. Contract manufacturers may also be subject to comparable foreign requirements. This review may be costly and time-consuming and could delay or prevent the launch of a drug candidate. The FDA or similar foreign regulatory agencies at any time may also implement new standards, or change their interpretation and enforcement of existing standards for manufacture, packaging or testing of products. If we or our contract manufacturers are unable to comply, we or they may be subject to regulatory action, civil actions or penalties.

***We have no experience selling, marketing or distributing products and no internal capability to do so.***

If we receive regulatory approval to commence commercial sales of any of our drug candidates, we will face competition with respect to commercial sales, marketing, and distribution. These are areas in which we have no experience. To market any of our drug candidates directly, we would need to develop a marketing and sales force with technical expertise and with supporting distribution capability. In particular, we would need to recruit a large number of experienced marketing and sales personnel. Alternatively, we could engage a pharmaceutical or other healthcare company with an existing distribution system and direct sales force to assist us. However, to the extent we entered into such arrangements, we would be dependent on the efforts of third parties. If we are unable to establish sales and distribution capabilities, whether internally or in reliance on third parties, our business would suffer materially.

***If third parties on whom we rely for clinical trials do not perform as contractually required or as we expect, we may not be able to obtain regulatory approval for or commercialize our products and our business may suffer.***

We do not have the ability to independently conduct the clinical trials required to obtain regulatory approval for our drug candidates. We depend on independent clinical investigators, contract research organizations, and other third-party service providers in the conduct of the clinical trials of our drug candidates and expect to continue to do so. We contracted with contract research organizations to

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manage our Phase 1 and Phase 2 clinical trials of IMO-3100, our ongoing Phase 1 clinical trial of IMO-8400 and our planned Phase 2 clinical trial of IMO-8400 in patients with psoriasis, and expect to contract with such organizations for future clinical trials. We rely heavily on these parties for successful execution of our clinical trials, but do not control many aspects of their activities. We are 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 and foreign regulatory agencies require us to comply with certain standards, commonly referred to as good clinical practices, and applicable regulatory requirements, 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 clinical trial participants are protected. Our reliance on third parties that we do not control does not relieve us of these responsibilities and requirements. Third parties may not complete activities on schedule, or at all, or may not conduct our clinical trials in accordance with regulatory requirements or our stated protocols. The failure of these third parties to carry out their obligations could delay or prevent the development, approval, and commercialization of our drug candidates. If we seek to conduct any of these activities ourselves in the future, we will need to recruit appropriately trained personnel and add to our infrastructure.

***The commercial success of any drug candidates that we may develop will depend upon the degree of market acceptance by physicians, patients, third-party payors, and others in the medical community.***

Any products that we ultimately bring to the market, if they receive marketing approval, may not gain market acceptance by physicians, patients, third-party payors or others in the medical community. If these products do not achieve an adequate level of acceptance, we may not generate significant product revenue and we may not become profitable. The degree of market acceptance of our drug candidates, if approved for commercial sale, will depend on a number of factors, including:

- the prevalence and severity of any side effects, including any limitations or warnings contained in the product's approved labeling;
- the efficacy and potential advantages over alternative treatments;
- the ability to offer our drug candidates for sale at competitive prices;
- relative convenience and ease of administration;
- the willingness of the target patient population to try new therapies and of physicians to prescribe these therapies;
- the strength of marketing and distribution support and the timing of market introduction of competitive products; and
- publicity concerning our products or competing products and treatments.

Even if a potential product displays a favorable efficacy and safety profile, market acceptance of the product will not be known until after it is launched. Our efforts to educate patients, the medical community, and third-party payors on the benefits of our drug candidates may require significant resources and may never be successful. Such efforts to educate the marketplace may require more resources than are required by conventional technologies marketed by our competitors.

***If we are unable to obtain adequate reimbursement from third-party payors for any products that we may develop or acceptable prices for those products, our revenues and prospects for profitability will suffer.***

Most patients rely on Medicare, Medicaid, private health insurers, and other third-party payors to pay for their medical needs, including any drugs we may market. If third-party payors do not provide adequate coverage or reimbursement for any products that we may develop, our revenues and prospects

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for profitability will suffer. Congress enacted a limited prescription drug benefit for Medicare recipients in the Medicare Prescription Drug, Improvement, and Modernization Act of 2003. While the program established by this statute may increase demand for our products if we were to participate in this program, our prices will be negotiated with drug procurement organizations for Medicare beneficiaries and are likely to be lower than we might otherwise obtain. Non-Medicare third-party drug procurement organizations may also base the price they are willing to pay on the rate paid by drug procurement organizations for Medicare beneficiaries or may otherwise negotiate the price they are willing to pay.

A primary trend in the United States healthcare industry is toward cost containment. In addition, in some foreign countries, particularly the countries of the European Union, the pricing of prescription pharmaceuticals is subject to governmental control. In these countries, pricing negotiations with governmental authorities can take six months or longer after the receipt of regulatory marketing approval for a product. To obtain reimbursement or pricing approval in some countries, we may be required to conduct a clinical trial that compares the cost effectiveness of our drug candidates or products to other available therapies. The conduct of such a clinical trial could be expensive and result in delays in commercialization of our products. These further clinical trials would require additional time, resources, and expenses. If reimbursement of our products is unavailable or limited in scope or amount, or if pricing is set at unsatisfactory levels, our prospects for generating revenue, if any, could be adversely affected and our business may suffer.

In March 2010, the Patient Protection and Affordable Care Act and the Health Care and Education Reconciliation Act became law. These health care reform laws are intended to broaden access to health insurance; reduce or constrain the growth of health care spending, especially Medicare spending; enhance remedies against fraud and abuse; add new transparency requirements for health care and health insurance industries; impose new taxes and fees on certain sectors of the health industry; and impose additional health policy reforms. Among the new fees is an annual assessment on makers of branded pharmaceuticals and biologics, under which a company's assessment is based primarily on its share of branded drug sales to federal health care programs. Such fees could affect our future profitability. Although it is too early to determine the effect of the new health care legislation on our future profitability and financial condition, 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.

Third-party payors are challenging the prices charged for medical products and services, and many third-party payors limit reimbursement for newly-approved health care products. These third-party payors may base their coverage and reimbursement on the coverage and reimbursement rate paid by carriers for Medicare beneficiaries. Furthermore, many such payors are investigating or implementing methods for reducing health care costs, such as the establishment of capitated or prospective payment systems. Cost containment pressures have led to an increased emphasis on the use of cost-effective products by health care providers. In particular, third-party payors may limit the indications for which they will reimburse patients who use any products that we may develop. Cost control initiatives could limit the price we might establish for products that we or our current or future collaborators may develop or sell, which would result in lower product revenues or royalties payable to us.

### ***We face a risk of product liability claims and may not be able to obtain insurance.***

Our business exposes us to the risk of product liability claims that is inherent in the manufacturing, testing, and marketing of human therapeutic drugs. We face an inherent risk of product liability exposure related to the testing of our drug candidates in human clinical trials and will face an even greater risk if we commercially sell any products. Regardless of merit or eventual outcome, liability claims and product recalls may result in:

- decreased demand for our drug candidates and products;
- damage to our reputation;

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- regulatory investigations that could require costly recalls or product modifications;
- withdrawal of clinical trial participants;
- costs to defend related litigation;
- substantial monetary awards to clinical trial participants or patients, including awards that substantially exceed our product liability insurance, which we would then have to pay using other sources, if available, and would damage our ability to obtain liability insurance at reasonable costs, or at all, in the future;
- loss of revenue;
- the diversion of management's attention away from managing our business; and
- the inability to commercialize any products that we may develop.

Although we have product liability and clinical trial liability insurance that we believe is adequate, this insurance is subject to deductibles and coverage limitations. We may not be able to obtain or maintain adequate protection against potential liabilities. If we are unable to obtain insurance at acceptable cost or otherwise protect against potential product liability claims, we will be exposed to significant liabilities, which may materially and adversely affect our business and financial position. These liabilities could prevent or interfere with our commercialization efforts.

#### **Risks Related to This Offering and Ownership of Our Common Stock**

*Our corporate governance structure, including provisions in our certificate of incorporation and by-laws and Delaware law, may prevent a change in control or management that stockholders may consider desirable.*

Section 203 of the Delaware General Corporation Law and our certificate of incorporation and by-laws contain provisions that might enable our management to resist a takeover of our company or discourage a third party from attempting to take over our company. These provisions include:

- a classified board of directors;
- limitations on the removal of directors;
- limitations on stockholder proposals at meetings of stockholders;
- the inability of stockholders to act by written consent or to call special meetings; and
- the ability of our board of directors to designate the terms of and issue new series of preferred stock without stockholder approval.

As part of the financing we consummated in November 2012, we agreed that we would seek stockholder approval of an amendment to the Company's certificate of incorporation and bylaws to eliminate the classified board of directors.

In addition, Section 203 of the Delaware General Corporation Law imposes restrictions on our ability to engage in business combinations and other specified transactions with significant stockholders. These provisions could have the effect of delaying, deferring or preventing a change in control of us or a change in our management that stockholders may consider favorable or beneficial. These provisions could also discourage proxy contests and make it more difficult for you and other stockholders to elect directors and take other corporate actions. These provisions could also limit the price that investors might be willing to pay in the future for shares of our common stock.



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***The preferred stock and warrants issued to certain affiliates of Pillar Invest Corporation, our largest stockholder group, in connection with our Series D and Series E financing have rights, preferences and privileges that are not held by, and are preferential to the rights of, our common stockholders. As a result, the interests of Pillar and its affiliates may differ from the interests of our common stockholders.***

In connection with our Series D redeemable convertible preferred stock financing we issued to Pillar Pharmaceuticals I, L.P., or Pillar I, 1,124,260 shares of our Series D redeemable convertible preferred stock, or Series D preferred stock, which shares are convertible into 6,266,175 shares of our common stock, and warrants exercisable for 2,810,650 shares of our common stock. In connection with our Series E convertible preferred stock financing we issued to Pillar Pharmaceuticals II, L.P., or Pillar II, and an affiliated second purchaser an aggregate of 424,242 shares of our Series E convertible preferred stock, or Series E preferred stock, which shares are convertible into 8,484,840 shares of our common stock, and warrants exercisable for 8,484,840 shares of our common stock. We refer to Pillar I, Pillar II and the affiliated second purchaser collectively as the Pillar Affiliates. As a result, the Pillar Affiliates are collectively our largest stockholder group. In addition, two members of our board of directors are affiliates of the Pillar Affiliates. In connection with their ownership of these securities, the Pillar Affiliates obtained various rights, preferences and privileges that are not held by the holders of our common stock and that in certain instances are preferential to the rights of the holders of our common stock. As a result, the interests of the Pillar Affiliates may differ from the interests of the holders of our common stock in material respects. Although there are contractual limitations on the beneficial ownership and voting rights of the Pillar Affiliates, the Pillar Affiliates may still be able to exert substantial influence over our business.

***The securities issued in our Series D and Series E financings have certain rights, preferences and privileges that may adversely affect our common stockholders and that may adversely affect our ability to obtain financing in the future.***

The rights, preferences and privileges of the Series D preferred stock and Series E preferred stock that we issued and sold in our November 2011 Series D financing and November 2012 Series E financing, respectively, provide the holders of such securities with significant rights, including preferential rights with respect to dividends, liquidation and, upon certain transactions, redemption, which are not provided to the holders of our common stock. The dividend rights of the Series D preferred stock and Series E preferred stock may adversely affect our liquidity. For example, our obligation to pay quarterly cash dividends to the holders of our preferred stock has reduced and will continue to reduce the funds that would otherwise be available to us for working capital and other general corporate purposes. In addition, under certain circumstances, we are entitled to pay dividends on our Series D preferred stock in shares of common stock. If we were to pay such dividends in common stock, our existing stockholders will experience dilution. In the event of a liquidation, dissolution or winding up of our company, the holders of our Series D preferred stock and Series E preferred stock will be entitled to receive an aggregate of up to approximately \$15.3 million before any cash distribution may be made or any other assets may be distributed to the holders of our common stock. Further, pursuant to the redemption rights of the Series D preferred stock, upon the occurrence of specified fundamental changes such as mergers, consolidations, business combinations, stock purchases or similar transactions (and in lieu of any liquidation preference the Series D preferred stock may otherwise be entitled to), the holders of shares of our Series D preferred stock may require that we redeem the Series D preferred stock held by them at a cash price equal to the original Series D preferred stock purchase price (approximately \$9.1 million in the aggregate) plus all accrued or declared but unpaid dividends thereon.

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On April 22, 2013, we entered into an agreement with Pillar I and Pillar II, which we refer to as the April 22, 2013 Pillar Agreement. Under the April 22, 2013 Pillar Agreement, Pillar I, as the sole holder of our Series D preferred stock, has irrevocably agreed to waive and not exercise these redemption rights. In addition, we and each of Pillar I and Pillar II have agreed to modify:

- the dividend provisions of the Series D Certificate of Designations to change the date after which we may elect to pay dividends in shares of our common stock from December 31, 2014 to October 1, 2013;
- the dividend provisions of the Series E Certificate of Designations to allow for the payment of dividends in shares of our common stock commencing October 1, 2013; and
- the dividend provisions of the Series D Certificate of Designations and Series E Certificate of Designations to allow for the payment of such dividends in shares of a to-be-created new series of non-voting preferred stock in the event that payment of such dividends may not be made in shares of our common stock as a result of the application of the beneficial ownership and voting power limitations set forth in the Series D Certificate of Designations and Series E Certificate of Designations, respectively.

In addition, on April 30, 2013, we entered into a second agreement with Pillar I, Pillar II and an entity affiliated with Pillar I and Pillar II, which we refer to collectively as the Pillar Entities. We refer to this agreement as the April 30, 2013 Pillar Agreement, and this agreement and the April 22, 2013 Pillar Agreement as the Pillar Agreements. Under the April 30, 2013 Pillar Agreement, each of the Pillar Entities has irrevocably agreed to waive the approximate \$15.3 million liquidation preference described above in the event of a liquidation, dissolution or winding up of our company.

We have agreed to seek approval from our stockholders at our 2013 annual meeting of stockholders of amendments to the Series D Certificate of Designations and Series E Certificate of Designations to effect these changes to the dividend and liquidation provisions of our Series D preferred stock and Series E preferred stock, the redemption rights of the holders of our Series D preferred stock and the rights of the holders of our Series D preferred stock to distributions in the event of a sale of our company, and the Pillar Entities have agreed to vote in favor of these amendments.

The Pillar Agreements will become effective upon the consummation of a qualified financing, as defined in the Pillar Agreements, which would include the consummation of this offering. See “Certain Relationships and Related Person Transactions” for additional information about the terms of the Pillar Agreements.

The rights, preferences and privileges associated with our Series D preferred stock and Series E preferred stock may adversely affect our ability to obtain financing in the future, including potentially limiting the price that investors might be willing to pay in the future for shares of our common stock or our other securities.

***Our stock price has been and may in the future be extremely volatile. In addition, because an active trading market for our common stock has not developed, our investors’ ability to trade our common stock may be limited. As a result, investors may lose all or a significant portion of their investment.***

Our stock price has been volatile. During the period from January 1, 2011 to March 31, 2013, the closing sales price of our common stock ranged from a high of \$3.25 per share to a low of \$0.49 per share. The stock market has also experienced periods of significant price and volume fluctuations and the market prices of biotechnology companies in particular have been highly volatile, often for reasons that have been unrelated to the operating performance of particular companies. The market price for our common stock may be influenced by many factors, including:

- our cash resources;

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- timing and results of nonclinical studies and clinical trials of our drug candidates or those of our competitors;
- the regulatory status of our drug candidates;
- failure of any of our drug candidates, if approved, to achieve commercial success;
- the success of competitive products or technologies;
- regulatory developments in the United States and foreign countries;
- our success in entering into collaborative agreements;
- developments or disputes concerning patents or other proprietary rights;
- the departure of key personnel;
- our ability to maintain the listing of our common stock on the Nasdaq Capital Market or an alternative national securities exchange;
- variations in our financial results or those of companies that are perceived to be similar to us;
- the terms of any financing consummated by 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; and
- general economic, industry, and market conditions.

In addition, our common stock has historically been traded at low volume levels and may continue to trade at low volume levels. As a result, any large purchase or sale of our common stock could have a significant impact on the price of our common stock and it may be difficult for investors to sell our common stock in the market without depressing the market price for the common stock or at all.

As a result of the foregoing, investors may not be able to resell their shares at or above the price they paid for such shares. Investors in our common stock must be willing to bear the risk of fluctuations in the price of our common stock and the risk that the value of their investment in our stock could decline.

***You will experience immediate and substantial dilution in the net tangible book value per share of the common stock you purchase.***

You will suffer immediate and dilution in the net tangible book value of the common stock you purchase in this offering. We expect that the public offering price of our common stock and related warrants in this offering will be higher than the net tangible book value per share of our outstanding common stock immediately after this offering. After giving effect to the issuance and sale in this offering of \$15.0 million of shares of our common stock and warrants to purchase up to \_\_\_\_\_ shares of our common stock, at an assumed combined public offering price of \$0.73 per share of our common stock and related warrant, which price was the last reported sale price of our common stock on the Nasdaq Capital Market on April 29, 2013, after deducting the estimated underwriting discounts and commissions and estimated offering expenses payable by us and excluding the proceeds, if any, from the exercise of the warrants issued pursuant to this offering, our as adjusted net tangible book value as of December 31, 2012 would have been approximately \$14.0 million, or approximately \$0.29 per share of our common stock. As a result, purchasers of securities in this offering will experience immediate dilution of approximately \$0.44 per share in net tangible book value of the common stock. If any shares of our common stock are issued upon exercise of the pre-funded warrants, purchasers of securities in this offering could experience dilution.

See "Dilution" for a more detailed description of the dilution to new investors in the offering.

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***Our management will have broad discretion in the use of the net proceeds from this offering and may not use them effectively.***

Our management will have broad discretion in the application of the net proceeds from this offering and our stockholders will not have the opportunity as part of their investment decision to assess whether the net proceeds are being used appropriately. Because of the number and variability of factors that will determine our use of the net proceeds from this offering, their ultimate use may vary substantially from their currently intended use. The failure by our management to apply these funds effectively could harm our business. Pending their use, we may invest the net proceeds from this offering in short-term, interest-bearing, investment grade securities. These investments may not yield a favorable return to our stockholders. See “Use of Proceeds” for a more detailed description of our proposed use of proceeds from this offering. We have broad discretion in the use of the net proceeds from this offering and may not use them effectively.

***Because we do not intend to pay dividends on our common stock, your returns will be limited to any increase in the value of our stock.***

We have never declared or paid any cash dividends on our common stock. We are required to obtain the prior written consent or affirmative vote of the holders of at least 51% of the then outstanding shares of our Series E preferred stock in order to declare or pay a cash dividend on our common stock. We currently intend to retain all available funds and any future earnings to support our operations and finance the growth and development of our business and do not anticipate declaring or paying any cash dividends on our common stock for the foreseeable future. Any return to stockholders will therefore be limited to the appreciation of their stock, if any.

***There is no public market for the warrants to purchase shares of our common stock being offered by us in this offering.***

There is no established public trading market for the warrants being offered in this offering, and we do not expect a market to develop. In addition, we do not intend to apply to list the warrants on any national securities exchange or other nationally recognized trading system, including the Nasdaq Capital Market. Without an active market, the liquidity of the warrants will be limited.

### **SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS**

This prospectus and the documents we incorporate by reference contain forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. All statements, other than statements of historical fact, included or incorporated in this report regarding our strategy, future operations, collaborations, intellectual property, cash resources, financial position, future revenues, projected costs, prospects, plans, and objectives of management are forward-looking statements. The words “believes,” “anticipates,” “estimates,” “plans,” “expects,” “intends,” “may,” “could,” “should,” “potential,” “likely,” “projects,” “continue,” “will,” and “would” and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. We cannot guarantee that we actually will achieve the plans, intentions or expectations disclosed in our forward-looking statements and you should not place undue reliance on our forward-looking statements. There are a number of important factors that could cause our actual results to differ materially from those indicated or implied by forward-looking statements. These important factors include those set forth above under the heading “Risk Factors.” These factors and the other cautionary statements made in this prospectus and the documents we incorporate by reference should be read as being applicable to all related forward-looking statements whenever they appear in this prospectus and the documents we incorporate by reference. In addition, any forward-looking statements represent our estimates only as of the date that this prospectus is filed with the Securities and Exchange Commission, or the SEC, and should not be relied upon as representing our estimates as of any subsequent date. We do not assume any obligation to update any forward-looking statements. We disclaim any intention or obligation to update or revise any forward-looking statement, whether as a result of new information, future events or otherwise.

## USE OF PROCEEDS

We estimate that the net proceeds to us of the sale of the common stock and warrants that we are offering will be approximately \$13.3 million, based on an assumed combined public offering price of \$0.73 per share of common stock and related warrant, which price was the last reported sale price of our common stock reported on the Nasdaq Capital Market on April 29, 2013, after deducting the estimated underwriting discounts and commissions and estimated offering expenses payable by us and excluding the proceeds, if any, from the exercise of the warrants issued pursuant to this offering.

We intend to use the net proceeds to us from this offering, together with our existing cash resources, to fund our planned Phase 2 clinical trial of IMO-8400 in patients with psoriasis and for working capital and other general corporate purposes.

This expected use of net proceeds from this offering represents our intentions based upon our current plans and business conditions. The amounts and timing of our actual expenditures may vary significantly depending on a number of factors, including the status of and results from clinical trials of IMO-8400 and whether regulatory authorities require us to perform additional clinical trials of IMO-3100 and IMO-8400 in order to obtain market approvals.

We believe that our available funds following this offering will be sufficient to enable us to conduct our planned Phase 2 clinical trial of IMO-8400 in patients with psoriasis and to plan for further clinical development of IMO-8400. We expect that these funds will not be sufficient to enable us to conduct, and we do not plan to conduct, any other clinical development of IMO-3100 or IMO-8400 or to conduct any other development of our other product candidates or technologies. It is also possible that we will not achieve the progress that we expect with respect to IMO-8400 because the actual costs and timing of clinical development activities are difficult to predict and are subject to substantial risks and delays.

We cannot estimate the amount of net proceeds to be used for the purposes described above. We may find it necessary or advisable to use the net proceeds for other purposes, and we will have broad discretion in the application of the net proceeds.

Pending use of the proceeds as described above, we intend to invest the proceeds in short-term, interest-bearing, investment grade securities.

**DIVIDEND POLICY**

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. We are required to obtain the prior written consent or affirmative vote of the holders of at least 51% of the then outstanding shares of our Series E preferred stock in order to declare or pay a cash dividend on our common stock.

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The following table sets forth our cash and cash equivalents and capitalization as of December 31, 2012, as follows:

- on an actual basis; and
- on an as adjusted basis to reflect our issuance and sale in this offering of \$15,000,000 of shares of common stock and warrants to purchase shares of our common stock at an assumed combined public offering price of \$0.73 per share, which price was the last reported sale price of our common stock on the Nasdaq Capital Market on April 29, 2013, after deducting the estimated underwriting discounts and commissions and estimated offering expenses payable by us and excluding the proceeds, if any, from the exercise of the warrants issued pursuant to this offering.

You should read this information in conjunction with our financial statements and the related notes appearing at the end of this prospectus and the “Management’s Discussion and Analysis of Financial Condition and Results of Operations” section and other financial information contained in this prospectus.

	As of December 31, 2012	
	Actual	As Adjusted
	(In thousands except per share data)	
Cash and cash equivalents	\$ 10,096	\$ 23,369
Series D Redeemable Convertible Preferred stock, \$0.01 par value; 1,124 shares designated, issued and outstanding, actual and as adjusted; Redemption amount – \$9,149; Liquidation preference – \$9,338	\$ 5,921	5,921
Non-redeemable Preferred Stock, Common Stock and Other Stockholders’ Equity: Preferred stock, \$0.01 par value, Authorized – 5,000 shares		
Series E Convertible Preferred stock, \$0.01 par value; 424 shares designated, issued and outstanding, actual and as adjusted; Liquidation preference \$5,980	3,701	3,701
Series A Convertible Preferred stock, \$0.01 par value; 1,500 shares designated, 1 share issued and outstanding, actual and as adjusted	—	—
Common stock, \$0.001 par value; 140,000 shares authorized, 27,643 shares issued and outstanding, actual; 48,191 shares issued and outstanding, as adjusted	28	48
Additional paid-in capital	391,635	404,888
Accumulated deficit	(394,658)	(394,658)
Total stockholders’ equity	706	13,979
Total capitalization	\$ 6,627	\$ 19,900

The table above excludes the shares of common stock issuable upon the exercise of the warrants being offered by us in this offering and also excludes the following as of December 31, 2012:

- 5,657,256 shares of common stock issuable upon exercise of stock options outstanding as of December 31, 2012, at a weighted-average exercise price of \$4.96 per share;
- 2,413,469 shares of common stock reserved as of December 31, 2012 for future issuance under our equity incentive plans;
- 1,926 shares of common stock reserved as of December 31, 2012 for issuance upon any conversion of our outstanding Series A preferred stock;



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- 6,266,175 shares of common stock reserved as of December 31, 2012 for issuance upon any conversion of our outstanding Series D preferred stock;
- 8,484,840 shares of common stock reserved as of December 31, 2012 for issuance upon any conversion of our outstanding Series E preferred stock; and
- 12,923,892 shares of common stock issuable upon exercise of warrants outstanding as of December 31, 2012, at a weighted average exercise price of \$1.24 per share.

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## DILUTION

If you invest in our securities in this offering, your ownership interest will be immediately diluted to the extent of the difference between the combined price per share of our common stock and related warrant in this offering and the as adjusted net tangible book value per share of our common stock upon closing of this offering. Net tangible book value per share of our common stock is determined at any date by subtracting our total liabilities from the amount of our total tangible assets (total assets less intangible assets) and dividing the difference by the number of shares of our common stock deemed to be outstanding at that date.

Our historical net tangible book value as of December 31, 2012 was approximately \$706,000, or \$0.03 per share of our outstanding common stock, based on 27,642,969 shares of common stock outstanding as of December 31, 2012.

Investors participating in this offering will incur immediate and significant dilution. After giving effect to the issuance and sale in this offering of \$15.0 million of shares of our common stock and warrants to purchase up to \_\_\_\_\_ shares of our common stock, at an assumed combined public offering price of \$0.73 per share of our common stock and related warrant, which price was the last reported sale price of our common stock on the Nasdaq Capital Market on April 29, 2013, after deducting the estimated underwriting discounts and commissions and estimated offering expenses payable by us and excluding the proceeds, if any, from the exercise of the warrants issued pursuant to this offering, our as adjusted net tangible book value as of December 31, 2012 would have been approximately \$14.0 million, or approximately \$0.29 per share of our common stock. This amount represents an immediate increase in net tangible book value of \$0.26 per share of our common stock to existing stockholders and an immediate dilution in net tangible book value of \$0.44 per share of our common stock to new investors purchasing securities in this offering. The following table illustrates this dilution:

Assumed combined public offering price per share of common stock and related warrant		\$ 0.73
Historical net tangible book value per share of our common stock as December 31, 2012	\$ 0.03	
As adjusted increase in net tangible book value per share of our common stock attributable to investors participating in this offering	<u>0.26</u>	
As adjusted net tangible book value per share of our common stock after this offering		<u>\$0.29</u>
Dilution of as adjusted net tangible book value per share to new investors		<u>\$ 0.44</u>

If any shares of our common stock are issued upon exercise of outstanding options or warrants, you will experience further dilution.

Certain of our existing principal stockholders and their affiliated entities have indicated an interest in purchasing up to \$2.5 million of shares of our common stock and warrants to purchase shares of our common stock in this offering at the public offering price. However, because indications of interest are not binding agreements or commitments to purchase, the underwriters could determine to sell more, less or no shares and warrants to any of these existing principal stockholders and any of these existing principal stockholders could determine to purchase more, less or no shares and warrants in this offering.

**SELECTED FINANCIAL DATA**

You should read the following selected financial data in conjunction with “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and our financial statements and the related notes appearing elsewhere in this prospectus.

The statements of operations and comprehensive (loss) data for the years ended December 31, 2012, 2011 and 2010 and the balance sheet data at December 31, 2012 and 2011, are derived from our audited financial statements appearing elsewhere in this prospectus. The statements of operations and comprehensive income data for the years ended December 31, 2009 and 2008 and the balance sheet data at December 31, 2010, 2009 and 2008, are derived from our audited financial statements that are not included in this prospectus. Our historical results are not necessarily indicative of the results to be expected in any future period.

	<b>Year Ended December 31,</b>				
	<b>2012</b>	<b>2011</b>	<b>2010</b>	<b>2009</b>	<b>2008</b>
	<b>(In thousands, except per share data)</b>				
<b>Statement of Operations and Comprehensive (Loss) Income Data:</b>					
Alliance revenue	\$ 51	\$ 53	\$ 16,110	\$ 34,518	\$ 26,450
Operating expenses:					
Research and development	13,673	17,969	24,226	18,570	16,152
General and administrative	6,279	7,939	9,867	8,561	9,798
Total operating expenses	19,952	25,908	34,093	27,131	25,950
(Loss) income from operations	(19,901)	(25,855)	(17,983)	7,387	500
Other income (expense):					
Decrease in fair value of warrant liability	675	1,974	—	—	—
Investment income, net	9	30	116	145	1,344
Interest expense	—	—	(2)	(3)	(92)
Foreign currency exchange (loss) gain	(23)	75	(94)	(27)	(267)
(Loss) income before income taxes	(19,240)	(23,776)	(17,963)	7,502	1,485
Income tax benefit	—	—	—	44	24
Net (loss) income	\$ (19,240)	\$ (23,776)	\$ (17,963)	\$ 7,546	\$ 1,509
Preferred stock accretion and dividends	3,210	4,548	—	—	—
Net (loss) income applicable to common stockholders	\$ (22,450)	\$ (28,324)	\$ (17,963)	\$ 7,546	\$ 1,509
Basic net (loss) income per share applicable to common stockholders	\$ (0.81)	\$ (1.03)	\$ (0.71)	\$ 0.32	\$ 0.07
Diluted net (loss) income per share applicable to common stockholders	\$ (0.81)	\$ (1.03)	\$ (0.71)	\$ 0.31	\$ 0.06
Shares used in computing basic net (loss) income per common share applicable to common stockholders (1)	27,639	27,623	25,139	23,420	22,655
Shares used in computing diluted net (loss) income per common share applicable to common stockholders (1)	27,639	27,623	25,139	24,079	25,331

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	Year Ended December 31,				
	2012	2011	2010	2009	2008
	(In thousands)				
Net (loss) income	(19,240)	(23,776)	(17,963)	7,546	1,509
Other comprehensive (loss) income:					
Decrease in unrealized gain on available –for-sale securities	—	(13)	32	17	(44)
Other comprehensive (loss) income	—	(13)	32	17	(44)
Comprehensive (loss) income	<u>\$ (19,240)</u>	<u>\$ (23,789)</u>	<u>\$ (17,931)</u>	<u>\$ 7,563</u>	<u>\$ 1,465</u>
<b>Balance Sheet Data:</b>					
Cash, cash equivalents and investments	\$ 10,096	\$ 24,571	\$ 34,643	\$ 40,207	\$ 55,606
Working capital	6,163	18,741	32,100	23,054	32,099
Total assets	10,823	25,595	36,881	47,639	59,400
Capital lease obligations	12	—	8	28	49
Redeemable preferred stock	5,921	5,921	—	—	—
Accumulated deficit	(394,658)	(375,418)	(351,642)	(333,679)	(341,225)
Total stockholders' equity	706	12,024	33,101	33,105	22,167

(1) Computed on the basis described in Note 11 of notes to financial statements appearing elsewhere in this prospectus.

## MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

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

### Overview

We are a clinical stage biotechnology company engaged in the discovery and development of novel synthetic DNA- and RNA-based drug candidates that are designed to modulate immune responses mediated through Toll-like Receptors, or TLRs. We are focusing our development efforts on the treatment of autoimmune and inflammatory diseases. We have two drug candidates, IMO-3100, a TLR7 and TLR9 antagonist, and IMO-8400, a TLR7, TLR8, and TLR9 antagonist, in clinical development for the treatment of autoimmune and inflammatory diseases. In December 2012, we announced top-line data from a Phase 2 clinical trial of IMO-3100 in patients with moderate to severe plaque psoriasis. We believe that the results of this trial provide clinical proof of concept for our approach of targeting specific TLRs for the treatment of psoriasis and potentially other autoimmune and inflammatory diseases.

TLRs are specific receptors present in immune system cells. Using a chemistry-based approach, we have created synthetic DNA- and RNA-based compounds that are targeted to TLR3, TLR7, TLR8, and TLR9. A TLR antagonist is a compound that blocks activation of an immune response through the targeted TLR. A TLR agonist is a compound that stimulates an immune response through the targeted TLR.

We believe that the modulation of immune responses through TLRs provides a rationale for the development of drug candidates to treat a broad range of diseases, including autoimmune and inflammatory diseases, cancer and respiratory diseases, and for use as vaccine adjuvants. We are a party to a collaboration alliance with Merck Sharp & Dohme Corp. (formerly Merck & Co., Inc.), or Merck & Co., for the use of agonists of TLR7, TLR8, and TLR9 as adjuvants in the development of vaccines for cancer, infectious diseases, and Alzheimer's disease. We are seeking to enter into additional collaborative alliances with third parties with respect to our TLR-targeted programs in oncology, hematological malignancies, respiratory diseases, and the use of TLR3 agonists as vaccine adjuvants.

At December 31, 2012, we had an accumulated deficit of \$394.7 million. We expect to incur substantial operating losses in future periods. We do not expect to generate significant product revenue, sales-based milestones or royalties until we successfully complete development and obtain marketing approval for drug candidates, either alone or in collaborations with third parties, which we expect will take a number of years. In order to commercialize our drug candidates, we need to complete clinical development and to comply with comprehensive regulatory requirements.

We believe our available funds following this offering will be sufficient to enable us to conduct our planned Phase 2 clinical trial of IMO-8400 in patients with psoriasis and to plan for further clinical development of IMO-8400. We expect that these funds will not be sufficient to enable us to conduct, and we do not plan to conduct, any other clinical development of IMO-3100 or IMO-8400 or to conduct any other development of our other product candidates or technologies. It is also possible that we will not achieve the progress that we expect with respect to IMO-8400 because the actual costs and timing of clinical development activities are difficult to predict and are subject to substantial risks and delays. Accordingly, we will be required to obtain further funding through public or private equity offerings,

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debt financings, collaborations and licensing arrangements or other sources. Financing may not be available to us in the necessary timeframe, in the amounts that we need, on terms that are acceptable to us or at all. Our failure to raise capital as and when needed would have a negative impact on our financial condition and our ability to pursue our business strategy.

### **Critical Accounting Policies and Estimates**

This management's discussion and analysis of financial condition and results of operations is based on our financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States. The preparation of these financial statements requires management 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 and the reported amounts of revenues and expenses during the reporting period. On an ongoing basis, management evaluates its estimates and judgments, including those related to revenue recognition, stock-based compensation and our Series D redeemable convertible preferred stock, or Series D preferred stock, and related common stock warrants. Management bases its estimates and judgments on historical experience and on various other factors that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

We regard an accounting estimate or assumption underlying our financial statements as a "critical accounting estimate" where:

- the nature of the estimate or assumption is material due to the level of subjectivity and judgment necessary to account for highly uncertain matters or the susceptibility of such matters to change; and
- the impact of the estimates and assumptions on financial condition or operating performance is material.

Our significant accounting policies are described in Note 2 of the notes to our financial statements appearing elsewhere in this prospectus. Not all of these significant policies, however, fit the definition of critical accounting policies and estimates. We believe that our accounting policies relating to revenue recognition, stock-based compensation and convertible preferred stock and related common stock warrants fit the description of critical accounting estimates and judgments.

#### *Revenue Recognition*

An important part of our business strategy is to enter into research and development collaborations with biotechnology and pharmaceutical corporations that bring expertise and resources to the potential research and development and commercialization of drugs based on our technology. Under our research and development collaborations, we have generally licensed specified portions of our intellectual property and provided research and development services to the collaborator during the period of continued involvement in the early portion of the collaborations. Our collaborators have generally been responsible for drug development activities initiated after the collaboration is effective. Our collaborators are also generally responsible for any commercialization activities that may be initiated if any of the drug candidates receive marketing approval from the appropriate regulatory authority. The terms of our agreements have included non-refundable license fees, research and development funding, payments based upon achievement of clinical and preclinical development milestones and royalties on product sales.

The following revenue recognition policy incorporates Accounting Standard Update, or ASU, No. 2009-13, "Multiple-Element Revenue Arrangements" and ASU No. 2010-17, "Milestone Method of Revenue Recognition" both of which we adopted on January 1, 2011. These new accounting standards did not

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affect revenue that we earned through December 31, 2012. We plan to follow No. 2009-13 prospectively for any arrangements entered into or materially modified after the adoption date. We plan to follow ASU No. 2010-17 prospectively for any future milestones.

When evaluating multiple element arrangements, we consider whether the components of the arrangement represent separate units of accounting based on specified criteria such as whether the deliverable has standalone value to the collaborator. Any fixed or determinable payments that we expect to receive under the arrangement are allocated among the separate units of accounting and the appropriate revenue recognition criteria are applied to each of these separate units. Any item that does not qualify as a separate unit of accounting is combined with other appropriate items and the combined deliverable is treated as a separate unit of accounting.

Our allocation of fixed or determinable payments to the separate units of accounting is based on the relative-selling-price method, which is based on the following hierarchy used in determining the selling price for each unit of accounting: (1) vendor specific objective evidence, or VSOE, the price at which the item is regularly sold by the vendor on a standalone basis, is the preferred method; (2) third-party evidence, or TPE, of vendors selling similar goods to similarly situated customers on a standalone basis if VSOE of selling price of a product or service is not available; and (3) best estimate of selling price if neither VSOE nor TPE of selling price of a product or service is available.

Our timing of revenue recognition from upfront license fees received under collaboration agreements depends upon the terms of the agreement.

We recognize revenue from reimbursements earned in connection with research and development collaboration agreements as related research and development costs are incurred, and contractual services are performed, provided collectability is reasonably assured. We include amounts contractually owed to us under these research and development collaboration agreements, including any earned but unbilled receivables, in receivables in our balance sheets. Our principal costs under these agreements are generally for our personnel and related expenses of conducting research and development, as well as for research and development performed by outside contractors or consultants or related research and development materials provided by third parties or for clinical trials we conduct on behalf of a collaborator.

For payments that are contingent upon milestone events or achieving a specific result from the research and development efforts, we recognize these milestone payments as revenue in their entirety upon achieving the related milestone provided the milestone meets the criteria specified below. Milestones typically consist of significant events in the development life cycle of the related technology, such as initiating clinical trials, filing for approval with regulatory agencies, and obtaining approvals from regulatory agencies. We recognize revenue from milestone payments received under collaboration agreements in their entirety upon achieving the related milestone, provided that the milestone event is substantive, its achievability was not reasonably assured at the inception of the agreement, the amount attributed to the milestone is reasonable in relation to our performance and to the amounts attributed to the other deliverables in the arrangement and we have no further performance obligations relating to the milestone event. In the event that the agreement provides for payment to be made subsequent to our standard payment terms, we recognize revenue when payment becomes due.

Amounts received prior to satisfying the above revenue recognition criteria are recorded as deferred revenue in our balance sheets. We classify amounts that we expect to recognize in the next twelve months as short-term deferred revenue. We classify amounts that we do not expect to recognize within the next twelve months as long-term deferred revenue.

Although we follow detailed guidelines in measuring revenue, certain judgments affect the application of our revenue policy. For example, we record deferred revenue, if any, on our balance sheet as short-term

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or long-term deferred revenue based on our best estimate of when such amounts would be recognized. However, these estimates are based on our collaboration agreement and our then current operating plan and, if either should change, we could recognize a different amount of deferred revenue over the subsequent twelve-month period.

Our estimate of deferred revenue also reflects our estimate of the periods of our involvement in our collaborations and the estimated periods over which our performance obligations will be completed. In some instances, the timing of satisfying these obligations can be difficult to estimate. Accordingly, our estimates may change in subsequent periods. Such changes to estimates would result in a change in revenue recognition amounts. If these estimates and judgments change over the course of these agreements, it may affect the timing and amount of revenue that we recognize and record in subsequent periods.

### *Stock-Based Compensation*

We recognize all share-based payments to employees and directors as expense in our statements of operations and comprehensive loss based on their fair values. We record compensation expense over an award's requisite service period, or vesting period, based on the award's fair value at the date of grant. Our policy is to charge the fair value of stock options as an expense, adjusted for forfeitures, on a straight-line basis over the vesting period, which is generally four years for employees and three years for directors. Prior to December 2011, the vesting of all of our stock options was based on the passage of time and the employees' continued service. In December 2011 and January 2012, we granted performance based stock options to purchase 697,500 shares of common stock to employees. As of the grant date of such options, options to purchase 174,375 shares were to vest immediately upon the achievement of various performance conditions and options to purchase 523,125 shares were to vest over a three-year service period upon the achievement of the same performance conditions. During 2012 we achieved three of the specified performance conditions. As a result, options to purchase 80,213 shares vested immediately and options to purchase 240,640 shares began vesting over a three-year period in accordance with the terms of the performance-based options. In addition, during 2012, four of the specified performance conditions were not met by their deadlines resulting in the cancellation of 156,797 performance-based options. We recognize expense over the implicit and explicit service periods for awards with performance conditions when we determine the achievement of the performance conditions to be probable.

We use the Black-Scholes option pricing model to estimate the fair value of stock option grants. The Black-Scholes model relies on a number of key assumptions to calculate estimated fair values, including assumptions as to average risk-free interest rate, expected dividend yield, expected life and expected volatility. For the assumed risk-free interest rate, we use the U.S. Treasury security rate with a term equal to the expected life of the option. Our assumed dividend yield of zero is based on the fact that we have never paid cash dividends to common stockholders and have no present intention to pay cash dividends. We use an expected option life based on actual experience. Our assumption for expected volatility is based on the actual stock-price volatility over a period equal to the expected life of the option.

If factors change and we employ different assumptions for estimating stock-based compensation expense in future periods, or if we decide to use a different valuation model, the stock-based compensation expense we recognize in future periods may differ significantly from what we have recorded in the current period and could materially affect our operating income (loss), net income (loss) and earnings (loss) per share. It may also result in a lack of comparability with other companies that use different models, methods and assumptions. The Black-Scholes option pricing model was developed for use in estimating the fair value of traded options that have no vesting restrictions and are fully transferable. These characteristics are not present in our option grants. Although the Black-Scholes option pricing model is widely used, existing valuation models, including the Black-Scholes valuation model, may not provide reliable measures of the fair values of our stock-based compensation.



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We recorded charges of \$2.1 million, \$2.7 million, and \$3.7 million in our statements of operations and comprehensive loss for the years ended December 31, 2012, 2011 and 2010, respectively, for stock compensation expense attributable to share-based payments made to employees and directors. The decrease in stock compensation expense for 2012, as compared to 2011, was primarily due to decreases in the expense associated with employee options granted before 2009 and director options granted before 2010. The decrease in stock compensation expense for 2011, as compared to 2010, was primarily due to decreases in the expense associated with employee options granted before 2008 and director options granted before 2009, as well as 2010 stock compensation expense associated with the modification of stock options during 2010 as a result of our adoption of policies on the treatment of options in connection with director or employee retirement.

### *Convertible Preferred Stock and Warrants*

#### *Series D Redeemable Convertible Preferred Stock and Warrants*

On November 4, 2011, we received net proceeds of \$9.1 million from the sale and issuance of shares of our Series D preferred stock and related warrants to purchase shares of our common stock, or Series D warrants. We first assessed these financial instruments under Accounting Standards Codification, or ASC, 480, "Distinguishing Liabilities from Equity", and determined that neither financial instrument was within the scope of ASC 480. We then assessed these financial instruments under ASC 815, "Derivatives and Hedging" as follows:

*Series D Warrants.* We determined that the Series D warrants were a derivative instrument as they contained a price protection feature that causes the Series D warrants to not be considered "indexed to the company's own stock" and to therefore not be qualified for the exemption requirements in ASC 815-40. We recorded the Series D warrants as a liability at fair value as of the November 4, 2011 transaction date and marked the recorded amount to fair value through earnings each quarter. The fair value of the Series D warrants was \$3.2 million on the November 4, 2011 transaction date and \$1.2 million at December 31, 2011. The \$2.0 million decrease in the fair value between November 4, 2011 and December 31, 2011 was recorded as non-operating income in 2011. The fair value of the Series D warrant liability decreased from \$1.2 million at December 31, 2011 to \$0.5 million at November 9, 2012, the date on which we sold shares of our Series E convertible preferred stock, or Series E preferred stock, and related warrants to purchase shares of our common stock, or Series E warrants, in a financing transaction, resulting in the recognition of \$0.7 million in non-operating income in 2012. The sale of shares of Series E preferred stock and Series E warrants in our November 2012 Series E financing triggered an anti-dilution adjustment under the terms of the Series D warrants, resulting in the exercise price of the Series D warrants being reduced and fixed at the minimum price of \$1.46 per share. As a result, the Series D warrants are no longer being subject to any anti-dilution adjustments and now meet the exception under ASC 815-40 as they were now considered "indexed to the company's own stock" and met certain criteria for equity classification. Accordingly, we marked the Series D warrants to fair value through earnings as of November 9, 2012, and reclassified the remaining \$0.5 million balance of the Series D warrant liability to stockholders equity at that time.

*Series D Redeemable Convertible Preferred Stock.* We determined that the Series D preferred stock contained three embedded features: (1) optional redemption by the company; (2) optional redemption by the holder and (3) optional conversion by the holder. We determined that each of the embedded features met the definition of a derivative. We determined that the Series D preferred stock should be considered an equity host for the purposes of assessing the embedded derivatives for potential bifurcation. We noted the following regarding these embedded features:

*Optional Redemption by the Company and Optional Redemption by the Holder.* We assessed the redemption features under ASC 815-40 to determine if they were eligible for the exemption from

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derivative accounting. In order to meet the exemption the feature must be “indexed to the company’s own stock” and meet specified criteria for equity classification. We determined that both redemption features met these requirements and were not bifurcated.

*Optional Conversion by the Holder.* We determined that the optional conversion by holder feature was clearly and closely related to the Series D preferred stock host. As such the conversion feature did not require bifurcation under ASC 815.

We then assessed the Series D preferred stock under ASC 470, “Debt,” to determine if there was a beneficial conversion feature, or BCF. We determined the value of the BCF by comparing (1) the \$6.3 million financing proceeds allocated to the Series D preferred stock, computed by reducing the \$9.5 million gross proceeds from the Series D financing by the \$3.2 million fair value of the Series D warrants, to (2) the \$10.7 million intrinsic value of the common stock that the Series D preferred stock could be converted into on the date of the Series D financing. Based on this comparison, we determined the BCF to be \$4.4 million which we recorded in additional paid-in capital.

As the Series D preferred stock contains a contingent put feature that is outside of our control, it is considered redeemable and we have recorded it in temporary equity. The initial carrying value of the Series D preferred stock was \$1.5 million, after discounts for the portion of the financing proceeds allocated to the warrant liability, the BCF and the financing transaction costs. Since the Series D preferred stock was immediately convertible, the \$4.4 million discount related to the BCF was immediately accreted to preferred dividends in 2011, resulting in an increase in the carrying value of the Series D preferred stock to \$5.9 million. The sale of shares of Series E preferred stock and Series E warrants in our November 2012 Series E financing triggered an anti-dilution adjustment under the terms of the Series D preferred stock, resulting in the conversion price of the Series D preferred stock being reduced and fixed at \$1.46 per share, and such shares no longer being subject to any anti-dilution adjustments. The anti-dilution adjustment to the conversion price of the Series D preferred stock resulted in an additional \$1.2 million discount on the purchase price of the Series D preferred stock and resulted in an additional BCF. The \$1.2 million additional BCF was immediately accreted to preferred dividends in November 2012 which resulted in the carrying value of the Series D preferred stock remaining at \$5.9 million. The holders of shares of Series D preferred stock then outstanding are entitled to require us to purchase such shares of Series D preferred stock for \$9.1 million plus any accrued but unpaid dividends upon the occurrence of a fundamental change of the Company. Since we have determined that a fundamental change of the Company is not currently probable, the remaining discount of \$3.2 million is not accreted to preferred stock dividends in our statements of operations and comprehensive loss. Such amount will only be accreted to preferred dividends in our statements of operations and comprehensive loss at the time that the redemption becomes probable, if ever.

If we had determined that the Series D preferred stock was a debt host rather than an equity host, the conversion feature would have been bifurcated and accounted for as a derivative. If the conversion feature had been accounted for as a derivative it would have been marked to fair value each quarter with the change in fair value being recorded in other income (expense) in our statements of operations and comprehensive loss. This would have materially affected our net loss available for common stockholders and loss per share.

On April 22, 2013, we entered into an agreement with Pillar Pharmaceuticals I, L.P., or Pillar I, and Pillar Pharmaceuticals II, L.P., or Pillar II, which we refer to as the April 22, 2013 Pillar Agreement. Under the April 22, 2013 Pillar Agreement, Pillar I, as the sole holder of our Series D preferred stock, has irrevocably agreed to waive and not exercise the contingent put feature described above effective upon the consummation of a qualified financing. Under the terms of the April 22, 2013 Pillar Agreement, a qualified financing is defined as the issuance and sale of our equity securities from and after the date of the April 22, 2013 Pillar Agreement in one or more closings resulting in aggregate gross proceeds to us of

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at least \$12.5 million which would include the consummation of this offering. As a result of our agreement with Pillar I and Pillar II, we anticipate being able to reclassify our Series D preferred stock from temporary equity to permanent equity on our balance sheet in the same manner that we currently classify our Series E preferred stock. See “Certain Relationships and Related Person Transactions” for additional information about the terms of the April 22, 2013 Pillar Agreement.

### *Series E Convertible Preferred Stock*

On November 9, 2012, we received net proceeds of \$6.0 million from the sale and issuance of shares of our Series E preferred stock and Series E warrants to purchase shares of our common stock. We first considered the Series E preferred stock under ASC 480 and determined that it was not mandatorily redeemable. We then identified the following three embedded features within the Series E preferred stock: (1) optional conversion by the holder; (2) optional redemption by the company; and (3) an alternative redemption by the company. We determined that the Series E preferred stock was equity like. We assessed the optional conversion by the holder to be clearly and closely related to the preferred stock and thus not subject to bifurcation under ASC 815. The optional redemption by us and the alternative redemption by us were both indexed to our own stock and met the criteria for equity classification under ASC 815-40 and thus were not required to be bifurcated.

We issued the Series E preferred stock together with Series E warrants to purchase up to 8,484,840 shares of common stock. Since the Series E preferred stock and the Series E warrants were classified in stockholders’ equity, the gross proceeds from the financing were allocated between the Series E preferred stock and the Series E warrants based on their relative fair values at the time of the November 9, 2012 Series E financing. We computed the fair value of the warrants using the Black Scholes Model and determined it to be \$2.9 million. We recorded the \$2.3 million prorated value of the warrants as additional paid-in capital.

We then considered the Series E preferred stock under ASC 470-20 to determine if a BCF existed. As of the transaction date, we computed a BCF of \$1.3 million using the initial stated conversion rate. Since the conversion feature is immediately exercisable, we accreted the \$1.3 million BCF immediately to preferred dividends

### *New Accounting Pronouncements*

We adopted Financial Accounting Standards Board ASU No. 2011-04, “Fair Value Measurement (Topic 820)” on a prospective basis effective January 1, 2012. ASU No. 2011-04 updates the existing fair value measurement guidance currently included in the ASC to achieve common fair value measurement and disclosure requirements in United States Generally Accepted Accounting Principles, or U.S. GAAP, and International Financial Reporting Standards. ASU No. 2011-04 is generally consistent with the Company’s previous fair value measurement policies but includes additional disclosure requirements, particularly for assets and liabilities that require the use of Level 3 inputs to measure fair value. The adoption of ASU No. 2011-04 did not have a material impact on the Company’s financial position or results of operations.

Effective January 1, 2012, we adopted ASU No. 2011-05, “Comprehensive Income”, which requires companies to present the components of net income and other comprehensive income either as one continuous statement or as two consecutive statements. ASU No. 2011-05 is applied retroactively to all periods presented. ASU No. 2011-05 eliminates the option to present components of other comprehensive income as part of the statement of changes in stockholders’ (deficit) equity. The update does not change the items which must be reported in other comprehensive income, how such items are measured or when they must be reclassified to net income. The adoption of ASU No. 2011-05 did not have a material impact on the Company’s financial position or results of operations.

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**Results of Operations**

***Years ended December 31, 2012, 2011 and 2010***

*Alliance Revenue*

Our alliance revenues are comprised primarily of revenue earned under various collaboration and licensing agreements which include license fees, research and development revenues, including reimbursement of internal and third-party expenses, milestones and patent-related reimbursements.

The following table is a summary of our alliance revenue earned under our collaboration and licensing agreements:

	Year Ended December 31.			Annual Percentage Change	
	2012	2011	2010	2012/2011	2012/2011
	(In millions)				
License fees	\$ —	\$ —	\$ 12.2	—	(100)%
Research and development	—	—	0.1	—	(100)%
Milestones	—	—	3.8	—	(100)%
Other	0.1	0.1	—	—	—
Total alliance revenue	<u>\$ 0.1</u>	<u>\$ 0.1</u>	<u>\$ 16.1</u>	—	(99)%

*License Fees.* License fees primarily include license fee revenue recognized during 2010 under our collaborations with Merck & Co. and Merck KGaA, Darmstadt, Germany, or Merck KGaA. License fee revenue during 2010 was comprised of amortization of the upfront license fee payments under these collaborations. We recognized license fee revenue ratably over the expected period of our continuing involvement in the collaborations, which has generally represented the estimated research period of the agreement.

The following table is a summary of license fees recognized under our two collaborations during 2010:

<u>Collaborator</u>	Year Ended December 31, 2010 (In millions)
Merck KGaA	\$ 7.3
Merck & Co.	4.8

We received a \$40.0 million upfront payment from Merck KGaA in Euros in February 2008 of which we received \$39.7 million due to foreign currency exchange rates in effect at the time. We recognized the \$40.0 million upfront payment as revenue over the twenty eight-month research term that ended in June 2010. We received a \$20.0 million upfront payment from Merck & Co. in December 2006. We recognized the \$20.0 million upfront payment as revenue over the two-year initial research term and the two-year extension period that ended in December 2010. Since we completed the research portions of these collaborations during 2010, all of the upfront license fee payments were fully amortized by December 2010. Consequently, the amount of license fee revenue that we recognized under the Merck KGaA and Merck & Co. collaborations decreased in 2010 and we did not recognize any license fee revenue during 2011 and 2012.

*Research and Development Revenue.* Research and development revenues in 2010 consisted of reimbursement of us by Merck KGaA of costs incurred by us in connection with clinical trials under our

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collaboration agreement with Merck KGaA. By March 2010, Merck KGaA had assumed sponsorship of these clinical trials of IMO-2055 and we did not conduct any clinical trials of IMO-2055 after 2010. As a result, we did not incur any such costs or receive any such reimbursements in 2011 and 2012 and as such did not recognize any research and development revenue in 2011 and 2012.

*Milestone Revenue.* In 2011 and 2012, we received no milestone payments. In 2010, we received \$3.8 million as a result of the initiation by Merck KGaA of a Phase 1b clinical trial of IMO-2055 in treatment of patients with squamous cell carcinoma of the head and neck, or SCCHN.

*Other Revenue.* Other revenue consisted of reimbursement by licensees of costs associated with patent maintenance.

#### *Research and Development Expenses*

Research and development expenses decreased by approximately \$4.3 million, or 24%, from \$18.0 million in 2011 to \$13.7 million in 2012 and decreased by approximately \$6.2 million, or 26%, from \$24.2 million in 2010 to \$18.0 million in 2011. In the following table, research and development expense is set forth in six categories which are discussed beneath the table:

	Year Ended December 31,			Annual Percentage Change	
	2012	2011	2010	2012/2011	2011/2010
	(In millions)				
IMO-3100 external development expense	\$ 2.5	\$ 1.7	\$ 5.2	47%	(67)%
IMO-8400 external development expense	0.5	—	—	—	—
IMO-2055 external development expense (cost of regaining rights to cancer program in 2011)	—	2.4	—	(100)%	—
IMO-2125 external development expense	0.2	2.1	7.5	(90)%	(72)%
Other drug development expense	5.1	4.8	3.9	6%	23%
Basic discovery expense	5.4	7.0	7.6	(23)%	(8)%
	<u>\$13.7</u>	<u>\$18.0</u>	<u>\$24.2</u>	(24)%	(26)%

*IMO-3100 External Development Expenses.* These expenses include external expenses that we have incurred in connection with IMO-3100 since November 2009, when we commenced clinical development of IMO-3100. These external expenses include payments to independent contractors and vendors for drug development activities conducted after the initiation of IMO-3100 clinical development but exclude internal costs such as payroll and overhead expenses. We incurred approximately \$9.9 million in external development expenses from November 2009 through December 31, 2012, including costs associated with our clinical trials, manufacturing and process development activities related to the production of IMO-3100, and additional nonclinical toxicology studies.

The increase in IMO-3100 expenses in 2012, as compared to 2011, was primarily attributable to costs incurred in 2012 in connection with the preparation for and conduct of our Phase 2 clinical trial of IMO-3100 in patients with psoriasis that we initiated in April 2012 and for which we completed patient activities in December 2012. The increases in 2012 were partially offset by decreases in costs associated with nonclinical studies, the manufacture of IMO-3100 drug supply, costs incurred in the 2011 periods in preparation for a previously planned Phase 2 clinical trial, and data analysis of the completed Phase 1 clinical trials of IMO-3100.

The decrease in IMO-3100 expenses in 2011 as compared to 2010 was primarily attributable to lower costs in 2011 associated with nonclinical safety studies, lower expenses in 2011 associated with the

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manufacture of additional IMO-3100 drug supplies, and the completion of all patient activities in 2010 with respect to our Phase 1 clinical trials. These reductions in 2011 expenses for IMO-3100 relative to 2010 expenses were partially offset by 2011 costs associated with the preparation for a planned Phase 2 clinical trial.

We expect IMO-3100 expenses in 2013 to decrease relative to 2012 expenses, due to the completion of patient activities in the Phase 2 trial in 2012.

*IMO-8400 External Development Expenses.* These expenses include external expenses that we have incurred in connection with IMO-8400 since October 2012, when we commenced clinical development of IMO-8400. These external expenses include payments to independent contractors and vendors for drug development activities conducted after the initiation of IMO-8400 clinical development but exclude internal costs such as payroll and overhead expenses. Since October 2012, we have incurred approximately \$0.5 million in external development expenses through December 31, 2012, including costs associated with our Phase 1 clinical trial in healthy subjects that we initiated in 2012, and additional nonclinical studies. We classified the IMO-8400 external development expenses incurred prior to October 2012 as Other Drug Development Expenses.

In the fourth quarter of 2012, we initiated a Phase 1 clinical trial of IMO-8400 in healthy subjects. The first portion of this Phase 1 trial was a rising single-dose evaluation of IMO-8400 administered by subcutaneous injection. The second portion of this Phase 1 trial involved escalating dosages of IMO-8400 administered once per week for four weeks. The primary objectives of this Phase 1 clinical trial are to evaluate the safety, and pharmacodynamics of IMO-8400. This trial is being conducted at a single U.S. site.

Based on the clinical activity of IMO-3100 observed in our four-week Phase 2 clinical trial of IMO-3100 in patients with psoriasis, we have determined that the next step in our development program is to conduct a Phase 2 clinical trial in patients with psoriasis to, among other things, evaluate the clinical activity of IMO-8400 with a treatment period of up to 12 weeks. Based on our evaluation of the comparative profiles of IMO-3100 and IMO-8400, including the engagement of TLR8 by IMO-8400, we have determined to focus our resources on the development of IMO-8400 and to conduct this trial in patients with psoriasis with IMO-8400. In March 2013, we submitted to the regulatory authorities in the Netherlands for review the proposed protocol for this trial and we received a “no objection” clearance from the Centrale Commissie Mensgebonden Onderzoek. Under the protocol, 32 adult patients with moderate to severe plaque psoriasis, as indicated by a score of 12.5 or greater in the Psoriasis Area Severity Index, would be randomized into one of four cohorts and receive placebo or IMO-8400 at a dose level of 0.075, 0.15, or 0.3 mg/kg/week for 12 weeks, with a six-week follow-up period. We expect that we could initiate this trial as early as the second quarter of 2013 and could have top-line data by the end of 2013. However, we do not plan to initiate this trial unless and until we have completed this offering and raised the necessary proceeds to fund this trial and until we have confirmed the successful completion of our ongoing Phase 1 trial of IMO-8400.

We are also planning to initiate a signal-seeking Phase 2 clinical trial of IMO-8400 in patients with lupus and are considering conducting a proof-of-concept study of IMO-8400 in an orphan autoimmune disease indication. We expect to select the orphan autoimmune disease indication for further exploration in the second half of 2013. However, our plans to conduct the Phase 2 clinical trial of IMO-8400 in patients with lupus and the proof-of-concept study are subject to successful completion of our ongoing Phase 1 trial of IMO-8400 and our ability to raise additional funding beyond the proceeds of this offering to fund the conduct of this Phase 2 trial and proof-of-concept study. We expect to seek such funding through public or private equity offerings, debt financings, collaborations and licensing arrangements or other sources.

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*IMO-2055 External Development Expenses.* These expenses include external expenses that we have incurred in connection with IMO-2055. These external expenses include payments to independent contractors and vendors for drug development activities conducted after the initiation of IMO-2055 clinical development, but exclude internal costs such as payroll and overhead expenses. We commenced clinical development of IMO-2055 in 2003 and from 2003 through December 31, 2012 we incurred approximately \$19.9 million in external development expenses, including costs associated with our clinical trials, manufacturing, process development activities related to the production of IMO-2055, additional nonclinical toxicology studies, and the cost of regaining our rights to IMO-2055 and follow-on compounds for use in the treatment of cancer, excluding cancer vaccines, under the termination agreement discussed below.

Under our collaboration with Merck KGaA, Merck KGaA was responsible for developing IMO-2055 for the treatment of cancer excluding vaccines. Merck KGaA refers to IMO-2055 as EMD 1201081. From December 2007 to March 2010, we conducted clinical trials of IMO-2055 under the collaboration and Merck KGaA reimbursed us. As of March 2010, Merck KGaA assumed sponsorship of all ongoing clinical trials of IMO-2055 for the treatment of cancer and responsibility for all further clinical development of IMO-2055 in the treatment of cancer. As a result of Merck KGaA's assumption of sponsorship of the trials, we did not incur significant expenses for IMO-2055 development in 2010 and 2011, except for costs associated with the termination agreement discussed below.

On November 30, 2011, we entered into an agreement to terminate our collaboration with Merck KGaA and to regain rights for developing TLR9 agonists for the treatment of cancer. In connection with the termination agreement, we agreed to reimburse Merck KGaA for up to €1.8 million (\$2.4 million using a December 31, 2012 exchange rate) of Merck KGaA's costs for the third-party contract research organization that was coordinating Merck KGaA's Phase 2 trial of IMO-2055 in combination with cetuximab, payable in eleven installments commencing on March 1, 2012 including a final payment payable upon Merck KGaA's completion of certain specified activities. As of December 31, 2012, we have paid €0.8 of the €1.8 million (\$1.1 million (using exchange rates in effect at the time that the payments were made) of the \$2.4 million). We also agreed to pay to Merck KGaA one-time €1.0 million (\$1.3 million using a December 31, 2012 exchange rate) milestone payments upon the occurrence of each of the following milestones: (i) partnering of IMO-2055 with any third party, (ii) initiation of any Phase 2 or Phase 3 clinical trial for IMO-2055 and (iii) regulatory submission of IMO-2055 in any country. We recorded, in research and development expense during 2011, €1.8 million (\$2.4 million using a November 30, 2011 exchange rate) in installment payments which represents the cost of regaining our rights to IMO-2055 and our follow-on compounds for use in the treatment of cancer, excluding cancer vaccines. Under the agreement, Merck KGaA agreed to continue to conduct the Phase 2 trial of IMO-2055 in combination with cetuximab and other specified related activities and to complete and analyze all clinical trials that Merck KGaA had initiated or for which Merck KGaA had assumed sponsorship and to finalize clinical trial reports. As a result, we did not incur significant expenses for IMO-2055 development during 2012. Any milestone payments will be recorded at the time that any milestones are achieved.

We and, during the collaboration period, Merck KGaA, have conducted clinical trials of IMO-2055 alone or in combination with other anticancer agents in several cancer indications, including a Phase 1b trial of IMO-2055 in combination with erlotinib and bevacizumab in patients with advanced non-small cell lung cancer, a Phase 1b clinical trial of IMO-2055 in combination with cetuximab and the chemotherapy regimen FOLFIRI in patients with advanced colorectal cancer, a randomized Phase 2 trial of IMO-2055 in combination with cetuximab in patients with squamous cell carcinoma of the head and neck, and a Phase 2 trial of IMO-2055 monotherapy in patients with renal cell carcinoma.

We are seeking to enter into collaboration with one or more pharmaceutical companies to advance the use of IMO-2055 in the treatment of cancer.

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*IMO-2125 External Development Expenses.* These expenses include external expenses that we have incurred in connection with IMO-2125. These external expenses include payments to independent contractors and vendors for drug development activities conducted after the initiation of IMO-2125 clinical development, but exclude internal costs such as payroll and overhead expenses. We commenced clinical development of IMO-2125 in May 2007 and from May 2007 through December 31, 2012 we incurred approximately \$16.6 million in external development expenses, including costs associated with our clinical trials manufacturing, process development activities related to the production of IMO-2125, and additional nonclinical toxicology studies.

The decrease in IMO-2125 external development expenses in 2012, as compared to 2011, reflects our determination to discontinue further development of IMO-2125 in the treatment of hepatitis C virus, or HCV, in the third quarter of 2011. IMO-2125 external development expenses during 2011 included costs associated with the conduct of nonclinical toxicology studies, costs associated with the Phase 1 clinical trial in null-responder HCV patients and the Phase 1 clinical trial in treatment-naïve HCV patients, and costs associated with preparation for a Phase 2 clinical trial of IMO-2125 in treatment-naïve HCV patients that we had planned to initiate in the second quarter of 2011. IMO-2125 external development expenses during 2012 were related primarily to costs associated with the completion of nonclinical studies during the first half of 2012, costs associated with data analysis of a Phase 1 clinical trial in null-responder HCV patients, and costs associated with the maintenance of the clinical drug supply.

The decrease in IMO-2125 expenses in 2011 as compared to 2010 was attributable to decreases in costs associated with the Phase 1 clinical trial in null-responder HCV patients that we initiated in September 2007 and the Phase 1 clinical trial in treatment-naïve HCV patients that we initiated in October 2009, manufacturing which occurred in 2010 but not in 2011, the preparation in 2010 for a Phase 2 clinical trial of IMO-2125 in non-responder HCV patients that we had planned to conduct, and a decrease in the cost of conducting additional nonclinical safety studies of IMO-2125. The decrease in 2011 was partially offset by costs incurred in the first half of 2011 associated with preparation for the Phase 2 clinical trial of IMO-2125 in treatment-naïve HCV patients that we had planned to initiate in the second quarter of 2011. We expect that IMO-2125 external development expenses will be significantly lower in future periods.

*Other Drug Development Expenses.* These expenses include external expenses associated with preclinical development of identified compounds in anticipation of advancing these compounds into clinical development. In addition, these expenses include internal costs, such as payroll and overhead expenses, associated with preclinical development and products in clinical development. The external expenses associated with preclinical compounds include payments to contract vendors for manufacturing and the related stability studies, preclinical studies, including animal toxicology and pharmacology studies, and professional fees. Internal expenses associated with products in clinical development include costs associated with our Autoimmune Disease Scientific Advisory Board.

The increase in other drug development expenses in 2012, as compared to 2011, was primarily due to costs of preclinical studies and manufacturing activities to support the Investigational New Drug application, or IND, for IMO-8400, which we submitted to the FDA in the third quarter of 2012, and was partially offset by the cost of obtaining from Novartis nonclinical and clinical trial data from studies of IMO-2134, a TLR9 agonist, which cost we accrued in 2011, costs associated with nonclinical studies and manufacturing of preclinical research compounds in 2011, and lower employee compensation during 2012.

The increase in other drug development expenses in 2011, as compared to 2010, was primarily due to increases in the cost of nonclinical studies of preclinical compounds, manufacturing expenses and consulting costs. These increases reflect costs associated with preclinical studies to support the planned submission of an IND for IMO-8400 and were partially offset by lower employee expenses in 2011. The



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increase in other drug development expenses during 2011 also reflects the cost of obtaining from Novartis nonclinical and clinical trial data from studies conducted by our former collaborative partner of IMO-2134.

*Basic Discovery Expenses.* These expenses include our internal and external expenses relating to our discovery efforts with respect to our TLR-targeted programs, including agonists and antagonists of TLR3, TLR7, TLR8, and TLR9, TLR antisense, and gene silencing oligonucleotides. These expenses reflect payments for laboratory supplies, external research, and professional fees, as well as payroll and overhead expenses. The decrease in basic discovery expenses in 2012, as compared to 2011, was primarily due to decreases in the cost of laboratory supplies and employee compensation reflecting reduced activity and reduced headcount resulting from our September 2011 re-assessment and prioritization of our drug development programs. The decrease in basic discovery expenses in 2011, as compared to 2010, was primarily due to decreases in the cost of laboratory supplies and employee expenses.

We do not know if we will be successful in developing any drug candidate from our research and development programs. At this time, and without knowing the outcome of our ongoing Phase 1 clinical trial of IMO-8400, and without an established plan for future clinical tests of drug candidates, we cannot reasonably estimate or know the nature, timing, and costs of the efforts that will be necessary to complete the remainder of the development of, or the period, if any, in which material net cash inflows may commence from, any drug candidate from our research and development programs. Moreover, the clinical development of any drug candidate from our research and development programs is subject to numerous risks and uncertainties associated with the duration and cost of clinical trials, which vary significantly over the life of a project as a result of unanticipated events arising during clinical development.

*General and Administrative Expenses*

General and administrative expenses decreased by approximately \$1.6 million, or 20%, from \$7.9 million in 2011 to \$6.3 million in 2012 and decreased by approximately \$2.0 million, or 20%, from \$9.9 million in 2010 to \$7.9 million in 2011. General and administrative expenses consist primarily of salary expense, stock compensation expense, consulting fees and professional legal fees associated with our patent applications and maintenance, our corporate regulatory filing requirements, our corporate legal matters, and our business development initiatives.

The \$1.6 million decrease in general and administration expenses in 2012, as compared to 2011, was primarily due to lower legal costs associated with patent matters and lower employee compensation due to decreases in stock based compensation and the number of employees during 2012. These decreases were partially offset by higher corporate legal expenses associated with pursuing financing alternatives, including the financing arrangement we entered into with Cowen and Company LLC, or Cowen, in April 2012.

The \$2.0 million decrease in general and administrative expenses in 2011, as compared to 2010, was primarily due to decreases in stock based compensation, employee cash compensation expenses and consulting fees associated with business and strategic initiatives in 2011. The decrease in stock compensation expense during 2011 was mainly due to higher recognized expense in 2010 associated with the modification of non-employee director stock options and lower expense recognized in 2011 due to options whose fair value had been fully amortized prior to the end of 2011. These decreases in general and administrative expenses were partially offset by increases in legal costs associated with patent matters in 2011.

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*Decrease in Fair Value of Warrant Liability*

During November 2011 we recorded a warrant liability of \$3.2 million reflecting the fair value of the Series D warrants issued in our November 2011 Series D financing. We determined the Series D warrants to be a derivative instrument because they contained a specified anti-dilution provision that did not meet the “indexed to the company’s own stock” exemption requirements in ASC 815-40, “Derivatives and Hedging — Contracts in an Entity’s own Stock,” ASC 815-40. The Series D warrants were classified as a liability, recorded at fair value as of the transaction date and were marked to fair value through earnings each quarter. The fair value of the Series D warrants decreased to \$1.2 million at December 31, 2011 primarily due to a decrease in the price of our common stock. The reduction in the fair value of the Series D warrant liability resulted in the recognition of \$2.0 million in non-operating income in 2011.

The fair value of the Series D warrant liability decreased from \$1.2 million at December 31, 2011 to \$0.5 million at November 9, 2012 primarily due to decreases in the market price of our common stock and the remaining term of the Series D warrants resulting in the recognition of \$0.7 million in non-operating income in 2012. The sale of shares of Series E preferred stock and Series E warrants in our November 2012 Series E financing triggered an anti-dilution adjustment under the terms of the Series D warrants, resulting in the exercise price of the Series D warrants being reduced and fixed at the minimum \$1.46 per share and the Series D warrants no longer being subject to any anti-dilution adjustments. Once the exercise price of the Series D warrants became fixed, the Series D warrants then met the exception under ASC 815-40 as they were now “indexed to the company’s own stock” and met certain criteria for equity classification, thus we marked the Series D warrants to fair value through earnings as of November 9, 2012, and we then reclassified the remaining \$0.5 million Series D warrant liability to stockholders equity at that time.

*Investment Income, net*

Investment income was a negligible amount in 2012 and 2011 because most of our invested funds have been deposited in a money market fund which pays minimal interest. Investment income decreased from \$0.1 million in 2010 to a negligible amount in 2011 due to lower average investment balances and lower interest rates in 2011.

*Foreign Currency Exchange Gain (Loss)*

Our foreign currency exchange loss was a negligible amount in 2012 compared to a gain of \$0.1 million in 2011 and a loss of \$(0.1) million in 2010. The foreign currency exchange loss during 2012 was primarily due to the impact that the weakening value of the U.S. dollar had on our Euro-denominated accrued liabilities associated with the cost of re-gaining the rights to our cancer program and our clinical trial obligations. The foreign currency exchange gain during 2011 was primarily due to the impact that the strengthening value of the U.S. dollar had on our Euro-denominated accrued liabilities associated with the cost of re-gaining the rights to our cancer program and our clinical trial obligations. The foreign currency exchange loss during 2010 was primarily due to the impact that fluctuations in U.S. Dollar/Euro currency exchange rates had on the receipt of milestone payments under our Merck KGaA collaboration in the first and third quarters of 2010. In 2009, we earned a milestone for which we had a \$4.3 million receivable at December 31, 2009. Merck KGaA paid us for this milestone in February 2010 and we received \$4.1 million based on foreign exchange rates in effect at the time of payment as a result of the strengthening value of the U.S. dollar. Consequently, we incurred a foreign currency exchange loss of \$0.2 million on the milestone payment during the first quarter of 2010. The foreign currency exchange loss during 2010 also reflects the impact that fluctuations in U.S. Dollar/Euro currency exchange rates have on payments under our clinical trial agreements that are denominated in Euros and on the receipt of the milestone payment in the third quarter of 2010 when we earned a \$3.8 million milestone for which we received \$4.1 million based on foreign exchange rates in effect at the time of payment as a result of the weakening value of the U.S. dollar, resulting in a foreign currency exchange gain of \$0.3 million.

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### *Preferred Stock Accretion and Dividends*

The \$3.2 million in preferred stock accretion and dividends in 2012 consists of \$1.3 million related to the BCF of the Series E preferred stock and \$1.2 million related to the additional beneficial conversion feature of the Series D preferred stock that we have accreted to preferred dividends, as described under “Critical Accounting Policies and Estimates,” \$0.7 million in dividends payable on shares of our Series D preferred stock and a negligible amount of dividends payable on shares of our Series E preferred stock.

The \$4.5 million in preferred stock accretion and dividends in 2011 consists of \$4.4 million related to the BCF of the Series D preferred stock that we have accreted to preferred dividends, as described under “Critical Accounting Policies and Estimates,” and \$0.1 million in dividends payable on shares of our Series D preferred stock.

### *Net Loss Applicable to Common Stockholders*

As a result of the factors discussed above, our net loss applicable to common stockholders was \$22.4 million, \$28.3 million and \$18.0 million for the years ended December 31, 2012, 2011 and 2010, respectively. Since January 1, 2001, we have primarily been involved in the development of our TLR pipeline. From January 1, 2001 through December 31, 2012, we incurred losses of \$134.5 million. We also incurred net losses of \$260.2 million prior to December 31, 2000 during which time we were primarily involved in the development of non-TLR targeted antisense technology. Since our inception, we had an accumulated deficit of \$394.7 million through December 31, 2012. We expect to continue to incur substantial operating losses in the future.

### *Net Operating Loss Carryforwards*

As of December 31, 2012, we had cumulative net operating loss carryforwards, or NOLs, of approximately \$173.3 million and \$67.3 million available to reduce federal and state taxable income, which expire through 2032. In addition, we had cumulative federal and state tax credit carryforwards of \$5.0 million and \$5.2 million, respectively, available to reduce federal and state income taxes, which expire through 2032 and 2027, respectively. The Tax Reform Act of 1986 contains provisions, which limit the amount of NOLs and credit carryforwards that companies may utilize in any one year in the event of cumulative changes in ownership over a three-year period in excess of 50%. We have completed several financings since the effective date of the Tax Reform Act of 1986, which as of December 31, 2012, have resulted in ownership changes in excess of 50% and that will significantly limit our ability to utilize our NOL and tax credit carryforwards. Ownership changes in future periods may place additional limits on our ability to utilize net operating loss and tax credit carryforwards.

## **Liquidity and Capital Resources**

### *Sources of Liquidity*

We require cash to fund our operating expenses and to make capital expenditures. Historically, we have funded our cash requirements primarily through the following:

- equity and debt financing;
- license fees, research funding and milestone payments under collaborative and license agreements;
- interest income; and
- lease financings.

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*Series E Preferred Stock and Warrant Financing*

In November 2012, we entered into a Convertible Preferred Stock and Warrant Purchase Agreement, or Series E Purchase Agreement, for the issuance and sale of shares of Series E preferred stock and Series E warrants, with Pillar II and a second purchaser, which we refer to as the Series E purchasers. Pillar II is an investment partnership managed by two of our directors and one of our significant stockholders. Under the Series E Purchase Agreement, we issued and sold to the Series E purchasers, for an aggregate purchase price of approximately \$7.0 million, 424,242 shares of Series E preferred stock and Series E warrants to purchase up to 8,484,840 shares of common stock. The shares of Series E preferred stock are convertible, subject to limitations, into an aggregate of 8,484,840 shares of common stock at a conversion price of \$0.70 per share. The initial exercise price of the warrants is \$0.70 per share. The warrants to purchase common stock are exercisable immediately, and will expire if not exercised on or prior to November 9, 2017. We have agreed to pay to the Series E preferred stockholders quarterly dividends payable in cash in arrears at the rate of 4.6% per annum with the first dividend payment being due on March 31, 2013. Under the terms of the Series D preferred stock, any dividends that we pay to the Series E preferred stockholders will also be paid to the Series D preferred stockholders on an as-converted to common stock basis. We have agreed that, at our 2013 annual meeting of stockholders, we will propose an amendment to the Certificate of Designations, Preferences and Rights of Series D Preferred Stock, or the Series D Certificate of Designations, which is described below, to, among other things, modify the terms of the Series D preferred stock that currently require payment of dividends to Series D preferred stockholders upon payment of dividends to Series E stockholders. If such amendment is approved by our stockholders, the Series E preferred stockholders would become entitled to receive dividends payable in cash quarterly in arrears at the rate of 8% per annum and the Series D preferred stockholders would cease to be entitled to corresponding dividends. If such amendment is submitted to our stockholders and it is not approved, the holders of our Series E preferred stock will no longer be entitled to receive dividends. The net proceeds to us from the Series E financing, excluding the proceeds of any future exercise of the Series E warrants, were approximately \$6.0 million.

Under the terms of the Series E Purchase Agreement, we granted the Series E purchasers participation rights in future financings. In addition, we agreed to use our best efforts to file a preliminary proxy statement for our next annual meeting of stockholders that will, among other things, seek approval from our stockholders of the following matters:

- the issuance and sale by us to the Series E purchasers (together with all prior issuances and sales to Pillar I, an investment partnership managed by one of our directors and significant stockholders) of a number of shares of common stock (including securities convertible into or exercisable for common stock) that is greater than 19.99% of our outstanding common stock or our outstanding voting power after such issuance and sale in accordance with Nasdaq Listing Rule 5635(b), or the Nasdaq Proposal;
- an amendment to our restated certificate of incorporation and bylaws, as necessary, to eliminate the classification of our board of directors; and
- an amendment to the Series D Certificate of Designations for our Series D preferred stock, which is held by Pillar I, to modify the dividend provisions of the Series D Certificate of Designations so that dividends on the Series E preferred stock are not required to be paid to the holders of Series D preferred stock and to conform the beneficial ownership limitations applicable to the conversion of the Series D preferred stock to the beneficial ownership limitations applicable to the conversion of the Series E preferred stock.

Also under the terms of the Series E Purchase Agreement, each Series E purchaser agreed:

- for so long as the Series E purchaser and its affiliates beneficially own more than 19.99% (prior to the date our stockholders approve the Nasdaq Proposal) or 25% (effective upon the date that our

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stockholders approve the Nasdaq Proposal) of our outstanding common stock, that the Series E purchaser and its affiliates will vote any shares held by them in excess of the number of shares equal to 19.99% or 25%, as applicable, of the outstanding common stock (including the shares of common stock issuable upon conversion or exercise of securities that are convertible into or exercisable for shares of common stock held by such Series E purchaser and its affiliates) with respect to any matter put to a vote of the holders of common stock in the same manner and percentage as the holders of the common stock (other than the Series E purchasers) vote on such matter;

- to certain restrictions on the transfer of any securities issued to such Series E purchaser pursuant to the Series E Purchase Agreement, including to not sell or transfer any such securities in one or a series of transactions if such transfer would, in the aggregate, result in the transfer more than 5% of the then outstanding combined voting power of our outstanding securities (excluding from this restriction certain transfers to permitted transferees or in connection with an underwritten public offering by us that has been approved by the board of directors); and
- to be subject to a standstill provision that continues for so long as such Series E purchaser and its affiliates beneficially own more than 15% of our outstanding common stock.

After the later of November 9, 2014 and the date that no shares of Series D preferred stock remain outstanding, we may redeem all or a portion of the Series E preferred stock for a cash payment equal to the \$14.00 original Series E preferred stock issue price per share plus any accrued or declared but unpaid dividends thereon following notice to the holders of the Series E preferred stock if the closing price of the Common Stock for 20 or more trading days in a period of 30 consecutive trading days is greater than or equal to 400% of the Series E preferred stock conversion price. We may not redeem any shares of Series E preferred stock from a holder that cannot convert such shares of Series E preferred stock into common stock as a result of the beneficial ownership limitations described above. In such event, we may redeem such nonredeemable shares pursuant to alternative redemption provisions set forth in the Certificate of Designations, Preferences and Rights of Series E Preferred Stock, or the Series E Certificate of Designations, following notice to the holders of the nonredeemable shares, for a cash payment equal to the greater of the 20 consecutive trading day average closing price per share of the common stock ending on the trading day immediately prior to redemption date plus any dividends accrued or declared but unpaid thereon and the Series E conversion price plus any dividends accrued or declared but unpaid thereon. After November 9, 2014, we may redeem the Series E warrants for \$0.01 per share of common stock issuable on exercise of the Series D warrants following notice to the Series E purchasers if the closing price of the common stock for 20 or more trading days in a period of 30 consecutive trading days is greater than or equal to \$2.80, subject to adjustment.

In connection with the Series E Purchase Agreement, we filed a registration statement that became effective on January 17, 2013, registering the resale of the shares of common stock issuable upon conversion of the Series E preferred stock and the shares of common stock issuable upon exercise of the Series E warrants.

Under the April 22, 2013 Pillar Agreement, we and each of Pillar I and Pillar II have agreed, among other things:

- to modify the dividend provisions of the Series E Certificate of Designations to allow for the payment of dividends in shares of our common stock commencing October 1, 2013; and
- to allow for the payment of dividends in shares of a to-be-created new series of non-voting preferred stock in the event that payment of such dividends may not be made in shares of our common stock as a result of the application of the beneficial ownership and voting power limitations set forth in the Series E Certificate of Designations.

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In addition, on April 30, 2013, we entered into a second agreement with Pillar I, Pillar II and an entity affiliated with Pillar I and Pillar II, which we refer to collectively as the Pillar Entities. We refer to this agreement as the April 30, 2013 Pillar Agreement. Under the April 30, 2013 Pillar Agreement, Pillar II and the entity affiliated with Pillar II, together the holders of 100% of the Series E preferred stock, have irrevocably agreed to waive the right of the holders of the Series E preferred stock under Section 2.1.1 of the Series E Certificate of Designations to receive, in the event of a Liquidation, an amount per share of Series E preferred stock equal to the original issue price of such share of Series E preferred stock plus any dividends accrued or declared but unpaid thereon to the extent such amount is greater than the amount that would have been payable with respect to such share had all shares of Series E preferred stock been converted into shares of our common stock immediately prior to such Liquidation, and that upon a Liquidation the holders of the Series E preferred stock will receive under Section 2.1 of the Series E Certificate of Designations an amount per share of Series E preferred stock equal to the amount that would be payable with respect to such share had all shares of Series E preferred stock been converted into shares of our common stock immediately prior to such Liquidation.

Under the April 30, 2013 Pillar Agreement and the April 22, 2013 Pillar Agreement, which we refer to together as the Pillar Agreements, we have agreed to seek approval from our stockholders at our 2013 annual meeting of stockholders of amendments to the Series E Certificate of Designations to effect these changes to the dividend and liquidation provisions of our Series E preferred stock, and Pillar II and its affiliated entity have agreed:

- to vote, and to cause its affiliates to vote, all shares of our voting stock held by Pillar II or its affiliates, and over which Pillar II or its affiliates has the power to vote, in favor of such amendments; and
- not to, and to cause its affiliates not to, sell or transfer any shares of our common stock or Series E preferred stock held by Pillar II or its affiliates to any person, entity or group unless such proposed transferee agrees in a written instrument executed by such transferee, Pillar II and us to take and hold such securities subject to, among other things, the Pillar Agreements and to be bound by the terms of the Pillar Agreements, including the waiver of rights, voting agreements and restrictions on transfer set forth therein.

The Pillar Agreements will become effective upon the consummation of a qualified financing, as defined in the Pillar Agreements, which would include the consummation of this offering. The Pillar Agreements will terminate in the event that a qualified financing is not consummated by October 1, 2013.

See “Certain Relationships and Related Person Transactions” for additional information about the terms of the Pillar Agreements.

*Cowen Sales Agreement*

In April 2012, we entered into a sales agreement with Cowen pursuant to which we may issue and sell shares of our common stock, having an aggregate offering price of up to \$10.0 million from time to time through Cowen as our sales agent. Cowen may sell our common stock by methods deemed to be an “at-the-market” offering, as defined under the Securities Act, including sales made directly on the Nasdaq Capital Market, on any other existing trading market for our common stock or to or through a market maker other than on an exchange. With our prior written approval, Cowen may also sell our common stock by any other method permitted by law, including in privately negotiated transactions.

Cowen has agreed to offer the common stock subject to the terms and conditions of the sales agreement on a daily basis or as otherwise agreed upon by us and Cowen. Under the arrangement, we will designate the maximum amount of our common stock to be sold through Cowen on a daily basis or otherwise determine such maximum amount together with Cowen. Subject to the terms and conditions of the sales agreement,

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Cowen has agreed to use its commercially reasonable efforts to sell on our behalf all of the shares of common stock requested to be sold by us. We may instruct Cowen not to sell common stock if the sales cannot be effected at or above the price designated by us in any such instruction. We or Cowen may suspend the offering of the common stock being made through Cowen under the sales agreement upon proper notice to the other party. We and Cowen each have the right, by giving written notice as specified in the sales agreement, to terminate the sales agreement in each party's sole discretion at any time.

The sales agreement provides that Cowen will be entitled to aggregate compensation for its services equal to 3.0% of the gross sales price per share of all shares sold through Cowen under the sales agreement. We have no obligation to sell any shares under the sales agreement. We have agreed in the sales agreement to provide indemnification and contribution to Cowen against certain liabilities, including liabilities under the Securities Act. In addition, we have agreed, under certain circumstances, to reimburse a portion of the expenses of Cowen in connection with the offering of common stock up to a maximum of \$50,000. The shares will be issued pursuant to our shelf registration statement on Form S-3 (File No. 333-169060).

We had not sold any shares under the sales agreement as of January 31, 2013.

*Series D Preferred Stock and Warrant Financing*

In November 2011, we entered into a Convertible Preferred Stock and Warrant Purchase Agreement, or Series D Purchase Agreement, with Pillar I. The Series D Purchase Agreement was amended in November 2012 in connection with the Series E financing. Under the Series D Purchase Agreement, we issued and sold to Pillar I, for an aggregate purchase price of \$9.5 million, 1,124,260 shares of our Series D preferred stock and Series D warrants to purchase up to 2,810,650 shares of our common stock. The shares of Series D preferred stock were initially convertible, subject to limitations, into 5,621,300 shares of our common stock at an initial conversion price of \$1.63. The initial exercise price of the warrants was \$1.63 per share.

The net proceeds to us from the offering, excluding the proceeds of any future exercise of the Series D warrants, were approximately \$9.1 million. No holder of the Series D preferred stock may convert its shares to the extent such conversion would result in the holder and its affiliates beneficially owning more than 19.99% of the common stock outstanding. As a result of the dilutive effect of our November 2012 Series E financing, the 1,124,260 shares of our Series D preferred stock became convertible, subject to limitations, into 6,266,175 shares of our common stock and the exercise price of the Series D warrants became fixed at \$1.46 per share.

The Series D Purchase Agreement was amended in connection with the Series E financing to provide:

- for so long as Pillar I and its affiliates beneficially own more than 19.99% (prior to the date the stockholders of the Company approve the Nasdaq Proposal) or 25% (effective upon the date that the stockholders of the Company approve the Nasdaq Proposal) of the outstanding common stock, that Pillar I and its affiliates will vote any shares held by them in excess of the number of shares equal to 19.99% or 25%, as applicable, of the outstanding common stock (including the shares of common stock issuable upon conversion of securities convertible into or exercisable for shares of common stock held by Pillar I and its affiliates) with respect to any matter put to a vote of the holders of common stock in the same manner and percentage as the holders of the common stock (other than the Series E purchasers and their affiliates) vote on such matter; and
- for certain restrictions on the transfer of any securities issued to Pillar I (including securities convertible into or exercisable for common stock) pursuant to the Series D Purchase Agreement, including to not sell or transfer any such securities in one or a series of transactions if such transfer would, in the aggregate, result in the transfer of more than 5% of the then outstanding

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combined voting power of the outstanding securities of the Company (excluding from this restriction certain transfers to permitted transferees or in connection with an underwritten public offering by the Company that has been approved by our board of directors).

Series D preferred stockholders are entitled to receive dividends payable quarterly in arrears at the rate of 7% per annum. Such dividends shall be paid in cash through December 31, 2014 and thereafter in cash or with shares of common stock, as determined by us in our sole discretion, except that we may not pay any dividends to a holder of Series D preferred stock in shares of common stock to the extent the issuance of such shares would result in the holder of Series D preferred stock and its affiliates beneficially owning more than 19.99% (prior to the date the stockholders of the Company approve the Nasdaq Proposal) or 35% (effective upon the date that the stockholders of the Company approve the Nasdaq Proposal) of the common stock outstanding or the combined voting power of our securities outstanding immediately after giving effect to the issuance of such shares of common stock. We have agreed to pay to the Series E preferred stockholders quarterly dividends payable in cash in arrears at the rate of 4.6% per annum with the first dividend payment being due on March 31, 2013. Under the terms of the Series D preferred stock, any dividends that we pay to the Series E preferred stockholders will also be paid to the Series D preferred stockholders on an as-converted to common stock basis. We have agreed that, at our 2013 annual meeting of stockholders, we will propose an amendment to the Series D Certificate of Designations to, among other things, modify the terms of the Series D preferred stock that currently require payment of dividends to Series D preferred stockholders upon payment of dividends to Series E stockholders. If such amendment is approved by our stockholders, the Series E preferred stockholders would become entitled to receive dividends payable in cash quarterly in arrears at the rate of 8% per annum and the Series D preferred stockholders would cease to be entitled to corresponding dividends. If such amendment is submitted to our stockholders and it is not approved, the holders of the Series E preferred stock will no longer be entitled to receive dividends.

After November 4, 2013 and following written notice by us, we may redeem, for a cash payment equal to the \$8.1375 original Series D preferred stock issue price per share plus any accrued or declared but unpaid dividends thereon, all or a portion of the Series D preferred stock if the closing price of our common stock for 20 or more trading days in a period of 30 consecutive trading days is greater than or equal to 200% of the Series D preferred stock conversion price. In addition, the holders of shares of Series D preferred stock then outstanding are entitled to require us to purchase the shares of Series D preferred stock at a price equal to the original Series D preferred stock purchase price per share plus all accrued or declared but unpaid dividends thereon upon the occurrence of specified fundamental changes such as mergers, consolidations, business combinations, stock purchases or similar transactions resulting in a person or group unaffiliated with any holder of Series D preferred stock owning 66.67% or more of the outstanding voting securities of the Company or successor entity.

Under the terms of the Series D Purchase Agreement, Pillar I agreed to be subject to a standstill provision that continues for so long as Pillar I and its affiliates beneficially own more than 15% of our outstanding common stock.

The sale of shares of Series E preferred stock and Series E warrants in our November 2012 Series E financing triggered an anti-dilution adjustment under the terms of the Series D warrants, resulting in the exercise price of the Series D warrants being reduced and fixed at the minimum \$1.46 per share and the Series D warrants no longer being subject to any anti-dilution adjustments. The Series D warrants may be exercised at Pillar I's option at any time on or before November 4, 2016. The Series D warrants, as amended in connection with the November 2012 Series E financing, provide that the Series D warrants may not be exercised with respect to any portion of the warrants, to the extent that such exercise would result in Pillar I and its affiliates beneficially owning more than 19.99% of the number of shares of common stock outstanding or the combined voting power of our securities outstanding immediately after giving effect to the issuance of shares of common stock issuable upon exercise of the Series D warrants,



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unless our stockholders approve the Nasdaq Proposal, in which case, the 19.99% limitation will be increased, with respect to Pillar I, to 35%. After November 4, 2013, we may redeem the Series D warrants for \$0.01 per share of common stock issuable on exercise of the Series D warrants following notice to Pillar I if the closing price of the common stock for 20 or more trading days in a period of 30 consecutive trading days is greater than or equal to \$6.51, subject to adjustment.

In connection with the Series D Purchase Agreement, we also filed a registration statement that became effective on December 21, 2011, registering the resale of the shares of common stock issuable upon conversion of the Series D preferred stock and the shares of common stock issuable upon exercise of the Series D warrants. In February 2013, we filed a registration statement that became effective on February 8, 2013 covering the resale of additional shares of common stock issuable upon conversion of the Series D preferred stock.

Under the April 22, 2013 Pillar Agreement, Pillar I has irrevocably agreed to waive and not exercise the rights, powers, preferences and other terms of the Series D preferred stock under Section 6 of the Series D Certificate of Designations, including without limitation the right to require us to purchase all or any portion of the shares of our Series D preferred stock at a price equal to the original Series D preferred stock purchase price per share plus all accrued or declared but unpaid dividends thereon upon the occurrence of specified fundamental changes such as mergers, consolidations, business combinations, stock purchases or similar transactions resulting in a person or group unaffiliated with any holder of Series D preferred stock owning 66.67% or more of the outstanding voting securities of the Company or successor entity.

In addition, under the April 22, 2013 Pillar Agreement, we and each of Pillar I and Pillar II have agreed, among other things:

- to modify the dividend provisions of the Series D Certificate of Designations to change the date after which we may elect to pay dividends in shares of our common stock from December 31, 2014 to October 1, 2013, and to allow for the payment of such dividends in shares of a to-be-created new series of non-voting preferred stock in the event that payment of such dividends may not be made in shares of our common stock as a result of the application of the beneficial ownership and voting power limitations set forth in the Series D Certificate of Designations; and
- in connection with the waiver of the right to require us to purchase the Series D preferred stock upon the occurrence of specified fundamental changes, to modify the Series D Certificate of Designations to provide, in the event of a sale of our company, for the distribution of any assets that remain available for distribution to our stockholders, after payment to the holders of our Series A convertible preferred stock and any other class of our capital stock that ranks senior to our Series D preferred stock, to the holders of our Series D preferred stock on a pro rata basis with the holders of our common stock, Series E preferred stock and such new series of non-voting preferred stock.

Under the April 30, 2013 Pillar Agreement, Pillar I has irrevocably agreed to waive the right of the holders of the Series D preferred stock under Section 2.1 of the Series D Certificate of Designations to receive, in the event of a voluntary or involuntary liquidation, dissolution or winding up of the Company, or Liquidation, an amount per share of Series D preferred stock equal to the original issue price of such share of Series D preferred stock plus any dividends accrued or declared but unpaid thereon to the extent such amount is greater than the amount that would have been payable with respect to such share had all shares of Series D preferred stock been converted into shares of our common stock immediately prior to such Liquidation, and that upon a Liquidation the holders of the Series D preferred stock will receive an amount per share of Series D preferred stock equal to the amount that would be payable with respect to such share had all shares of Series D preferred stock been converted into shares of our common stock immediately prior to such Liquidation.

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In addition, under the Pillar Agreements, we have agreed to seek approval from our stockholders at our 2013 annual meeting of stockholders of amendments to the Series D Certificate of Designations to effect these changes to the dividend and liquidation provisions of our Series D preferred stock, the redemption rights of the holders of our Series D preferred stock and the rights of the holders of our Series D preferred stock to distributions in the event of a sale of our company, and Pillar I has agreed:

- to vote, and to cause its affiliates to vote, all shares of our voting stock held by Pillar I or its affiliates, and over which Pillar I or its affiliates has the power to vote, in favor of such amendments; and
- not to, and to cause its affiliates not to, sell or transfer any shares of our common stock or Series D preferred stock held by Pillar I or its affiliates to any person, entity or group unless such proposed transferee agrees in a written instrument executed by such transferee, Pillar I and us to take and hold such securities subject to, among other things, the Pillar Agreements and to be bound by the terms of the Pillar Agreements, including the waivers of rights, voting agreements and restrictions on transfer set forth therein.

The Pillar Agreements, including our obligations to issue the Pillar Warrants under the Pillar Agreements, will become effective upon the consummation of a qualified financing, which would include the consummation of this offering. The Pillar Agreements will terminate in the event that a qualified financing is not consummated by October 1, 2013.

See “Certain Relationships and Related Person Transactions” for additional information about the terms of the Pillar Agreements.

### *Registered Direct Financing*

In August 2010, we raised \$15.1 million in gross proceeds from a registered direct offering of our common stock and warrants to institutional investors. In the offering, we sold 4,071,005 shares of common stock and warrants to purchase 1,628,402 shares of common stock. The common stock and the warrants were sold in units at a price of \$3.71 per unit, with each unit consisting of one share of common stock and warrants to purchase 0.40 shares of common stock. The warrants to purchase common stock have an exercise price of \$3.71 per share, are exercisable immediately, and will expire if not exercised on or prior to August 5, 2015. The net proceeds to us from the offering, excluding the proceeds of any future exercise of the warrants, were approximately \$14.1 million.

### *Collaboration Agreements*

Under the terms of our collaboration with Merck KGaA, which was terminated in November 2011, we received in February 2008 a \$40.0 million upfront license fee in Euros of which we received \$39.7 million due to foreign currency exchange rates and approximately \$12.1 million in milestone payments. In addition, Merck KGaA reimbursed us \$4.5 million for expenses related to the development of IMO-2055. In connection with the termination of the collaboration, we agreed to reimburse Merck KGaA for up to €1.8 million (\$2.4 million using a December 31, 2012 exchange rate) of Merck KGaA’s costs for the third-party contract research organization that was coordinating Merck KGaA’s Phase 2 trial of IMO-2055 in combination with cetuximab, payable in eleven installments commencing on March 1, 2012 including a final payment payable upon Merck KGaA’s completion of certain specified activities. As of December 31, 2012, we have paid €0.8 of the €1.8 million (\$1.1 million (using exchange rates in effect at the time that the payments were made) of the \$2.4 million). We also agreed to pay to Merck KGaA one-time €1.0 million (\$1.3 million using a December 31, 2012 exchange rate) milestone payments upon the occurrence of each of the following milestones: partnering of IMO-2055 with any third party, initiation of any Phase 2 or Phase 3 clinical trial for IMO-2055 and regulatory submission of IMO-2055 in any country.

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Under the terms of our collaboration with Merck & Co., Merck & Co. paid us a \$20.0 million license fee in December 2006 and purchased 1,818,182 shares of our common stock for a price of \$5.50 per share for an aggregate purchase price of \$10.0 million. Since entering this agreement, we have also received \$1.0 million in milestone payments and \$3.4 million in research and development payments.

### *Cash Flows*

As of December 31, 2012, we had approximately \$10.1 million in cash and cash equivalents, a net decrease of approximately \$14.5 million from December 31, 2011. Net cash used in operating activities totaled \$19.9 million during 2012, reflecting our \$19.2 million net loss for 2012, as adjusted for non-cash income and expenses, including stock-based compensation, depreciation and the \$0.7 million decrease in the warrant liability that was credited to operations through November 9, 2012. It also reflects changes in our prepaid expenses and accounts payable, accrued expenses and other liabilities.

The \$5.4 million net cash provided by financing activities during 2012 primarily reflects the \$6.0 million in net proceeds from the sale of Series E preferred stock and Series E warrants in November 2012 and the proceeds received from employee stock purchases, offset, in part, by dividends paid on our Series D preferred stock and payments on our capital lease.

As of December 31, 2011, we had approximately \$24.6 million in cash, cash equivalents and investments, a net decrease of approximately \$10.0 million from December 31, 2010. Net cash used in operating activities totaled \$19.2 million during 2011, reflecting our \$23.8 million net loss for 2011, as adjusted for non-cash income and expenses, including the decrease in the warrant liability, stock-based compensation, the cost of regaining rights to our cancer program, depreciation expense and amortization. It also reflects changes in our prepaid expenses and accounts payable, accrued expenses and other liabilities.

The net cash provided by investing activities during 2011 of \$17.6 million reflects the maturity of \$18.6 million in available-for-sale securities and a \$0.1 million decrease in restricted cash offset by the purchase of approximately \$1.0 million of securities during 2011.

The \$9.1 million net cash provided by financing activities during 2011 primarily reflects the \$9.1 million in net proceeds from the sale of Series D preferred stock and Series D warrants in November 2011 and the proceeds received from employee stock purchases, offset, in part, by payments on our capital leases.

As of December 31, 2010, we had approximately \$34.6 million in cash and cash equivalents and investments, a net decrease of approximately \$5.6 million from December 31, 2009. Net cash used in operating activities totaled \$19.6 million during 2010. The \$19.6 million reflects our \$18.0 million net loss for 2010, as adjusted for non-cash revenue and expenses, including the reduction in deferred revenue associated with the recognition of deferred revenue under our collaboration agreements, stock-based compensation, depreciation and amortization. It also reflects changes in our accounts receivable, prepaid expenses and accounts payable, accrued expenses and other liabilities.

The net cash used in investing activities during 2010 of \$3.1 million reflects our purchase of approximately \$10.3 million in securities offset by the proceeds of approximately \$7.2 million from securities that matured in 2010. The net cash provided by investing activities also reflects a \$0.1 million investment in laboratory, office and computer equipment and an increase in available cash of \$0.1 million as a result of a reduction in our restricted cash requirements for a security deposit under the terms of the lease for our facility.

The net cash provided by financing activities during 2010 of \$14.2 million primarily reflects the \$14.1 million in net proceeds from the sale of common stock and warrants in August 2010 and \$0.1 million in proceeds received from the exercise of common stock options and employee stock purchases during 2010 offset, in part, by payments under a capital lease.

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*Funding Requirements*

We have incurred operating losses in all fiscal years except 2002, 2008 and 2009, and we had an accumulated deficit of \$394.7 million at December 31, 2012.

We have received no revenues from the sale of drugs. As of January 31, 2013, almost all of our revenues have been from collaboration and license agreements. We have devoted substantially all of our efforts to research and development, including clinical trials, and we have not completed development of any drugs. Because of the numerous risks and uncertainties associated with developing drugs, we are unable to predict the extent of any future losses, whether or when any of our products will become commercially available or when we will become profitable, if at all.

We do not expect to generate significant additional funds internally until we successfully complete development and obtain marketing approval for products, either alone or in collaboration with third parties, which we expect will take a number of years. In addition, we have no committed external sources of funds.

We had cash and cash equivalents of approximately \$10.1 million at December 31, 2012. We believe that without the proceeds of this offering our existing cash and cash equivalents would only be sufficient to fund our operations at least into the third quarter of 2013 based on our current operating plan, including the completion of our ongoing Phase 1 clinical trial of IMO-8400 in healthy subjects that we initiated in the fourth quarter of 2012, and preparations for the further advancement of our autoimmune and inflammatory disease program. We believe, however, that the net proceeds of this offering, together with our existing cash and cash equivalents, will enable us to fund our operations at least through the fourth quarter of 2014. Specifically, we believe that our available funds following this offering will be sufficient to enable us to conduct our planned Phase 2 clinical trial of IMO-8400 in patients with psoriasis and to plan for further clinical development of IMO-3100 or IMO-8400. We expect that these funds will not be sufficient to enable us to conduct, and we do not plan to conduct, any other clinical development of IMO-3100 or IMO-8400 or to conduct any other development of our other product candidates or technologies. It is also possible that we will not achieve the progress that we expect with respect to IMO-8400 because the actual costs and timing of clinical development activities are difficult to predict and are subject to substantial risks and delays.

We expect that we will require substantial additional funds beyond the proceeds of this offering to conduct research and development, including preclinical testing and clinical trials of our drug candidates and to fund our operations. We expect to continue to seek additional funding through collaborations, the sale or license of assets or financings of equity or debt securities. We believe that the key factors that will affect our ability to obtain funding are:

- the results of our clinical and preclinical development programs, including the top-line results of the Phase 2 trial of IMO-3100 and the anticipated results of the Phase 1 clinical trial of IMO-8400, which we initiated in the fourth quarter of 2012;
- developments relating to our existing strategic collaboration with Merck & Co.;
- our ability to maintain the listing of our common stock on the Nasdaq Capital Market or an alternative national securities exchange;
- the cost, timing and outcome of regulatory reviews;
- competitive and potentially competitive products and technologies and investors' receptivity to our drug candidates and the technology underlying them in light of competitive products and technologies;
- the receptivity of the capital markets to financings by biotechnology companies generally and companies with drug candidates and technologies such as ours specifically; and
- our ability to enter into new strategic collaborations with biotechnology and pharmaceutical companies and the success of such collaborations.

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In addition, increases in expenses or delays in clinical development may adversely impact our cash position and require additional funds or further cost reductions. Financing may not be available to us when we need it or may not be available to us on favorable or acceptable terms. We could be required to seek funds through collaborative alliances or others that may require us to relinquish rights to some of our technologies, drug candidates or drugs that we would otherwise pursue on our own. In addition, if we raise additional funds by issuing equity securities, our then existing stockholders will experience dilution. 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 are likely to include rights that are senior to the holders of our common stock. Any additional debt financing or equity that we raise may contain terms, such as liquidation and other preferences, or liens or other restrictions on our assets, which are not favorable to us or our stockholders. An equity financing that involves existing stockholders may cause a concentration of ownership. The terms of any financing may adversely affect the holdings or the rights of existing stockholders. If we are unable to obtain adequate funding on a timely basis or at all, we will be required to terminate, modify or delay preclinical or clinical trials of one or more of our drug candidates, significantly curtail or terminate discovery or development programs for new drug candidates, relinquish rights to portions of our technology, drug candidates and/or products, or terminate our operations and pursue a liquidation of the Company through a sale or license of assets or a possible bankruptcy.

*Nasdaq Listing*

Our common stock began trading on the Nasdaq Capital Market on February 7, 2013. In order to continue the listing of our common stock on the Nasdaq Capital Market, we are required to satisfy the \$2.5 million stockholders' equity requirement on or before May 22, 2013 and to otherwise meet the continued listing requirements of the Nasdaq Capital Market.

Prior to February 7, 2013, our common stock was traded on the Nasdaq Global Market where we were required to meet specified financial requirements, including requirements that we maintain a minimum closing bid price of at least \$1.00 per share for our common stock and that we maintain a minimum stockholders' equity of \$10.0 million or a minimum market value of listed securities of \$50.0 million. On June 7, 2012, we received a notification letter from the Nasdaq Listing Qualifications staff of the Nasdaq Stock Market advising us that we were not in compliance with the \$50.0 million minimum market value of listed securities requirement for continued listing on the Nasdaq Global Market pursuant to Nasdaq Listing Rule 5450(b)(2)(A). Nasdaq also noted in its letter that we did not satisfy the alternative requirement under Nasdaq Listing Rule 5450(b)(1)(A), which requires registrants to maintain a minimum of \$10.0 million in stockholders' equity. Nasdaq also stated in its letter that, in accordance with Nasdaq Listing Rule 5810(c)(3)(C), we had been provided a compliance period of 180 calendar days, or until December 4, 2012, to regain compliance with the minimum \$50.0 million market value continued listing requirement.

On December 5, 2012, we received a letter from the Listing Qualifications Staff of the Nasdaq Stock Market advising us that we had not regained compliance with the minimum \$50.0 million market value of listed securities requirement set forth in Nasdaq Listing Rule 5450(b)(2)(A) or the minimum \$10.0 million stockholders' equity alternative continued listing requirement set forth in Nasdaq Listing Rule 5450(b)(1)(A), and that, unless we requested a hearing before the Panel trading in our common stock would be suspended at the opening of business on December 14, 2012, and our common stock would be delisted from the Nasdaq Global Market. We requested a hearing before the Nasdaq Listing Qualifications Hearing Panel, or the Panel, at which we requested continued listing pending our return to compliance. Our hearing request stayed the suspension of trading and delisting of our common stock pending the conclusion of the hearing process. On February 5, 2013, the Panel granted our request to transfer the listing of our common stock from the Nasdaq Global Market to the Nasdaq Capital Market and to continue the listing of our common stock on the Nasdaq Capital Market, provided that we have

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satisfied the \$2.5 million stockholders' equity requirement on or before March 31, 2013, and have otherwise met the continued listing requirements of the Nasdaq Capital Market. On March 5, 2013, we received a revised determination from the Panel indicating that the Panel had extended the date by which we are required to satisfy the \$2.5 million stockholders' equity requirement for continued listing on that market and otherwise meet the continued listing requirements of the Nasdaq Capital Market from March 31, 2013 to May 22, 2013. In addition, by May 22, 2013, we are required to provide the Panel with additional information regarding our projected burn-rate and stockholders' equity through May 31, 2014.

In addition, on November 26, 2012, we received a letter from the Listing Qualifications Staff of the Nasdaq Stock Market indicating that, based on the closing bid price of our common stock for the 30 consecutive business days prior to November 26, 2012, we no longer satisfied the requirement that our common stock maintain a minimum bid price of \$1.00 per share as required by Nasdaq Listing Rule 5450(a)(1). Nasdaq stated in its letter that in accordance with Nasdaq Listing Rule 5810(c)(3)(A), we had been provided 180 calendar days, or until May 28, 2013, to regain compliance with the minimum bid price requirement. The Nasdaq letter stated that if, at any time before May 28, 2013, the closing bid price of our common stock is at or above \$1.00 per share for a minimum of 10 consecutive business days, we will be deemed to have regained compliance with the minimum bid price requirement and the matter will be closed. If we do not regain compliance with the minimum bid price requirement by May 28, 2013, Nasdaq will provide us with a written notification that our common stock is subject to delisting. We may be eligible to receive an additional 180 day grace period (for a total of 360 days from November 26, 2012) to regain compliance with the minimum bid price requirement provided that we satisfy the continued listing standard for market value of publicly held shares and all other applicable initial listing standards for the Nasdaq Capital Market, other than the minimum bid price requirement, as of May 28, 2013.

### *Contractual Obligations*

As of December 31, 2012, our contractual commitments were as follows:

<u>Contractual Commitment</u>	<u>Payments Due by Period</u>				
	<u>Total</u>	<u>Less than 1 year</u>	<u>1-3 years</u>	<u>3-5 years</u>	<u>After 5 years</u>
Operating lease	\$2,116	\$1,488	\$628	\$—	\$—
License agreements	240	35	70	60	75
<b>Total</b>	<b>\$2,356</b>	<b>\$1,523</b>	<b>\$698</b>	<b>\$60</b>	<b>\$75</b>

Our only material lease commitment relates to our facility in Cambridge, Massachusetts. Under our antisense technology in-license agreements, we are obligated to make milestone payments upon achieving specified milestones and to pay royalties to our licensors. In addition to the minimum license fees shown in the above table, there are contingent milestone and royalty payment obligations that are not included. Since we developed all of our TLR technology internally, there are no TLR technology in-license agreements.

The table above does not reflect our obligation to pay dividends to the holders of the Series D and Series E preferred stock. Under the terms of the Series D preferred stock, we are obligated to pay dividends quarterly in arrears at the rate of 7%, or \$640,000, per annum. Such dividends shall be paid in cash through December 31, 2014 and thereafter we may pay them in cash or with shares of common stock, as determined by us in our sole discretion, except that we may not pay any dividends to a holder of Series D preferred stock in shares of common stock to the extent the issuance of such shares would result in the Series D preferred stockholder and its affiliates beneficially owning more than 19.99% of our common stock outstanding or the combined voting power of our securities outstanding immediately after giving

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effect to the issuance of such shares of common stock. Under the terms of the Series E preferred stock, we are obligated to pay cash dividends quarterly in arrears at the rate of 4.6%, or \$273,000, per annum with the first dividend payment being due on March 31, 2013. Under the terms of the Series D preferred stock, any dividends that we pay to the Series E preferred stockholders will also be paid to the Series D preferred stockholder on an as-converted to common stock basis, which amount equals \$202,000 per annum.

We have agreed that, at our 2013 annual meeting of stockholders, we will propose an amendment to the Series D Certificate of Designations to, among other things, modify the terms of the Series D preferred stock that require payment of dividends to Series D preferred stockholders upon payment of dividends to our Series E stockholders. If such amendment is approved by our stockholders, the holders of the Series E preferred stock will become entitled to receive dividends payable in cash quarterly in arrears at the rate of 8%, or \$475,000, per annum and the Series D preferred stockholder would cease to be entitled to dividends upon payment of dividends to our Series E stockholders. If such amendment is submitted to our stockholders and it is not approved, the Series E preferred stockholders will no longer be entitled to receive dividends.

In addition, under the terms of the April 22, 2013 Pillar Agreement we have agreed that, at our 2013 annual meeting of stockholders, we will propose amendments to the Series D Certificate of Designations and the Series E Certificate of Designations to, among other things, modify the dividend provisions of the Series D Certificate of Designations and Series E Certificate of Designations, allow for the payment of dividends in shares of our common stock commencing October 1, 2013 and allow us to pay dividends in shares of a to-be-created new series of non-voting preferred stock in the event that payment of such dividends may not be made in shares of our common stock as a result of the application of the beneficial ownership and voting power limitations set forth in the Series D Certificate of Designations and the Series E Certificate of Designations, respectively. See “Certain Relationships and Related Person Transactions” for additional information about the terms of the April 22, 2013 Pillar Agreement.

As of December 31, 2012, we had no off-balance sheet arrangements. We do not expect to make any material capital expenditures in 2013.

***Quantitative and Qualitative Disclosures about Market Risk.***

Foreign currency exchange gains and losses may result from amounts to be paid under our Merck KGaA collaboration and termination agreements and payments under our clinical trial agreements that are denominated in Euros. As of December 31, 2012, we had net accrued obligations of €1.0 million, or \$1.3 million. All other assets and liabilities are in U.S. dollars, which is our functional currency.

We maintain investments in accordance with our investment policy. The primary objectives of our investment activities are to preserve principal, maintain proper liquidity to meet operating needs and maximize yields. Although our investments are subject to credit risk, our investment policy specifies credit quality standards for our investments and limits the amount of credit exposure from any single issue, issuer or type of investment. We regularly review our investment holdings in light of the then current economic environment. We do not own auction rate securities or derivative financial investment instruments in our investment portfolio. At December 31, 2012, all of our invested funds were invested in a money market fund classified in cash and cash equivalents on the accompanying balance sheet.

Based on a hypothetical ten percent adverse movement in interest rates, the potential losses in future earnings, fair value of risk sensitive financial instruments, and cash flows are immaterial, although the actual effects may differ materially from the hypothetical analysis.

## BUSINESS

### Overview

We are a clinical stage biotechnology company engaged in the discovery and development of novel synthetic DNA- and RNA-based drug candidates that are designed to modulate immune responses mediated through Toll-like Receptors, or TLRs. We are focusing our development efforts on the treatment of autoimmune and inflammatory diseases. We have two drug candidates, IMO-3100, a TLR7 and TLR9 antagonist, and IMO-8400, a TLR7, TLR8, and TLR9 antagonist, in clinical development for the treatment of autoimmune and inflammatory diseases. In December 2012, we announced top-line data from a Phase 2 clinical trial of IMO-3100 in patients with moderate to severe plaque psoriasis. We believe that the results of this trial provide clinical proof of concept for our approach of targeting specific TLRs for the treatment of psoriasis and potentially other autoimmune and inflammatory diseases.

TLRs are specific receptors present in immune system cells. Using a chemistry-based approach, we have created synthetic DNA- and RNA-based compounds that are targeted to TLR3, TLR7, TLR8, and TLR9. A TLR antagonist is a compound that blocks activation of an immune response through the targeted TLR. A TLR agonist is a compound that stimulates an immune response through the targeted TLR.

We believe that the modulation of immune responses through TLRs provides a rationale for the development of drug candidates to treat a broad range of diseases, including autoimmune and inflammatory diseases, cancer and respiratory diseases, and for use as vaccine adjuvants. We are a party to a collaboration alliance with Merck Sharp & Dohme Corp. (formerly Merck & Co., Inc.), or Merck & Co., for the use of agonists of TLR7, TLR8, and TLR9 as adjuvants in the development of vaccines for cancer, infectious diseases, and Alzheimer's disease. We are seeking to enter into additional collaborative alliances with third parties with respect to our TLR-targeted programs in oncology, hematological malignancies, respiratory diseases, and the use of TLR3 agonists as vaccine adjuvants.

*Autoimmune and Inflammatory Disease Program.* In December 2012, we announced top-line data from a randomized double-blinded, placebo-controlled Phase 2 clinical trial of IMO-3100 that we conducted in 44 adult patients with moderate to severe plaque psoriasis. In this Phase 2 trial, patients received doses of IMO-3100 once weekly for four weeks. In addition, in this Phase 2 trial, IMO-3100 showed clinical activity in patients with psoriasis. We believe that the results of this trial provide clinical proof of concept for our approach of targeting specific TLRs for the treatment of psoriasis and potentially other autoimmune and inflammatory diseases.

We are conducting a Phase 1 clinical trial to evaluate the safety and pharmacodynamics of IMO-8400 in healthy subjects. The first portion of the trial involved escalating single doses of IMO-8400 and the second portion of the trial involved four weekly doses of IMO-8400. We completed dosing in the escalating single-dose portion of this trial in the first quarter of 2013. In this portion of the trial, IMO-8400 was well-tolerated and showed target engagement of TLR7, TLR8, and TLR9 at three dosage levels in these subjects. In the second quarter of 2013, we completed dosing in the multiple-dose portion of the trial. We anticipate data from the multiple-dose portion of this trial later in the second quarter of 2013.

Based on the clinical activity of IMO-3100 observed in our four-week Phase 2 clinical trial of IMO-3100 in patients with psoriasis, we have determined that the next step in our development program is to conduct a Phase 2 clinical trial in patients with psoriasis with a treatment period of up to 12 weeks. Based on our evaluation of the comparative profiles of IMO-3100 and IMO-8400, including the engagement of TLR8 by IMO-8400, we have determined to focus our resources on the development of IMO-8400 and to conduct this trial in patients with psoriasis with IMO-8400. We expect that we could initiate this trial as early as the second quarter of 2013 and could have top-line data by the end of 2013.



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However, we do not plan to initiate this trial unless and until we have completed this offering and raised the necessary proceeds to fund this trial and until we have confirmed the successful completion of our ongoing Phase 1 trial of IMO-8400.

We are also planning to initiate a signal-seeking Phase 2 clinical trial of IMO-8400 in patients with lupus and are considering conducting a proof-of-concept study of IMO-8400 in an orphan autoimmune disease indication. We expect to select the orphan autoimmune disease indication for further exploration in the second half of 2013. However, our plans to conduct the Phase 2 clinical trial of IMO-8400 in patients with lupus and the proof-of-concept study are subject to successful completion of our ongoing Phase 1 trial of IMO-8400 and our ability to raise additional funding beyond the proceeds of this offering to fund the conduct of this Phase 2 trial and proof-of-concept study. We expect to seek such funding through public or private equity offerings, debt financings, collaborations and licensing arrangements or other sources.

*Vaccine Adjuvant Collaboration.* In January 2012, we announced that Merck & Co. had selected several of our TLR7, TLR8 or TLR9 agonists for evaluation and use as vaccine adjuvant candidates in the fields of cancer, infectious diseases, and Alzheimer's disease.

*Additional Programs.* In addition to our TLR program in autoimmune and inflammatory diseases, and our collaboration with Merck & Co. for the use of TLR7, TLR8, and TLR9 agonists as vaccine adjuvants, we have identified TLR drug candidates for applications in the treatment of cancer, hematological malignancies and respiratory diseases, and created TLR3 agonists for use as vaccine adjuvants. We have also created gene silencing oligonucleotides, or GSOs, which are designed to inhibit the production of disease-associated proteins by targeting RNA. We believe our GSO technology provides us with a platform from which drug candidates for multiple disease indications can be developed. We are seeking to enter into collaborations with third parties to advance these drug candidates and technology platform. Except in connection with collaborations, we do not plan to expend any additional resources on these programs.

### ***Overview of the Human Immune System***

The immune system protects the body by working through various mechanisms to recognize and eliminate bacteria, viruses and other infectious agents, referred to as pathogens, and abnormal cells such as cancer cells. These mechanisms initiate a series of signals resulting in stimulation of the immune system in response to the pathogens or abnormal cells. The activities of the immune system are undertaken by its two components: the innate immune system and the adaptive immune system.

The role of the innate immune system is to provide a rapid, non-specific response to a pathogen or to abnormal cells in the body and to activate the adaptive immune system. The innate immune system consists of specialized cells such as macrophages, dendritic cells and monocytes. When the body recognizes a pathogen, it activates these specialized cells of the innate immune system, resulting in a cascade of signaling events, referred to as Th1-type signaling events, that cause the production of proteins such as cytokines to fight the infection caused by the pathogen.

In contrast to the innate immune system, the adaptive immune system provides a pathogen-specific response to an infection. The adaptive immune system does this through the recognition by certain immune cells of specific proteins, called antigens, which are part of the pathogen or abnormal cell. Signals produced by the innate immune system initiate this process. Upon recognition of an antigen, which could come from pathogens or from cancer cells, the adaptive immune system produces antibodies and antigen-specific immune cells that specifically detect and destroy cells that contain the antigen.

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### **TLR-based Drug Discovery Technology**

TLRs comprise a family of receptors of the immune system. Of the ten human TLRs identified to date, TLRs 3, 7, 8, and 9 are receptors which are present inside specific immune cells. These TLRs are activated upon recognition of RNA and DNA from pathogens. TLR9 is a receptor that specifically recognizes DNA of the pathogen, and TLR3, TLR7, and TLR8 are receptors that recognize RNA of the pathogen. Based on our extensive experience in DNA and RNA chemistry, we have created novel synthetic DNA- and RNA-based compounds targeted to TLRs. Some of our compounds are designed to be agonists of TLR3, TLR7, TLR8, or TLR9. Others of our compounds are designed to be antagonists to TLR7 and TLR9 or to TLR7, TLR8, and TLR9.

#### *TLR7, TLR8, and TLR9 Antagonists*

We have created novel classes of drug candidates that are designed to be antagonists of specific TLRs. Preclinical studies from independent researchers have suggested that TLR7, TLR8 and TLR9 may play a role in some autoimmune and inflammatory diseases. In cell-based experiments and animal models, our antagonist compounds have blocked immune stimulation mediated through TLR7 and TLR9, or through TLR7, TLR8, and TLR9. We have evaluated our TLR antagonist drug candidates in preclinical mouse models of human autoimmune and inflammatory diseases including lupus, rheumatoid arthritis, multiple sclerosis, psoriasis, colitis, pulmonary inflammation, and hyperlipidemia. In these models, treatment with our TLR antagonist drug candidates was associated with improvement in a number of disease associated parameters. IMO-3100 is an antagonist of TLR7 and TLR9. IMO-8400 is an antagonist of TLR7, TLR8, and TLR9.

#### *TLR9 Agonists*

Drug candidates that are agonists of TLR9 and induce immune responses through TLR9 may be useful for the treatment or prevention of infectious diseases, cancer, and asthma and allergies, and may be used as vaccine adjuvants. We have created our TLR9 agonist candidates to activate specific cells of the immune system and thereby produce cytokines and other proteins. These activated cells and the cytokines and other proteins they produce lead to stimulation of both the innate and the adaptive components of the immune system. IMO-2055, a compound which has been evaluated in a number of clinical trials for the treatment of cancer, and IMO-2134, a compound which was evaluated in a Phase 1 clinical trial for the treatment of respiratory diseases, are TLR9 agonists.

#### *TLR7 and TLR8 Agonists*

We have created novel synthetic RNA-based compounds that are agonists of TLR7 or dual agonists of TLR7 and TLR8. In preclinical studies in cell culture and animal models, these TLR7 and dual TLR7 and TLR8 agonists induced immune responses that we believe may be useful for the treatment of cancer and infectious diseases and as vaccine adjuvants. We have studied a dual TLR7 and TLR8 agonist, which we refer to as IMO-4200, in preclinical models of hematological cancers. In preclinical models, we have observed antitumor activity of IMO-4200 as a monotherapy and in combination with selected targeted drugs currently approved for cancer treatment.

#### *TLR3 Agonists*

We have created a novel class of double-stranded RNA-based compounds that act as agonists of TLR3 and have evaluated their potential use as vaccine adjuvants. Vaccines are composed of one or more antigens and one or more adjuvants in an appropriate formulation. The function of vaccine adjuvants is to enhance immune cell recognition of the vaccine antigens and increase the ability of the immune system to make antigen-specific antibodies. In preclinical models, our TLR3 agonists promoted increased production of antigen-specific antibodies and cytotoxic T cells compared to responses induced by the antigen alone in preclinical vaccination studies.

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[Table of Contents](#)**Research and Development Programs**

We are focusing our development efforts on our autoimmune and inflammatory disease program. We are seeking to enter into collaborative alliances with respect to each of our other programs, other than our program currently under collaboration with Merck & Co. Except in connection with collaborations, we do not plan to expend any additional resources on these programs. The following table summarizes the development status of our autoimmune and inflammatory disease program and the programs we seek to advance through collaborations.

**RESEARCH AND DEVELOPMENT PROGRAMS**

<b>Drug Candidate(s)</b>	<b>Indication / Application</b>	<b>Development Status</b>
<i>Autoimmune and Inflammatory Diseases</i>		
IMO-3100	Psoriasis	Phase 2 Clinical Trial Top-Line Results Announced December 2012
IMO-8400	Psoriasis/Lupus	Ongoing Phase 1 Clinical Trial
<i>Program in Collaboration with Merck &amp; Co.</i>		
<i>Vaccine Adjuvants</i>		
TLR7, TLR8, and TLR9 Agonists	Cancer, Infectious Diseases, and Alzheimer's Disease	Research Being Conducted by Merck & Co. under Collaboration
<i>Programs for Which We are Seeking Third-Party Collaborations</i>		
<i>Cancer</i>		
IMO-2055 Plus Erlotinib and Bevacizumab	Non-Small Cell Lung Cancer	Phase 1b Clinical Trial Results Announced January 2012
IMO-2055 Plus Cetuximab	Squamous Cell, Head and Neck	Phase 2 Clinical Trial Results Announced May 2012
IMO-2055 Plus Cetuximab and FOLFIRI	Colorectal Cancer	Phase 1b Clinical Trial Results Announced May 2012
IMO-4200	Hematologic Malignancies	Research
<i>Respiratory Diseases</i>		
IMO-2134	Asthma and Allergy	Phase 1 Clinical Trial Results Announced May 2011
<i>TLR3 Agonists</i>	Infectious Diseases and Other Applications	Research
<i>Gene Silencing Oligonucleotides</i>	Inhibition of Gene Expression by Targeting RNA	Research

Cetuximab, erlotinib, and bevacizumab are marketed under the names Erbitux®, Tarceva®, and Avastin®, respectively.

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### *Autoimmune and Inflammatory Diseases*

#### *Overview*

Autoimmune diseases are disorders where the body attacks its own organs. According to the NIH Autoimmune Diseases Coordinating Committee: Autoimmune Diseases Research Plan December 2002, approximately 14 million to 22 million people in the United States have an autoimmune disease, with psoriasis, lupus, and rheumatoid arthritis being the most prevalent. These diseases are chronic, requiring long-term treatment, and may be life-threatening. Current approaches for the treatment of autoimmune diseases include broad immunosuppression or agents that block specific cytokines or signaling pathways. For instance, methotrexate, which inhibits proliferation of immune system cells by interfering with nucleic acid synthesis, and cyclosporine, which inhibits proliferation and activation of immune system cells by interfering with interleukin 2 synthesis, are broad immunosuppressants since they suppress general immune cell growth and activity rather than a specific immune response.

These approaches are used in the treatment of psoriasis. For mild psoriasis, phototherapy and topical immunosuppressants are generally used, while for progressive disease physicians typically use systemic immunosuppressants, such as methotrexate and cyclosporine. Moderate to severe plaque psoriasis, which is an indication for which we are developing our product candidates, is primarily treated with biologics, including antibodies which block specific cytokines such as Enbrel, which is marketed by Amgen, Pfizer, Inc., or Pfizer, and Takeda Pharmaceutical Company Limited, or Takeda, Remicade, which is marketed by Janssen Biotech, Merck & Co., and Mitsubishi Tanabe Pharma, Humira, which is marketed by Abbott Laboratories, and Stelara, which is marketed by Janssen Biotech. In addition to these antibodies, several biologic therapies are currently in late stage development for the treatment of moderate to severe plaque psoriasis. We believe that there are approximately 1.5 million people in the United States with moderate to severe psoriasis.

While broad immunosuppressants and agents that block specific cytokines are widely used and can provide clinical benefit, long-term use of these treatments has been shown to have limitations due to adverse events and patient compliance. Additionally, treatment with biologics is expensive and may lose effectiveness over time. As a result, we believe there continues to be an unmet need for an improved therapeutic approach which can provide for the long-term treatment of autoimmune diseases without issues as to safety or patient compliance.

#### *Use of TLRs Antagonists for the Treatment of Autoimmune and Inflammatory Diseases*

In autoimmune and inflammatory diseases such as psoriasis, lupus, rheumatoid arthritis, Behçet's disease, non-infectious uveitis, and cardiovascular disease, the immune system forms autoantibodies, damage-associated molecular patterns, or DAMPs, and pathogen associated molecular patterns, or PAMPs. These autoantibodies, DAMPs, and PAMPs are recognized by TLR7, TLR8, and TLR9, which activate immune response and induce multiple cytokines and signaling cascades such as Th1, Th17, and inflammasome pathways. These in turn can further exacerbate disease.

Our approach is to block these TLRs and inhibit the induction of these cytokines and signaling pathways. Specifically, our TLR antagonists are designed to inhibit induction of immune responses to autoantibodies, DAMPs and PAMPs upstream from cytokine induction rather than to block the activity of any one specific cytokine. In preclinical models of psoriasis, lupus and rheumatoid arthritis, treatment with TLR antagonist candidates, such as IMO-3100 and IMO-8400, has been shown to block activation of immune response through TLR receptors and improve many disease associated parameters. Depending on the preclinical disease model, these candidates have been shown to inhibit Th1, Th17, and inflammasome pathways, leading to the reversal of disease-related changes in gene expression and suppression of cytokines such as TNF- $\alpha$  and interleukins IL-12, IL-6, IL-17, and IL-1 $\beta$ .

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Preclinical data showing that our TLR antagonists inhibited Th1, Th17, and inflammasome pathways in models of psoriasis have been published in the Journal of Investigative Dermatology and were recently presented by Dr. James Krueger at the American Association of Dermatology 2013. Preclinical data showing that our TLR antagonists inhibit Th1, Th17, and inflammasome pathways in models of lupus were presented at the American Association of Immunologists in May 2012.

We believe that, since our TLR antagonist drug candidates may be effective at low dosages and are manufactured by customary chemical synthesis, treatment costs may be lower than with currently marketed biologics. More importantly, we further believe that, due to our TLR antagonist candidates targeting a specific upstream immune response that inhibits production of multiple cytokines involved in autoimmune disease, our approach may provide the potential for long-term disease remission and tolerability.

### *IMO-3100*

IMO-3100 is an antagonist of TLR7 and TLR9. In November 2009, we submitted to the United States Food and Drug Administration, or FDA, an Investigational New Drug application, or IND, for the clinical evaluation of IMO-3100 in autoimmune diseases. Following submission of the IND, we conducted Phase 1 single-dose and multiple-dose clinical trials of IMO-3100 in healthy subjects. In the single-dose Phase 1 clinical trial in 36 healthy subjects, IMO-3100 was administered by subcutaneous injection at five dose levels, with six subjects per regimen, with an additional six subjects receiving placebo treatment. In the four-week multiple dose Phase 1 clinical trial in 24 healthy subjects, IMO-3100 was administered at two dose levels of either 0.64 mg/kg once per week or 0.32 mg/kg twice per week or placebo, with eight subjects per regimen. IMO-3100 was well tolerated at all dose levels in both trials, and there were no treatment-related discontinuations or serious adverse events. Mild injection site reactions were the most frequent adverse event. In both trials, the intended target engagement of TLR7 and TLR9 was observed in IMO-3100-treated subjects compared to placebo-treated subjects.

Following the Phase 1 trials, we selected psoriasis for the initial indication for clinical evaluation of IMO-3100. We selected psoriasis as the initial indication in order to conduct a placebo-controlled monotherapy trial in an autoimmune disease indication with well-established clinical activity endpoints. In June 2011, we submitted a Phase 2 protocol to the FDA to conduct a 12-week clinical trial of IMO-3100 in adult patients with moderate to severe plaque psoriasis. In July 2011, the FDA placed a clinical hold on the protocol that we had submitted. In October 2011, we submitted to the FDA a new Phase 2 protocol to evaluate IMO-3100 in adult patients with moderate to severe plaque psoriasis, randomized into three arms, over a four-week treatment period. In December 2011, the FDA removed the clinical hold.

In the second quarter of 2012, we initiated a randomized double-blind, placebo-controlled Phase 2 clinical trial of IMO-3100 in adult patients with moderate to severe plaque psoriasis. A total of 44 patients were enrolled in this trial and randomized on a 1:1:1 basis to receive IMO-3100 monotherapy at a dose level of either 0.16 or 0.32 mg/kg or placebo by subcutaneous injection once weekly for four weeks with a four-week follow-up period. Assessments of safety were performed throughout the treatment and follow-up periods. Multiple parameters were monitored to assess the clinical activity of IMO-3100, including Psoriasis Area Severity Index, or PASI, scores. In addition to the clinical assessments, although we recognized that a known limitation of skin biopsies after four weeks of treatment is that psoriatic plaques do not resolve in a uniform fashion, and therefore, biopsies may not provide a representative sampling of lesions, biopsies were evaluated for treatment-related changes in epidermal thickness and immune cell infiltrates. In December 2012, we announced top-line results from this Phase 2 trial:

- Of the 44 enrolled patients, 40 were clinically evaluable at the end of the four-week treatment period and 37 were evaluable following the four-week follow up period.

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- Treatment at both IMO-3100 dose levels was well tolerated, with no treatment-related discontinuations.
- Among evaluable patients, the median PASI scores at treatment initiation were 14.9, 16.1, and 12.5 in the 0.16 mg/kg, 0.32 mg/kg, and placebo cohorts, respectively.
- A treatment effect was demonstrated in measures of clinical efficacy in patients in both IMO-3100 dose cohorts; PASI score reductions at both dose levels were sustained throughout the four-week follow-up period.
- At the end of the four-week follow-up period, 48% of patients treated with either dose of IMO-3100 (12 of 25) demonstrated improvements of 35% to 90% from baseline PASI scores compared with 0 of 12 in the placebo cohort; this difference was statistically significant ( $p < 0.005$ ).
- This trial achieved the pre-specified clinical endpoint of reduction in PASI scores at the end of treatment in the 0.16 mg/kg dose cohort with statistical significance ( $p < 0.02$ ) compared to the placebo cohort, but not in the 0.32 mg/kg dose cohort.
- The 0.16 mg/kg cohort also achieved, with statistical significance ( $p < 0.02$ ), the pre-specified clinical endpoint of improvement in plaque induration, a measure of plaque thickness, at the end of treatment and during the follow-up period.
- At the end of the four-week follow-up period, 25% (3 of 12) of patients treated with 0.16 mg/kg dose and 31% (4 of 13) with 0.32 mg/kg dose achieved a reduction of 50% or more in PASI score, compared to 0 of 12 placebo patients achieving a reduction of 50% or more in PASI score.

Skin biopsies of a representative psoriatic lesion were collected from each patient at baseline and after completion of treatment to investigate changes in epidermal thickness and immune cell infiltrates. Change in epidermal thickness was the primary endpoint for this trial. Placebo treated patients had a median change in epidermal thickness of +7.7% compared to a median change of -6.4% among IMO-3100 treated patients. The histology endpoint in biopsy samples was not statistically significant and the primary endpoint of this trial was not achieved.

We have also analyzed RNA isolated from biopsy samples collected from patients during the Phase 2 trial. We believe that the top-line results demonstrated a significant improvement in the psoriasis disease-associated gene profile, including the IL-17 pathway, in the samples from patients treated with IMO-3100 compared to placebo. We expect data from this analysis will be presented at a future scientific meeting.

We believe that the results of this trial provide clinical proof of concept of our approach of targeting specific TLRs for the treatment of psoriasis and potentially other autoimmune and inflammatory diseases.

### *IMO-8400*

IMO-8400 is an antagonist of TLR7, TLR8, and TLR9. In the first quarter of 2012, we selected IMO-8400 as the second drug candidate in our autoimmune and inflammatory disease program.

We submitted an IND to the FDA in the third quarter of 2012 and in the fourth quarter initiated a Phase 1 clinical trial at one site in the United States to assess the safety and the pharmacodynamic activity of IMO-8400 in healthy subjects. A total of 42 subjects received single or multiple ascending doses of IMO-8400 in this trial. The single-dose portion of this trial involved three escalating dose levels of 0.1, 0.3, and 0.6 mg/kg of IMO-8400. Six subjects received IMO-8400 by subcutaneous injection at each dose level of 0.1, 0.3, and 0.6 mg/kg, and an additional six subjects received placebo. IMO-8400 treatment was well tolerated, and the intended target engagement of TLR7, TLR8, and TLR9 was observed in IMO-8400-treated subjects compared to placebo-treated subjects.

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In the second quarter of 2013, we completed dosing in the multiple-dose portion of this trial. The multiple-dose portion of this trial involved two dose levels of IMO-8400, 0.3 and 0.6 mg/kg, with six subjects at each dose level receiving four weekly doses of IMO-8400 and a total of six subjects receiving placebo. We expect data from the multiple-dose portion of this trial to be available later in the second quarter of 2013.

### *Next Steps*

Based on the clinical activity of IMO-3100 observed in our four-week Phase 2 clinical trial of IMO-3100 in patients with psoriasis, we have determined that the next step in our development program is to conduct a Phase 2 clinical trial in patients with psoriasis to, among other things, evaluate the clinical activity of IMO-8400 with a treatment period of up to 12 weeks. Based on our evaluation of the comparative profiles of IMO-3100 and IMO-8400, including the engagement of TLR8 by IMO-8400, we have determined to focus our resources on the development of IMO-8400 and to conduct this trial in patients with psoriasis with IMO-8400. In March 2013, we submitted to the regulatory authorities in the Netherlands for review the proposed protocol for this trial and we received a “no objection” clearance from the Centrale Commissie Mensgebonden Onderzoek. Under the protocol, 32 adult patients with moderate to severe plaque psoriasis, as indicated by a PASI score of 12.5 or greater, would be randomized into one of four cohorts and receive placebo or IMO-8400 at a dose level of 0.075, 0.15, or 0.3 mg/kg/week for 12 weeks, with a six-week follow-up period. We expect that we could initiate this trial as early as the second quarter of 2013 and could have top-line data by the end of 2013. However, we do not plan to initiate this trial unless and until we have completed this offering and raised the necessary proceeds to fund this trial and until we have confirmed the successful completion of our ongoing Phase 1 trial of IMO-8400.

We are also planning to initiate a signal-seeking Phase 2 clinical trial of IMO-8400 in patients with lupus and are considering conducting a proof-of-concept study of IMO-8400 in an orphan autoimmune disease indication. We expect to select the orphan autoimmune disease indication for further exploration in the second half of 2013. However, our plans to conduct the Phase 2 clinical trial of IMO-8400 in patients with lupus and the proof-of-concept study are subject to successful completion of our ongoing Phase 1 trial of IMO-8400 and our ability to raise additional funding beyond the proceeds of this offering to fund the conduct of this Phase 2 trial and proof-of-concept study. We expect to seek such funding through public or private equity offerings, debt financings, collaborations and licensing arrangements or other sources.

### *Vaccine Adjuvants — TLR7, TLR8, and TLR9 Agonists*

Vaccines are composed of one or more antigens and one or more adjuvants in an appropriate formulation. The function of the adjuvants is to enhance immune recognition of the antigens and increase the ability of the immune system to make antigen-specific antibodies.

In preclinical animal models, our TLR7, TLR8, and TLR9 agonists have shown adjuvant activity when combined with various types of antigens. Preclinical studies that we conducted with our TLR7, TLR8, and TLR9 agonists and various antigens have shown improvements in several measures of antigen recognition, such as achievement of higher antibody levels, higher ratios of specific to nonspecific antibodies, and a reduction in the number of doses required to achieve effective antibody levels. Based in part on these results, we believe that agonists of TLR7, TLR8, and TLR9 have the potential to be used as adjuvants in vaccines.

In December 2006, we entered into a research collaboration with Merck & Co., and granted Merck & Co. an exclusive license to develop and commercialize our TLR7, TLR8, and TLR9 agonists by incorporating them in therapeutic and prophylactic vaccines being developed by Merck & Co. for

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cancer, infectious diseases, and Alzheimer's disease. The original term of the research collaboration was two years and Merck & Co. extended the research collaboration for two additional years to December 2010. During the four-year research collaboration period, multiple TLR agonists were created by us and evaluated by Merck & Co. against the criteria established in the license agreement. In January 2012, in accordance with the research collaboration, Merck & Co. selected multiple novel TLR7, TLR8, and TLR9 agonists for Merck & Co.'s exclusive evaluation and use as vaccine adjuvants under the current license agreement.

### *Additional TLR Programs*

In addition to our TLR programs in autoimmune and inflammatory diseases, and our collaboration with Merck & Co. for the use of TLR7, TLR8, and TLR9 agonists as vaccine adjuvants, we have identified TLR drug candidates for applications in the treatment of cancer, hematological malignancies and respiratory diseases, and created TLR3 agonists for use as vaccine adjuvants. We are seeking to enter into collaborations with third parties to advance these programs. Except in connection with collaborations, we do not plan to expend any additional resources on these programs.

*Cancer.* The immune system is capable of recognizing cancer cells as abnormal cells, leading to an immune response. However, the body's immune response to cancer cells may be weak or absent. We believe that agonists of TLR7, TLR8, and TLR9 can enhance the body's immune response to cancer cells because TLRs are involved in stimulation of both innate and adaptive immunity.

In December 2007, we entered into an exclusive, worldwide license agreement with Merck KGaA, Darmstadt, Germany, or Merck KGaA, to research, develop, and commercialize products containing our TLR9 agonists, including IMO-2055, for the treatment of cancer, excluding cancer vaccines. In November 2011, as part of an agreed-upon termination of our collaboration with Merck KGaA, we regained global rights to IMO-2055 and our other TLR9 agonists, including preclinical lead drug candidates selected for further evaluation under the collaboration, for the treatment of cancer.

We and, during the collaboration period, Merck KGaA, conducted clinical trials of IMO-2055 alone or in combination with other anticancer agents in several cancer indications, including the following:

- a Phase 1b clinical trial of IMO-2055 in combination with erlotinib and bevacizumab in patients with advanced non-small cell lung cancer, or NSCLC;
- a Phase 1b clinical trial of IMO-2055 in combination with cetuximab and the chemotherapy regimen FOLFIRI in patients with advanced colorectal cancer;
- a randomized Phase 2 clinical trial of IMO-2055 in combination with cetuximab in patients with squamous cell carcinoma of the head and neck, or SCCHN; and
- a Phase 2 clinical trial of IMO-2055 monotherapy in patients with renal cell carcinoma, or RCC.

During 2012 and pursuant to our agreement with respect to the termination of our collaboration with Merck KGaA, Merck KGaA completed the two Phase 1b clinical trials and the randomized Phase 2 clinical trial of IMO-2055 on our behalf.

*Hematological Malignancies.* In December 2010, we selected IMO-4200 as a lead TLR7 and TLR8 agonist candidate for the treatment of hematological malignancies. In preclinical models of lymphoma, IMO-4200 in combination with approved cancer treatments increased antitumor activity. We have conducted preclinical studies in mouse models combining IMO-4200 with ofatumumab, an anti-CD20 antibody, and, in separate experiments, with rituximab, an anti-CD20 antibody, plus a chemotherapy agent, fludarabine or bendamustine. In all of these combinations, IMO-4200 improved antitumor activity, increased survival, and enhanced the immunological mechanism of action of the antibody in preclinical models.



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*Respiratory Diseases.* Asthma and allergy conditions are characterized by an imbalance of the immune system. Currently approved agents for the treatment of asthma and allergy conditions, including steroids and antibodies, are generally designed to suppress symptoms of asthmatic or allergic response. Our TLR9 agonists, by comparison, are designed to induce immune responses that could be useful in restoring immune system balance. In preclinical studies conducted by us and our collaborators, our TLR9 agonists caused improvements in multiple indices of allergic conditions. One of our TLR9 agonists, IMO-2134, was evaluated by our former collaborator, Novartis Pharmaceuticals, Ltd., or Novartis, in a Phase 1 clinical trial.

*Vaccine Adjuvants.* We have created proprietary TLR3 agonists for potential use as vaccine adjuvants. In preclinical models, our TLR3 agonists stimulated immune responses, including promoting an increased production of antigen-specific antibodies and cytotoxic T cells as compared to responses induced by the antigen alone in preclinical vaccination studies.

### *Gene Silencing Oligonucleotides*

Through our expertise in nucleic acid chemistry, we have designed and created a new class of molecules to inhibit gene expression. These GSOs are single-stranded RNA or DNA constructs that are complementary to targeted mRNA sequences of therapeutic interest. In preclinical studies, our GSOs have inhibited in vivo gene expression without requiring a delivery enhancement technology.

## **Collaborative Alliances**

An important part of our business strategy is to enter into research and development collaborations, licensing agreements, and other strategic alliances with biotechnology and pharmaceutical corporations that bring expertise and resources to the potential development and commercialization of drugs based on our technology. We are currently party to a collaboration with Merck & Co. We were a party to a collaboration with Merck KGaA that was terminated in November 2011.

### *Merck & Co.*

In December 2006, we entered into an exclusive license and research collaboration agreement with Merck & Co. to research, develop and commercialize vaccine products containing our TLR7, TLR8, and TLR9 agonists in the fields of cancer, infectious diseases and Alzheimer's disease. Under the terms of the agreement, we granted Merck & Co. worldwide exclusive rights to a number of our TLR7, TLR8, and TLR9 agonists for use in combination with Merck & Co.'s therapeutic and prophylactic vaccines under development in the fields of cancer, infectious diseases, and Alzheimer's disease. There is no limit under the agreement to the number of vaccines to which Merck & Co. can apply our agonists within these fields. We also agreed with Merck & Co. to engage in a two-year research collaboration to generate novel agonists targeting TLR7 and TLR8 and incorporating both Merck & Co.'s and our chemistry for use in vaccines in the defined fields. Under the terms of the agreement, Merck & Co. extended the research collaboration for two additional years to December 2010. Under the terms of the agreement:

- Merck & Co. paid us a \$20.0 million upfront license fee;
- Merck & Co. purchased \$10.0 million of our common stock at \$5.50 per share;
- Merck & Co. agreed to fund the research and development collaboration through its term;
- Merck & Co. agreed to pay us milestone payments as follows:
  - up to \$165.0 million if vaccines containing our TLR9 agonist compounds are successfully developed and marketed in each of the oncology, infectious disease and Alzheimer's disease fields;

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- up to \$260.0 million if vaccines containing our TLR9 agonist compounds are successfully developed and marketed for follow-on indications in the oncology field and if vaccines containing our TLR7 or TLR8 agonists are successfully developed and marketed in each of the oncology, infectious disease, and Alzheimer's disease fields; and
- if Merck & Co. develops and commercializes additional vaccines using our agonists, we would be entitled to receive additional milestone payments; and
- Merck & Co. agreed to pay us mid to upper single-digit royalties on net product sales of vaccines using our TLR agonist technology that are developed and marketed, with the royalty rates being dependent on disease indication and the TLR agonist employed.

Under the agreement, Merck & Co. is obligated to pay us royalties, on a product-by-product and country-by-country basis, until the later of the expiration of the patent rights licensed to Merck & Co. and the expiration of regulatory-based exclusivity for the vaccine product. If the patent rights and regulatory-based exclusivity expire in a particular country before the 10th anniversary of the product's first commercial sale in such country, Merck & Co.'s obligation to pay us royalties will continue at a reduced royalty rate until such anniversary, except that Merck & Co.'s royalty obligation will terminate upon the achievement of a specified market share in such country by a competing vaccine containing an agonist targeting the same toll-like receptor as that targeted by the agonist in the Merck & Co. vaccine. In addition, the applicable royalties may be reduced if Merck & Co. is required to pay royalties to third parties for licenses to intellectual property rights, which royalties exceed a specified threshold. Merck & Co.'s royalty and milestone obligations may also be reduced if Merck & Co. terminates the agreement based on specified uncured material breaches by us.

Merck & Co. may terminate the collaborative alliance without cause upon 90 days written notice to us. Either party may terminate the collaborative alliance upon the other party's filing or institution of bankruptcy, reorganization, liquidation or receivership proceedings, or for a material breach if such breach is not cured within 60 days after delivery of written notice.

In January 2012, in accordance with the agreement, Merck & Co. selected multiple novel TLR7, TLR8, and TLR9 agonists for Merck & Co.'s exclusive evaluation and use as vaccine adjuvants.

### *Merck KGaA*

In December 2007, we entered into an exclusive, worldwide license agreement with Merck KGaA to research, develop and commercialize products containing our TLR9 agonists for the treatment of cancer, excluding cancer vaccines. Under the terms of the agreement, we granted Merck KGaA worldwide exclusive rights to our lead TLR9 agonists, IMO-2055 and IMO-2125, and to a specified number of novel follow-on TLR9 agonists to be identified by Merck KGaA and us under a research collaboration that ended in June 2010, for use in the treatment, cure and delay of the onset or progression of cancer in humans. Under the terms of the agreement:

- In February 2008, Merck KGaA paid us a \$40.0 million upfront license fee in Euros of which we received \$39.7 million due to foreign currency exchange rates;
- Merck KGaA agreed to reimburse future development costs for certain of our on-going IMO-2055 clinical trials, which we continued to conduct on behalf of Merck KGaA until September 2009;
- Merck KGaA agreed to pay us up to €264 million in development, regulatory approval, and commercial success milestone payments if products containing our TLR9 agonist compounds are successfully developed and marketed for treatment, cure and/or delay of the onset or progression of cancer in humans; and
- Merck KGaA agreed to pay mid single-digit to low double-digit royalties on net sales of products containing our TLR9 agonists that are marketed.

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In February 2009, we amended the license agreement with Merck KGaA so that we could initiate and conduct on behalf of Merck KGaA additional clinical trials of IMO-2055, until such time as Merck KGaA had filed an IND application with the FDA for IMO-2055 and assumed sponsorship of these trials. Under the amendment, Merck KGaA agreed to reimburse us for costs associated with any additional trials that we initiated and conducted. As of March 2010, Merck KGaA had assumed sponsorship of all clinical trials of IMO-2055 for the treatment of cancer and had taken responsibility for all further clinical development of IMO-2055 in the treatment of cancer, excluding vaccines.

In November 2011, we and Merck KGaA entered into a termination agreement terminating the license agreement. Under the termination agreement,

- The license agreement was terminated and we regained all rights for developing TLR9 agonists for the treatment of cancer, including all rights to IMO-2055 and any follow-on TLR9 agonists;
- Merck KGaA agreed to continue to conduct the Phase 2 trial of IMO-2055 in combination with cetuximab that was then ongoing and other specified related activities;
- Merck KGaA agreed to complete and analyze all clinical trials that Merck KGaA had initiated or for which Merck KGaA had assumed sponsorship and to finalize clinical study reports;
- We gained the rights to the data from the Phase 2 trial of IMO-2055 in combination with cetuximab, as well as to the data from the Phase 1 trials conducted in other cancer indications;
- We agreed to reimburse Merck KGaA a maximum of €1.8 million (\$2.4 million using a December 31, 2012 exchange rate) of Merck KGaA's costs for the third-party contract research organization that is coordinating the Phase 2 trial of IMO-2055 in combination with cetuximab, payable in eleven installments comprised of ten monthly installments to be invoiced by Merck KGaA to us commencing on March 1, 2012 and a final payment payable by us to Merck KGaA upon Merck KGaA's completion of certain specified activities. As of December 31, 2012, we have paid €0.8 million of the €1.8 million (\$1.1 million (using exchange rates in effect at the time that the payments were made) of the \$2.4 million);
- We agreed to pay to Merck KGaA one-time €1.0 million (\$1.3 million using a December 31, 2012 exchange rate) milestone payments upon occurrence of each of the following milestones: (i) partnering of IMO-2055 between us and any third party, (ii) initiation of any Phase 2 or Phase 3 clinical trial for IMO-2055 and (iii) regulatory submission of IMO-2055 in any country; and
- Merck KGaA granted us an option to obtain a license to certain manufacturing and formulation know-how owned or developed by Merck KGaA under the License Agreement and to Merck KGaA's IMOXine trademark. Our option to license the IMOXine trademark has expired. If we elect to exercise our option with respect to the manufacturing and formulation know-how, we have agreed to pay a low single digit royalty on net sales of IMO-2055, with respect to such license.

## **Antisense Technology**

We have been a pioneer in the development of antisense technology. We have used our antisense expertise and technology to validate potential targets in the TLR signaling pathway. Antisense compounds may assist us in identifying drug candidates. We also believe that our antisense technology may be useful to pharmaceutical and biotechnology companies that are seeking to develop drug candidates that down-regulate gene targets discovered by, or proprietary to, such companies. Antisense drug candidates are designed to bind to RNA targets through hybridization, and decrease production of the specific protein encoded by the target RNA. We believe that drugs based on antisense technology may be more effective and cause fewer side effects than conventional drugs in applications with well-defined RNA targets because antisense drugs are designed to intervene in a highly specific fashion in the production of proteins, rather than after the proteins are made.

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We have licensed specified rights related to antisense technology to certain parties. We also have in-licensed certain rights related to antisense technology.

*Out-licenses.* In 2001 we entered into an agreement with Isis Pharmaceuticals, Inc., or Isis, under which we granted Isis a license (with the right to sublicense) to our antisense chemistry and delivery patents and patent applications, but we retained the right to use these patents and applications in our own drug discovery and development efforts and in collaborations with third parties. Isis paid us \$15.0 million in cash and issued 857,143 shares of its common stock having an aggregate fair market value on the dates on which title to the shares was received of \$17.3 million and agreed to pay us a mid double-digit percentage of specified sublicense income it receives from some types of sublicenses of our patents and patent applications. As of December 31, 2012, we have received \$0.3 million in sublicense income from Isis. Also under the agreement, we licensed from Isis specified antisense patents and patent applications, principally Isis' suite of RNase H patents and patent applications. We paid to Isis \$0.7 million and issued 1,005,499 shares of our common stock having a fair market value of approximately \$1.2 million on the date of issuance for this license and are obligated to pay Isis an annual patent maintenance fee and low single-digit royalties on net sales of antisense products sold that are covered by Isis's patent rights. We have the right to use these patents and patent applications in our drug discovery and development efforts and in some types of third-party collaborations. As of December 31, 2012, we have only paid Isis annual maintenance fees and have not paid any royalties. The agreement may be terminated for an uncured material breach by either party. The licenses granted under the Isis agreement terminate upon the last to expire of the patents and patent applications licensed under the agreement. We may terminate at any time the sublicense by Isis to us of the patents and patent applications.

In addition, we are party to two other license agreements involving the license of our antisense patents and patent applications for antisense chemistry and delivery and for specific gene targets, under which we generally are entitled to receive license fees, sublicensing income, research payments, payments upon achievement of developmental milestones, and royalties on product sales. As of December 31, 2012, we had received a total of \$1.5 million under these agreements.

*In-licenses.* Our principal in-license related to antisense technology is with University of Massachusetts Medical Center for antisense chemistry and for certain gene targets. Under the terms of our license agreement with University of Massachusetts Medical Center, we are the worldwide, exclusive licensee under a number of U.S. issued patents and various patent applications owned by University of Massachusetts Medical Center relating to the chemistry of antisense oligonucleotides and their use. Many of these patents and patent applications have corresponding applications on file or corresponding patents in other major industrial countries. The patents licensed to us by University of Massachusetts Medical Center expire at dates ranging from 2013 to 2014. This license expires upon the expiration of the last to expire of the patents covered by the license. Under the agreement, we have agreed to pay a low single-digit royalty on net product sales, a low double-digit percentage of any sublicense license income we receive, and a small annual license maintenance fee. Since 1999, we have paid approximately \$1.7 million to University of Massachusetts Medical Center under this license agreement.

Additionally, we have entered into five other royalty-bearing license agreements under which we have acquired rights to antisense related patents, patent applications, and technology. Under all of these in-licenses, we are obligated to pay low to mid single-digit royalties on our net sales of products or processes covered by a valid claim of a licensed patent or patent application. Under some of these in-licenses, we are required to pay a low double-digit percentage of any sublicense income. All of our in-licenses impose various commercialization, sublicensing, insurance, and other obligations on us, and our failure to comply with these requirements could result in termination of the in-licenses.

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**Academic and Research Collaborations**

We have entered into research collaborations with scientists at leading academic research institutions. These research collaborations allow us to augment our internal research capabilities and obtain access to specialized knowledge and expertise.

In general, our research collaborations may require us to supply compounds and pay various amounts to support the research. Under these research agreements, if a collaborator, solely or jointly with us, creates any invention, we may own exclusively such invention, have an automatic paid-up, royalty-free non-exclusive license or have an option to negotiate an exclusive, worldwide, royalty-bearing license to such invention. Inventions developed solely by our scientists in connection with research collaborations are owned exclusively by us. These collaborative agreements are non-exclusive and may be terminated with limited notice.

**Research and Development Expenses**

For the years ended December 31, 2012, 2011 and 2010, we spent approximately \$13.7 million, \$18.0 million, and \$24.2 million on research and development activities.

**Patents, Proprietary Rights and Trade Secrets**

Our success depends in part on our ability to obtain and maintain proprietary protection for our drug candidates, technology and know-how, to operate without infringing the proprietary rights of others and to prevent others from infringing our proprietary rights. We use a variety of methods to seek to protect our proprietary position, including filing U.S. and foreign patent applications related to our proprietary technology, inventions and improvements that are important to the development of our business. We also rely on trade secrets, know-how, continuing technological innovation, and in-licensing opportunities to develop and maintain our proprietary position.

We have devoted and continue to devote a substantial amount of our resources into establishing intellectual property protection for:

- Novel chemical entities that function as agonists of TLR3, TLR7, TLR8 or TLR9;
- Novel chemical entities that function as antagonists of TLR7, TLR8 or TLR9; and
- Use of our novel chemical entities and chemical modifications to treat and prevent a variety of diseases.

As of January 31, 2013, we owned more than 50 U.S. patents and patent applications and more than 100 patents and patent applications throughout the rest of the world for our TLR-targeted immune modulation technologies. These patents and patent applications include novel chemical compositions of matter and methods of use for our immune modulatory compounds, including IMO-3100, IMO-8400, and IMO-2055. As of January 31, 2013, all of our intellectual property covering immune modulatory compositions and methods of their use is based on discoveries made solely by us. These patents expire at various dates ranging from 2017 to 2031. With respect to IMO-3100, we have issued U.S. patents that cover the chemical composition of matter of IMO-3100 and methods of its use that will expire at the earliest in 2026. With respect to IMO-8400, we have U.S. patent applications that cover the chemical composition of matter of IMO-8400 and methods of its use that will expire at the earliest in 2031. With respect to IMO-2055, we have issued U.S. patents that cover the chemical composition of matter of IMO-2055 and methods of its use, including in combination with marketed cancer products, with the earliest composition claims in the United States expiring in 2023.

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As of January 31, 2013, we also own three U.S. patent applications and six corresponding worldwide patent application for our GSO compounds and methods of their use. Patents issuing from these applications, if any, would expire at their earliest in 2030.

In addition to our TLR-targeted patent portfolio, we are the owner or hold licenses of patents and patent applications related to antisense technology. As of January 31, 2013, our antisense patent portfolio included more than 75 U.S. patents and patent applications and more than 75 patents and patent applications throughout the rest of the world. These antisense patents and patent applications include novel compositions of matter, the use of these compositions for various genes, sequences and therapeutic targets, and oral and other routes of administration. Some of the patents and patent applications in our antisense portfolio were in-licensed. These in-licensed patents expire at various dates ranging from 2013 to 2021.

Because patent applications in the United States and many foreign jurisdictions are typically not published until 18 months after filing, or in some cases not at all, and because publications of discoveries in the scientific literature often lag behind actual discoveries, we cannot be certain that we were the first to make the inventions claimed in each of our issued patents or pending patent applications, or that we were the first to file for protection of the inventions set forth in these patent applications.

Litigation may be necessary to defend against or assert claims of infringement, to enforce patents issued to us, to protect trade secrets or know-how owned by us, or to determine the scope and validity of the proprietary rights of others or to determine the appropriate term for an issued patent. In addition, the United States Patent and Trademark Office, or USPTO, may declare interference proceedings to determine the priority of inventions with respect to our patent applications or reexamination or reissue proceedings to determine if the scope of a patent should be narrowed. Litigation or any of these other proceedings could result in substantial costs to and diversion of effort by us, and could have a material adverse effect on our business, financial condition and results of operations. These efforts by us may not be successful.

In January 2010, we filed a lawsuit against the USPTO in the United States District Court for the District of Columbia. In light of recent decisions in that court and the Court of Appeals for the Federal Circuit, we believe the USPTO assigned a shorter patent term to some of our U.S. patents than was allowed by law. We filed the lawsuit to obtain a determination of the appropriate patent term for these patents. This case has been stayed pending the final decision in an earlier case filed by another company with a similar fact pattern and seeking the same resolution.

We may rely, in some circumstances, on trade secrets and confidentiality agreements to protect our technology. Although trade secrets are difficult to protect, wherever possible, we use confidential disclosure agreements to protect the proprietary nature of our technology. We regularly implement confidentiality agreements with our employees, consultants, scientific advisors, and other contractors and collaborators. However, there can be no assurance that these agreements will not be breached, that we will have adequate remedies for any breach, or that our trade secrets and/or proprietary information will not otherwise become known or be independently discovered by competitors. To the extent that our employees, consultants or contractors use intellectual property owned by others in their work for us, disputes may also arise as to the rights in related or resulting know-how and inventions.

## **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, such as those we are developing.

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### *United States drug approval process*

In the United States, the FDA regulates drugs under the Federal Food, Drug, and Cosmetic Act, or FDCA, the Public Health Service Act 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 U.S. requirements at any time during the product development process, approval process or after approval, may subject an applicant to a variety of administrative or judicial sanctions, such as the FDA's refusal to approve pending applications, withdrawal of an approval, imposition of a clinical hold, issuance of warning letters, product recalls, product seizures, total or partial suspension of production or distribution injunctions, fines, refusals of government contracts, restitution, disgorgement of profits or civil or criminal penalties.

The process required by the FDA before a drug may be marketed in the United States generally involves the following:

- completion of nonclinical laboratory tests, animal studies and formulation studies in compliance with the FDA's good laboratory practice, or GLP, regulations;
- submission to the FDA of an IND, which must become effective before human clinical trials may begin;
- approval by an independent institutional review board, or IRB, for 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 for each indication;
- submission to the FDA of a new drug application, or NDA;
- 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 current good manufacturing practices, or 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.

### *Nonclinical studies*

Nonclinical 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 nonclinical studies is subject to federal regulations and requirements, including GLP regulations for safety/toxicology studies. An IND sponsor must submit the results of the nonclinical tests, together with manufacturing information, analytical data, any available clinical data or literature and plans for clinical studies, among other things, to the FDA as part of an IND. Additional nonclinical 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.

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### *Clinical trials*

Clinical trials involve the administration of the investigational new drug to human subjects under the supervision of qualified investigators in accordance with GCP requirements, which include, among other things, the requirement that all research subjects provide their informed consent in writing before their participation in any clinical trial. Clinical trials are conducted under written study protocols detailing, among other things, the objectives of the trial, 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 for 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. The IRB must review and approve, among other things, the trial protocol and informed consent information to be provided to study subjects. An IRB must operate in compliance with FDA regulations. Information about certain clinical trials must be submitted within specific timeframes to the National Institutes of Health for public dissemination on their ClinicalTrials.gov website.

Human clinical trials are typically conducted in three sequential phases, which may overlap or be combined:

- *Phase 1:* The drug is initially introduced into healthy human subjects or patients with the target disease or condition and tested for safety, dosage tolerance, absorption, metabolism, distribution, excretion and, if possible, to gain an early indication of its effectiveness.
- *Phase 2:* The drug is administered to a limited patient population to identify possible adverse effects and safety risks, to preliminarily evaluate the efficacy of the product for specific targeted diseases and to determine dosage tolerance and optimal dosage.
- *Phase 3:* The drug is administered to an expanded patient population in adequate and well-controlled clinical trials to generate sufficient data to statistically confirm the efficacy and safety of the product for approval, to establish the overall risk-benefit profile of the product and to provide adequate information for the labeling of the product.

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

### *Marketing approval*

Assuming successful completion of the required clinical testing, the results of the nonclinical and clinical studies, together with detailed information relating to the product's chemistry, manufacture, controls and proposed labeling, among other things, are submitted to the FDA as part of an NDA requesting approval to market the product for one or more indications. Under federal law, the submission of most NDAs is additionally subject to a substantial application user fee, currently exceeding \$1.9 million, and the sponsor of an approved NDA is also subject to annual product and establishment user fees, currently exceeding \$98,000 per product and \$520,000 per establishment. These fees are typically increased annually.

The FDA conducts a preliminary review of all NDAs within the first 60 days after submission before accepting them for filing to determine whether they are sufficiently complete to permit substantive review. The FDA may request additional information rather than accept an NDA for filing. In this event,



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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. Under these goals, the FDA has committed to review most such applications for non-priority products within 10 months of submission, and most applications for priority review products, that is, drugs that the FDA determines represent a significant improvement over existing therapy, within six months of submission. If the drug is considered to be a new molecular entity, or NME, these time periods are measured from the official “filing” date rather than the date of submission, which generally adds two months to the review period. The review process may be extended by the FDA for three additional months to consider certain information or clarification regarding information already provided in the submission. The FDA may also refer applications for novel drugs or products that present difficult questions of safety or efficacy to an advisory committee, typically a panel that includes clinicians and other experts, for review, evaluation and a recommendation as to whether the application should be approved. The FDA is not bound by the recommendations of an advisory committee, but it considers such recommendations carefully when making decisions.

Before approving an NDA, 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, 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 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 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 and refuse to approve the NDA.

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

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### *Fast track designation*

The FDA is required to facilitate the development and expedite the review of drugs that are intended for the treatment of a serious or life-threatening disease condition for which there is no effective treatment and which demonstrate the potential to address unmet medical needs for the disease condition. Under the fast track program, the sponsor of a new drug 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 before the application is complete. This rolling review is available if the applicant provides and the FDA agrees to 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 is submitted. In addition, the fast track designation may be withdrawn by the FDA if the FDA believes that the designation is no longer supported by data emerging in the clinical trial process.

### *Priority review*

Under FDA policies, a product candidate may be eligible for priority review, or review within a six-month time frame from the time a complete application is submitted (for non-NMEs) or filed (for NMEs). Products regulated by the FDA's Center for Drug Evaluation and Research, or CDER, are eligible for priority review if they provide a safe and effective therapy where no satisfactory alternative exists or a significant improvement compared to marketed products in the treatment, diagnosis or prevention of a 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 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 or on a clinical endpoint that can be measured earlier than irreversible morbidity or mortality, that is reasonably likely to predict an effect on irreversible morbidity or mortality or other clinical benefit, taking into account the severity, rarity or prevalence of the condition and the availability or lack of alternative treatments. 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 verify and describe the predicted effect on irreversible morbidity or mortality or other clinical endpoint. Failure to conduct required post-approval studies, or verify and describe the predicted effect on irreversible morbidity or mortality or other clinical endpoint 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.

### *Breakthrough designation*

Under the provisions of the new Food and Drug Administration Safety and Innovation Act, or FDASIA, enacted in 2012, a sponsor can request designation of a product candidate as a "breakthrough therapy." A breakthrough therapy is defined as a drug that is intended, alone or in combination with one or more

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other drugs, to treat a serious or life-threatening disease or condition, and preliminary clinical evidence indicates that the drug may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. Drugs designated as breakthrough therapies are also eligible for accelerated approval. The FDA must take certain actions, such as holding timely meetings and providing advice, intended to expedite the development and review of an application for approval of a breakthrough therapy.

### *Orphan drugs*

Under the Orphan Drug Act, the FDA may grant orphan drug designation to drugs 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. After the FDA grants orphan drug designation, the generic identity of the drug 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 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 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 for the same disease or condition, or the same drug 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 application user fee.

### *Pediatric information*

Under the Pediatric Research Equity Act, as amended, an NDA or supplement to an NDA must contain data that are adequate to assess the safety and effectiveness of the drug for the claimed indications in all relevant pediatric subpopulations, and to support dosing and administration for each pediatric subpopulation for which the product is safe and effective. The FDA may, on its own initiative or at the request of the applicant, grant deferrals for submission of some or all pediatric data until after approval of the product for use in adults, or full or partial waivers from the pediatric data requirements. Unless otherwise required by regulation, the pediatric data requirements do not apply to products with orphan drug designation.

### *The Hatch-Waxman Act*

#### *Abbreviated new drug applications*

In seeking approval for a drug through an NDA, applicants are required to list with the FDA each patent with claims that cover the applicant's product or a method of using the 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, dosage form and route of administration as the listed drug and has been shown to be bioequivalent through *in vitro* or *in vivo* testing or otherwise to the listed drug. ANDA applicants are not required to conduct or submit results of preclinical or clinical tests to prove the safety or effectiveness of their drug product, other than the requirement for bioequivalence testing. Drugs approved in this way are commonly referred to as "generic equivalents" to the listed drug, and can often be substituted by pharmacists under prescriptions written for the original listed drug.

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The ANDA applicant is required to certify to the FDA concerning any patents listed for the approved product in the FDA's Orange Book, except for patents covering methods of use for which the ANDA applicant is not seeking approval. Specifically, the applicant must certify with respect to each patent 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, unenforceable 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 or unenforceable is called a Paragraph IV certification. If the applicant does not challenge the listed patents or indicate that it is not seeking approval of a patented method of use, 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 notice 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 period, such as exclusivity for obtaining approval of a new chemical entity, for the referenced product has expired. Federal law provides a period of five years following approval of a drug containing no previously approved active moiety during which ANDAs for generic versions of those drugs cannot be submitted unless the submission contains a Paragraph IV challenge to a listed patent, in which case the submission may be made four years following the original product approval. Federal law provides for a period of three years of exclusivity during which the FDA cannot grant effective approval of an ANDA if a listed drug contains a previously approved active moiety, but FDA requires as a condition of approval new clinical trials conducted by or for the sponsor. This three-year exclusivity period often protects changes to a previously approved drug product, such as a new dosage form, route of administration, combination or indication. Under the Best Pharmaceuticals for Children Act, federal law also provides that periods of patent and non-patent marketing exclusivity listed in the Orange Book for a drug may be extended by six months if the NDA sponsor conducts pediatric studies identified by the FDA in a written request. For written requests issued by the FDA after September 27, 2007, the date of enactment of the FDAAA, the FDA must grant pediatric exclusivity no later than nine months prior to the date of expiration of patent or non-patent exclusivity in order for the six-month pediatric extension to apply to that exclusivity period.

### *Section 505(b)(2) new drug applications*

Most drug products obtain FDA marketing approval pursuant to a full 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

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and for which the applicant has not obtained a right of reference. If the 505(b)(2) applicant can establish that reliance on the FDA's previous approval is scientifically appropriate, it may eliminate the need to conduct certain preclinical or clinical studies of the new product. The FDA may also require companies to perform additional studies or measurements to support the change from the approved product. The FDA may then approve the new product candidate for all or some of the label indications for which the referenced product has been approved, as well as for any new indication sought by the Section 505(b)(2) applicant.

To the extent that the Section 505(b)(2) applicant is relying on studies conducted for an already approved product, the applicant is required to certify to the FDA concerning any patents listed for the approved product in the Orange Book to the same extent that an ANDA applicant would. As a result, approval of a 505(b)(2) NDA can be stalled until all the listed patents claiming the referenced product have expired, until any non-patent exclusivity, such as exclusivity for obtaining approval of a new chemical entity, listed in the Orange Book for the referenced product has expired, and, in the case of a Paragraph IV certification and subsequent patent infringement suit, until the earlier of 30 months, settlement of the lawsuit or a decision in the infringement case that is favorable to the Section 505(b)(2) applicant.

### *Other regulatory requirements*

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

The FDA may impose a number of post-approval requirements as a condition of approval of an NDA. 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.

In addition, drug manufacturers and other entities involved in the manufacture and distribution of approved drugs 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;

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- fines, warning letters or holds on post-approval clinical trials;
- refusal of the FDA to approve pending applications or supplements to approved applications, or suspension or revocation of product license approvals;
- product seizure or detention, or refusal to permit the import or export of products; or
- consent decrees, injunctions or the imposition of civil or criminal penalties.

The FDA strictly regulates marketing, labeling, advertising and promotion of products that are placed on the market. Drugs 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 or recommending the purchase, lease or order of any healthcare item or service reimbursable under Medicare, Medicaid or other federally financed healthcare programs. This statute has been interpreted to apply to arrangements between pharmaceutical manufacturers on the one hand and prescribers, purchasers and formulary managers on the other. Violations of the anti-kickback statute are punishable by imprisonment, criminal fines, civil monetary penalties and exclusion from participation in federal healthcare programs. Although there are a number of statutory exemptions and regulatory safe harbors protecting certain common activities from prosecution or other regulatory sanctions, the exemptions and safe harbors are drawn narrowly, and practices that involve remuneration intended to induce prescribing, purchases or recommendations may be subject to scrutiny if they do not qualify for an exemption or safe harbor.

Federal false claims laws prohibit any person from knowingly presenting, or causing to be presented, a false claim for payment to the federal government, or knowingly making, or causing to be made, a false statement to have a false claim paid. Recently, several pharmaceutical and other healthcare companies have been prosecuted under these laws for allegedly inflating drug prices they report to pricing services, which in turn were used by the government to set Medicare and Medicaid reimbursement rates, and for allegedly providing free product to customers with the expectation that the customers would bill federal programs for the product. In addition, certain marketing practices, including off-label promotion, may also be found to 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.

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### *Foreign regulation*

In order to market any product outside of the United States, we would need to comply with numerous and varying regulatory requirements of other countries regarding safety and efficacy and governing, among other things, clinical trials, marketing authorization, commercial sales and distribution of our products. Whether or not we obtain FDA approval for a product, we would need to obtain the necessary approvals by the comparable regulatory authorities of foreign countries before we can commence clinical trials or marketing of the product in those countries. The approval process varies from country to country and can involve additional product testing and additional administrative review periods. The time required to obtain approval in other countries might differ from and be longer than that required to obtain FDA approval. Regulatory approval in one country does not ensure regulatory approval in another, but a failure or delay in obtaining regulatory approval in one country may negatively impact the regulatory process in others.

### *New legislation and regulations*

From time to time, legislation is drafted, introduced and passed in Congress that could significantly change the statutory provisions governing the testing, approval, manufacturing and marketing of products regulated by the FDA. For example, the FDAAA discussed above was enacted in 2007. 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 might obtain regulatory approval. Sales of any of our product candidates, if approved, will depend, in part, on the extent to which the costs of the products will be covered by third-party payors, including government health programs such as Medicare and Medicaid, commercial health insurers and managed care organizations. The process for determining whether a payor will provide coverage for a drug product may be separate from the process for setting the price or reimbursement rate that the payor will pay for the drug product once coverage is approved. Third-party payors may limit coverage to specific drug products on an approved list, or formulary, which might not include all of the approved drugs for a particular indication.

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

The containment of healthcare costs has become a priority of federal, state and foreign governments, and the prices of drugs have been a focus in this effort. Third-party payors are increasingly challenging the prices charged for medical products and services and examining the medical necessity and cost-effectiveness of medical products and services, in addition to their safety and efficacy. If these third-party payors do not consider our products to be cost-effective compared to other available therapies, they may not cover our products after approval as a benefit under their plans or, if they do, the level of payment may not be sufficient to allow us to sell our products at a profit. The U.S. government, state legislatures and foreign governments have shown significant interest in implementing cost containment programs to

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

### **Manufacturing**

We do not currently own or operate manufacturing facilities for the production of clinical or commercial quantities of any of our drug candidates. We currently rely and expect to continue to rely on other companies for the manufacture of our drug candidates for preclinical and clinical development. We currently source our bulk drug manufacturing requirements from a limited number of contract manufacturers through the issuance of work orders on an as-needed basis. We depend and will continue to depend on our contract manufacturers to manufacture our drug candidates in accordance with cGMP regulations for use in clinical trials. We will ultimately depend on contract manufacturers for the manufacture of our products for commercial sale. Contract manufacturers are subject to extensive governmental regulation.

Under our collaborative agreement with Merck & Co., Merck & Co. is responsible for manufacturing the drug candidates.



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**Competition**

We are developing our TLR-targeted drug candidates for use in the treatment of autoimmune and inflammatory diseases and for use as vaccine adjuvants. We have two drug candidates in clinical development in our autoimmune and inflammatory disease program. We are also collaborating with Merck & Co. for the use of agonists of TLR7, TLR8, and TLR9 as vaccine adjuvants for cancer, infectious diseases and Alzheimer's disease. In addition, we are seeking to enter into collaborative alliances with pharmaceutical companies to advance our TLR-targeted programs in oncology and respiratory diseases, and for the use of TLR3 agonists as vaccine adjuvants, as well as applications of our GSO technology platform. For all of these disease areas, there are many other companies, public and private, that are actively engaged in discovery, development, and commercializing products and technologies that may compete with our drug candidates and programs, including TLR targeted compounds as well as non-TLR targeted therapies.

Our principal competitor developing TLR-targeted compounds for autoimmune and inflammatory diseases is Dynavax Technologies Corporation, or Dynavax, with its collaborator, GlaxoSmithKline plc., or GlaxoSmithKline. Merck & Co.'s vaccines using our TLR7, TLR8 or TLR9 agonists as adjuvants may compete with vaccines using TLR agonists as adjuvants being developed or marketed by GlaxoSmithKline, Novartis, Dynavax, VaxInnate, Inc., Intercell AG, and Cytos Biotechnology AG.

We are developing drug candidates for the treatment of moderate to severe plaque psoriasis. There are a number of well-known immune suppressors and biologics that are currently being widely used for the treatment of moderate to severe plaque psoriasis, including methotrexate and cyclosporine, which are both immune suppressors, and biologics like Enbrel, which is marketed by Amgen, Pfizer and Takeda, Remicade, which is marketed by Janssen Biotech, Merck & Co. and Mitsubishi Tanabe Pharma, Humira, which is marketed by Abbott Laboratories, and Stelara, which is marketed by Janssen Biotech. In addition to existing treatments, we are also aware of additional compounds for the treatment of moderate to severe plaque psoriasis that are currently in late stage development, including apremilast, which is being developed by Celgene Corporation, tofacitinib, which is being developed by Pfizer, secukinumab, which is being developed by Novartis, ixekizumab, which is being developed by Eli Lilly and Company, and brodalumab, which is being developed by Amgen, AstraZeneca PLC and Kyowa Hakko Kirin Co., Ltd. We believe that our drug candidates, if approved for the treatment of moderate to severe plaque psoriasis, will compete with these products on the basis of improved long-term disease remission and long-term tolerability, as well as potentially lower treatment costs due to lower dosage requirements and a simpler manufacturing process.

Some of the potentially competitive products have been in development or commercialized for years, in some cases by large, well established pharmaceutical companies. Many of the marketed products have been accepted by the medical community, patients, and third-party payors. Our ability to compete may be affected by the previous adoption of such products by the medical community, patients, and third-party payors. Additionally, in some instances, insurers and other third-party payors seek to encourage the use of generic products, which makes branded products, such as our drug candidates, potentially less attractive, from a cost perspective, to buyers.

We recognize that other companies, including large pharmaceutical companies, may be developing or have plans to develop products and technologies that may compete with ours. Many of our competitors have substantially greater financial, technical, and human resources than we have. In addition, many of our competitors have significantly greater experience than we have in undertaking preclinical studies and human clinical trials of new pharmaceutical products, obtaining FDA and other regulatory approvals of products for use in health care and manufacturing, and marketing and selling approved products. Our competitors may discover, develop or commercialize products or other novel technologies that are more effective, safer or less costly than any that we are developing. Our competitors may also obtain FDA or other regulatory approval for their products more rapidly than we may obtain approval for ours.

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We anticipate that the competition with our products and technologies will be based on a number of factors including product efficacy, safety, availability, and price. The timing of market introduction of our products and competitive products will also affect competition among products. We expect the relative speed with which we can develop products, complete the clinical trials, and approval processes and supply commercial quantities of the products to the market to be important competitive factors. Our competitive position will also depend upon our ability to attract and retain qualified personnel, to obtain patent protection or otherwise develop proprietary products or processes, and protect our intellectual property, and to secure sufficient capital resources for the period between technological conception and commercial sales.

**Employees**

As of January 31, 2013, we employed 18 individuals, nine of whom are engaged in research and development and 10 of whom hold a Ph.D., M.D., or equivalent degree. None of our employees are covered by a collective bargaining agreement, and we consider relations with our employees to be good.

**Properties**

We lease approximately 26,000 square feet of laboratory and office space located in Cambridge, Massachusetts. The lease expires on May 31, 2014, subject to a five-year renewal option exercisable by us. We have specified rights to sublease this facility.

**Legal Proceedings**

None.

## MANAGEMENT

### Executive Officers and Directors

The following table sets certain information regarding our executive officers and directors as of as of January 31, 2013.

<u>Name</u>	<u>Age</u>	<u>Position</u>
Sudhir Agrawal, D. Phil.	59	Chairman of the Board of Directors, President and Chief Executive Officer
Louis J. Arcudi III, M.B.A.	52	Senior Vice President of Operations, Chief Financial Officer, Treasurer and Secretary
Timothy M. Sullivan, Ph.D.	58	Vice President, Development Programs and Alliance Management
Robert D. Arbeit, M.D.	65	Vice President, Clinical Development
Youssef El Zein <sup>(2),(3)</sup>	64	Director
C. Keith Hartley <sup>(1),(3)</sup>	70	Director
Robert W. Karr, M.D. <sup>(1)</sup>	64	Director
Malcolm MacCoss, Ph.D. <sup>(2)</sup>	65	Director
William S. Reardon <sup>(1),(3)</sup>	66	Director
Eve E. Slater <sup>(2)</sup>	67	Director
Abdul-Wahab Umari	45	Director

<sup>(1)</sup> Member of the audit committee.

<sup>(2)</sup> Member of the compensation committee.

<sup>(3)</sup> Member of the nominating and corporate governance committee.

**Sudhir Agrawal, D. Phil.**, a director since 1993, has been the chairman of our board of directors since September 2010, our President since September 2008 and our Chief Executive Officer since August 2004. He also served as our Chief Scientific Officer from January 1993 until September 2010, as our President from February 2000 to October 2005 and as Acting Chief Executive Officer from February 2000 until September 2001. Dr. Agrawal joined us in 1990 and served in various capacities before his appointment as Chief Scientific Officer, including Vice President of Discovery and Senior Vice President of Discovery. Prior to joining us, Dr. Agrawal served as a Foundation Scholar at the Worcester Foundation for Experimental Biology and carried out his post-doctoral research at the Medical Research Council's Laboratory of Molecular Biology in Cambridge, England from 1985 to 1986. We believe that Dr. Agrawal's qualifications to sit on our board of directors include his unique insights into our challenges, opportunities and operations that he has as a result of the roles he has played with us since our founding, including scientific founder, chief scientific officer, chief executive officer and chairman.

**Louis J. Arcudi, III, M.B.A.**, has been our Senior Vice President of Operations since April 2011 and our Chief Financial Officer, Treasurer and Secretary since he joined us in December 2007. Prior to joining us, Mr. Arcudi served as Vice President of Finance and Administration and Treasurer for Peptimmune, Inc., a biotechnology company, from 2003 to 2007. From 2000 to 2003 Mr. Arcudi was Senior Director of Finance and Administration at Genzyme Molecular Oncology Corporation, a division of Genzyme Corporation, a biotechnology company. He was Director of Finance Business Planning and Operations International at Genzyme from 1998 to 2000. Prior to joining Genzyme, he held finance positions with increasing levels of responsibility at Cognex Corporation, a supplier of machine vision systems, Millipore Corporation, a provider of technologies, tools and services for bioscience, research and biopharmaceutical manufacturing, and General Motors Corporation, an automobile manufacturer. Mr. Arcudi received a M.B.A. from Bryant College and a B.S. in accounting and information systems from the University of Southern New Hampshire.

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**Timothy M. Sullivan, Ph.D.**, has been our Vice President, Development Programs and Alliance Management since April 2010 and was our Vice President, Development Programs from August 2004 until April 2010. He joined us in 2002 as Senior Director, Preclinical Drug Development. His prior professional experience includes positions as Executive Director of Non-clinical Drug Safety Evaluation for Purdue Pharma L.P., a pharmaceutical company, from 1999 to 2002, and Vice President of Eastern Operations for Oread, Inc., a contract drug development organization, from 1997 to 1999. Prior to 1997, Dr. Sullivan held a variety of technical management roles with other pharmaceutical companies and contract research organizations, including Adria, Battelle, Roma Toxicology Centre, and in veterinary medicine, including International Minerals & Chemical. Dr. Sullivan earned his B.S. in microbiology from Michigan State University in 1975. His graduate studies were at Purdue University, where he earned a M.S. degree in health physics in 1978 and a Ph.D. in toxicology in 1981.

**Robert D. Arbeit, M.D.**, joined us in August 2009 as Vice President, Clinical Development. Prior to joining us, Dr. Arbeit was Vice President, Clinical Development, from July 2007 to July 2009, and Executive Director, Clinical Development, from February 2003 until July 2007, at Paratek Pharmaceuticals, Inc., a pharmaceutical company. Prior to that, from January 2001 to January 2003, he served at Cubist Pharmaceuticals, Inc., a pharmaceutical company, as Executive Medical Director. From 1979 to 2000, Dr. Arbeit held positions with increasing levels of responsibility at the VA Medical Center in Boston, where his last position was Associate Chief of Staff for Research. Dr. Arbeit received his B.A. from Williams College and earned an M.D. at Yale University School of Medicine. He completed a medical residency at Yale-New Haven Hospital, CT and a Clinical Fellowship in Infectious Diseases at Beth Israel Hospital, Boston, MA.

**Youssef El Zein**, a director since 1992, has been the Managing Partner of Pillar Invest Corporation, a Cayman Island company that has founded and is the General Partner of a family of funds, including Pillar Pharmaceuticals I, L.P. and Pillar Pharmaceuticals II, L.P. since 2011. Mr. El Zein has been the chairman and CEO of Pillar Invest (offshore) SAL since 2009. Mr. El Zein has been managing partner of Pillar Investment Limited, a private investment firm, since 1991. Mr. El Zein obtained his Bachelor of Arts in Economics from the American University of Beirut in 1970 and a postgraduate degree in Economics from St Catherine's College, Oxford University in 1973. We believe that Mr. El Zein's qualifications to sit on our board of directors include his knowledge of our industry, his financial experience and significant role in various financings we have conducted recently and during his 20 years of service on our board of directors.

**C. Keith Hartley**, a director since 2000, has been President of Hartley Capital Advisors, a financial consulting firm, since June 2000. Mr. Hartley was Managing Partner of Forum Capital Markets LLC, an investment banking firm, from August 1995 to May 2000. Mr. Hartley also serves as a director of Universal Display Corporation, a publicly traded company that develops organic light emitting diodes for use in flat panel displays and lighting applications. We believe that Mr. Hartley's qualifications to sit on our board of directors include his business and finance background, his investment banking background and knowledge of the capital markets and his relationship with us since 1997 when his investment banking firm led a debt financing for us.

**Robert W. Karr, M.D.**, a director since 2005, has been Managing Member of StartUp Partners International LLC, a consulting firm serving pharmaceutical and biotechnology clients since January 2010. Dr. Karr has served as managing director of Karr Pharm Consulting LLC since January 2008. Dr. Karr served as our President from December 2005 until December 2007. Prior to joining us, Dr. Karr was an independent consultant. From June 2000 through December 2004, Dr. Karr was a senior executive in Global Research & Development for Pfizer, Inc., a pharmaceutical company, where he served as Senior Vice President, Strategic Management from 2003 to 2004 and Vice President, Strategic Management from 2000 to 2003. Prior to its merger with Pfizer, Dr. Karr served as Vice President, Research & Development Strategy for Warner-Lambert Company, a pharmaceutical company. He also

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served on the board of directors of GTX, Inc., a publicly-traded biotechnology company, from 2005 to 2011. We believe that Dr. Karr's qualifications to sit on our board of directors include his broad managerial and scientific experience in the pharmaceutical industry, his understanding of our company given his role as our former President and his continuing role as a director, and his contribution to the board of directors in discussions of our drug discovery programs, clinical development strategy and clinical programs.

**Malcolm MacCoss, Ph.D.**, a director since 2010, founded Bohicket Pharma Consulting LLC in January 2010. In this position, Dr. MacCoss consults for several pharmaceutical companies worldwide on drug discovery issues. Previously, Dr. MacCoss served as the Group Vice President for Chemical Research at the Schering-Plough Research Institute of Schering-Plough Corporation, a pharmaceutical company that is now part of Merck & Co., Inc., from August 2008 to January 2010. In this role he served as the Head of Chemistry at the Schering-Plough Kenilworth, New Jersey site and as the chair of the Schering-Plough Global Chemistry Council, a forum for formulating global chemistry strategies. From 1999 to August 2008, Dr. MacCoss served as Vice President, Basic Chemistry at the Rahway, New Jersey site of Merck Research Laboratories, of Merck & Co., Inc., a pharmaceutical company. He also served as the Vice President of Basic Chemistry and Drug Discovery Sciences, as the Deputy Site-Head of the Rahway site and as the Chairman of the Merck World-Wide Chemistry Council. Dr. MacCoss is a Fellow of the Royal Society of Chemistry, and in 2009 he was admitted into the American Chemical Society Medicinal Chemistry Hall of Fame. In 2010 he received the ACS Division of Medicinal Chemistry National Award. He also serves on the Advisory Committee of the Executive Dean for the School of Arts and Sciences, Rutgers University. We believe that Dr. MacCoss' qualifications to sit on our board of directors include his extensive scientific background, his 20 plus years experience with pharmaceutical companies, and his contribution to the board of directors in discussions of our drug discovery programs, clinical development strategy and clinical programs.

**William S. Reardon, C.P.A.**, a director since 2002, has been lead independent director of our board of directors since September 2010. He was an audit partner at PricewaterhouseCoopers LLP, where he led the Life Science Industry Practice for New England and the Eastern United States from 1986 until his retirement from the firm in July 2002. Mr. Reardon served on the board of the Emerging Companies Section of the Biotechnology Industry Organization from June 1998 to June 2000 and the board of directors of the Massachusetts Biotechnology Council from April 2000 to April 2002. He serves as a director of Synta Pharmaceuticals, Inc., a publicly-traded biopharmaceutical company, and he served as a director of Oscient Pharmaceuticals Corporation, a publicly-traded pharmaceutical company from March 2003 to March 2010. Mr. Reardon has also served as a trustee of closed-end mutual funds H&Q Healthcare Investors and H&Q Life Sciences Investors since April 2010. We believe that Mr. Reardon's qualifications to sit on our board of directors include his accounting and financial experience, including as a partner at a leading accounting firm leading its life science practice, his role in keeping the board of directors and senior management team abreast of current accounting regulations and his experience as a member of several boards of directors of biotechnology companies. Additionally, we value Mr. Reardon's role in leading the Board on matters of corporate governance, both as lead independent director and prior to his appointment to that position.

**Eve E. Slater, M.D.**, a director since 2010, is currently Associate Professor of Clinical Medicine at Columbia University College of Physicians and Surgeons, where she has taught in various positions since 1983. Dr. Slater was Senior Vice President, Worldwide Policy at Pfizer, Inc. from May 2007 until June 2009. Dr. Slater was the Assistant Secretary for Health, United States Department of Health and Human Services from 2002 until 2003, and was the Acting Assistant Secretary for Health from 2001 until her confirmation by the United States Senate in 2002. Dr. Slater held senior management positions at Merck Research laboratories from 1983 to 2001, including Senior Vice President of External Policy, Vice President of Corporate Public Affairs, Senior Vice President of Clinical and Regulatory Development, Executive Director of Biochemistry and Molecular Biology, and Senior Director of Biochemical

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Endocrinology. Dr. Slater was trained in Internal Medicine and Cardiology at Massachusetts General Hospital, is board certified in Internal Medicine and Cardiology and is a Fellow of the American College of Cardiology. We believe that Dr. Slater's qualifications to sit on our board of directors include her extensive scientific and medical background, significant public company board experience, and years of service with pharmaceutical companies and governmental institutions.

**Abdul-Wahab Umari**, a director since November 2012, has been a managing partner of Pillar Investment Limited, a private investment firm, since 2003. Prior to joining Pillar, Mr. Umari was the Founder, Chairman and Chief Executive Officer of Transmog Inc. SAL, a telecommunications company headquartered in Lebanon from 1995 to 2001. From 1989 to 1993, Mr. Umari was a Lead Systems Engineer at Bechtel Power Corporation in Gaithersburg, Maryland. Mr. Umari has been a member of the external advisory board of the American University of Beirut since 2003 and he served on the advisory board of Foundation Henri Cartier-Bresson, a non-profit organization, from 1998 to 2008. Mr. Umari obtained an M.B.A. from New York University's Leonard N. Stern School of Business in 1995. Mr. Umari completed his undergraduate studies in Mechanical Engineering at Boston University in 1990. We believe that Mr. Umari's qualifications to sit on our board of directors include his knowledge of our industry, his financial experience and his role in various financings that we have conducted.

### **Family Relationships**

There are no family relationships among any of our directors or executive officers.

### **Composition of the Board of Directors**

Our board of directors currently consists of eight members. In accordance with the terms of our restated certificate of incorporation and bylaws, our board of directors is divided into three classes, class I, class II and class III, with each class serving staggered three-year terms. Upon the expiration of the term of a class of directors, directors in that class will be eligible to be elected for a new three-year term at the annual meeting of stockholders in the year in which their term expires. The members of the classes are divided as follows:

- Class III: Sudhir Agrawal, Dr. Eve Slater and Youssef El Zein and their term expires at the annual meeting of stockholders to be held in 2013;
- Class I: C. Keith Hartley, William S. Reardon and Abdul-Wahab Umari and their term expires at the annual meeting of stockholders to be held in 2014; and
- Class II: Robert Karr and Malcolm MacCoss and their term expires at the annual meeting of stockholders to be held in 2015.

Our restated certificate of incorporation and amended and restated bylaws provide that the authorized number of directors may be changed only by resolution of the board of directors. Our restated certificate of incorporation and amended and restated bylaws also provide that our directors may be removed only for cause by the affirmative vote of the holders of at least two-thirds of the votes that all our stockholders would be entitled to cast in an annual election of directors, and that any vacancy on our board of directors, including a vacancy resulting from an enlargement of our board of directors, may be filled only by vote of a majority of our directors then in office.

In connection with our Series E preferred stock financing that closed in November 2012, we agreed that, at our 2013 annual meeting of stockholders, we would seek stockholder approval of an amendment to the Company's certificate of incorporation and bylaws to eliminate the classification of our board of directors.

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We have no formal policy regarding board diversity. Our priority in selection of board members is identification of members who will further the interests of our stockholders through his or her established record of professional accomplishment, the ability to contribute positively to the collaborative culture among board members, knowledge of our business and understanding of the competitive landscape.

**Director Independence**

Under applicable Nasdaq rules, a director will only qualify as an “independent director” if, in the opinion of our board of directors, that person does not have a relationship which would interfere with the exercise of independent judgment in carrying out the responsibilities of a director. Our board of directors has determined that Mr. Hartley, Dr. Karr, Dr. MacCoss, Mr. Reardon, Dr. Slater, Mr. Umari and Mr. El Zein and all of the members of each of the audit, compensation and nominating and corporate governance committees are independent as defined under applicable Nasdaq rules including, in the case of all members of the audit committee, the independence requirements contemplated by Rule 10A-3 under the Securities Exchange Act of 1934, as amended.

**Board Committees**

Our board of directors has established three standing committees: audit, compensation and nominating and corporate governance. Each of these committees operates under a charter that has been approved by our board of directors. Our board of directors has also adopted corporate governance guidelines to assist our board in the exercise of its duties and responsibilities.

*Audit Committee*

Our audit committee’s responsibilities include:

- appointing, approving the compensation of, and assessing the independence of our registered public accounting firm;
- overseeing the work of our registered public accounting firm, including through the receipt and consideration of certain reports from such accounting firm;
- reviewing and discussing with management and the registered public accounting firm our annual and quarterly financial statements and related disclosures;
- monitoring our internal control over financial reporting, disclosure controls and procedures and code of business conduct and ethics;
- discussing our risk management policies;
- establishing procedures for the receipt and retention of accounting related complaints and concerns;
- reviewing and approving related party transactions;
- meeting independently with our registered public accounting firm and management; and
- preparing the audit committee report required by SEC rules.

The current members of our audit committee are Mr. Reardon (Chairman), Mr. Hartley and Dr. Karr. Our board of directors has determined that all three members of the audit committee are “audit committee financial experts” within the meaning of SEC rules and regulations.

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### *Compensation Committee*

Our compensation committee's responsibilities include:

- annually reviewing and approving corporate goals and objectives relevant to compensation for our executive officers;
- determining the compensation of our senior executives;
- overseeing the evaluation of our senior executives;
- overseeing and administering our cash and equity incentive plans;
- reviewing and making recommendations to the board of directors with respect to director compensation;
- reviewing and discussing annually with management the compensation discussion and analysis required by the SEC rules; and
- preparing the compensation committee report required by SEC rules.

The current members of our compensation committee are Dr. MacCoss (Chairman), Mr. El Zein, and Dr. Slater.

### *Nominating and Corporate Governance Committee*

Our nominating and corporate governance committee's responsibilities include:

- identifying individuals qualified to become members of our board of directors;
- recommending to our board of directors the persons to be nominated for election as directors or to fill vacancies on our board of directors, and the persons to be appointed to each of the committees of the board of directors;
- reviewing and making recommendations to the board of directors with respect to management succession planning;
- developing and recommending to the board of directors corporate governance principles; and
- overseeing periodic evaluations of the board of directors.

The current members of our nominating and corporate governance committee are Mr. Hartley (Chairman), Mr. El Zein and Mr. Reardon.

### **Compensation Committee Interlocks and Insider Participation**

Our compensation committee currently consists of Mr. El Zein, Dr. MacCoss and Dr. Slater. No member of our compensation committee was at any time during 2012, or was formerly, an officer or employee of ours. No member of our compensation committee engaged in any related person transaction involving our company during 2012 other than Mr. El Zein. See "Certain Relationships and Related Person Transactions" for information about the terms of the transaction we engaged in with affiliates of Mr. El Zein. None of our executive officers has served as a director or member of the compensation committee (or other committee serving the same function as the compensation committee) of any other entity, while an executive officer of that other entity served as a director or member of our compensation committee.

### **Code of Ethics and Code of Conduct**

We have adopted a written code of business conduct and ethics that applies to our principal executive officer, principal financial officer, principal accounting officer or controller, or persons performing



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similar functions. We have posted a current copy of the Code of Business Conduct and Ethics in the “Investors – Corporate Governance” section of our website, which is located at [www.iderapharma.com](http://www.iderapharma.com). We intend to satisfy the disclosure requirements under Item 5.05 of Form 8-K regarding an amendment to, or waiver from, a provision of our code of business conduct and ethics by posting such information on our website at [www.iderapharma.com](http://www.iderapharma.com).

### **Board Leadership Structure**

Our board does not have a policy on whether the offices of chairman of the board and chief executive officer should be separate and, if they are to be separate, whether the chairman of the board should be selected from among the independent directors or should be an employee of the company. Our board believes that it should have the flexibility to make these determinations at any given point in time in the way that it believes best to provide appropriate leadership for our company at that time. The roles of chairman of the board and chief executive officer were held by the same person from August 1991 until February 2000. From February 2000 until September 2010, the positions of chairman of the board of directors and chief executive officer were separate. Since September 2010, the positions of chairman of the board and chief executive officer have both been held by Dr. Agrawal. Concurrent with the appointment of Dr. Agrawal as chairman, Mr. Reardon was appointed as lead independent director.

In September 2010, the nominating and corporate governance committee and the full board discussed whether to appoint a new independent chairman, to unify the chairman and chief executive officer positions and/or to appoint a lead independent director. The committee and the board recognized that the company’s bylaws do not require that our chairman and chief executive officer positions be separate, that no single leadership model is right for all companies and at all times, and that depending on the circumstances, other leadership models, such as a combined chairman and chief executive officer, might be appropriate. The committee and the board also noted that pursuant to our corporate governance guidelines, if the chairman is not an independent director, the board may elect a lead director from its independent directors. In such case, the chairman and chief executive officer would consult periodically with the lead director on board matters and on issues facing our company. In addition, the lead director would serve as the principal liaison between the chairman of the board and the independent directors and would preside at any executive session of independent directors.

The nominating and corporate governance committee recommended, and the board approved, Dr. Agrawal, our chief executive officer, as chairman of the board and Mr. Reardon as lead independent director. The board believes that Dr. Agrawal’s deep knowledge of our industry and our company, his scientific leadership of our company since 1990 and his strategic leadership of the company make him best suited to serve as both chairman and chief executive officer. At the same time, the board believes that the lead independent director function and its committees of independent directors provide the appropriate level of independent oversight. The board also believes that the lead independent director position includes responsibilities similar to those performed by a chairman of the board of directors who is not also the company’s chief executive officer. The board believes that Mr. Reardon, as lead independent director, provides appropriate balance as a corporate governance matter and that the current structure is in the best interest of stockholders at this time.

### **Board’s Role in Risk Oversight**

Our board of directors, as a whole, has responsibility for risk oversight, with reviews of certain areas being conducted by relevant committees that report directly to the board of directors. The oversight responsibility of the board of directors and its committees is enabled by management reporting processes that are designed to provide visibility to the board of directors about the identification, assessment and management of critical risks and management’s risk mitigation strategies. These areas of focus include competitive, economic, operational, financial (accounting, credit, liquidity and tax), legal, regulatory, compliance, health, safety, environmental, political and reputational risks. Our board of directors

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regularly reviews information regarding our strategy, operations, credit and liquidity, as well as the risks associated with each. Our compensation committee is responsible for overseeing risks relating to our executive compensation plans and arrangements. Our audit committee is responsible for overseeing financial risks and risks associated with related party transactions. Our nominating and corporate governance committee is responsible for overseeing risks associated with the independence of the board of directors. While each committee is responsible for evaluating certain risks and overseeing the management of such risks, our entire board of directors is regularly informed through committee reports about such risks.

### Director Compensation

We use a combination of cash and equity-based compensation to attract and retain candidates to serve on our board of directors. We do not compensate directors who are also our employees for their service on our board of directors. As a result, Dr. Agrawal does not receive any compensation for his service on our board of directors, including any compensation he might otherwise receive for his service as chairman of the board of directors. We periodically review our cash and equity-based compensation for non-employee directors.

Under our director compensation program, we pay our non-employee directors retainers in cash. Each director receives a cash retainer for service on the board of directors and for service on each committee on which the director is a member. The chairmen of the board and of each committee receive higher retainers for such service. These fees are payable quarterly in arrears. The fees paid to non-employee directors for service on the board of directors and for service on each committee of the board of directors on which the director is a member are as follows:

	Member Annual Fee	Chairman Annual Fee
Board of Directors	\$ 35,000	\$ —
Audit Committee	\$ 7,000	\$ 15,000
Compensation Committee	\$ 7,000	\$ 15,000
Nomination and Corporate Governance Committee	\$ 3,500	\$ 7,500
Scientific Committee <sup>(1)</sup>	\$ 7,000	\$ 15,000
Service as Lead Director	\$ 17,500	\$ —

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<sup>(1)</sup> This committee was eliminated as of January 1, 2013.

We also reimburse our directors for travel and other related expenses for attendance at meetings.

Our director compensation program includes a stock-for-fees policy, under which directors have the right to elect to receive common stock in lieu of cash fees. These shares of common stock are issued under our 2008 Stock Incentive Plan. The number of shares to be issued to participating directors is determined on a quarterly basis by dividing the cash fees to be paid through the issuance of common stock by the fair market value of our common stock, which is the closing price of our common stock, on the first business day of the quarter following the quarter in which the fees were earned. In 2012, Dr. MacCoss received 1,216 shares of our common stock in lieu of \$1,425 in cash fees. No other director elected to receive common stock in lieu of cash fees during 2012.

Under our director compensation program, upon their initial election to the board of directors, new non-employee directors receive an initial option grant to purchase 30,000 shares, and all non-employee directors receive an annual option grant to purchase 20,000 shares. The annual grants are made on the date of the annual meeting of stockholders.

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These options vest quarterly over three years from the date of grant, subject to continued service as a director, and are granted under our 2008 Stock Incentive Plan. These options are granted with exercise prices equal to the fair market value of our common stock, which is the closing price of our common stock on the date of grant, and become immediately exercisable in full if there is a change in control of our company.

Under our retirement policy for non-employee members of the board, if a non-employee director is deemed to retire, then

- all outstanding options held by such director will automatically vest in full; and
- the period during which such director may exercise the options will be extended to the expiration of the option under the plan.

Under the policy, a member of the board of directors will be deemed to have retired if:

- the director resigns from the board or determines not to stand for re-election and has served as a director for more than 10 years; or
- the director does not stand for re-election or is not nominated for re-election due to the fact that he or she is or will be older than 75 at the end of such director's term.

The following table sets forth a summary of the compensation we paid to our non-employee directors who served on our board in 2012.

**DIRECTOR COMPENSATION FOR 2012**

<u>Name</u>	<u>Fees Earned or Paid in Cash (S)</u>	<u>Option Awards (S)<sup>(1)</sup></u>	<u>Total (S)</u>
Youssef El Zein	\$ 53,500	\$ 9,882	\$ 63,382
C. Keith Hartley	\$ 49,500	\$ 9,882	\$ 59,382
Robert W. Karr	\$ 49,000 <sup>(2)</sup>	\$ 9,882	\$ 58,882
Malcolm MacCoss	\$ 57,000 <sup>(2) (3)</sup>	\$ 9,882	\$ 66,882
William S. Reardon	\$ 71,000	\$ 9,882	\$ 80,882
Eve E. Slater	\$ 49,000 <sup>(2)</sup>	\$ 9,882	\$ 58,882
Abdul-Wahab Umari <sup>(4)</sup>	\$ 8,750	\$ 10,770	\$ 19,520

<sup>(1)</sup> These amounts represent the aggregate grant date fair value of option awards made to each listed director in 2012 as computed in accordance with Financial Accounting Standards Board Accounting Standards Codification Topic 718, "Stock Compensation" (ASC 718). These amounts do not represent the actual amounts paid to or realized by the directors during 2012. See Note 2(j) to the financial statements in this prospectus regarding assumptions we made in determining the fair value of option awards. As of December 31, 2012, our non-employee directors held options to purchase shares of our common stock as follows: Mr. El Zein: 104,752; Mr. Hartley: 107,252; Dr. Karr: 185,375; Dr. MacCoss: 66,000; Mr. Reardon: 107,252; Dr. Slater: 56,000; and Mr. Umari: 30,000.

<sup>(2)</sup> These amounts include cash meeting fees for service on our scientific committee, which was eliminated as of January 1, 2013.

<sup>(3)</sup> Includes cash meeting fees of \$1,425 in lieu of which Dr. MacCoss elected to receive 1,216 shares of our common stock.

<sup>(4)</sup> Mr. Umari joined our board of directors in November 2012.

## EXECUTIVE COMPENSATION

### Compensation Discussion and Analysis

#### *Executive Summary*

The compensation committee of our board of directors is responsible for establishing compensation policies with respect to our executive officers, including our chief executive officer and our other executive officers who are listed in the Summary Compensation table below and who we refer to as “named executive officers.” Our compensation committee makes compensation decisions relating to our executive officers after consultation with our board of directors.

This section discusses the principles underlying our executive compensation policies and decisions and the most important factors relevant to an analysis of these policies and decisions. It provides qualitative information regarding the manner and context in which compensation is awarded to and earned by our named executive officers. As further discussed in this section, our compensation and benefit programs help us attract, retain and motivate individuals who will maximize our business results by working to meet or exceed established company or individual objectives. In addition, we reward our executive officers for meeting certain developmental milestones, such as completing advancements in product candidate development, strategic partnerships or other financial transactions that add to our capital resources or create value for stockholders. We also decline to increase salaries, make bonus awards or issue equity compensation in the event that the company’s performance falls below expectations or developmental milestones are not met.

#### *Compensation Philosophy and Objectives*

The compensation committee seeks to achieve the following broad goals in connection with our executive compensation programs and decisions regarding individual compensation:

- attract, retain and motivate the best possible executive talent;
- ensure executive compensation is aligned with our corporate strategies and business objectives, including our short-term operating goals and longer-term strategic objectives;
- promote the achievement of key strategic and financial performance measures by linking short- and long-term cash and equity incentives to the achievement of measurable corporate and individual performance goals; and
- align executives’ incentives with the creation of stockholder value.

To achieve these objectives, the compensation committee evaluates our executive compensation program with the goal of setting compensation at levels the committee believes are competitive with those of other companies in our industry and our region that compete with us for executive talent. In addition, our executive compensation program ties a substantial portion of each executive officer’s overall compensation to key strategic, financial, research and operational goals such as clinical trial and regulatory progress, intellectual property portfolio development, establishment and maintenance of key strategic relationships and exploration of business development opportunities, as well as our financial and operational performance. We also provide a portion of our executive compensation in the form of stock options or other stock awards that vest over time from the time of the grant of the option awards and from the time of achievement of performance milestones, which we believe helps to retain our executives and align their interests with those of our stockholders by allowing them to participate in the longer term success of our company as reflected in stock price appreciation.

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During 2011 and 2012, our compensation committee engaged Radford Surveys + Consulting, or Radford, to provide advice and recommendations regarding the amount and form of executive compensation, equity incentive programs and compensation generally. Radford did not provide any services to our company during 2011 or 2012 other than pursuant to its engagement by the compensation committee.

As part of its engagement in November 2010, Radford provided data on executive compensation from a peer group of publicly traded companies developed by the committee with Radford in November 2010. The committee selected these companies at that time in the belief that these companies had business life cycles, growth profiles, market capitalizations, products, research and development investment levels and number/capabilities of employees that were then comparable to ours. In working with Radford to develop the peer group, the committee and Radford generally targeted companies ranging from one-third to three times Idera Pharmaceuticals' size in terms of number of employees and market capitalization, with lead drug candidates typically in Phase 2 or Phase 3. The companies included in the peer group were:

Achillion Pharmaceuticals, Inc.	Anadys Pharmaceuticals, Inc.	ARIAD Pharmaceuticals, Inc.
ArQule, Inc.	AVI BioPharma, Inc.	BioCryst Pharmaceuticals, Inc.
Celldex Therapeutics, Inc.	Cyclacel Pharmaceuticals, Inc.	Cytokinetics, Incorporated
CytRx Corp.	Dynavax Technologies Corp.	GenVec, Inc.
Infinity Pharmaceuticals, Inc.	Micromet, Inc.	Myrexix, Inc.
Novavax, Inc.	Peregrine Pharmaceuticals, Inc.	Sangamo BioSciences, Inc.
Synta Pharmaceuticals Corp.		

In November 2010, Radford also provided compensation survey data from the Radford Global Life Science Survey, a survey of U.S. biotech companies. Our compensation committee reviews a blend of the peer group and survey data in its determinations regarding executive compensation. We refer to this blended data as the "market compensation data."

Our compensation committee considered this blended data in December 2010 in connection with the establishment of base salaries for our named executive officers in 2011 and in December 2011 in connection with its determination of option grants for our named executive officers in December 2011 and January 2012.

Our compensation committee intends that if the company achieves its goals and the executive performs at the level expected, then the executive should have the opportunity to receive compensation that is competitive with industry norms. Accordingly, our compensation committee generally targets overall compensation for executives towards the 50th percentile of the market compensation data. However, the compensation committee from time to time targets a different percentile for individual elements of compensation or specific individuals based on experience, performance levels and potential performance levels of the executive and changes in duties and responsibilities.

In order to accomplish its objectives consistent with its philosophy for executive compensation, our compensation committee typically takes the following actions annually:

- reviews executive officer performance;
- reviews all components of executive officer compensation, including base salary, cash bonuses, equity compensation, the dollar value to the executive and cost to us of all health and life insurance and other employee benefits and the estimated payout obligations under severance and change in control scenarios;

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- seeks input from our chief executive officer on the performance of all other executive officers;
- consults with an independent compensation consultant;
- holds executive sessions (without our management present);
- reviews information regarding the performance and executive compensation of other companies; and
- reviews all of the foregoing with the board of directors.

Under our annual performance review program for our executives, annual performance goals are determined for our company as a whole and for each executive individually. Annual corporate goals are proposed by management and approved by the compensation committee. These corporate goals target the achievement of specific research, clinical, operational and financial milestones.

Annual individual goals focus on contributions that facilitate the achievement of the corporate goals and are closely aligned with the corporate goals. Individual goals are proposed by each executive and approved by the chief executive officer. Typically, the compensation committee sets the chief executive officer's goals and reviews and discusses with the chief executive officer the goals for all other executive officers. The individual performance goals of each named executive officer consist primarily of the key objectives and goals from our annual business plan that relate to the functional area for which the named executive officer is responsible. The individual performance goals for the chief executive officer are largely coextensive with the corporate goals.

Generally, at the end of each year, the compensation committee evaluates corporate and individual performance. The compensation committee considers the achievement of the corporate goals and individual performance as factors in determining annual salary increases, annual bonuses and annual stock option awards granted to our executives, although because of their high level of responsibility within our company, the determination of annual bonuses for our executive officers, including our named executive officers, is heavily weighted on our corporate performance. In assessing corporate performance, the committee evaluates corporate performance alongside the approved corporate goals for the year and also evaluates other aspects of corporate performance, including achievements and progress made by the company outside of the corporate goals. In assessing individual performance, the compensation committee evaluates corporate performance in the areas of each officer's responsibility and relies on the chief executive officer's evaluation of each officer. The chief executive officer prepares evaluations of the other executives and in doing so compares individual performance to the individual performance goals. The chief executive officer recommends annual executive salary increases, annual stock option awards and bonuses, if any, which are then reviewed and approved by the compensation committee. In the case of the chief executive officer, the compensation committee conducts his individual performance evaluation. During this process, the compensation committee consults with its compensation consultant and, prior to approving compensation for executive officers, consults with the board of directors.

For all executives, annual base salary increases, if any, are implemented during the first calendar quarter of the year. Annual stock option awards and bonuses, if any, are granted as determined by the compensation committee, typically in the fourth quarter of the applicable year.

The compensation committee does not plan to approve annual equity grants to employees, including named executive officers, at a time when our company is in possession of material non-public information. We do not award stock options to named executive officers concurrently with the release of material non-public information.

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In light of continued uncertainties with respect to our clinical development plan, results of our ongoing clinical trials and our financial condition, in November 2012 the compensation committee determined not to conduct the compensation and performance review for our named executive officers that it generally conducts at the end of the year. Instead, the compensation committee agreed to defer such review until the results of our phase 2 clinical trial of IMO-3100 and our phase 1 clinical trial of IMO-8400 were known and we had sought and obtained additional financing.

*Elements of Executive Compensation*

The compensation program for our executives generally consists of five elements based upon the foregoing objectives:

- base salary;
- annual cash bonuses;
- stock option awards;
- health care and life insurance and other employee benefits; and
- severance and change in control benefits.

The value of our variable, performance-based compensation is split between short-term compensation in the form of a cash bonus and long-term compensation in the form of stock option awards that vest over time from the time of the grant of the option awards and from the time of achievement of performance milestones. The annual cash bonus is intended to provide an incentive to our executives to achieve near-term operational objectives. The stock option awards provide an incentive for our executives to achieve longer-term strategic business goals, which should lead to higher stock prices and increased stockholder value. We have not had any formal or informal policy or target for allocating compensation between long-term and short-term compensation, between cash and non-cash compensation or among the different forms of non-cash compensation. Instead, the compensation committee, after reviewing industry information and our cash resources, determines subjectively what it believes to be the appropriate level and mix of the various compensation components.

We do not have any defined benefit pension plans or any non-qualified deferred compensation plans.

We entered into a multi-year employment agreement with our chief executive officer, Dr. Agrawal, in October 2005, which was amended in 2008 to ensure compliance with Section 409A of the Internal Revenue Code of 1986, as amended. In August 2011, we entered into an amendment to our employment offer letter with our senior vice president of operations and chief financial officer, Mr. Arcudi, and in December 2011, we entered into an amended and restated employment letter with Mr. Arcudi. These agreements are described below under the caption "Agreements with our Named Executive Officers."

*Base Salary*

In establishing base salaries for our executive officers, our compensation committee typically reviews the market compensation data presented by Radford, considers historic salary levels of the executive officer and the nature of the executive officer's responsibilities, compares the executive officer's base salary with those of our other executives and considers the executive officer's performance. The compensation committee also typically considers the challenges involved in hiring and retaining managerial personnel and scientific personnel with extensive experience in the chemistry of DNA and RNA and its application to toll-like receptors because of the new nature of this technology, general economic conditions and our financial condition. In assessing the executive officer's performance, the compensation committee considers the executive officer's role in the achievement of the annual corporate goals, as well as the performance evaluation prepared by our chief executive officer with respect to such executive officer. The compensation

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committee considers such evaluation as a means of informing the committee's decision as to whether the executive officer's performance was generally consistent with the company's expectations.

In November 2011, the compensation committee set base salaries for 2012. In light of setbacks during 2011 regarding our research and development programs, our board's adoption of new strategic goals for the company in September 2011 and our cash resources, the committee determined that annual base salaries for the named executive officers would not be increased for 2012 and would remain at 2011 levels, except that Mr. Arcudi's base salary was increased by \$5,000 as a result of his appointment in April 2011 as our senior vice president of operations. As a result of its deferral of its annual compensation and performance review, the compensation committee has not made any determinations with respect to base salaries for 2013.

### *Cash Bonuses*

The compensation committee generally structures cash bonuses by linking them to the achievement of the annual corporate goals, corporate performance outside of the corporate goals and individual performance. The amount of the bonus paid, if any, varies among the executive officers depending on individual performance and their contribution to the achievement of our annual corporate goals and corporate performance generally. The compensation committee reviews and assesses corporate goals and individual performance by executive officers and considers the reasons why specific goals have been achieved or have not been achieved. While achievement against the applicable corporate goals is given substantial weight in connection with the determination of annual bonus, consideration is also given to an evaluation of our named executive officers' individual performance based on analysis of achievement of individual performance goals as well as the following subjective criteria:

- leadership,
- management,
- judgment and decision making skills,
- results orientation and
- communication.

No formula is applied to the analysis of the achievement of corporate goals or individual goals by executive officers for purposes of the committee's determination of annual cash bonuses.

The compensation committee did not set performance goals for 2012 given the fluidity of our business plans and in light of the uncertainties with respect to our clinical development plan, results of our ongoing clinical trials and our financial condition. Instead, the compensation committee decided it would assess individual and corporate achievements as part of its annual compensation and performance review at the end of 2012. As a result of its deferral of its annual compensation and performance review, the compensation committee has not made any determination with respect to 2012 cash bonuses for our named executive officers.

### *Equity Compensation*

Our equity award program is the primary vehicle for offering long-term incentives to our executive officers, including our named executive officers. We believe that equity awards provide our executives with a strong link to our long-term performance, create an ownership culture and help to align the interest of our named executive officers and our stockholders. Equity grants are intended as both a reward for contributing to the long-term success of our company and an incentive for future performance. The vesting feature of our equity awards is intended to further our goal of executive retention by providing an incentive to our named executive officers to remain in our employ during the



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vesting period. In determining the size of equity awards to our executives, our compensation committee considers the achievement of our annual corporate goals, individual performance, the applicable executive officer's previous awards, including the exercise price of such previous awards, the recommendations of management and the market compensation data presented by Radford.

Our equity awards have typically taken the form of stock options. However, under the terms of our stock incentive plan, we may grant equity awards other than stock options, such as restricted stock awards, stock appreciation rights and restricted stock units.

The compensation committee approves all equity awards to our executive officers. The compensation committee reviews all components of the executive officer's compensation when determining annual equity awards to ensure that an executive officer's total compensation conforms to our overall philosophy and objectives.

The compensation committee typically makes initial stock option awards to new executive officers upon commencement of their employment and annual stock option awards thereafter. Equity awards to our named executive officers are typically granted annually in conjunction with the annual performance review. This review typically occurs at the regularly scheduled meeting of the compensation committee held in the fourth quarter of each year. In general, our option awards vest over four years in 16 equal quarterly installments. The exercise price of stock options equals the fair market value of our common stock on the date of grant, which is typically equal to the closing price of our common stock on Nasdaq on the date of grant.

In November 2011, the compensation committee granted annual option awards to our named executive officers, effective December 5, 2011. In light of setbacks during 2011 regarding our research and development programs and our board's adoption of new strategic goals in September 2011, as well as the committee's determination not to increase salaries for 2012 or grant bonuses for 2011 to our named executive officers, the committee structured these options to retain our named executive officers and to align the interests of our executive officers with the interests of our stockholders in the value creation that could arise beginning in 2012 from the achievement of our new strategic goals. As a result, the committee increased the size of the annual option awards, specifically targeting the 75th percentile of the market compensation data, and linked a portion of the vesting of the option awards to the achievement of specified milestones with the option awards having the following time based vesting and performance vesting components:

- 25% of the shares subject to the option become exercisable over four years in 16 equal quarterly installments with the first installment vesting February 28, 2012;
- 25% of the shares subject to the option become exercisable on November 28, 2012;
- 50% of the shares subject to the option become exercisable upon the achievement of specified performance milestones with 25% of the number of shares corresponding to a particular performance milestone vesting upon achievement of the performance milestone and the balance of such shares vesting in three equal installments on the first, second and third anniversaries of the achievement of such milestone; and
- 100% of the unexercisable shares subject to the option become exercisable if, upon or within 12 months after a change in control of the company, the named executive officer's employment is terminated by us without cause or the named executive officer terminates his employment for good reason.

The compensation committee adopted this vesting structure in order to address the following components of incentive compensation:

- our typical annual long-term incentive grant, vesting quarterly over four years;

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- a short-term retention grant, vesting in full upon the first anniversary of the grant, which the committee adopted based on the need for executive retention and in recognition that our officers had not received salary increases for 2012 or cash bonuses for 2011; and
- a performance grant, vesting based on the achievement of specified performance milestones modeled on our strategic goals adopted by our board in September 2011.

The performance-based portion of the option awards was tied to nine specified performance milestones. These milestones relate to clinical trials and regulatory processes for our lead compounds, business development transactions and corporate financing. Each milestone must be achieved by a specified date ranging from March 31, 2012 to June 30, 2013 in order to be achieved. The committee designed these milestones to be challenging milestones that the committee believed could be reasonably achieved within the specified timing. Each milestone was weighted and assigned a percentage by the committee such that the achievement of a particular milestone will result in the commencement of vesting of that percentage of the shares subject to the performance-based portion of the option. The total weighting of the milestones equals 125% with the effect that a named executive officer can vest with respect to all of the shares subject to the performance-based portion of the option even if one or more milestones are not achieved. However, even if milestones with aggregate weighting of more than 100% are achieved, the named executive officer will not be entitled to more than 100% of the shares subject to the performance-based portion of the option.

In determining the size of the option awards, the compensation committee reviewed the market compensation data presented by Radford regarding annual option grants on the basis of percentage ownership (as opposed to market value), specifically targeting the 75th percentile of the market compensation data. The committee also considered corporate and individual performance during 2011, the value of options then held by executive officers and our chief executive officer's recommendations with respect to the awards to be made to the other executive officers. On this basis, the committee granted options to each of our named executive officer, effective December 2011, including an option to Dr. Agrawal to purchase 500,000 shares. In addition to these options, the committee granted Dr. Agrawal a similar performance option in January 2012 to purchase 35,000 shares on the same terms.

As a result of its deferral of its annual compensation and performance review, the compensation committee has not made any determination with respect to annual options awards or other equity awards for 2012.

### *Benefits and Other Compensation*

We maintain broad-based benefits that are provided to all employees, including health and dental insurance, life and disability insurance and a 401(k) plan. During 2012, consistent with our prior practice, we matched 50% of the employee contributions to our 401(k) plan up to a maximum of 6% of the participating employee's annual salary, resulting in a maximum company match of 3% of the participating employee's annual salary, and subject to certain additional statutory dollar limitations. Named executive officers are eligible to participate in all of our employee benefit plans, in each case on the same basis as other employees and subject to any limitations in such plans. Each of our named executive officers contributed to our 401(k) plan and their contributions were matched by us.

Our board of directors has adopted a retirement policy to address the treatment of options in the event of an employee's retirement that applies to all employees, including all officers. For purposes of this policy, an employee will be deemed to have retired if the employee terminates his or her employment with us, has been an employee of ours for more than 10 years and is older than 65 upon termination of employment. Under the policy, if an employee retires, then

- all outstanding options held by the employee will automatically vest in full; and

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- the period during which the employee may exercise the options will be extended to the expiration of the term of the option under the plan.

Our board adopted this policy for our employees in recognition of the importance of stock options to the compensation of employees and in order that our employees get the full benefit of the options held by them if he or she retires after making 10 years of contributions to the company.

We occasionally pay relocation expenses for newly hired executive officers who we require to relocate as a condition to their employment by us. We also occasionally pay local housing expenses and travel costs for executives who maintain a primary residence outside of a reasonable daily commuting range to our headquarters. We believe that these are typical benefits offered by comparable companies to executives who are asked to relocate and that we would be at a competitive disadvantage in trying to attract executives who would need to relocate in order to work for us if we did not offer such assistance. In 2012, Dr. Sullivan received reimbursement for local housing expenses because Dr. Sullivan maintains a primary residence outside of a reasonable daily commuting range to our headquarters.

Our named executive officers also may participate in our employee stock purchase plan, which is generally available to all employees who work over 20 hours per week, including our executive officers so long as they own less than 5% of our common stock, including for this purpose vested and unvested stock options. Due to his stock ownership, Dr. Agrawal is not eligible to participate in the employee stock purchase plan. None of our named executive officers participated in the employee stock purchase plan during 2012.

*Severance and Change-in-Control Benefits*

We currently have an employment agreement with Dr. Agrawal and an employment letter agreement with Mr. Arcudi under which we agreed to provide benefits in the event of the termination of their employment under specified circumstances. We have provided more detailed information about these benefits, along with estimates of their value under various circumstances, under the captions "Agreements with our Named Executive Officers" and "Potential Payments Upon Termination or Change in Control" below.

In December 2011, we entered into an amended and restated employment letter with Mr. Arcudi. In connection with this amendment and restatement, we increased the period of time following termination of employment for which he is entitled to receive severance and healthcare, disability and life insurance benefits from three months to 12 months in connection with a termination by us without cause at any time, and provided severance and healthcare, disability and life insurance benefits for 12 months in connection with termination by Mr. Arcudi for good reason upon or within 12 months after a change of control. The committee agreed to these provisions based in part on market compensation data from Radford.

We believe providing severance and/or change-in-control benefits as a component of our compensation structure that can help us compete for executive talent and attract and retain highly talented executive officers whose contributions are critical to our long-term success. After reviewing the practices of companies in general industry surveys provided by our independent compensation consultant, we believe that our severance and change-in-control benefits are appropriate.

*Deductibility of Executive Compensation/Internal Revenue Code Section 162(m)*

Section 162(m) of the Internal Revenue Code generally disallows a tax deduction to public companies for certain compensation in excess of \$1 million per person paid to our chief executive officer and the three other officers (other than our chief executive officer and chief financial officer) whose compensation is required to be disclosed under the Securities Exchange Act of 1934, as amended by reason of being among our three other most highly compensated officers. Certain compensation, including qualified

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performance-based compensation, will not be subject to the deduction limit if specified requirements are met. The compensation committee reserves the right to use its judgment to authorize compensation payments that may be subject to the limit when the compensation committee believes such payments are appropriate and in the best interests of our company and our stockholders. There can be no assurance that compensation attributable to awards granted under our plans will be treated as qualified performance-based compensation under Section 162(m).

**Agreements with our Named Executive Officers**

We have entered into agreements with certain of our named executive officers, as discussed below, that provide benefits to the executives upon their termination of employment in certain circumstances or under which we have agreed to specific compensation elements. Other than as discussed below, our named executive officers do not have employment agreements with us, other than standard employee confidentiality agreements, and are at-will employees.

*Sudhir Agrawal, D. Phil.*

We are a party to an employment agreement, as amended, with Dr. Agrawal, our chairman, president and chief executive officer. The agreement had an initial three-year term that is automatically extended for an additional year on October 19th of each year during the term of the agreement unless either party provides prior written notice to the other that the term of the agreement is not to be extended. As a result, on each October 19th, the term of the agreement, as extended will be three years. On October 19, 2012, the term was extended from October 19, 2014 to October 19, 2015.

Under the agreement, Dr. Agrawal is currently entitled to receive an annual base salary of \$549,000 or such higher amount as our compensation committee or our board of directors may determine. In addition, under the agreement, Dr. Agrawal is eligible to receive an annual bonus in an amount equal to between 20% and 70% of his base salary, as determined by the compensation committee or our board of directors.

If we terminate Dr. Agrawal's employment without cause or if he terminates his employment for good reason, as such terms are defined in the agreement, we have agreed to:

- continue to pay Dr. Agrawal his base salary as severance for a period ending on the earlier of the final day of the term of the agreement in effect immediately prior to such termination and the second anniversary of his termination date;
- pay Dr. Agrawal a lump sum cash payment equal to the pro rata portion of the annual bonus that he earned in the year preceding the year in which his termination occurs;
- continue to provide Dr. Agrawal with healthcare, disability and life insurance benefits for a period ending on the earlier of the final day of the term of the agreement in effect immediately prior to the termination date and the second anniversary of the termination date, except to the extent another employer provides Dr. Agrawal with comparable benefits;
- accelerate the vesting of any stock options or other equity incentive awards previously granted to Dr. Agrawal as of the termination date to the extent such options or equity incentive awards would have vested had he continued to be an employee until the final day of the term of the agreement in effect immediately prior to such termination; and
- permit Dr. Agrawal to exercise any vested stock options until the second anniversary of the termination date.

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If Dr. Agrawal's employment is terminated by him for good reason or by us without cause in connection with, or within one year after, a change in control, we have agreed to provide Dr. Agrawal with all of the items listed above, except that in lieu of the severance amount described above, we will pay Dr. Agrawal a lump sum cash payment equal to his base salary multiplied by the lesser of the aggregate number of years or portion thereof remaining in his employment term and two years. We have also agreed that if we execute an agreement that provides for our company to be acquired or liquidated, or otherwise upon a change in control, all unvested stock options held by Dr. Agrawal will vest in full.

If required by Section 409A of the Internal Revenue Code, the payments we are required to make to Dr. Agrawal for the first six months following termination of his employment under his agreement will be made as a lump sum on the date that is six months and one day following such termination.

Our employment agreement with Dr. Agrawal provides that if all or a portion of the payments made under the agreement are subject to the excise tax imposed by Section 4999 of the Code, or a similar state tax or assessment, we will pay him an amount necessary to place him in the same after-tax position as he would have been had no excise tax or assessment been imposed. Any amounts paid pursuant to the preceding sentence will also be increased to the extent necessary to pay income and excise tax on those additional amounts.

In the event of Dr. Agrawal's death or the termination of his employment due to disability, we have agreed to pay Dr. Agrawal or his beneficiary a lump sum cash payment equal to the pro rata portion of the annual bonus that he earned in the year preceding his death or termination due to disability. Additionally, any stock options or other equity incentive awards previously granted to Dr. Agrawal and held by him on the date of his death or termination due to disability will vest as of such date to the extent such options or equity incentive awards would have vested had he continued to be an employee until the final day of the term of the employment agreement in effect immediately prior to his death or termination due to disability. Dr. Agrawal or his beneficiary will be permitted to exercise such stock options until the second anniversary of his death or termination of employment due to disability.

Dr. Agrawal has agreed that during his employment with us and for a one-year period thereafter, he will not hire or attempt to hire any of our employees or compete with us.

*Louis J. Arcudi, III*

We are a party to an employment letter with Mr. Arcudi, our Senior Vice President of Operations, Chief Financial Officer, Treasurer and Secretary. If we terminate Mr. Arcudi's employment without cause at any time, or if he terminates his employment for good reason upon a change in control or within one year after a change of control, as such terms are defined in the agreement, we have agreed to:

- continue to pay Mr. Arcudi his base salary as severance for twelve months following such termination payable in accordance with our then current payroll practices; and
- continue to provide Mr. Arcudi with healthcare, disability and life insurance benefits for twelve months following such termination, except to the extent another employer provides Mr. Arcudi with comparable benefits.

Our agreement to pay severance and benefits is subject to Mr. Arcudi's entering into a separation and release agreement.

If required by Section 409A of the Internal Revenue Code, the payments we are required to make to Mr. Arcudi in the first six months following the termination of his employment under his agreement will be made as a lump sum on the date that is six months and one day following such termination.

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**Summary Compensation Table**

The table below summarizes compensation paid to or earned by our named executive officers. Our named executive officers have no stock awards, defined benefit pension or non-qualified compensation to report for 2012, 2011 and 2010.

**Summary Compensation Table for Fiscal Year 2012**

<u>Name and Principal Position</u>	<u>Year</u>	<u>Salary (\$)</u>	<u>Option Awards (\$)<sup>(1)</sup></u>	<u>Non-Equity Plan Compensation<sup>(2)</sup></u>	<u>All Other Compensation (\$)<sup>(3)</sup></u>	<u>Total (\$)</u>
Sudhir Agrawal, D. Phil., Chairman, President and Chief Executive Officer	2012	\$ 549,000	\$ 24,019	—	\$ 75,447	\$ 648,466
	2011	\$ 549,000	\$ 334,500	—	\$ 30,606	\$ 914,156
	2010	\$ 530,000	\$ 362,795	\$ 260,000	\$ 29,710	\$ 1,182,505
Louis J. Arcudi, III Senior Vice President of Operations, Chief Financial Officer, Treasurer and Secretary	2012	\$ 315,000	—	—	\$ 43,523	\$ 358,523
	2011	\$ 310,000	\$ 133,820	—	\$ 30,135	\$ 473,955
	2010	\$ 290,000	\$ 148,476	\$ 55,000	\$ 29,092	\$ 522,568
Timothy M. Sullivan, Ph. D. Vice President, Development Programs and Alliance Management	2012	\$ 299,000	—	—	\$ 49,877	\$ 348,877
	2011	\$ 299,000	\$ 100,365	—	\$ 46,978	\$ 446,343
	2010	\$ 289,120	\$ 113,247	\$ 51,000	\$ 45,893	\$ 499,260
Robert D. Arbeit, M.D. Vice President, Clinical Development	2012	\$ 300,000	—	—	\$ 11,968	\$ 311,968
	2011	\$ 300,000	\$ 100,365	—	\$ 11,913	\$ 412,278
	2010	\$ 290,100	\$ 112,634	\$ 51,000	\$ 11,766	\$ 465,500

<sup>(1)</sup> Represents the aggregate grant date fair value of options granted to each of the named executive officers as computed in accordance with ASC 718. These amounts do not represent the actual amounts paid to or realized by the named executive officers. See Note 2(j) to the financial statements in this prospectus regarding assumptions we made in determining the fair value of option awards.

<sup>(2)</sup> Represents bonuses paid under our cash bonus program based upon the achievement of corporate goals and the specified bonus target for each named executive officer.

<sup>(3)</sup> "All Other Compensation" for 2012 for each of the named executive officers includes the following:

	<u>Dr. Agrawal</u>	<u>Mr. Arcudi</u>	<u>Dr. Sullivan</u>	<u>Dr. Arbeit</u>
Premiums paid by us for all insurance plans	\$ 22,681	\$ 22,192	\$ 25,440	\$ 4,468
Company match on 401(k)	\$ 7,500	\$ 7,500	\$ 7,500	\$ 7,500
Reimbursement for housing expenses	—	—	\$ 16,937	—
Unused vacation accrual	\$ 45,266	\$ 13,831	—	—

See "Compensation Discussion and Analysis" above for a discussion of annual cash bonuses and the amount of salary and bonus in proportion to total compensation.

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**Grants of Plan-Based Awards**

The following table sets forth information regarding stock options granted to Dr. Agrawal during 2012. There were no other stock options and no non-equity incentive plan awards granted during 2012.

**Grants of Plan-Based Awards for Fiscal Year 2012**

<u>Name</u>	<u>Grant Date</u>	<u>All Other Option Awards: Number of Securities Underlying Options (#)<sup>(1)</sup></u>	<u>Exercise or Base Price of Option Awards (\$/Sh)</u>	<u>Grant Date Fair Value of Option Awards (\$)<sup>(2)</sup></u>
Sudhir Agrawal, D. Phil.	1/3/2012	35,000	1.16	\$ 24,019
Louis J. Arcudi, III	—	—	—	—
Timothy M. Sullivan, Ph.D.	—	—	—	—
Robert D. Arbeit, M.D.	—	—	—	—

<sup>(1)</sup> The stock options granted to each of the named executive officers listed above were granted pursuant to our 2008 Stock Incentive Plan. The term of these options is ten years. The stock options vest based on a combination of performance based vesting and time based vesting. See “Compensation Discussion and Analysis – Elements of Compensation – Equity Compensation” for a full description of the vesting terms for these options. See “Agreements with our Named Executive Officers” for further information about acceleration of vesting of Dr. Agrawal’s options in the event of the termination of his employment and/or a change of control.

<sup>(2)</sup> Represents the aggregate grant date fair value of option awards made to named executive officers in 2012 as computed in accordance with ASC 718. These amounts do not represent the actual amounts paid to or realized by the named executive officers during 2012. See Note 2(j) to the financial statements in this prospectus regarding assumptions we made in determining the fair value of option awards.

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**Outstanding Equity Awards At Fiscal Year-End**

The following table sets forth information regarding the outstanding stock options held by our named executive officers as of December 31, 2012. None of our named executive officers held shares of unvested restricted stock as of December 31, 2012.

**Outstanding Equity Awards At Fiscal Year-End for 2012**

<u>Name</u>	<u>Number of Securities Underlying Unexercised Options (#) Exercisable</u>	<u>Number of Securities Underlying Unexercised Options (#) Unexercisable</u>	<u>Option Exercise Price (\$)</u>	<u>Option Expiration Date</u>
Sudhir Agrawal, D. Phil. <sup>(1)</sup>	31,250	—	\$ 4.16	11/30/2014
	125,000	—	\$ 4.48	5/12/2015
	50,000	—	\$ 5.76	6/1/2015
	37,500	—	\$ 4.24	12/15/2015
	125,000	—	\$ 5.10	12/14/2016
	62,500	—	\$ 7.05	6/25/2017
	125,000	—	\$ 13.28	1/2/2018
	200,000	—	\$ 8.70	12/16/2018
	225,000 <sup>(2)</sup>	75,000 <sup>(2)</sup>	\$ 5.24	12/23/2019
	115,500 <sup>(3)</sup>	115,500 <sup>(3)</sup>	\$ 2.74	12/27/2020
184,999 <sup>(4)</sup>	253,751 <sup>(4)</sup>	\$ 1.157	11/28/2021	
	12,950 <sup>(4)</sup>	17,764 <sup>(4)</sup>	\$ 1.16	11/28/2021
Louis J. Arcudi, III	80,000	—	\$ 12.25	12/3/2017
	40,000	—	\$ 8.70	12/16/2018
	82,500 <sup>(2)</sup>	27,500 <sup>(2)</sup>	\$ 5.24	12/23/2019
	47,500 <sup>(3)</sup>	47,500 <sup>(3)</sup>	\$ 2.74	12/27/2020
	74,000 <sup>(4)</sup>	101,500 <sup>(4)</sup>	\$ 1.157	11/28/2021
Timothy M. Sullivan, Ph.D.	5,625	—	\$ 8.96	12/16/2013
	58,750	—	\$ 4.16	11/30/2014
	12,500	—	\$ 4.24	12/15/2015
	20,000	—	\$ 5.10	12/14/2016
	25,000	—	\$ 13.28	1/2/2018
	35,000	—	\$ 8.70	12/16/2018
	52,500 <sup>(2)</sup>	17,500 <sup>(2)</sup>	\$ 5.24	12/23/2019
	36,250 <sup>(3)</sup>	36,250 <sup>(3)</sup>	\$ 2.74	12/27/2020
55,499 <sup>(4)</sup>	76,126 <sup>(4)</sup>	\$ 1.157	11/28/2021	
Robert D. Arbeit, M.D.	32,500 <sup>(5)</sup>	7,500 <sup>(5)</sup>	\$ 6.43	8/3/2019
	12,750 <sup>(2)</sup>	4,250 <sup>(2)</sup>	\$ 5.24	12/23/2019
	36,250 <sup>(3)</sup>	36,250 <sup>(3)</sup>	\$ 2.74	12/27/2020
	55,499 <sup>(4)</sup>	76,126 <sup>(4)</sup>	\$ 1.157	11/28/2021

<sup>(1)</sup> See "Agreements with our Named Executive Officers" for further information about acceleration of vesting of Dr. Agrawal's options in the event of the termination of his employment and/or a change of control.

<sup>(2)</sup> 6.25% of the shares subject to this option vest quarterly from the date of grant until December 23, 2013 when all shares will be vested. The total number of shares subject to the option equals the sum of the figures in the exercisable and unexercisable columns.

<sup>(3)</sup> 6.25% of the shares subject to this option vest quarterly from the date of grant until December 27, 2014 when all shares will be vested. The total number of shares subject to the option equals the sum of the figures in the exercisable and unexercisable columns.

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(4) The shares subject to this option vest as follows:

- 25% of the shares vest over four years in 16 equal quarterly installments with the first installment vesting February 28, 2012;
- 25% of the shares vested on November 28, 2012;
- 50% of the shares vest upon the achievement of specified performance milestones with 25% of the number of shares corresponding to a particular performance milestone vesting upon achievement of the performance milestone and the balance of such shares vesting in three equal installments on the first, second and third anniversaries of the achievement of such milestone; and
- 100% of the unexercisable shares subject to the option vest if, upon or within 12 months after a change in control of the company, the named executive officer's employment is terminated by us without cause or the named executive officer terminates his employment for good reason.

(5) 6.25% of the shares subject to this option vest quarterly from the date of grant until August 3, 2013 when all shares will be vested. The total number of shares subject to the option equals the sum of the figures in the exercisable and unexercisable columns.

### **Option Exercises and Stock Vested**

None of our named executive officers exercised any options during the year ended December 31, 2012.

### **Potential Payments under Termination or Change in Control**

We have an employment agreement with Dr. Agrawal that provides for severance benefits and acceleration of vesting of equity awards following a termination of his employment with our company. Additionally, Mr. Arcudi's employment offer letter provides for severance benefits in certain circumstances. These agreements are described above under the caption "Agreements with our Named Executive Officers." Neither Dr. Sullivan nor Dr. Arbeit is entitled to any severance benefits following a termination of his employment with our company. Each of our named executive officers is entitled to acceleration of vesting in connection with a termination of employment upon or within one year after a change in control for the options the compensation committee granted in November 2011, effective December 5, 2011 and January 3, 2012.

#### *Termination of Employment Not in Connection with or following a Change in Control*

The following table sets forth the estimated potential benefits that our named executive officers would be entitled to receive upon their termination of employment with our company (other than a termination in connection with or following a change in control of the company) if the named executive officers' employment terminated on December 31, 2012. This table represents estimates only and does not necessarily reflect the actual amounts that would be paid to our named executive officers, which would only be known at the time that they become eligible for payment following their termination.

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**Termination of Employment Not In Connection With or Following Change in Control**

<u>Name</u>	<u>Severance Payments (\$)</u>	<u>Bonus Amount (\$)</u>	<u>Value of Accelerated Vesting of Stock Options (\$)<sup>(3)</sup></u>	<u>Value of Continuation of Benefits (\$)<sup>(1)</sup></u>	<u>Total (\$)</u>
Sudhir Agrawal, D. Phil. <sup>(2)</sup>	\$ 1,098,000	—	—	\$ 47,507	\$ 1,145,507
Louis J. Arcudi, III <sup>(4)</sup>	\$ 315,000	—	—	\$ 23,226	\$ 338,226
Timothy M. Sullivan, Ph.D.	—	—	—	—	—
Robert D. Arbeit, M.D.	—	—	—	—	—

<sup>(1)</sup> This amount represents the estimated cost to us of continuing the named executive officer's healthcare, disability, life and dental insurance benefits for the full severance period applicable to such named executive officer based on our costs for such benefits at December 31, 2012.

<sup>(2)</sup> Following the termination of Dr. Agrawal's employment by him for good reason or by us other than for death, disability or cause, Dr. Agrawal will be entitled to severance payments, a pro rata portion of his bonus for the prior year, if any, benefits continuation and acceleration of vesting of his equity awards to the extent such options or equity incentive awards would have vested had he continued to be an employee until the final day of the term of the agreement in effect immediately prior to such termination. Upon termination of Dr. Agrawal's employment due to death or disability, we have agreed to pay a pro rata portion of his bonus for the prior year and to accelerate the vesting of his equity awards to the extent such options or equity incentive awards would have vested had he continued to be an employee until the final day of the term of the agreement in effect immediately prior to such termination. See "Agreements with our Named Executive Officers" for further information about acceleration of vesting and severance payments in such circumstances.

<sup>(3)</sup> Calculated by multiplying the number of shares subject to options for which vesting would be accelerated by the difference between \$0.89, the closing price of our common stock on December 31, 2012, and the per share exercise prices for such options. As of December 31, 2012, all of Dr. Agrawal's options had exercise prices that were higher than \$0.89 per share.

<sup>(4)</sup> Severance payments and benefits continuation will only be paid to Mr. Arcudi following termination by us without cause. See "Agreements with our Named Executive Officers" for further information about our agreement with Mr. Arcudi.

*Termination of Employment In Connection With or Following Change in Control*

The following table sets forth the estimated potential benefits that our named executive officers would be entitled to receive upon their termination of employment with our company in connection with or following a change in control of the company if the change of control occurred on December 31, 2012 and the named executive officer's employment was immediately terminated. This table represents estimates only and does not necessarily reflect the actual amounts that would be paid to our named executive officers, which would only be known at the time that they become eligible for payment following their termination.

**Termination of Employment In Connection With or Following Change in Control**

<u>Name</u>	<u>Severance Payments (\$)</u>	<u>Bonus Amount (\$)</u>	<u>Value of Accelerated Vesting of Stock Options (\$)</u>	<u>Value of Continuation of Benefits (\$)<sup>(1)</sup></u>	<u>Total (\$)</u>
Sudhir Agrawal, D. Phil. <sup>(2)</sup>	\$ 1,098,000	—	— <sup>(3)</sup>	\$ 47,507	\$ 1,145,507
Louis J. Arcudi, III <sup>(4)</sup>	\$ 315,000	—	—	\$ 23,226	\$ 338,226
Timothy M. Sullivan, Ph.D.	—	—	—	—	—
Robert D. Arbeit, M.D.	—	—	—	—	—

<sup>(1)</sup> Represents the estimated cost to us of continuing the named executive officers' healthcare, disability, life and dental insurance benefits for the applicable severance period based on our costs for such benefits at December 31, 2012.

*footnotes continued on following page*

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- (2) Following the termination of Dr. Agrawal's employment in connection with or following a change in control by him for good reason or by us other than for death, disability or cause, Dr. Agrawal will be entitled to a lump sum severance payment, a pro rata portion of his bonus for the prior year, benefits continuation and full acceleration of vesting of his option awards. See "Agreements with our Named Executive Officers" for further information about acceleration of vesting and severance payments in such circumstances.
- (3) Calculated by multiplying the number of shares subject to options for which vesting would be accelerated by the difference between \$0.89, the closing price of our common stock on December 31, 2012, and the per share exercise prices for such options. As of December 31, 2012, all of options subject to acceleration granted to these individuals had an exercise price that was higher than \$0.89 per share.
- (4) Following the termination of Mr. Arcudi's employment in connection with or following a change in control by him for good reason or by us other than for death, disability or cause, Mr. Arcudi will be entitled to severance payments of his then current base salary and benefits continuation for a twelve-month period, payable in accordance with and at the times contemplated by our then current payroll practices.

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**EQUITY COMPENSATION PLAN INFORMATION**

The following table provides information about our common stock that may be issued upon exercise of options and warrants under all of our equity compensation plans as of December 31, 2012.

<u>Plan Category</u>	<u>Number of Securities to be Issued Upon Exercise of Outstanding Options and Warrants</u> (a)	<u>Weighted- Average Exercise Price of Outstanding Options and Warrants</u> (b)	<u>Number of Securities Remaining Available For Future Issuance Under Equity Compensation Plans (Excluding Securities Reflected in Column (a))</u> (c)
Equity compensation plans approved by stockholders <sup>(1)</sup>	5,657,256	\$ 4.96	2,413,469
Equity compensation plans not approved by stockholders	—	—	—
<b>Total</b>	<b>5,657,256</b>	<b>\$ 4.96</b>	<b>2,413,469</b>

<sup>(1)</sup> Consists of our:

- 1995 Employee Stock Purchase Plan;
- 1995 Director Stock Option Plan;
- 1997 Stock Incentive Plan;
- 2005 Stock Incentive Plan; and
- 2008 Stock Incentive Plan.

Shares are available for future issuance only under our 1995 Employee Stock Purchase Plan and our 2008 Stock Incentive Plan.

## CERTAIN RELATIONSHIPS AND RELATED PERSON TRANSACTIONS

Since January 1, 2010, except as discussed below regarding transactions with Pillar Pharmaceuticals I, L.P., or Pillar I, Pillar Pharmaceuticals II, L.P., or Pillar II, and Merck Sharp & Dohme Corp. (formerly Merck & Co., Inc.), or Merck & Co., which are currently greater than 5% stockholders, and Mr. El Zein, and Mr. Umari, whom are currently members of our board of directors and affiliates of Pillar I and Pillar II, we have not entered into or engaged in any related party transactions, as defined by the SEC, with our directors, officers and stockholders who beneficially owned more than 5% of our outstanding common stock, as well as affiliates or immediate family members of those directors, officers and stockholders. We believe that the terms of our transactions described below were no less favorable than those that we could have obtained from unaffiliated third parties.

### Series D Preferred Stock and Warrant Financing

In November 2011, we entered into a Convertible Preferred Stock and Warrant Purchase Agreement, or Series D Purchase Agreement, with Pillar I, an investment partnership managed by Mr. El Zein. Mr. El Zein is a director and controlling stockholder of Pillar Invest, which is the general partner of Pillar I, and is a limited partner of Pillar I. The Series D Purchase Agreement was amended in connection with our November 2012 Series E financing.

Under the Series D Purchase Agreement, we issued and sold to Pillar I, for an aggregate purchase price of \$9.5 million, 1,124,260 shares of Series D redeemable convertible preferred stock, or Series D preferred stock, and related warrants to purchase shares of our common stock, or Series D warrants, to purchase up to 2,810,650 shares of common stock. The shares of Series D preferred stock were initially convertible, subject to limitations, into 5,621,300 shares of our common stock at an initial conversion price of \$1.63. The initial exercise price of the warrants was \$1.63 per share. No Series D preferred stockholder may convert its shares to the extent such conversion would result in such Series D stockholder and its affiliates beneficially owning more than 19.99% of the common stock outstanding. The sale of shares of Series E convertible preferred stock, or Series E preferred stock, and related warrants to purchase shares of our common stock, or Series E warrants, in our November 2012 Series E financing triggered an anti-dilution adjustment under the terms of the Series D preferred stock, resulting in the conversion price of the Series D preferred stock being reduced and fixed at the minimum \$1.46 per share and the Series D preferred stock no longer being subject to any anti-dilution adjustments.

The Series D Purchase Agreement was amended in connection with the Series E financing to provide:

- for so long as Pillar I and its affiliates beneficially own more than 19.99% (prior to the date the stockholders of the Company approve the Nasdaq Proposal, as described below) or 25% (effective upon the date that the stockholders of the Company approve the Nasdaq Proposal) of the outstanding common stock, that Pillar I and its affiliates will vote any shares held by them in excess of the number of shares equal to 19.99% or 25%, as applicable, of the outstanding common stock (including the shares of common stock issuable upon conversion of securities convertible into or exercisable for shares of common stock held by Pillar I and its affiliates, including Pillar II) with respect to any matter put to a vote of the holders of common stock in the same manner and percentage as the holders of the common stock (other than the Series E preferred stockholders and their affiliates) vote on such matter; and
- for certain restrictions on the transfer of any securities issued to Pillar I (including securities convertible into or exercisable for common stock) pursuant to the Series D Purchase Agreement, including to not sell or transfer any such securities in one or a series of transactions if such transfer would, in the aggregate, result in the transfer of more than 5% of the then outstanding combined voting power of the outstanding securities of the Company (excluding from this restriction certain transfers to permitted transferees or in connection with an underwritten public offering by the Company that has been approved by our board of directors).

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In connection with our Series E preferred stock and warrant financing, as described below, we agreed to seek approval from our stockholders of the issuance and sale by the Company to Pillar II (together with all prior issuances and sales to Pillar I) of a number of shares of common stock (including securities convertible into or exercisable for common stock) that is greater than 19.99% of the outstanding common stock or outstanding voting power of the Company after such issuance and sale in accordance with Nasdaq Listing Rule 5635(b), which we refer to as the Nasdaq Proposal.

Pillar I is entitled to receive dividends payable quarterly in arrears at the rate of 7% per annum. Such dividends shall be paid in cash through December 31, 2014 and thereafter in cash or with shares of common stock, as determined by us in our sole discretion, except that we may not pay any dividends to a Series D preferred stockholder in shares of common stock to the extent the issuance of such shares would result in the Series D preferred stockholder and its affiliates beneficially owning more than 19.99% (prior to the date the stockholders of the Company approve the Nasdaq Proposal) or 35% (effective upon the date that the stockholders of the Company approve the Nasdaq Proposal) of the common stock outstanding or the combined voting power of our securities outstanding immediately after giving effect to the issuance of such shares of common stock. We have agreed to pay to Series E preferred stockholders quarterly dividends payable in cash in arrears at the rate of 4.6% per annum with the first dividend payment being due on March 31, 2013. Under the terms of the Series D preferred stock, any dividends that we pay to Series E preferred stockholders will also be paid to Series D preferred stockholders on an as-converted to common stock basis. We have agreed that, at our 2013 annual meeting of stockholders, we will propose an amendment to the Certificate of Designations, Preferences and Rights of Series D Preferred Stock, or the Series D Certificate of Designations, to, among other things, modify the terms of the Series D preferred stock dividends that require the payment of dividends to Series D preferred stockholders upon payment of dividends to Series E stockholders. If such amendment is approved by our stockholders, the Series E preferred stockholders would become entitled to receive dividends payable in cash quarterly in arrears at the rate of 8% per annum and Series D preferred stockholders would cease to be entitled to corresponding dividends. If such amendment is submitted to our stockholders and it is not approved, Series E preferred stockholders will no longer be entitled to receive dividends.

After November 4, 2013 and following written notice by us, we may redeem, for a cash payment equal to the \$8.1375 original Series D preferred stock issue price per share plus any accrued or declared but unpaid dividends thereon, all or a portion of the Series D preferred stock if the closing price of our common stock for 20 or more trading days in a period of 30 consecutive trading days is greater than or equal to 200% of the \$1.46 Series D preferred stock conversion price. In addition, the holders of shares of Series D preferred stock then outstanding are entitled to require us to purchase the shares of Series D preferred stock at a price equal to the original Series D preferred stock purchase price per share plus all accrued or declared but unpaid dividends thereon upon the occurrence of specified fundamental changes such as mergers, consolidations, business combinations, stock purchases or similar transactions resulting in a person or group unaffiliated with any Series D preferred stockholder owning 66.67% or more of the outstanding voting securities of the Company or successor entity.

Under the terms of the Series D Purchase Agreement, Pillar I agreed to be subject to a standstill provision that continues for so long as Pillar I and its affiliates beneficially own more than 15% of the outstanding common stock of the Company.

The sale of shares of Series E preferred stock and Series E warrants in our November 2012 Series E financing triggered an anti-dilution adjustment under the terms of the Series D warrants, resulting in the exercise price of the Series D warrants being fixed at the minimum \$1.46 per share and the Series D warrants no longer being subject to any anti-dilution adjustments. The Series D warrants may be exercised at Pillar I's option at any time on or before November 4, 2016. The Series D warrants, as amended in connection with the November 2012 Series E financing, provide that the Series D warrants may not be exercised with respect to any portion of the warrants, to the extent that such exercise would

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result in Pillar I and its affiliates beneficially owning more than 19.99% of the number of shares of common stock outstanding or the combined voting power of our securities outstanding immediately after giving effect to the issuance of shares of common stock issuable upon exercise of the Series D warrants, unless our stockholders approve the Nasdaq Proposal, in which case, the 19.99% limitation will be increased, with respect to Pillar I, to 35%. After November 4, 2013, we may redeem the Series D warrants for \$0.01 per share of common stock issuable on exercise of the Series D warrants following notice to Pillar I if the closing price of the common stock for 20 or more trading days in a period of 30 consecutive trading days is greater than or equal to \$6.51 per share.

In connection with the Series D Purchase Agreement, we filed a registration statement that became effective on December 21, 2011, registering the resale of the shares of common stock issuable upon conversion of the Series D preferred stock and the shares of common stock issuable upon exercise of the Series D warrants. In February 2013, we filed a registration statement that became effective on February 8, 2013, covering the resale of additional shares of common stock issuable upon conversion of the Series D preferred stock.

### **Series E Preferred Stock and Warrant Financing**

In November 2012, we entered into a Convertible Preferred Stock and Warrant Purchase Agreement, or Series E Purchase Agreement, with Pillar II and a second purchaser, which we collectively refer to as the Series E purchasers. Pillar II is an investment partnership managed by two of our directors and one of our significant stockholders. Mr. El Zein, a member of our board of directors, is a director and controlling stockholder of Pillar Invest, which is the general partner of Pillar II, and is a limited partner of Pillar II. Pillar Invest also entered into an Advisory Agreement with the second purchaser of our Series E preferred stock and Series E warrants pursuant to which Pillar Invest has investment discretion over the shares purchased by such second purchaser. Mr. El Zein has voting and investment control over the securities beneficially owned by Pillar II and Besancon. In addition, Abdul-Wahab Umari, also a member of our board of directors, is a managing partner of Pillar Invest.

Under the Series E Purchase Agreement, we issued and sold to the Series E purchasers, for an aggregate purchase price of approximately \$7.0 million, 424,242 shares of Series E preferred stock and Series E warrants to purchase up to 8,484,840 shares of common stock. The shares of Series E preferred stock are convertible, subject to limitations, into an aggregate of 8,484,840 shares of common stock at a conversion price of \$0.70 per share. No Series E preferred stockholder may convert its shares to the extent such conversion would result in the holder and its affiliates beneficially owning more than 19.99% of the common stock outstanding. The exercise price of the warrants is \$0.70 per share. The warrants to purchase common stock are exercisable immediately, and will expire if not exercised on or prior to November 9, 2017.

We have agreed to pay to the Series E preferred stockholders quarterly dividends payable in cash in arrears at the rate of 4.6% per annum with the first dividend payment being due on March 31, 2013. Under the terms of the Series D preferred stock, any dividends that we pay to Series E preferred stockholders will also be paid to Series D preferred stockholders on an as-converted to common stock basis. We have agreed that, at our 2013 annual meeting of stockholders, we will propose an amendment to the Series D Certificate of Designations to, among other things, modify the terms of the Series D preferred stock that require the payment of dividends to Series D preferred stockholders upon payment of dividends to Series E preferred stockholders. If such amendment is approved by our stockholders, the Series E preferred stockholders would become entitled to receive dividends payable in cash quarterly in arrears at the rate of 8% per annum and the Series D preferred stockholders would cease to be entitled to corresponding dividends. If such amendment is submitted to our stockholders and it is not approved, the Series E preferred stockholders will no longer be entitled to receive dividends.

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Under the terms of the Series E Purchase Agreement, we granted Pillar II participation rights in future financings. In addition, we agreed to use our best efforts to file a preliminary proxy statement for our 2013 annual meeting of stockholders that will, among other things, seek approval from our stockholders of the following matters:

- the Nasdaq Proposal;
- an amendment to our restated certificate of incorporation and bylaws, as necessary, to eliminate the classification of our board of directors; and
- an amendment to the Series D Certificate of Designations for our Series D preferred stock to modify the dividend provisions of the Series D Certificate of Designations so that dividends on the Series E preferred stock are not required to be paid to the Series D preferred stockholders and to conform the beneficial ownership limitations applicable to the conversion of the Series D preferred stock to the beneficial ownership limitations applicable to the conversion of the Series E preferred stock.

Also under the terms of the Series E Purchase Agreement, each Series E preferred stockholder has agreed:

- for so long as the Series E preferred stockholder and its affiliates beneficially own more than 19.99% (prior to the date the stockholders of the Company approve the Nasdaq Proposal) or 25% (effective upon the date that the stockholders of the Company approve the Nasdaq Proposal) of the outstanding common stock, that the Series E preferred stockholder and its affiliates will vote any shares held by them in excess of the number of shares equal to 19.99% or 25%, as applicable, of the outstanding common stock (including the shares of common stock issuable upon conversion or exercise of securities that are convertible into or exercisable for shares of common stock held by such Series E preferred stockholder and its affiliates) with respect to any matter put to a vote of the holders of common stock in the same manner and percentage as the holders of the common stock (other than the Series E preferred stockholder) vote on such matter;
- to certain restrictions on the transfer of any securities issued to such Series E preferred stockholder (including securities convertible into or exercisable for common stock) pursuant to the convertible preferred stock and warrant purchase agreement including to not sell or transfer any such securities in one or a series of transactions if such transfer would, in the aggregate, result in the transfer of more than 5% of the then outstanding combined voting power of the outstanding securities of the Company (excluding from this restriction certain transfers to permitted transferees or in connection with an underwritten public offering by the Company that has been approved by our board of directors); and
- to be subject to a standstill provision that continues for so long as such Series E preferred stockholder and its affiliates beneficially own more than 15% of the outstanding common stock of the Company.

After the later of November 9, 2014 and the date that no shares of Series D preferred stock remain outstanding, we may redeem all or a portion of the Series E preferred stock for a cash payment equal to the \$14.00 original Series E preferred stock issue price per share plus any accrued or declared but unpaid dividends thereon following notice to the Series E preferred stockholders if the closing price of our common stock for 20 or more trading days in a period of 30 consecutive trading days is greater than or equal to 400% of the \$0.70 Series E preferred stock conversion price. We may not redeem any shares of Series E preferred stock from a Series E preferred stockholder that cannot convert such shares of Series E preferred stock into common stock as a result of the beneficial ownership limitations described above. In such event, we may redeem such nonredeemable shares for a cash payment equal to the greater of the 20 consecutive trading day average closing price per share of the common stock ending on the trading day immediately prior to redemption date plus any dividends accrued or declared but unpaid thereon and



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the Series E conversion price plus any dividends accrued or declared but unpaid thereon. After November 9, 2014, we also may redeem the Series E warrants for \$0.01 per share of common stock issuable on exercise of the Series D warrants following notice to the Series E purchasers if the closing price of the common stock for 20 or more trading days in a period of 30 consecutive trading days is greater than or equal to \$2.80 per share.

In connection with the Series E Purchase Agreement, we filed a registration statement that became effective on January 17, 2013, registering the resale of the shares of common stock issuable upon conversion of the Series E preferred stock and the shares of common stock issuable upon exercise of the Series E warrants.

#### **April 2013 Pillar Agreements**

On April 22, 2013, we entered into an agreement with Pillar I and Pillar II, which we refer to as the April 22, 2013 Pillar Agreement. Under the April 22, 2013 Pillar Agreement, Pillar I has irrevocably agreed to waive and not exercise the rights, powers, preferences and other terms of the Series D preferred stock under Section 6 of the Series D Certificate of Designations, including without limitation the right to require us to purchase all or any portion of the shares of our Series D preferred stock at a price equal to the original Series D preferred stock purchase price per share plus all accrued or declared but unpaid dividends thereon upon the occurrence of specified fundamental changes such as mergers, consolidations, business combinations, stock purchases or similar transactions resulting in a person or group unaffiliated with any holder of Series D preferred stock owning 66.67% or more of the outstanding voting securities of the Company or successor entity.

Under the April 22, 2013 Pillar Agreement, we and each of Pillar I and Pillar II have agreed, among other things:

- to an amendment to the Series D Certificate of Designations for our Series D preferred stock that would:
  - modify the dividend provisions of the Series D Certificate of Designations to change the date after which we may elect to pay dividends in shares of our common stock from December 31, 2014 to October 1, 2013, and to allow for the payment of such dividends in shares of a to-be-created new series of non-voting preferred stock in the event that payment of such dividends may not be made in shares of our common stock as a result of the application of the beneficial ownership and voting power limitations set forth the Series D Certificate of Designations; and
  - in connection with the waiver of the right to require us to purchase the Series D preferred stock upon the occurrence of specified fundamental changes, to modify the Series D Certificate of Designations to provide, in the event of a sale of our company, for the distribution of any assets that remain available for distribution to our stockholders, after payment to the holders of our Series A convertible preferred stock and any other class of our capital stock that ranks senior to our Series D preferred stock, to the holders of our Series D preferred stock on a pro rata basis with the holders of our common stock, Series E preferred stock and such new series of non-voting preferred stock; and
- to an amendment to the Certificate of Designations, Preferences and Rights of Series E Preferred Stock, or the Series E Certificate of Designations, that would:
  - modify the dividend provisions of the Series E Certificate of Designations to allow for the payment of dividends in shares of our common stock commencing October 1, 2013; and

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- allow for the payment of dividends in shares of a to-be-created new series of non-voting preferred stock in the event that payment of such dividends may not be made in shares of our common stock as a result of the application of the beneficial ownership and voting power limitations set forth in the Series E Certificate of Designations.

In addition, on April 30, 2013, we entered into a second agreement with Pillar I, Pillar II and an entity affiliated with Pillar I and Pillar II, which we refer to collectively as the Pillar Entities, which we refer to as the April 30, 2013 Pillar Agreement. We refer to the April 30, 2013 Pillar Agreement and the April 22, 2013 Pillar Agreement collectively as the Pillar Agreements.

Under the April 30, 2013 Pillar Agreement, Pillar I has irrevocably agreed to waive the right of the holders of the Series D preferred stock under Section 2.1 of the Series D Certificate of Designations to receive, in the event of a voluntary or involuntary liquidation, dissolution or winding up of the Company, or Liquidation, an amount per share of Series D preferred stock equal to the original issue price of such share of Series D preferred stock plus any dividends accrued or declared but unpaid thereon to the extent such amount is greater than the amount that would have been payable with respect to such share had all shares of Series D preferred stock been converted into shares of our common stock immediately prior to such Liquidation, and that upon a Liquidation the holders of the Series D preferred stock will receive an amount per share of Series D preferred stock equal to the amount that would be payable with respect to such share had all shares of Series D preferred stock been converted into shares of our common stock immediately prior to such Liquidation.

In addition, under the April 30, 2013 Pillar Agreement, Pillar II and the entity affiliated with Pillar II, together the holders of 100% of the Series E preferred stock, have irrevocably agreed to waive the right of the holders of the Series E preferred stock under Section 2.1.1 of the Series E Certificate of Designations to receive, in the event of a Liquidation, an amount per share of Series E preferred stock equal to the original issue price of such share of Series E preferred stock plus any dividends accrued or declared but unpaid thereon to the extent such amount is greater than the amount that would have been payable with respect to such share had all shares of Series E preferred stock been converted into shares of our common stock immediately prior to such Liquidation, and that upon a Liquidation the holders of the Series E preferred stock will receive under Section 2.1 of the Series E Certificate of Designations an amount per share of Series E preferred stock equal to the amount that would be payable with respect to such share had all shares of Series E preferred stock been converted into shares of our common stock immediately prior to such Liquidation.

Under the Pillar Agreements, we have agreed to seek approval from our stockholders at our 2013 annual meeting of stockholders of amendments to the Series D Certificate of Designations and Series E Certificate of Designations to effect these changes to the dividend and liquidation provisions of our Series D preferred stock and Series E preferred stock, the redemption rights of the holders of our Series D preferred stock and the rights of the holders of our Series D preferred stock to distributions in the event of a sale of our company. Each applicable Pillar Entity has agreed:

- to vote, and to cause its affiliates to vote, all shares of our voting stock held by such Pillar Entity or its affiliates, and over which such Pillar Entity or its affiliates has the power to vote, in favor of such amendments; and
- not to, and to cause its affiliates not to, sell or transfer any shares of our common stock, Series D preferred stock or Series E preferred stock held by such Pillar Entity or its affiliates to any person, entity or group unless such proposed transferee agrees in a written instrument executed by such transferee, the applicable Pillar Entity and us to take and hold such securities subject to, among other things, the Pillar Agreements and to be bound by the terms of such Pillar Agreements, including the waiver of rights, voting agreements and restrictions on transfer set forth therein.

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Under the April 22, 2013 Pillar Agreement, in consideration of the agreements of Pillar I and II under the April 22, 2013 Pillar Agreement and the delivery of the waiver by Pillar I, and for no additional cash consideration, we have agreed to issue to Pillar I warrants, the Pillar I Warrants, to purchase up to 1,000,000 shares of our common stock. The Pillar I Warrants will have an exercise price per share equal to the greater of (a) \$0.61 and (b) to the extent that warrants to purchase shares of our common stock are issued in the qualified financing, the per share exercise price of the warrants issued in such qualified financing, which would include the exercise price of the warrants issued in this offering to the extent that this offering is deemed to be a qualified financing.

In addition, under the April 30, 2013 Pillar Agreement, in consideration of the agreements of the Pillar Entities under the April 30, 2013 Pillar Agreement and the delivery of the waivers by the Pillar Entities, and for no additional cash consideration, we have agreed to issue to the Pillar Entities warrants, the Additional Pillar Warrants, and together with the Pillar I Warrants, the Pillar Warrants, to purchase up to an aggregate of 1,000,000 shares of our common stock. The Additional Pillar Warrants will have an exercise price per share equal to the greater of (a) \$0.79 and (b) to the extent that warrants to purchase shares of our common stock are issued in the qualified financing, the per share exercise price of the warrants issued in such qualified financing, which would include the exercise price of any warrants issued in this offering to the extent that this offering is deemed to be a qualified financing.

The Pillar Warrants are each exercisable immediately, and will expire if not exercised on or prior to the fifth anniversary from the date of issuance. The Pillar Warrants provide that, after the second anniversary of the date of issuance, we may redeem such Pillar Warrants for \$0.01 per share of common stock issuable on exercise of such Pillar Warrants following notice to the holder thereof if the closing price of our common stock for 20 or more trading days in a period of 30 consecutive trading days is greater than or equal to \$2.80 per share.

The Pillar Agreements, including our obligations to issue the Pillar Warrants under the Pillar Agreements, will become effective upon the consummation of a qualified financing, which would include the consummation of this offering. The Pillar Agreements will terminate in the event that a qualified financing is not consummated by October 1, 2013. Under the terms of the Pillar Agreements, a qualified financing is defined as the issuance and sale of our equity securities from and after the date of the applicable Pillar Agreement in one or more closings resulting in aggregate gross proceeds to us of at least \$12.5 million.

In addition, we have agreed to file a registration statement to register the resale of the shares of common stock issuable upon exercise of the Pillar Warrants.

### **Merck & Co.**

In December 2006, we entered into an exclusive license and research collaboration agreement with Merck & Co. to research, develop and commercialize vaccine products containing our TLR7, TLR8, and TLR9 agonists in the fields of cancer, infectious diseases and Alzheimer's disease. Under the terms of the agreement, we granted Merck & Co. worldwide exclusive rights to a number of our TLR7, TLR8, and TLR9 agonists for use in combination with Merck & Co.'s therapeutic and prophylactic vaccines under development in the fields of cancer, infectious diseases, and Alzheimer's disease. There is no limit under the agreement to the number of vaccines to which Merck & Co. can apply our agonists within these fields. We also agreed with Merck & Co. to engage in a two-year research collaboration to generate novel agonists targeting TLR7 and TLR8 and incorporating both Merck & Co.'s and the Company's chemistry for use in vaccines in the defined fields. Under the terms of the agreement, Merck & Co. extended the research collaboration for two additional years to December 2010. Under the terms of the agreement:

- Merck & Co. paid us a \$20.0 million upfront license fee;

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- Merck & Co. purchased \$10.0 million of our common stock at \$5.50 per share;
- Merck & Co. agreed to fund the research and development collaboration through its term;
- Merck & Co. agreed to pay us milestone payments as follows:
  - up to \$165.0 million if vaccines containing our TLR9 agonist compounds are successfully developed and marketed in each of the oncology, infectious disease and Alzheimer’s disease fields;
  - up to \$260.0 million if vaccines containing our TLR9 agonist compounds are successfully developed and marketed for follow-on indications in the oncology field and if vaccines containing our TLR7 or TLR8 agonists are successfully developed and marketed in each of the oncology, infectious disease, and Alzheimer’s disease fields; and
  - if Merck & Co. develops and commercializes additional vaccines using our agonists, we would be entitled to receive additional milestone payments; and
- Merck & Co. agreed to pay us mid to upper single-digit royalties on net product sales of vaccines using our TLR agonist technology that are developed and marketed, with the royalty rates being dependent on disease indication and the TLR agonist employed.

Under the agreement, Merck & Co. is obligated to pay us royalties, on a product-by-product and country-by-country basis, until the later of the expiration of the patent rights licensed to Merck & Co. and the expiration of regulatory-based exclusivity for the vaccine product. If the patent rights and regulatory-based exclusivity expire in a particular country before the 10th anniversary of the product’s first commercial sale in such country, Merck & Co.’s obligation to pay us royalties will continue at a reduced royalty rate until such anniversary, except that Merck & Co.’s royalty obligation will terminate upon the achievement of a specified market share in such country by a competing vaccine containing an agonist targeting the same toll-like receptor as that targeted by the agonist in the Merck & Co. vaccine. In addition, the applicable royalties may be reduced if Merck & Co. is required to pay royalties to third parties for licenses to intellectual property rights, which royalties exceed a specified threshold. Merck & Co.’s royalty and milestone obligations may also be reduced if Merck & Co. terminates the agreement based on specified uncured material breaches by us.

Merck & Co. may terminate the collaborative alliance without cause upon 90 days written notice to us. Either party may terminate the collaborative alliance upon the other party’s filing or institution of bankruptcy, reorganization, liquidation or receivership proceedings, or for a material breach if such breach is not cured within 60 days after delivery of written notice.

In January 2012, in accordance with the agreement, Merck & Co. selected multiple novel TLR7, TLR8, and TLR9 agonists for Merck & Co.’s exclusive evaluation and use as vaccine adjuvants.

### **Policies and Procedures for Related Person Transactions**

Our board of directors is committed to upholding the highest legal and ethical conduct in fulfilling its responsibilities and recognizes that related party transactions can present a heightened risk of potential or actual conflicts of interest. Accordingly, as a general matter, it is our preference to avoid related party transactions.

In accordance with our audit committee charter, members of the audit committee, all of whom are independent directors, review and approve all related party transactions for which approval is required under applicable laws or regulations, including SEC and the Nasdaq Stock Market rules. Current SEC rules define a related party transaction to include any transaction, arrangement or relationship in which

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we are a participant and the amount involved exceeds \$120,000, and in which any of the following persons has or will have a direct or indirect interest:

- our executive officers, directors or director nominees;
- any person who is known to be the beneficial owner of more than 5% of our common stock;
- any person who is an immediate family member, as defined under Item 404 of Regulation S-K, of any of our executive officers, directors or director nominees or beneficial owners of more than 5% of our common stock; or
- any firm, corporation or other entity in which any of the foregoing persons is employed or is a partner or principal or in a similar position or in which such person, together with any other of the foregoing persons, has a 5% or greater beneficial ownership interest.

In addition, the audit committee reviews and investigates any matters pertaining to the integrity of management, including conflicts of interest and adherence to our code of business conduct and ethics. Under our code of business conduct and ethics, our directors, officers and employees are expected to avoid any relationship, influence or activity that would cause or even appear to cause a conflict of interest. Under our code of business conduct and ethics, a director is required to promptly disclose to our board of directors any potential or actual conflict of interest involving him or her. In accordance with our code of business conduct and ethics, the board of directors will determine an appropriate resolution on a case-by-case basis. All directors must recuse themselves from any discussion or decision affecting their personal, business or professional interests.

**Participation in Offering**

Certain of our existing principal stockholders, including certain of the Pillar Entities and their affiliated entities, have indicated an interest in purchasing up to \$2.5 million of shares of our common stock and warrants to purchase shares of our common stock in this offering at the public offering price. However, because indications of interest are not binding agreements or commitments to purchase, the underwriters could determine to sell more, less or no shares and warrants to any of these existing principal stockholders and any of these existing principal stockholders could determine to purchase more, less or no shares and warrants in this offering.

**SECURITY OWNERSHIP OF CERTAIN BENEFICIAL  
OWNERS AND MANAGEMENT**

On January 31, 2013, we had 27,642,969 shares of common stock issued and outstanding, 424,242 shares of Series E preferred stock, or Series E preferred stock, issued and outstanding and 1,124,260 shares of Series D preferred stock, or Series D preferred stock, issued and outstanding. The following table sets forth information we know about the beneficial ownership of our common stock, our Series E preferred stock and our Series D preferred stock, as of January 31, 2013, by:

- each person known by us to own beneficially more than 5% of the outstanding shares of our common stock;
- each person known to us to beneficially own more than 5% of the outstanding shares of our Series E preferred stock;
- each person known to us to beneficially own more than 5% of the outstanding shares of our Series D preferred stock;
- each of our directors;
- each of our named executive officers; and
- all directors and executive officers as a group.

We have determined beneficial ownership in accordance with the rules of the SEC, and the information in the table below is not necessarily indicative of beneficial ownership for any other purpose. Under such rules, beneficial ownership of a person includes any shares as to which such person has the sole or shared voting power or investment power. In addition, under such rules, beneficial ownership of a person includes any shares that such person has the right to acquire within 60 days after January 31, 2012 through the conversion of any convertible security or the exercise of any stock option, warrant or other right. These shares, however, are not considered outstanding when computing the percentage ownership of each other person.

Certain of our existing principal stockholders, including certain of the Pillar Entities and their affiliated entities, have indicated an interest in purchasing up to \$2.5 million of shares of our common stock and warrants to purchase shares of our common stock in this offering at the public offering price. However, because indications of interest are not binding agreements or commitments to purchase, the underwriters could determine to sell more, less or no shares and warrants to any of these existing principal stockholders and any of these existing principal stockholders could determine to purchase more, less or no shares and warrants in this offering.

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Unless otherwise indicated in the footnotes to the table below, each stockholder named in the table has sole investment and voting power (or shares such power with his or her spouse) with respect to the shares shown as beneficially owned by them. The inclusion of any shares deemed beneficially owned does not constitute an admission of beneficial ownership of such shares.

Name and Address of Beneficial Owner <sup>(1)</sup>	Amount and Nature of Beneficial Ownership of Common Stock	% of Common Stock Beneficially Owned	Amount and Nature of Beneficial Ownership of Series D Preferred Stock	% of Series D Preferred Stock Beneficially Owned	Amount and Nature of Beneficial Ownership of Series E Preferred Stock	% of Series E Preferred Stock Beneficially Owned	% of Combined Voting Power of Series D Preferred Stock and Common Stock <sup>(2)</sup>	% of Common Stock Beneficially Owned After the Offering	% of Combined Voting Power of Series D Preferred Stock and Common Stock After the Offering <sup>(2)</sup>
<b>5% Stockholders</b>									
Pillar Investment Entities c/o Pillar Invest Offshore SAL Starco Ctr Bloc B, 3rd Flr, Omar Daouk St. Beirut, M8 2020-3313	6,759,892 <sup>(3)</sup>	19.99% <sup>(3)</sup>	1,124,260 <sup>(4)</sup>	100%	424,242 <sup>(5)</sup>	100%	19.99% <sup>(3)</sup>	19.99% <sup>(3)</sup>	12.58% <sup>(3)</sup>
Merck & Co., Inc. One Merck Drive Whitehouse Station, NJ 08889	1,818,182 <sup>(6)</sup>	6.58%	—	—	—	—	5.38%	3.77%	3.34%
Senator Investment Group LP 1330 Avenue of the Americas 26th Floor New York, NY 10019	1,370,215 <sup>(7)</sup>	4.96%	—	—	—	—	4.05%	2.84%	2.52%
<b>Directors and Named Executive Officers</b>									
Youssef El Zein	6,759,892 <sup>(8)</sup>	19.99% <sup>(3)</sup>	1,124,260 <sup>(9)</sup>	100%	424,242 <sup>(10)</sup>	100%	19.99% <sup>(3)</sup>	19.99% <sup>(3)</sup>	12.58% <sup>(3)</sup>
Sudhir Agrawal, D. Phil.	1,470,880 <sup>(11)</sup>	5.07%	—	—	—	—	*	2.97%	*
Robert D. Arbeit, M.D.	157,339 <sup>(12)</sup>	*	—	—	—	—	*	*	*
Louis J. Arcudi, III	348,925 <sup>(13)</sup>	1.25%	—	—	—	—	*	*	*
C. Keith Hartley	134,300 <sup>(14)</sup>	*	—	—	—	—	*	*	*
Robert W. Karr, M.D.	161,757 <sup>(15)</sup>	*	—	—	—	—	*	*	*
Malcolm MacCoss, Ph.D.	44,924 <sup>(16)</sup>	*	—	—	—	—	*	*	*
William S. Reardon	85,349 <sup>(17)</sup>	*	—	—	—	—	*	*	*
Eve E. Slater	31,333 <sup>(18)</sup>	*	—	—	—	—	*	*	*
Timothy M. Sullivan, Ph.D.	339,631 <sup>(19)</sup>	1.21%	—	—	—	—	*	*	*
Abdul-Wahab Umari	2,500 <sup>(20)</sup>	*	—	—	—	—	*	*	*
All current directors and executive officers as a group (11 individuals)	9,536,830 <sup>(21)</sup>	26.20%	1,124,260 <sup>(4)</sup>	100%	424,242 <sup>(5)</sup>	100%	20.66%	23.64%	13.00%

\* Less than 1%

<sup>(1)</sup> Except as otherwise noted, the address for each person listed above is c/o Idera Pharmaceuticals, Inc., 167 Sidney Street, Cambridge, Massachusetts 02139.

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- (2) The percentage of the combined voting power of the Series D preferred stock and the common stock is calculated by dividing (a) the sum of the total number of shares of common stock owned by the stockholder and the total number of shares of common stock then issuable upon conversion of the Series D preferred stock owned by the stockholder by (b) the sum of the total number of shares of common stock outstanding and the total number of shares of common stock then issuable upon conversion of the Series D preferred stock outstanding. The sum of the total number of shares of common stock outstanding and the total number of shares of common stock then issuable upon conversion of the Series D preferred stock outstanding as of January 31, 2013 was 33,816,760. As of January 31, 2013, the Series E preferred stock is nonvoting stock.
- (3) Consists of (i) 6,093,675 shares of common stock issuable upon conversion of 1,093,310 shares of Series D preferred stock held by Pillar I, (ii) 586,101 shares of common stock held directly by Mr. El Zein and (iii) 80,116 shares of common stock subject to outstanding stock options that are exercisable within 60 days after January 31, 2013 held by Mr. El Zein. As a result of the application of the Conversion Cap, as described below in this footnote, the table above does not include the following as being beneficially owned by the Pillar Investment Entities: (a) 172,500 shares of common stock issuable upon conversion of 30,950 shares of Series D preferred stock held by Pillar I; (b) 6,266,820 shares of common stock issuable upon conversion of 313,341 shares of Series E preferred stock held by Pillar II; (c) 2,218,020 shares of common stock issuable upon conversion of 110,901 shares of Series E preferred stock held by Participations Besancon, or Besancon, and over which Pillar Invest Corporation has investment discretion, pursuant to an advisory agreement between Pillar Invest Corporation and Besancon, or the Advisory Agreement; (d) 6,266,820 shares of common stock issuable upon exercise of a warrant to purchase common stock held by Pillar II; (e) 2,218,020 shares of common stock issuable upon exercise of a warrant to purchase common stock held by Besancon and over which Pillar Invest Corporation has investment discretion pursuant to the Advisory Agreement; and (f) 2,810,650 shares of common stock issuable upon exercise of a warrant to purchase common stock held by Pillar I. 5,133,873 shares of common stock issuable upon conversion of outstanding Series D preferred stock or Series E preferred stock held by certain of the Pillar Investment Entities or issuable upon the exercise of the warrants described above that were otherwise excluded from the beneficial ownership of the Pillar Investment Entities as a result of the application of the Conversion Cap are included for purposes of determining the percentage of common stock beneficially owned after the offering. Mr. El Zein is a director and controlling stockholder of Pillar Invest Corporation, which is the general partner of Pillar I and Pillar II, and is a limited partner of Pillar I and Pillar II. Mr. El Zein expressly disclaims beneficial ownership over shares held directly by Pillar I, Pillar II and indirectly by Pillar Invest Corporation, including the shares of Series E preferred stock and warrants issued in connection therewith held by Besancon, or the Besancon Securities. Pillar I and Pillar II expressly disclaim beneficial ownership of the Besancon Securities. Besancon is an investment fund having no affiliation with Mr. El Zein, Pillar I, Pillar II or Pillar Invest Corporation. The information in this footnote is based on a Schedule 13D/A filed with the SEC on November 16, 2012 and a Schedule 13D filed with the SEC on November 14, 2011. Pursuant to the terms of the Series D preferred stock and the warrants to purchase common stock issued in connection with the issuance of the Series D preferred stock, the Series E preferred stock and the warrants to purchase common stock issued in connection with the issuance of the Series E preferred stock, the shares of Series E preferred stock and Series D preferred stock cannot be converted by the holder thereof into shares of our common stock and the warrants issued in connection with Series E preferred stock and Series D preferred stock cannot be exercised by the holder thereof with respect to any portion of the shares, to the extent that such conversion or exercise would result in the Pillar Investment Entities beneficially owning more than 19.99% of (x) the number of shares of common stock outstanding or (y) the combined voting power of our securities outstanding immediately after giving effect to the issuance of shares of common stock issuable upon exercise of the Series E warrants and the Series D warrants. This limitation on conversion and exercise of the Series D preferred stock, Series E preferred stock and warrants issued in connection with the issuance of the Series D preferred stock and the Series E preferred stock is referred to in this footnote as the Conversion Cap. In addition, pursuant to the terms of the purchase agreements under which such securities were acquired, the purchasers have each agreed that for so long as such purchaser and its affiliates beneficially own more than 19.99% of our outstanding common stock, such purchase, and its affiliates will vote any shares held by them in excess of the number of shares equal to 19.99% of the outstanding common stock (including the shares of common stock issuable upon conversion of the Series E preferred stock and the Series D preferred stock) with respect to any matter put to a vote of the holders of common stock in the same manner and percentage as the holders of the common stock vote on such matter. All shares of common stock and Series D preferred stock that were otherwise excluded from the calculation of the voting power of the Pillar Investment Entities are included for purposes of determining the percentage of combined voting power of our Series D preferred stock and common stock after the offering. See "Certain Relationships and Related Person Transactions" for further information about the Series E preferred stock and warrants issued in connection with the issuance of the Series E preferred stock and the terms of the purchase agreement between Pillar II and us and information about the Series D preferred stock and warrants issued in connection with the issuance of the Series D preferred stock and the terms of the purchase agreement between Pillar I and us.
- (4) Consists of shares of preferred stock held by Pillar I.
- (5) Consists of shares of preferred stock held by Pillar II and the preferred stock held by Besancon.
- (6) As reported on a Schedule 13G filed with the SEC on December 15, 2006.

*footnotes continued on following page*



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- (7) As reported on a Schedule 13G filed with the SEC on February 25, 2013, Senator Investment Group LP also holds a warrant exercisable for 1,293,802 shares of common stock that are not included as beneficially owned by Senator Investment Group LP in the table above. The warrant may only be exercised so long as Senator Investment Group LP holds no more than 4.99% of the number of shares of common stock outstanding after such exercise. The limit may be increased to 9.99% upon no less than 61 days' notice to us. Senator Investment Group LP, a Delaware limited partnership, serves as investment manager to two Delaware limited partnerships, four Cayman Islands limited partnerships, and a Cayman Islands company, collectively, the Funds, and as such, has investment discretion with respect to the Funds. Douglas Silverman, a United States citizen, and Alexander Klabin, a United States citizen, have control of a Delaware limited liability company that may be deemed to control Senator Investment Group LP. The partners of the Funds have the right to participate in the receipt of dividends from, or proceeds from the sale of, the securities reported herein held by the Funds in accordance with their respective ownership interests in the Funds. Senator Investment Group LP disclaims beneficial ownership of the securities.
- (8) Consists of shares reported under footnote 3 this table above. Mr. El Zein is a director and controlling stockholder of Pillar Invest Corporation, which is the general partner of Pillar I and Pillar II, and is a limited partner of Pillar I and Pillar II. Accordingly, Mr. El Zein may be deemed to have sole power to direct the voting and disposition of the shares of common stock held directly by Pillar I and Pillar II and indirectly by Pillar Invest Corporation, including the Besancon Securities. Mr. El Zein expressly disclaims beneficial ownership over shares held directly by Pillar I, Pillar II and indirectly by Pillar Invest Corporation, including the Besancon Securities, except to the extent of his pecuniary interest therein, if any, by virtue of his ownership interest in Pillar Invest Corporation and his limited partnership interest in Pillar I and Pillar II.
- (9) Consists of shares of preferred stock held by Pillar I. Mr. El Zein is a director and controlling stockholder of Pillar Invest Corporation, which is the general partner of Pillar I, and is a limited partner of Pillar I. Accordingly, Mr. El Zein may be deemed to have sole power to direct the voting and disposition of the shares of preferred stock held directly by Pillar I. Mr. El Zein expressly disclaims beneficial ownership of any shares of preferred stock held directly by Pillar I or indirectly by Pillar Invest Corporation.
- (10) Consists of shares of preferred stock held by Pillar II. Mr. El Zein is a director and controlling stockholder of Pillar Invest Corporation, which is the general partner of Pillar II, and is a limited partner of Pillar II. Accordingly, Mr. El Zein may be deemed to have sole power to direct the voting and disposition of the shares of preferred stock held directly by Pillar II. Mr. El Zein expressly disclaims beneficial ownership of any shares of preferred stock held directly by Pillar II or indirectly by Pillar Invest Corporation, including the Besancon Securities.
- (11) Includes 1,344,603 shares of common stock subject to outstanding stock options that are exercisable within 60 days after January 31, 2013.
- (12) Includes 149,779 shares of common stock subject to outstanding stock options that are exercisable within 60 days after January 31, 2013.
- (13) Includes 343,060 shares of common stock subject to outstanding stock options that are exercisable within 60 days after January 31, 2013.
- (14) Includes 80,116 shares of common stock subject to outstanding stock options that are exercisable within 60 days after January 31, 2013. Also includes 2,434 shares of common stock held in a Defined Benefit Pension Plan, owned and controlled solely by Mr. Hartley.
- (15) Includes 549 shares of common stock held by the Robert W. Karr Revocable Trust. Dr. Karr disclaims beneficial ownership of all shares held in this trust. Also includes 161,208 shares of common stock subject to outstanding stock options that are exercisable within 60 days after January 31, 2013.
- (16) Includes 41,833 shares of common stock subject to outstanding stock options that are exercisable within 60 days after January 31, 2013.
- (17) Includes 80,116 shares of common stock subject to outstanding stock options that are exercisable within 60 days after January 31, 2013.
- (18) Consists of shares of common stock subject to outstanding stock options that are exercisable within 60 days after January 31, 2013.
- (19) Includes 314,717 shares of common stock subject to outstanding stock options that are exercisable within 60 days after January 31, 2013.
- (20) Includes 2,500 shares of common stock subject to outstanding stock options that are exercisable within 60 days after January 31, 2013.
- (21) Includes 2,549,365 shares of common stock subject to outstanding stock options held by the directors and executive officers as a group that are exercisable within 60 days after January 31, 2013 and shares reported in clauses (i) through (iii) of the first sentence of footnote 3 to this table above.

## DESCRIPTION OF SECURITIES

### Capital Stock

We are authorized to issue 140,000,000 shares of common stock, \$0.001 par value per share, and 5,000,000 shares of preferred stock, \$0.01 par value per share, of which 1,500,000 are designated Series A convertible preferred stock, 200,000 shares are designated Series C junior participating preferred stock, 1,124,260 are designated Series D convertible preferred stock and 424,242 shares are designated Series E convertible preferred stock. As of January 31, 2013, there were 27,642,969 shares of common stock outstanding, 655 shares of Series A convertible preferred stock outstanding, 1,124,260 shares of Series D convertible preferred stock outstanding, 424,242 shares of Series E convertible preferred stock outstanding and no other shares of preferred stock issued and outstanding.

The material terms and provisions of our common stock, our preferred stock and each other class of our securities that qualifies or limits our common stock, are described in (a) our Registration Statement on Form 8-A filed December 4, 2003, as amended on August 17, 2007 and as further amended on December 7, 2007, (b) Item 5.03 of our Current Report on Form 8-K filed November 10, 2011 and (c) Item 5.03 of our Current Report on Form 8-K filed November 14, 2012, each of which is incorporated by reference in this prospectus. For the complete terms of our common stock and preferred stock, please refer to our certificate of incorporation and by-laws that we have filed with the SEC. The terms of these securities may also be affected by the General Corporation Law Statute of the State of Delaware.

### Warrants

The following is a brief summary of certain terms and conditions of the warrants being offered in this offering, including the pre-funded warrants, and is subject in all respects to the provisions contained in the warrants.

*Form.* The warrants will be issued as individual warrant agreements to the investors. You should review the forms of warrants, which are filed as exhibits to the Registration Statement of which this prospectus forms a part, for a complete description of the terms and conditions applicable to the warrants.

*Exercisability.* The warrants are exercisable at any time after their original issuance, \_\_\_\_\_, 2013, and at any time up to the date that is \_\_\_\_\_ after their original issuance. The pre-funded warrants are exercisable at any time after their original issuance, \_\_\_\_\_, 2013, and at any time up to the date that is \_\_\_\_\_ after their original issuance. The warrants will be exercisable, at the option of each holder, in whole or in part by delivering to us a duly executed exercise notice and, at any time a registration statement registering the issuance of the shares of common stock underlying the warrants under the Securities Act is effective and available for the issuance of such shares, or an exemption from registration under the Securities Act is available for the issuance of such shares, by payment in full in immediately available funds for the number of shares of common stock purchased upon such exercise. If a registration statement registering the issuance of the shares of common stock underlying the warrants under the Securities Act is not effective or available and an exemption from registration under the Securities Act is not available for the issuance of such shares, the holder may, in its sole discretion, elect to exercise the warrant through a cashless exercise, in which case the holder would receive upon such exercise the net number of shares of common stock determined according to the formula set forth in the warrant. No fractional shares of common stock will be issued in connection with the exercise of a warrant. In lieu of fractional shares, we will pay the holder an amount in cash equal to the fractional amount multiplied by the exercise price.

*Exercise Limitations.* A holder will not have the right to exercise any portion of the warrant if the holder (together with its affiliates) would beneficially own in excess of 4.99% of the number of shares of our common stock outstanding immediately after giving effect to the exercise, as such percentage ownership

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is determined in accordance with the terms of the warrants. However, any holder may increase or decrease such percentage to any other percentage upon at least 61 days' prior notice from the holder to us. In addition, notwithstanding any election made by a holder, under the warrants we may not effect the exercise of, and a holder is not entitled to exercise, any portion of the warrants, to the extent that such exercise would result in the holder thereof (and its affiliates) beneficially owning more than 19.99% of the number of shares of our common stock outstanding or the combined voting power of our securities outstanding immediately after giving effect to the issuance of shares of common stock issuable upon exercise of the warrants. In the event that warrants are issued to the Pillar Entities in this offering, the 19.99% exercise limitation in those warrants will be increased to 35% if the Nasdaq Proposal is approved by our stockholders at our 2013 annual meeting of stockholders consistent with the terms of other warrants held by the Pillar Entities.

*Exercise Price.* The exercise price per whole share of common stock purchasable upon exercise of the warrants is \$ \_\_\_\_\_ per share of common stock. The exercise price per whole share of the common stock purchasable upon exercise of the pre-funded warrants is \$0.01 per share of common stock. All of the exercise price is subject to appropriate adjustment in the event of certain stock dividends and distributions, stock splits, stock combinations, reclassifications or similar events affecting our common stock and also upon any distributions of assets, including cash, stock or other property to our stockholders.

*Redemption.* Subject to the terms and conditions provided in the warrants, at any time on or after the date that is \_\_\_\_\_ months following their original issuance, we have a right to redeem all or a portion of any warrant then outstanding for \$0.01 per share of common stock issuable on exercise of the outstanding warrant following 30 days' prior written notice to the holder if the closing price of the common stock for 20 or more trading days in a period of 30 consecutive trading days is greater than or equal to \$ \_\_\_\_\_ (subject to adjustment). Each warrant holder's right to exercise the warrant will be forfeited upon payment of the redemption fee.

*Transferability.* Subject to applicable laws, the warrants may be offered for sale, sold, transferred or assigned without our consent.

*Exchange Listing.* We do not plan on applying to list the warrants on the Nasdaq Capital Market, any other national securities exchange or any other nationally recognized trading system.

*Fundamental Transactions.* In the event of a fundamental transaction, as described in the warrants and generally including any reorganization, recapitalization or reclassification of our common stock, the sale, transfer or other disposition of all or substantially all of our properties or assets, our consolidation or merger with or into another person, the acquisition of more than 50% of our outstanding common stock, or any person or group becoming the beneficial owner of 50% of the voting power represented by our outstanding common stock, the holders of the warrants will be entitled to receive upon exercise of the warrants the kind and amount of securities, cash or other property that the holders would have received had they exercised the warrants immediately prior to such fundamental transaction.

*Rights as a Stockholder.* Except as otherwise provided in the warrants or by virtue of such holder's ownership of shares of our common stock, the holder of a warrant does not have the rights or privileges of a holder of our common stock, including any voting rights, until the holder exercises the warrant.

## MATERIAL U.S. TAX CONSIDERATIONS FOR NON-U.S. HOLDERS OF COMMON STOCK

The following is a general discussion of material U.S. federal income and estate tax considerations relating to the ownership and disposition of our common stock by a non-U.S. holder. For purposes of this discussion, the term “non-U.S. holder” means a beneficial owner of our common stock that is not, for U.S. federal income tax purposes:

- an individual who is a citizen or resident of the United States;
- a corporation, or other entity treated as a corporation for U.S. federal income tax purposes, created or organized in or under the laws of the United States or of any political subdivision of the United States;
- an estate the income of which is subject to U.S. federal income taxation regardless of its source; or
- a trust, if a U.S. court is able to exercise primary supervision over the administration of the trust and one or more U.S. persons have authority to control all substantial decisions of the trust or if the trust has a valid election to be treated as a U.S. person under applicable U.S. Treasury regulations.

An individual may be treated as a resident instead of a nonresident of the United States in any calendar year for U.S. federal income tax purposes if the individual was present in the United States for at least 31 days in that calendar year and for an aggregate of at least 183 days during the three-year period ending with the current calendar year. For purposes of this calculation, all of the days present in the current year, one-third of the days present in the immediately preceding year and one-sixth of the days present in the second preceding year are counted. Residents are taxed for U.S. federal income tax purposes as if they were U.S. citizens.

This discussion is based on current provisions of the U.S. Internal Revenue Code of 1986, as amended, which we refer to as the Code, existing and proposed U.S. Treasury Regulations promulgated thereunder, current administrative rulings and judicial decisions, all as in effect as of the date of this prospectus and all of which are subject to change or to differing interpretation, possibly with retroactive effect. Any change could alter the tax consequences to non-U.S. holders described in this prospectus. In addition, the Internal Revenue Service, or the IRS, could challenge one or more of the tax consequences described in this prospectus.

We assume in this discussion that each non-U.S. holder holds shares of our common stock as a capital asset (generally, property held for investment). This discussion does not address all aspects of U.S. federal income and estate taxation that may be relevant to a particular non-U.S. holder in light of that non-U.S. holder’s individual circumstances nor does it address any aspects of U.S. state, local or non-U.S. taxes. This discussion also does not consider any specific facts or circumstances that may apply to a non-U.S. holder and does not address the special tax rules applicable to particular non-U.S. holders, such as:

- insurance companies;
- tax-exempt organizations;
- financial institutions;
- brokers or dealers in securities;
- regulated investment companies;
- pension plans;
- controlled foreign corporations;

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- passive foreign investment companies;
- owners that hold our common stock as part of a straddle, hedge, conversion transaction, synthetic security or other integrated investment; and
- certain U.S. expatriates.

In addition, this discussion does not address the tax treatment of partnerships or persons who hold their common stock through partnerships or other entities which are pass-through entities for U.S. federal income tax purposes. A partner in a partnership or other pass-through entity that will hold our common stock should consult his, her or its own tax advisor regarding the tax consequences of the ownership and disposition of our common stock through a partnership or other pass-through entity, as applicable.

### **Prospective investors should consult their own tax advisors regarding the U.S. federal, state, local and non-U.S. income and other tax considerations of acquiring, holding and disposing of our common stock.**

#### **Dividends**

If we pay distributions on our common stock, those distributions generally will constitute dividends for U.S. federal income tax purposes to the extent paid from our current or accumulated earnings and profits, as determined under U.S. federal income tax principles. If a distribution exceeds our current and accumulated earnings and profits, the excess will be treated as a tax-free return of the non-U.S. holder's investment, up to such holder's tax basis in the common stock. Any remaining excess will be treated as capital gain, subject to the tax treatment described below under the heading "Gain on Disposition of Common Stock." Any such distribution will also be subject to the discussion below under the heading "Withholding and Information Reporting Requirements – FATCA."

Dividends paid to a non-U.S. holder generally will be subject to withholding of U.S. federal income tax at a 30% rate or such lower rate as may be specified by an applicable income tax treaty between the United States and such holder's country of residence. If we determine, at a time reasonably close to the date of payment of a distribution on our common stock, that the distribution will not constitute a dividend because we do not anticipate having current or accumulated earnings and profits, we intend not to withhold any U.S. federal income tax on the distribution as permitted by U.S. Treasury Regulations.

Dividends that are treated as effectively connected with a trade or business conducted by a non-U.S. holder within the United States, and, if an applicable income tax treaty so provides, that are attributable to a permanent establishment or a fixed base maintained by the non-U.S. holder within the United States, are generally exempt from the 30% withholding tax if the non-U.S. holder satisfies applicable certification and disclosure requirements. However, such U.S. effectively connected income, net of specified deductions and credits, is taxed at the same graduated U.S. federal income tax rates applicable to U.S. persons (as defined in the Code). Any U.S. effectively connected income received by a non-U.S. holder that is a corporation may also, under certain circumstances, be subject to an additional "branch profits tax" at a 30% rate or such lower rate as may be specified by an applicable income tax treaty between the United States and such holder's country of residence.

A non-U.S. holder of our common stock who claims the benefit of an applicable income tax treaty between the United States and such holder's country of residence generally will be required to provide a properly executed IRS Form W-8BEN (or successor form) and satisfy applicable certification and other requirements. Non-U.S. holders are urged to consult their own tax advisors regarding their entitlement to benefits under a relevant income tax treaty.

A non-U.S. holder that is eligible for a reduced rate of U.S. withholding tax under an income tax treaty may obtain a refund or credit of any excess amounts withheld by timely filing an appropriate claim with the IRS.

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**Gain on Disposition of Common Stock**

A non-U.S. holder generally will not be subject to U.S. federal income tax on gain recognized on a disposition of our common stock unless:

- the gain is effectively connected with the non-U.S. holder's conduct of a trade or business in the United States, and, if an applicable income tax treaty so provides, the gain is attributable to a permanent establishment or fixed base maintained by the non-U.S. holder in the United States; in these cases, the non-U.S. holder will be taxed on a net income basis at the regular graduated rates and in the manner applicable to U.S. persons, and, if the non-U.S. holder is a foreign corporation, an additional branch profits tax at a rate of 30%, or a lower rate as may be specified by an applicable income tax treaty, may also apply;
- the non-U.S. holder is an individual present in the United States for 183 days or more in the taxable year of the disposition and certain other requirements are met, in which case the non-U.S. holder will be subject to a 30% tax (or such lower rate as may be specified by an applicable income tax treaty) on the net gain derived from the disposition, which may be offset by U.S.-source capital losses of the non-U.S. holder, if any; or
- we are or have been, at any time during the five-year period preceding such disposition (or the non-U.S. holder's holding period, if shorter) a "U.S. real property holding corporation" unless our common stock is regularly traded on an established securities market and the non-U.S. holder held no more than 5% of our outstanding common stock, directly or indirectly, during the shorter of the 5-year period ending on the date of the disposition or the period that the non-U.S. holder held our common stock. Generally, a corporation is a "U.S. real property holding corporation" if the fair market value of its "U.S. real property interests" equals or exceeds 50% of the sum of the fair market value of its worldwide real property interests plus its other assets used or held for use in a trade or business. Although there can be no assurance, we believe that we are not currently, and we do not anticipate becoming, a "U.S. real property holding corporation" for U.S. federal income tax purposes. No assurance can be provided that our common stock will be regularly traded on an established securities market for purposes of the rule described above.

**Information Reporting and Backup Withholding Tax**

We must report annually to the IRS and to each non-U.S. holder the gross amount of the distributions on our common stock paid to such holder and the tax withheld, if any, with respect to such distributions. Non-U.S. holders may have to comply with specific certification procedures to establish that the holder is not a U.S. person (as defined in the Code) in order to avoid backup withholding at the applicable rate, currently 28%, with respect to dividends on our common stock. Generally, a holder will comply with such procedures if it provides a properly executed IRS Form W-8BEN (or other applicable Form W-8) or otherwise meets documentary evidence requirements for establishing that it is a non-U.S. holder, or otherwise establishes an exemption. Dividends paid to non-U.S. holders subject to withholding of U.S. federal income tax, as described above under the heading "Dividends," will generally be exempt from backup withholding.

Information reporting and backup withholding generally will apply to the proceeds of a disposition of our common stock by a non-U.S. holder effected by or through the U.S. office of any broker, U.S. or foreign, unless the holder certifies its status as a non-U.S. holder and satisfies certain other requirements, or otherwise establishes an exemption. Generally, information reporting and backup withholding will not apply to a payment of disposition proceeds to a non-U.S. holder where the transaction is effected outside the United States through a non-U.S. office of a broker. However, for information reporting purposes, dispositions effected through a non-U.S. office of a broker with substantial U.S. ownership or operations generally will be treated in a manner similar to dispositions effected through a U.S. office of a

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broker. Non-U.S. holders should consult their own tax advisors regarding the application of the information reporting and backup withholding rules to them.

Copies of information returns may be made available to the tax authorities of the country in which the non-U.S. holder resides or is incorporated under the provisions of a specific treaty or agreement.

Backup withholding is not an additional tax. Any amounts withheld under the backup withholding rules from a payment to a non-U.S. holder can be refunded or credited against the non-U.S. holder's U.S. federal income tax liability, if any, provided that an appropriate claim is timely filed with the IRS.

**Withholding and Information Reporting Requirements – FATCA**

Recently enacted legislation, or FATCA, will impose U.S. federal withholding tax of 30% on payments of dividends on, and gross proceeds from the sale or disposition of, our common stock if paid to a foreign entity unless (i) if the foreign entity is a “foreign financial institution,” the foreign entity undertakes certain due diligence, reporting, withholding, and certification obligations, (ii) if the foreign entity is not a “foreign financial institution,” the foreign entity identifies certain of its U.S. investors, or (iii) the foreign entity is otherwise exempt under FATCA. Although this legislation is effective with regards to amounts paid after December 31, 2012, under final regulations issued by the U.S. Department of Treasury on January 17, 2013, withholding under FATCA will only apply (1) to payments of dividends on our common stock made after December 31, 2013 and (2) to payments of gross proceeds from a sale or other disposition of our common stock made after December 31, 2016. Under certain circumstances, a non-U.S. holder may be eligible for refunds or credits of such taxes.

Prospective investors should consult their own tax advisors regarding the possible impact of the FATCA rules on their investment in our common stock, and on the entities through which they hold our common stock, including, without limitation, the process and deadlines for meeting the applicable requirements to prevent the imposition of this 30% withholding tax under FATCA.

**Federal Estate Tax**

Common stock owned or treated as owned by an individual who is a non-U.S. holder (as specially defined for U.S. federal estate tax purposes) at the time of death will be included in the individual's gross estate for U.S. federal estate tax purposes and, therefore, may be subject to U.S. federal estate tax, unless an applicable estate tax or other treaty provides otherwise.

**The preceding discussion of material U.S. federal tax considerations is for general information only. It is not tax advice. Prospective investors should consult their own tax advisors regarding the particular U.S. federal, state, local and non-U.S. tax consequences of purchasing, holding and disposing of our common stock, including the consequences of any proposed changes in applicable laws.**

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**UNDERWRITING**

We are offering the shares of common stock and warrants, including the pre-funded warrants, described in this prospectus through Piper Jaffray & Co. as underwriter. Subject to the terms and conditions of the underwriting agreement, we have agreed to sell to the underwriter, and the underwriter has agreed to purchase from us, \_\_\_\_\_ shares of common stock, pre-funded warrants to purchase up to \_\_\_\_\_ shares of common stock and warrants to purchase up to \_\_\_\_\_ shares of common stock.

The underwriter is committed to purchase all the shares of common stock, pre-funded warrants and warrants offered by us if it purchases any shares of common stock, pre-funded warrants and warrants.

Certain of our existing principal stockholders and their affiliated entities have indicated an interest in purchasing up to \$2.5 million of shares of our common stock and warrants to purchase shares of our common stock in this offering at the public offering price. However, because indications of interest are not binding agreements or commitments to purchase, the underwriters could determine to sell more, less or no shares and warrants to any of these existing principal stockholders and any of these existing principal stockholders could determine to purchase more, less or no shares and warrants in this offering.

The underwriter has advised us that it proposes to offer the shares of common stock and warrants directly to the public at the public offering price set forth on the cover page of this prospectus and to certain dealers at that same price less a concession not in excess of a combined \$ \_\_\_\_\_ per share of common stock and related warrants. The underwriter may allow and the dealers may re-allow a concession of not more than a combined \$ \_\_\_\_\_ per share of common stock and related warrants on sales to certain other brokers and dealers. After the offering, these figures may be changed by the underwriter.

Each share of common stock is being offered together with a warrant to purchase up to \_\_\_\_\_ shares of our common stock and each pre-funded warrant is being offered together with a warrant to purchase up to \_\_\_\_\_ shares of common stock. The shares of common stock, warrants and pre-funded warrants will be issued separately and no CUSIP number will be issued for any unit of common stock, warrants and/or pre-funded warrants. There is no market through which the warrants or pre-funded warrants may be sold and purchasers may not be able to resell the warrants or pre-funded warrants purchased under this prospectus. The underwriters have advised us that they currently intend to make a market in the common stock. However, the underwriters are not obligated to do so and may discontinue market-making activities at any time without notice. No assurance can be given as to the liquidity of the trading market for the common stock.

The underwriting fee per share of common stock and related warrant is equal to the public offering price per share of common stock and related warrant, less the amount paid by the underwriter to us per share of common stock and related warrant and the underwriting fee per pre-funded warrant is equal to the public offering price per pre-funded warrant, less the amount paid by the underwriter to us per pre-funded warrant. The following table shows the (i) per combined share and related warrant underwriting discounts and commissions and (ii) total underwriting discounts and commissions to be paid to the underwriter in connection with this offering.

	<u>Per Combined Share and Related Warrant</u>	<u>Per Pre-Funded Warrant</u>	<u>Total</u>
Public offering price	\$	\$	\$
Underwriting discounts and commissions paid by us	\$	\$	\$
Proceeds to us, before expenses	\$	\$	\$

We are also offering to those purchasers, which propose to purchase shares of common stock in this offering that would result in the purchaser, together with its affiliates and certain related parties,



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beneficially owning more than 9.9% of our outstanding common stock following the consummation of this offering, the opportunity to purchase, in lieu of the shares of our common stock that would result in ownership in excess of 9.9%, warrants to purchase such excess shares of our common stock. The purchase price for each such pre-funded warrant would equal the per share public offering price for the common stock in this offering less the \$0.01 per share exercise price of each such pre-funded warrant, and the exercise price of these pre-funded warrants would equal \$0.01 per share.

We estimate that the total fees and expenses payable by us, excluding underwriting discounts and commissions, will be approximately \$ . Pursuant to the terms of the underwriting agreement, we have also agreed to reimburse the underwriter for expenses, including reasonable fees and disbursements of counsel, relating to this offering of up to \$150,000, which amount is included in the above total and shall not be increased without our prior written consent.

We have agreed to indemnify the underwriter against certain liabilities, including liabilities under the Securities Act, or to contribute to payments that the underwriter may be required to make in respect of those liabilities.

We and each of our directors and executive officers are subject to lock-up agreements that prohibit us and them from offering for sale, pledging, selling, contracting to sell, selling any option or contract to purchase, purchasing any option or contract to sell, granting any option, right or warrant to purchase, lend or otherwise transferring or disposing of, directly or indirectly, any shares of our common stock or any securities convertible into or exercisable or exchangeable for shares of our common stock, from entering into any swap or other agreement that transfers, in whole or in part, any of the economic consequences of ownership of the common stock, or making any demand for, or exercising any right with respect to, the registration of any shares of our common stock or any security convertible into or exercisable or exchangeable for common stock, or making any public announcement of the intention to do any of the foregoing, for a period of at least 90 days following the date of the underwriting agreement without the prior written consent of Piper Jaffray & Co. The lock-up agreements do not prohibit our directors and executive officers from transferring shares of our common stock for bona fide estate or tax planning purposes, subject to certain requirements, including that the transferee be subject to the same lock-up terms, participating in any exchange of “underwater” options with us, acquiring or exercising stock options issued pursuant to our existing stock option plans, or entering into plans that satisfy the requirements of Rule 10b5-1 under the Securities Exchange Act of 1934, as amended, provided that no sales are made under such plans during the lock-up period.

The lock-up agreements do not prohibit us from issuing shares upon the exercise or conversion of securities outstanding on the date of this prospectus. The lock-up provisions do not prevent us from selling shares to the underwriter pursuant to the underwriting agreement, or prevent us from granting options to acquire securities under our existing stock option plans or issuing shares upon the exercise or conversion of securities outstanding on the date of this prospectus.

The 90-day lock-up period in all of the lock-up agreements is subject to extension if (i) during the last 17 days of the lock-up period we issue an earnings release or material news or a material event relating to us occurs or (ii) prior to the expiration of the lock-up period, we announce that we will release earnings results during the 16-day period beginning on the last day of the lock-up period, in which case the restrictions imposed in these lock-up agreements shall continue to apply until the expiration of the 18-day period beginning on the issuance of the earnings release or the occurrence of the material news or material event, if, within three days of that issuance or occurrence, Piper Jaffray & Co. publishes or otherwise distributes a research report or makes a public appearance concerning us, unless Piper Jaffray & Co. waives the extension in writing.

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Our shares are quoted on the Nasdaq Capital Market under the symbol “IDRA.”

To facilitate the offering, the underwriter may engage in transactions that stabilize, maintain or otherwise affect the price of our common stock during and after the offering. Specifically, the underwriter may over-allot or otherwise create a short position in the common stock for its own account by selling more shares of common stock than we have sold to it. Short sales involve the sale by the underwriter of a greater number of shares than it is required to purchase in the offering. The underwriter may close out any short position by either exercising its option to purchase additional shares or purchasing shares in the open market.

The underwriter may also engage in passive market making transactions in our common stock. Passive market making consists of displaying bids on the Nasdaq Capital Market limited by the prices of independent market makers and effecting purchases limited by those prices in response to order flow. Rule 103 of Regulation M promulgated by the SEC limits the amount of net purchases that each passive market maker may make and the displayed size of each bid. Passive market making may stabilize the market price of our common stock at a level above that which might otherwise prevail in the open market and, if commenced, may be discontinued at any time.

This prospectus in electronic format may be made available on web sites maintained by the underwriter, and the underwriter may distribute prospectus supplements electronically.

From time to time in the ordinary course of their respective businesses, the underwriter and certain of its affiliates may in the future engage in commercial banking or investment banking transactions with us and our affiliates.

## LEGAL MATTERS

The validity of the securities offered hereby will be passed upon for us by Wilmer Cutler Pickering Hale and Dorr LLP, Boston, Massachusetts. Dechert LLP, New York, New York, has acted as counsel for the underwriters in connection with certain legal matters related to this offering.

## EXPERTS

The financial statements of Idera Pharmaceuticals, Inc. at December 31, 2012 and 2011, and for each of the three years in the period ended December 31, 2012, appearing in this Prospectus and Registration Statement have been audited by Ernst & Young LLP, independent registered public accounting firm, as set forth in their report thereon, (which contains an explanatory paragraph describing conditions that raise substantial doubt about the Company's ability to continue as a going concern as described in Note 1 to the financial statements) appearing elsewhere herein, and are included in reliance upon such report given on the authority of such firm as experts in accounting and auditing.

## WHERE YOU CAN FIND MORE INFORMATION

We have filed with the SEC a registration statement on Form S-1 under the Securities Act to register our common stock being offered in this prospectus. This prospectus, which constitutes a part of the registration statement, does not contain all the information set forth in the registration statement or the exhibits and schedules filed thereto. For further information about us and our securities offered by this prospectus, we refer you to the registration statement and the exhibits and schedules filed with the registration statement. Any statement contained in this prospectus regarding the contents of any contract or any other document that is filed as an exhibit to the registration statement is not necessarily complete and each such statement is qualified in all respects by reference to the full text of such contract or other document filed as an exhibit to the registration statement.

You may read and copy any materials we file with the SEC, including the registration statement, at the SEC's Public Reference Room at 100 F Street, NE, Washington, D.C. 20549, on official business days during the hours of 10:00 a.m. to 3:00 p.m. You may obtain information on the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. The SEC also maintains an Internet website that contains reports, proxy statements and other information about issuers, like us, that file electronically with the SEC. The address of that website is <http://www.sec.gov>. Information on or accessible through the SEC's website is not a part of this prospectus. You may also inspect our SEC reports and other information at our website at [www.iderapharma.com](http://www.iderapharma.com). Information on or accessible through our website is not a part of this prospectus.

We are subject to the information reporting requirements of the Securities Exchange Act of 1934, as amended, and file reports, proxy statements and other information with the SEC. These reports, proxy statements and other information are available for inspection and copying at the public reference room and website of the SEC referred to above.

## INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

The following documents filed by us with the SEC are incorporated by reference into this prospectus. You should carefully read and consider all of these documents before making an investment decision:

- our annual report on Form 10-K for the year ended December 31, 2012;
- an amendment on Form 10-K/A to our annual report on Form 10-K for the year ended December 31, 2012;
- the descriptions of our capital stock contained in (a) our Registration Statement on Form 8-A filed December 4, 2003, as amended on August 17, 2007 and as further amended on December 7, 2007, (b) Item 5.03 of our Current Report on Form 8-K filed November 10, 2011 and (c) Item 5.03 of our Current Report on Form 8-K filed November 14, 2012, including any amendments or reports filed for the purpose of updating such descriptions; and
- our current report on Form 8-K filed April 23, 2013.

Nothing in this prospectus shall be deemed to incorporate information deemed furnished but not filed with the SEC. Any statement contained in a document that is incorporated by reference will be modified or superseded for all purposes to the extent that a statement contained in this prospectus modifies or is contrary to that previous statement. Any statement so modified or superseded will not be deemed a part of this prospectus except as so modified or superseded.

We will provide to each person, including any beneficial owner, to whom a prospectus is delivered, a copy of any or all of the reports or documents that have been incorporated by reference into this prospectus but not delivered with this prospectus. We will provide these reports upon written or oral request at no cost to the requester. Please direct your request, either in writing or by telephone, to Investor Relations, Idera Pharmaceuticals, Inc., 167 Sidney Street, Cambridge, Massachusetts 02139, telephone number (617) 679-5500.

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**IDERA PHARMACEUTICALS, INC.**  
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**December 31, 2012**

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**REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM**

The Board of Directors and Stockholders of Idera Pharmaceuticals, Inc.

We have audited the accompanying balance sheets of Idera Pharmaceuticals, Inc. as of December 31, 2012 and 2011, and the related statements of operations and comprehensive loss, stockholders' equity, and cash flows for each of the three years in the period ended December 31, 2012. 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 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. We were not engaged to perform an audit of the Company's internal control over financial reporting. Our audits included consideration of internal control over financial reporting as a basis for designing audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion. An audit also 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.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of Idera Pharmaceuticals, Inc. at December 31, 2012 and 2011, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2012, in conformity with U.S. generally accepted accounting principles.

The accompanying financial statements have been prepared assuming that the Company will continue as a going concern. As more fully described in Note 1 to the financial statements, the Company has recurring losses and negative cash flows from operations and will be required to raise additional capital or alternative means of financial support, or both, prior to December 31, 2013 in order to continue to fund its operations. These factors raise substantial doubt about the Company's ability to continue as a going concern. Management's plans in regard to these matters are also described in Note 1. The financial statements do not include any adjustments that might result from the outcome of this uncertainty.

/s/ ERNST & YOUNG LLP

Boston, Massachusetts  
March 11, 2013

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**IDERA PHARMACEUTICALS, INC.**  
**BALANCE SHEETS**

(In thousands, except per share amounts)	December 31, 2012	December 31, 2011
<b>ASSETS</b>		
Current assets:		
Cash and cash equivalents	\$ 10,096	\$ 24,571
Prepaid expenses and other current assets	198	255
Total current assets	10,294	24,826
Property and equipment, net	218	458
Restricted cash	311	311
Total assets	<u>\$ 10,823</u>	<u>\$ 25,595</u>
<b>LIABILITIES, REDEEMABLE PREFERRED STOCK AND STOCKHOLDERS' EQUITY</b>		
Current liabilities:		
Accounts payable	\$ 1,129	\$ 1,203
Accrued expenses	3,002	4,882
Total current liabilities	4,131	6,085
Warrant liability	—	1,178
Other liabilities	65	387
Total liabilities	4,196	7,650
Commitments and contingencies (Note 8)		
Series D Redeemable Convertible Preferred Stock, \$0.01 par value, Designated, issued and outstanding — 1,124 shares; Redemption Amount \$9,149 and Liquidation preference \$9,338 at December 31, 2012	5,921	5,921
Non-redeemable Preferred Stock, Common Stock, and Other Stockholders' equity:		
Preferred stock, \$0.01 par value, Authorized — 5,000 shares		
Series E convertible preferred stock, Designated, issued and outstanding — 424 and zero shares at December 31, 2012 and 2011, respectively; Liquidation preference \$5,980 at December 31, 2012	3,701	—
Series A convertible preferred stock, Designated — 1,500 shares, Issued and outstanding — 1 share	—	—
Common stock, \$0.001 par value, Authorized — 140,000 and 70,000 shares at December 31, 2012 and 2011, respectively Issued and outstanding — 27,643 and 27,637 shares at December 31, 2012 and 2011, respectively	28	28
Additional paid-in capital	391,635	387,414
Accumulated deficit	(394,658)	(375,418)
Total stockholders' equity	706	12,024
Total liabilities, redeemable preferred stock and stockholders' equity	<u>\$ 10,823</u>	<u>\$ 25,595</u>

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

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**IDERA PHARMACEUTICALS, INC.**  
**STATEMENTS OF OPERATIONS AND COMPREHENSIVE LOSS**

(In thousands, except per share amounts)	Years Ended December 31,		
	2012	2011	2010
Alliance revenue	\$ 51	\$ 53	\$ 16,110
Operating expenses:			
Research and development	13,673	17,969	24,226
General and administrative	6,279	7,939	9,867
Total operating expenses	<u>19,952</u>	<u>25,908</u>	<u>34,093</u>
Loss from operations	(19,901)	(25,855)	(17,983)
Other income (expense):			
Decrease in fair value of warrant liability	675	1,974	—
Investment income, net	9	30	116
Interest expense	—	—	(2)
Foreign currency exchange (loss) gain	(23)	75	(94)
Net loss	(19,240)	(23,776)	(17,963)
Preferred stock accretion and dividends	3,210	4,548	—
Net loss applicable to common stockholders	<u>\$ (22,450)</u>	<u>\$ (28,324)</u>	<u>\$ (17,963)</u>
Net loss per common share applicable to common stockholders (Note 11):			
Basic	<u>\$ (0.81)</u>	<u>\$ (1.03)</u>	<u>\$ (0.71)</u>
Diluted	<u>\$ (0.81)</u>	<u>\$ (1.03)</u>	<u>\$ (0.71)</u>
Shares used in computing net loss per common share applicable to common stockholders:			
Basic	<u>27,639</u>	<u>27,623</u>	<u>25,139</u>
Diluted	<u>27,639</u>	<u>27,623</u>	<u>25,139</u>
Net loss	(19,240)	(23,776)	(17,963)
Other comprehensive (loss) income:			
(Decrease) increase in unrealized gain on available-for-sale securities	—	(13)	32
Other comprehensive (loss) income	—	(13)	32
Comprehensive loss	<u>\$ (19,240)</u>	<u>\$ (23,789)</u>	<u>\$ (17,931)</u>

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



**IDERA PHARMACEUTICALS, INC.**  
**STATEMENTS OF STOCKHOLDERS' EQUITY**

(In thousands)	Series E Convertible Preferred Stock		Common Stock		Additional Paid-In Capital	Accumulated Deficit	Accumulated Other Comprehensive (Loss)/Income	Total Stockholders' Equity
	Number of Shares	Amount	Number of Shares	\$0.001 Par Value				
<b>Balance, December 31, 2009</b>	—	—	23,479	\$ 23	\$ 366,780	\$ (333,679)	\$ (19)	\$ 33,105
Sale of common stock and warrants, net of issuance costs	—	—	4,071	5	14,084	—	—	14,089
Exercise of common stock options, warrants and employee stock purchases	—	—	44	—	132	—	—	132
Issuance of common stock for services	—	—	2	—	8	—	—	8
Non-employee stock option expense	—	—	—	—	14	—	—	14
Stock-based compensation	—	—	—	—	3,684	—	—	3,684
Unrealized gain on marketable securities	—	—	—	—	—	—	32	32
Net loss	—	—	—	—	—	(17,963)	—	(17,963)
<b>Balance, December 31, 2010</b>	—	—	27,596	\$ 28	\$ 384,702	\$ (351,642)	\$ 13	\$ 33,101
Exercise of common stock options, warrants and employee stock purchases	—	—	26	—	51	—	—	51
Issuance of common stock for services	—	—	15	—	38	—	—	38
Non-employee stock option expense	—	—	—	—	1	—	—	1
Stock-based compensation	—	—	—	—	2,725	—	—	2,725
Series D redeemable preferred stock beneficial conversion feature	—	—	—	—	4,445	—	—	4,445
Series D redeemable preferred stock accretion and dividends	—	—	—	—	(4,548)	—	—	(4,548)
Decrease in unrealized gain on marketable securities	—	—	—	—	—	—	(13)	(13)
Net loss	—	—	—	—	—	(23,776)	—	(23,776)
<b>Balance, December 31, 2011</b>	—	—	27,637	\$ 28	\$ 387,414	\$ (375,418)	\$ —	\$ 12,024
Exercise of common stock options, warrants and employee stock purchases	—	—	5	—	4	—	—	4
Issuance of common stock for services	—	—	1	—	1	—	—	1
Non-employee stock option expense	—	—	—	—	5	—	—	5
Stock-based compensation	—	—	—	—	2,096	—	—	2,096
Series D redeemable preferred stock beneficial conversion feature	—	—	—	—	1,238	—	—	1,238
Series D redeemable preferred stock accretion and dividends	—	—	—	—	(1,908)	—	—	(1,908)
Transfer of Series D warrant to equity	—	—	—	—	503	—	—	503
Sale of Series E preferred stock and warrants, net of issuance costs	424	\$ 3,701	—	—	2,322	—	—	6,023
Series E preferred stock beneficial conversion feature	—	(1,262)	—	—	1,262	—	—	—
Series E redeemable preferred stock accretion and dividends	—	1,262	—	—	(1,302)	—	—	(40)
Net loss	—	—	—	—	—	(19,240)	—	(19,240)
<b>Balance, December 31, 2012</b>	<b>424</b>	<b>\$ 3,701</b>	<b>27,643</b>	<b>\$ 28</b>	<b>\$ 391,635</b>	<b>\$ (394,658)</b>	<b>\$ —</b>	<b>\$ 706</b>

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

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**IDERA PHARMACEUTICALS, INC.**  
**STATEMENTS OF CASH FLOWS**

(In thousands)	Years Ended December 31,		
	2012	2011	2010
<b>Cash Flows from Operating Activities:</b>			
Net loss	\$ (19,240)	\$ (23,776)	\$ (17,963)
Adjustments to reconcile net loss to net cash used in operating activities —			
Loss from disposition of assets	4	1	2
Non-employee stock option expense	5	1	14
Stock-based compensation	2,096	2,725	3,684
Cost of regaining rights to cancer program	—	2,423	—
Decrease in fair value of warrant liability	(675)	(1,974)	—
Issuance of common stock for services rendered	1	38	8
Amortization of investment premiums	—	62	253
Depreciation expense	251	494	546
Changes in operating assets and liabilities —			
Accounts receivable	—	—	4,495
Prepaid expenses and other current assets	57	640	139
Accounts payable, accrued expenses, and other liabilities	(2,415)	174	1,431
Deferred revenue	—	—	(12,165)
Net cash used in operating activities	(19,916)	(19,192)	(19,556)
<b>Cash Flows from Investing Activities:</b>			
Purchases of available-for-sale securities	—	(1,025)	(10,319)
Proceeds from maturity of available-for-sale securities	—	18,585	7,200
Decrease in restricted cash	—	102	103
Purchases of property and equipment	—	(23)	(92)
Net cash provided by (used in) investing activities	—	17,639	(3,108)
<b>Cash Flows from Financing Activities:</b>			
Sale of Series E convertible preferred stock and warrants, net of issuance costs	6,023	—	—
Sale of Series D redeemable convertible preferred stock and warrants, net of issuance costs	—	9,073	—
Sale of common stock and warrants, net of issuance costs	—	—	14,089
Proceeds from exercise of common stock options and employee stock purchases	4	51	132
Dividends paid	(583)	—	—
Payments on capital lease	(3)	(8)	(20)
Net cash provided by financing activities	5,441	9,116	14,201
Net (decrease) increase in cash and cash equivalents	(14,475)	7,563	(8,463)
Cash and cash equivalents, beginning of year	24,571	17,008	25,471
Cash and cash equivalents, end of year	<u>\$ 10,096</u>	<u>\$ 24,571</u>	<u>\$ 17,008</u>

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

**IDERA PHARMACEUTICALS, INC.**  
**NOTES TO FINANCIAL STATEMENTS**  
**December 31, 2012**

**1. Organization**

Idera Pharmaceuticals, Inc. (Idera or the Company) is a clinical stage biotechnology company engaged in the discovery and development of novel synthetic DNA- and RNA-based drug candidates that are designed to modulate immune responses mediated through Toll-like Receptors, or TLRs. The Company is focusing its development efforts on the treatment of autoimmune and inflammatory diseases. The Company has two drug candidates, IMO-3100, a TLR7 and TLR9 antagonist, and IMO-8400, a TLR7, TLR8, and TLR9 antagonist, in clinical development for the treatment of autoimmune and inflammatory diseases. The Company recently announced top-line data from a Phase 2 clinical trial of IMO-3100 in patients with moderate to severe plaque psoriasis. The Company believes that the results of this trial provide clinical proof of concept for its approach of targeting specific TLRs for the treatment of psoriasis and potentially other autoimmune and inflammatory diseases.

TLRs are specific receptors present in immune system cells. Using a chemistry-based approach, the Company has created synthetic DNA- and RNA-based compounds that are targeted to TLR3, TLR7, TLR8, and TLR9. A TLR antagonist is a compound that blocks activation of an immune response through the targeted TLR. A TLR agonist is a compound that stimulates an immune response through the targeted TLR.

The Company believes that the modulation of immune responses through TLRs provides a rationale for the development of drug candidates to treat a broad range of diseases, including autoimmune and inflammatory diseases, cancer, respiratory diseases, and for use as vaccine adjuvants. The Company is a party to a collaboration alliance with Merck Sharp & Dohme Corp. (formerly Merck & Co., Inc.) (Merck & Co.) for the use of agonists of TLR7, TLR8, and TLR9 as adjuvants in the development of vaccines for cancer, infectious diseases, and Alzheimer's disease. The Company is seeking to enter into additional collaborative alliances with third parties with respect to its TLR-targeted programs in oncology, hematological malignancies, respiratory diseases, and the use of TLR3 agonists as vaccine adjuvants.

The Company had cash and cash equivalents of approximately \$10,096,000 at December 31, 2012. The Company believes that its existing cash and cash equivalents will be sufficient to fund its operations at least into the third quarter of 2013 based on its current operating plan, including the completion of its ongoing Phase 1 clinical trial of IMO-8400 in healthy subjects that it initiated in the fourth quarter of 2012, and preparations for the further advancement of its autoimmune and inflammatory disease program, including preparations for a planned Phase 2 clinical trial of IMO-8400 in patients with psoriasis. The Company will need to raise additional funds prior to the end of the second quarter of 2013 in order to further advance its autoimmune and inflammatory disease program, commence any clinical trials and operate its business and continue as a going concern. Although the Company is exploring financing alternatives, financing may not be available to the Company in the necessary time frame, in the amounts that the Company needs, on terms that are acceptable to the Company or at all. If the Company is unable to raise the necessary funds by late in the second quarter of 2013, the Company expects that it will terminate its operations and pursue a liquidation of the Company through a sale or license of assets or a possible bankruptcy.

At December 31, 2012, the Company had an accumulated deficit of \$394,658,000. The Company expects to incur substantial operating losses in future periods. The Company does not expect to generate significant product revenue or sales-based milestones or royalties until it successfully completes development and obtains marketing approval for drug candidates, either alone or in collaborations with third parties, which it expects will take a number of years. In order to commercialize its drug candidates, the Company needs to complete clinical development and to comply with comprehensive regulatory requirements.

**IDERA PHARMACEUTICALS, INC.**  
**NOTES TO FINANCIAL STATEMENTS — (Continued)**

The Company is subject to a number of risks and uncertainties similar to those of other companies of the same size within the biotechnology industry, such as uncertainty of clinical trial outcomes, uncertainty of additional funding, and history of operating losses.

**2. Summary of Significant Accounting Policies**

*(a) Basis of Presentation*

The preparation of financial statements in conformity with accounting principles generally accepted in the United States requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

*(b) Cash, Cash Equivalents and Short-Term Investments*

The Company considers all highly liquid investments with maturities of 90 days or less when purchased to be cash equivalents. Cash and cash equivalents at December 31, 2012 and 2011 consisted of cash and money market funds.

Management determines the appropriate classification of marketable securities at the time of purchase. Investments that the Company does not have the positive intent to hold to maturity are classified as “available-for-sale” and reported at fair market value. Unrealized gains and losses associated with available-for-sale investments are recorded in “Accumulated other comprehensive income” on the accompanying balance sheets. The amortization of premiums and accretion of discounts, and any realized gains and losses and declines in value judged to be other-than-temporary, and interest and dividends for all available-for-sale securities are included in “Investment income, net” on the accompanying statements of operations. Investments that the Company intends to hold to maturity are classified as “held-to-maturity” investments. The Company had no “held-to-maturity” or other investments at either December 31, 2012 or 2011. The cost of securities sold is based on the specific identification method.

The Company had no realized gains or losses from available-for-sale securities in 2012, 2011 or 2010. There were no losses or other-than-temporary declines in value included in “Investment income, net” for any securities for the three years ended December 31, 2012. The Company had no auction rate securities as of December 31, 2012 and 2011.

*(c) Restricted Cash*

As part of the Company’s lease arrangement for its office and laboratory facility, the Company is required to restrict cash for a security deposit. As of December 31, 2012 and 2011, the restricted cash amounted to \$311,000 held in certificates of deposit securing a line of credit for the lessor.

*(d) Depreciation and Amortization*

Depreciation and amortization are computed using the straight-line method based on the estimated useful lives of the related assets. Laboratory and other equipment are depreciated over three to five years. Leasehold improvements are amortized over the remaining lease term or the related useful life, if shorter.

**IDERA PHARMACEUTICALS, INC.**  
**NOTES TO FINANCIAL STATEMENTS — (Continued)**

*(e) Revenue Recognition*

An important part of the Company's business strategy is to enter into research and development collaborations with biotechnology and pharmaceutical corporations that bring expertise and resources to the potential research and development and commercialization of drugs based on the Company's technology. Under the Company's research and development collaborations, the Company has generally licensed specified portions of its intellectual property and provided research and development services to the collaborator during the period of continued involvement in the early portion of the collaborations. The collaborators have generally been responsible for drug development activities initiated after the collaboration is effective. The collaborators are also generally responsible for any commercialization activities that may be initiated if any of the drug candidates receive marketing approval from the appropriate regulatory authority. The terms of these agreements may include non-refundable license fees, research and development funding, payments based upon achievement of clinical and preclinical development milestones and royalties on product sales.

When evaluating multiple element arrangements prior to adopting new revenue accounting standards on January 1, 2011, the Company considered whether the components of the arrangement represented separate units of accounting. The Company recognized revenue from non-refundable upfront fees received under collaboration agreements, not specifically tied to a separate earnings process, ratably over the term of the contractual obligation or the Company's estimated continuing involvement under the research collaboration. If the estimated period of continuing involvement was subsequently modified, the period over which the upfront fee was recognized was modified accordingly on a prospective basis. The Company recognized revenue from reimbursements earned in connection with research and development collaboration agreements as related research and development costs were incurred, and contractual services were performed, provided collectability was reasonably assured. For payments that were specifically associated with a separate earnings process, the Company recognized revenue when the specific performance obligation was completed. Performance obligations typically consisted of significant milestones in the development life cycle of the related technology, such as initiating clinical trials, filing for approval with regulatory agencies, and obtaining approvals from regulatory agencies. The Company recognized revenue from milestone payments received under collaboration agreements when earned, provided that the milestone event was substantive, its achievability was not reasonably assured at the inception of the agreement, it had no further performance obligations relating to the event, and collectability was reasonably assured. Amounts received prior to satisfying the above revenue recognition criteria were recorded as deferred revenue in the Company's balance sheet.

Under the Company's recent collaborative arrangements, the Company has received non-refundable license fees, milestone payments, reimbursements of certain internal and external research and development expenses and patent-related expenses. The Company is also entitled to receive royalties on product sales. The Company classifies all of these amounts as revenue since it considers licensing intellectual property and providing research and development and patent-related services to be part of its central business operations. For the year ended December 31, 2010, alliance revenue consisted primarily of revenue recognized under the collaboration with Merck KGaA, Darmstadt, Germany (Merck KGaA), which was terminated in November 2011, and the collaboration with Merck & Co. Since the Company completed the research portions of these collaborations during 2010, all of the upfront license fee payments under the collaborations were fully amortized and recognized by December 2010. Consequently, the amount of license fee revenue that the Company recognized under the Merck KGaA and Merck & Co. collaborations decreased in 2010 and the Company did not recognize any license fee revenue under the Merck KGaA and Merck & Co. collaborations during 2012 and 2011. For the years ended December 31, 2012 and 2011, alliance revenue consisted primarily of other revenue from the

**IDERA PHARMACEUTICALS, INC.**  
**NOTES TO FINANCIAL STATEMENTS — (Continued)**

reimbursement by licensees of costs associated with patent maintenance. Alliance revenue for 2012, 2011 and 2010, including revenue recognized under the Company's collaborative arrangements with Merck KGaA and Merck & Co. during 2010, was as follows:

(In thousands)	December 31,		
	2012	2011	2010
Merck KGaA	\$ —	\$ —	\$ 11,173
Merck & Co.	—	—	4,768
Total collaboration revenue	—	—	15,941
Other revenue	51	53	169
Total alliance revenue	\$ 51	\$ 53	\$ 16,110

During the year ended December 31, 2010, the Company incurred approximately \$26,000 in third-party expenses in connection with its collaborative arrangements. The Company did not incur any such expenses in the corresponding 2012 and 2011 periods. These third-party expenses are classified as research and development and general and administrative expenses.

The Company adopted Accounting Standard Update (ASU) No. 2009-13, "Multiple-Element Revenue Arrangements" and ASU No. 2010-17, "Milestone Method of Revenue Recognition" on January 1, 2011. These new accounting standards did not affect revenue that the Company earned through December 31, 2012. The Company plans to follow No. 2009-13 prospectively for any arrangements entered into or materially modified after the adoption date. The Company plans to follow ASU No. 2010-17 prospectively for any future milestones.

Additional information on the Company's collaborative arrangements is included in Note 5.

*(f) Financial Instruments*

The fair value of the Company's financial instruments is determined and disclosed in accordance with the three-tier fair value hierarchy specified in note 2(m). The Company is required to disclose the estimated fair values of its financial instruments. The Company's financial instruments consist of cash and cash equivalents, receivables and, at December 31, 2011, a warrant liability. The estimated fair values of these financial instruments approximate their carrying values as of December 31, 2012 and 2011, respectively. As of December 31, 2012 and 2011, the Company did not have any derivatives, hedging instruments or other similar financial instruments except for the warrant liability, at December 31, 2011, discussed in note 2(m), the Series D redeemable convertible preferred stock, the (Series D preferred stock), embedded features discussed in note 6(a) and the Series E convertible preferred stock, the (Series E preferred stock) embedded features discussed in note 7(g).

*(g) Comprehensive Income (Loss)*

Comprehensive income (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. Comprehensive income (loss) for the years ended December 31, 2012, 2011 and 2010 is comprised of reported net income (loss) and any change in net unrealized gains and losses on investments during each year, which is included in "Accumulated other comprehensive income" on the accompanying balance sheets.

**IDERA PHARMACEUTICALS, INC.**  
**NOTES TO FINANCIAL STATEMENTS — (Continued)**

Effective January 1, 2012, the Company adopted Accounting Standard Update No. 2011-05, “Comprehensive Income” (ASU No. 2011-05), which requires companies to present the components of net income and other comprehensive income either as one continuous statement or as two consecutive statements. ASU No. 2011-05 is applied retroactively to all periods presented. ASU No. 2011-05 eliminates the option to present components of other comprehensive income as part of the statement of changes in stockholders’ equity. The update does not change the items which must be reported in other comprehensive income, how such items are measured or when they must be reclassified to net income. The Company adopted ASU No. 2011-05 by presenting the components of net income and other comprehensive income as one continuous statement. The adoption of ASU No. 2011-05 did not have a material impact on the Company’s financial position or results of operations.

The following table includes the changes in the accumulated balance of the component of other comprehensive loss for the years ended December 31, 2011 and 2010:

<u>(In thousands)</u>	<u>Year ended December 31,</u>	
	<u>2011</u>	<u>2010</u>
Accumulated unrealized gain (loss) on available-for-sale securities at beginning of period	\$ 13	\$ (19)
Change during the period	<u>(13)</u>	<u>32</u>
Accumulated unrealized gain on available-for-sale securities at end of period	<u>\$ —</u>	<u>\$ 13</u>

There was no accumulated unrealized gain or loss on available-for-sale securities during 2012.

*(h) Net Income (Loss) per Common Share applicable to Common Stockholders*

Basic and diluted net loss per common share applicable to common stockholders is computed using the weighted average number of shares of common stock outstanding during the period. Diluted net loss per common share applicable to common stockholders is the same as basic net loss per common share applicable to common stockholders for each of the three years ended December 31, 2012 as the effects of the Company’s potential common stock equivalents are antidilutive (see Note 11).

*(i) Segment Reporting*

The Company views its operations and manages its business as one operating segment. Accordingly, the Company operates in one segment, which is the business of discovering and developing novel therapeutics that modulate immune responses through TLRs. As a result, the financial information disclosed herein represents all of the material financial information related to the Company’s principal operating segment. For all of the periods presented, all of the Company’s revenues were generated in the United States. As of December 31, 2012 and 2011, all assets were located in the United States.

*(j) Stock-Based Compensation*

The Company recognizes all share-based payments to employees and directors as expense in the statements of operations and comprehensive loss based on their fair values. The Company records compensation expense over an award’s requisite service period, or vesting period, based on the award’s fair value at the date of grant. The Company’s policy is to charge the fair value of stock options as an expense, adjusted for forfeitures, on a straight-line basis over the vesting period, which is generally four

**IDERA PHARMACEUTICALS, INC.**  
**NOTES TO FINANCIAL STATEMENTS — (Continued)**

years for employees and three years for directors. Prior to December 2011, the vesting of all of the Company's stock options was based on the passage of time and the employees' continued service. In December 2011 and January 2012, the Company granted performance-based stock options to purchase 697,500 shares of common stock to employees. As of the grant date of such options, options to purchase 174,375 shares were to vest immediately upon the achievement of various performance conditions and options to purchase 523,125 shares were to vest over a three year service period upon the achievement of the same performance conditions. During 2012 three of the specified performance conditions were achieved. As a result, options to purchase 80,213 shares vested immediately and options to purchase 240,640 shares began vesting over a three-year period in accordance with the terms of the performance-based options. In addition, during 2012, four of the specified performance conditions were not met by their deadlines resulting in the cancellation of 156,797 performance-based options. The Company recognizes expense over the implicit and explicit service periods for awards with performance conditions when the Company determines the achievement of the performance conditions to be probable.

The Company recorded charges of \$2,096,000, \$2,725,000, and \$3,684,000 for the years ended December 31, 2012, 2011 and 2010, respectively, for stock-based compensation expense attributable to share-based payments made to employees and directors.

The fair value of each option award is estimated on the date of grant using the Black-Scholes option-pricing model. The following assumptions apply to the options to purchase 187,500, 1,671,000, and 1,087,000 shares of common stock granted to employees and directors during the years ended December 31, 2012, 2011 and 2010, respectively:

	<u>2012</u>	<u>2011</u>	<u>2010</u>
Average risk free interest rate	0.8%	1.4%	2.1%
Expected dividend yield	—	—	—
Expected lives (years)	5.6	6.3	4.9
Expected volatility	62%	64%	68%
Weighted average grant date fair value of options granted during the period (per share)	\$0.51	\$0.75	\$1.69
Weighted average exercise price of options granted during the period (per share)	\$0.92	\$1.26	\$2.95

The expected lives of the options and the expected volatility are based on historical experience. All options granted during the three years ended December 31, 2012 were granted at exercise prices equal to the fair market value of the common stock on the dates of grant.

The fair value of options that vested during 2012, 2011 and 2010 amounted to \$2,123,000, \$2,707,000 and \$3,915,000, respectively. As of December 31, 2012, there was \$1,546,000 of unrecognized compensation cost related to nonvested stock-based compensation arrangements, which the Company expects to recognize over a weighted average period of 1.8 years.

*(k) Research and Development Expenses*

All research and development expenses, including amounts funded by research collaborations, are expensed as incurred. Research and development expenses are comprised of costs incurred in performing research and development activities, including drug development trials and studies, drug manufacturing, laboratory supplies, external research, payroll including stock-based compensation and overhead.



**IDERA PHARMACEUTICALS, INC.**  
**NOTES TO FINANCIAL STATEMENTS — (Continued)**

*(l) Concentration of Credit Risk*

Financial instruments that subject the Company to credit risk primarily consist of cash and cash equivalents and investments. The Company's credit risk is managed by investing its cash and cash equivalents and marketable securities in highly rated money market instruments, certificates of deposit, corporate bonds, and debt securities. Due to these factors, no significant additional credit risk is believed by management to be inherent in the Company's assets. As of December 31, 2012, all of the Company's cash and cash equivalents are held at one financial institution.

*(m) Fair Value of Assets and Liabilities*

The Company measures fair value at the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date using assumptions that market participants would use in pricing the asset or liability (the "inputs") into a three-tier fair value hierarchy. This fair value hierarchy gives the highest priority (Level 1) to quoted prices in active markets for identical assets or liabilities and the lowest priority (Level 3) to unobservable inputs in which little or no market data exists, requiring companies to develop their own assumptions. Observable inputs that do not meet the criteria of Level 1, and include quoted prices for similar assets or liabilities in active markets or quoted prices for identical assets and liabilities in markets that are not active, are categorized as Level 2. Level 3 inputs are those that reflect the Company's estimates about the assumptions market participants would use in pricing the asset or liability, based on the best information available in the circumstances. Valuation techniques for assets and liabilities measured using Level 3 inputs may include unobservable inputs such as projections, estimates and management's interpretation of current market data. These unobservable Level 3 inputs are only utilized to the extent that observable inputs are not available or cost-effective to obtain.

Effective January 1, 2012, the Company adopted, on a prospective basis, Accounting Standards Update No. 2011-04, "Fair Value Measurement (Topic 820)" (ASU No. 2011-04), which updates the existing fair value measurement guidance currently included in the Accounting Standards Codification (ASC) to achieve common fair value measurement and disclosure requirements in United States Generally Accepted Accounting Principles (U.S. GAAP) and International Financial Reporting Standards. ASU No. 2011-04 is generally consistent with the Company's previous fair value measurement policies but includes additional disclosure requirements, particularly for assets and liabilities that require the use of Level 3 inputs to measure fair value. The adoption of ASU No. 2011-04 did not have a material impact on the Company's financial position or results of operations.

**IDERA PHARMACEUTICALS, INC.**  
**NOTES TO FINANCIAL STATEMENTS — (Continued)**

The table below presents the assets and liabilities measured and recorded in the financial statements at fair value on a recurring basis at December 31, 2012 and 2011 categorized by the level of inputs used in the valuation of each asset and liability.

(In thousands)	Total	Quoted Prices in Active Markets for Identical Assets or Liabilities (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
<b>December 31, 2012</b>				
Assets				
Money market funds	\$ 9,990	\$ 9,990	\$ —	\$ —
Total Assets	<u>\$ 9,990</u>	<u>\$ 9,990</u>	<u>\$ —</u>	<u>\$ —</u>
Warrant liability				
Total Liabilities	<u>\$ —</u>	<u>\$ —</u>	<u>\$ —</u>	<u>\$ —</u>
<b>December 31, 2011</b>				
Assets				
Money market funds	\$24,532	\$ 24,532	\$ —	\$ —
Total Assets	<u>\$24,532</u>	<u>\$ 24,532</u>	<u>\$ —</u>	<u>\$ —</u>
Warrant liability				
Total Liabilities	<u>\$ 1,178</u>	<u>—</u>	<u>\$ —</u>	<u>\$ 1,178</u>

The Level 1 assets consist of money market funds, which are actively traded daily. Although the Company did not have any Level 2 assets at December 31, 2012 or 2011, Level 2 assets typically consist of corporate bond investments whose fair value is generally determined from quoted market prices received from pricing services based upon quoted prices from active markets and/or other significant observable market transactions at fair value. Since these prices may not represent actual transactions of identical securities, they are classified as Level 2. Since any investments are classified as available-for-sale securities, any unrealized gains or losses are recorded in accumulated other comprehensive income or loss within stockholders' equity on the balance sheet. The Company did not elect to measure any other financial assets or liabilities at fair value.

In connection with the sale of its Series D preferred stock in November 2011, the Company issued warrants which contained provisions for anti-dilution protection in the event that the Company issued other equity securities at a price below \$1.46 per common share. Because of the potential adjustment to the warrant exercise price that could result from this anti-dilution protection, the warrants do not meet the criteria set forth in ASC 815-40, "Derivatives and Hedging – Contracts in Entity's own Stock" to be considered indexed to the Company's own stock. Accordingly, the Company has recorded the fair value of these warrants as a liability. The Company estimated the fair value of these warrants at the issuance date using the Black-Scholes Model as the result was not significantly different than the use of a lattice or binomial model because the price protection provision is subject to a floor of \$1.46 per share and the initial exercise price is \$1.63. The Company characterized this warrant liability as a Level 3 liability because its fair value measurement is based, in part, on significant inputs not observed in the market and reflects the Company's assumptions as to the expected warrant exercise price, the expected volatility of the Company's common stock, the expected dividend yield, the expected term of the warrant instrument and the expected percentage of warrants to be exercised.

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**NOTES TO FINANCIAL STATEMENTS — (Continued)**

The Company revalues the warrants at the end of each quarter using the Black-Scholes Model and recognizes the change in the fair value of the warrants is recognized in the statements of operations and comprehensive loss as other income (expense). The following assumptions and other inputs were used to compute the fair value of the warrant liability as of the November 4, 2011 issuance date, December 31, 2011 and November 9, 2012 when it was transferred to stockholders' equity, as explained below:

	November 4, 2011	December 31, 2011	November 9, 2012
Common stock price	\$ 1.92	\$ 1.05	\$ 0.70
Expected warrant exercise price	\$ 1.46	\$ 1.46	\$ 1.46
Remaining term of warrant (years)	5.0	4.8	4.0
Expected volatility	61%	58%	59%
Average risk free interest rate	0.9%	0.8%	0.5%
Expected dividend yield	—	—	—
Expected percentage of warrants to be exercised	100%	100%	100%

The closing price of the Company's common stock is readily determinable since it is publicly traded. The exercise price of the warrant was initially set at \$1.63 subject to adjustment to as low as the \$1.46 minimum exercise price per share for diluting effects such as if in specified circumstances the Company sells its common stock at a price below \$1.46 per share. The Company used the \$1.46 minimum exercise price as an assumption in computing the fair value of the warrant at November 4, 2011 and December 31, 2011 because the Company's common stock was trading below the \$1.63 maximum exercise price as of such dates. The sale of shares of Series E preferred stock and Series E warrants in our November 2012 Series E financing triggered an anti-dilution adjustment under the terms of the Series D warrants, resulting in the exercise price of the Series D warrants being reduced and fixed at the minimum \$1.46 per share and the Series D warrants no longer being subject to any anti-dilution adjustments. Since the exercise price of the Series D warrants became fixed, the Series D warrants then met the exception under ASC 815-40 as they were now "indexed to the company's own stock" and met certain criteria for equity classification, thus the Series D warrants were marked to fair value through earnings as of November 9, 2012 and then reclassified to stockholders equity at that time. The estimated remaining term of the warrant is readily determinable from the warrant agreement as it is the remaining contractual term. The expected volatility is based on the actual stock-price volatility over a period equal to the greater of the remaining term of the warrant or three years. The assumed risk-free interest rate is based on the U.S. Treasury security rate with a term equal to the remaining term of the warrant. The assumed dividend yield of zero is based on the fact that the Company has never paid cash dividends to common stockholders and has no present intention to pay cash dividends to common stockholders. The Company assumed that future financings would dilute the warrant holder's ownership in the Company such that the 19.99% ownership limitation would not prevent the warrant holder from exercising all of the warrants during the term of the warrants.

Changes in the warrant liability from November 4, 2011 to November 9, 2012 were as follows:

(In thousands)	Fair Value of Warrant Liability
Balance, November 4, 2011	\$ 3,152
Decrease in fair value	(1,974)
Balance, December 31, 2011	1,178
Decrease in fair value	(675)
Transfer to stockholders' equity	(503)
Balance, November 9, 2012	\$ —

**IDERA PHARMACEUTICALS, INC.**  
**NOTES TO FINANCIAL STATEMENTS — (Continued)**

The fair value of the warrants decreased from \$3,152,000 at November 4, 2011 to \$1,178,000 at December 31, 2011 primarily due to decreases in the market price of the Company's common stock resulting in the recognition of \$1,974,000 in non-operating income in 2011. The fair value of the warrants decreased from \$1,178,000 at December 31, 2011 to 503,000 at November 9, 2012 primarily due to decreases in the market price of the Company's common stock and the remaining term of the warrants resulting in the recognition of \$675,000 of non-operating income during the period ended November 9, 2012 at which time the \$503,000 fair value of the warrant liability was transferred to stockholders' equity.

The Company did not elect to measure any other financial assets or liabilities at fair value.

### 3. Property and Equipment

At December 31, 2012 and 2011, net property and equipment at cost consisted of the following:

	December 31,	
	2012	2011
	(In thousands)	
Leasehold improvements	\$ 525	\$ 525
Laboratory equipment and other	2,856	2,898
Total property and equipment, at cost	3,381	3,423
Less: Accumulated depreciation	3,163	2,965
Property and equipment, net	<u>\$ 218</u>	<u>\$ 458</u>

Depreciation expense was approximately \$251,000, \$494,000 and \$546,000 in 2012, 2011 and 2010, respectively.

### 4. Accrued Expenses

At December 31, 2012 and 2011, accrued expenses consisted of the following:

	December 31,	
	2012	2011
	(In thousands)	
Payroll and related costs	\$ 199	\$ 71
Clinical and nonclinical trial expenses	895	2,172
Cost of regaining rights to cancer program	1,309	2,138
Professional and consulting fees	344	335
Other	255	166
	<u>\$ 3,002</u>	<u>\$ 4,882</u>

### 5. Collaboration and License Agreements

(a) *Collaboration and License Agreement with Merck & Co.*

In December 2006, the Company entered into an exclusive, worldwide license and research collaboration agreement with Merck & Co. to research, develop, and commercialize vaccine products containing the Company's TLR7, TLR8, and TLR9 agonists in the fields of cancer, infectious diseases, and Alzheimer's

**IDERA PHARMACEUTICALS, INC.**  
**NOTES TO FINANCIAL STATEMENTS — (Continued)**

disease. Under the terms of the agreement, the Company granted Merck & Co. exclusive rights to a number of the Company's TLR7, TLR8, and TLR9 agonists for use in combination with Merck & Co.'s therapeutic and prophylactic vaccines under development in the fields of cancer, infectious diseases, and Alzheimer's disease. There is no limit under the agreement to the number of vaccines to which Merck & Co. can apply the Company's agonists within these fields. The Company also agreed with Merck & Co. to engage in a two-year research collaboration to generate novel agonists targeting TLR7 and TLR8 incorporating both Merck & Co. and the Company's chemistry for use in vaccines in the defined fields. Under the terms of the agreement, Merck & Co. extended the research collaboration for two additional years to December 2010. Under the terms of the agreement:

- Merck & Co. paid the Company a \$20.0 million upfront license fee;
- Merck & Co. purchased \$10.0 million of the Company's common stock at \$5.50 per share;
- Merck & Co. agreed to fund the research and development collaboration through its term;
- Merck & Co. agreed to pay the Company milestone payments as follows:
  - up to \$165.0 million if vaccines containing the Company's TLR9 agonist compounds are successfully developed and marketed in each of the oncology, infectious disease, and Alzheimer's disease fields;
  - up to \$260.0 million if vaccines containing the Company's TLR9 agonist compounds are successfully developed and marketed for follow-on indications in the oncology field and if vaccines containing the Company's TLR7 or TLR8 agonists are successfully developed and marketed in each of the oncology, infectious disease, and Alzheimer's disease fields; and
  - if Merck & Co. develops and commercializes additional vaccines using the Company's agonists, the Company would be entitled to receive additional milestone payments; and
  - Merck & Co. agreed to pay the Company mid to upper single-digit royalties on net product sales of vaccines using the Company's TLR agonist technology that are developed and marketed, with the royalty rates being dependent on disease indication and the TLR agonist employed.

The Company recognized the \$20.0 million upfront payment as revenue over four years, including the initial two-year research term and the two-year extension period that ended in December 2010, which was the Company's period of continuing involvement under the research collaboration.

In December 2006, in connection with the execution of the license and collaboration agreement, the Company entered into a stock purchase agreement with Merck & Co. Pursuant to such stock purchase agreement, the Company issued and sold to Merck & Co. 1,818,182 shares of the Company's common stock for a price of \$5.50 per share resulting in aggregate gross proceeds of \$10.0 million.

The Company has recognized a total of \$1.0 million of milestone revenue under the license and collaboration agreement, which related to the achievement of a preclinical milestone with one of its TLR9 agonists used as an adjuvant in cancer vaccines.

*(b) Collaboration and License Agreement with Merck KGaA*

In December 2007, the Company entered into an exclusive, worldwide license agreement with Merck KGaA to research, develop and commercialize products containing its TLR9 agonists, including IMO-

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**NOTES TO FINANCIAL STATEMENTS — (Continued)**

2055, for the treatment of cancer, excluding cancer vaccines. Under the terms of the agreement: Merck KGaA paid the Company in February 2008 a \$40.0 million upfront license fee in Euros of which \$39.7 million was received due to foreign currency exchange rates in effect at that time, and Merck KGaA agreed to reimburse costs for the Company's IMO-2055 clinical trials for the period in which the Company continued to conduct the trials on behalf of Merck KGaA. In February 2009, the agreement was amended so that the Company could initiate and conduct on behalf of Merck KGaA additional clinical trials of IMO-2055, and Merck KGaA agreed to reimburse the Company for costs associated with any additional trials that the Company initiated and conducted. As of March 2010, Merck KGaA assumed sponsorship of all ongoing clinical trials of IMO-2055 for the treatment of cancer, and responsibility for all further clinical development of IMO-2055 in the treatment of cancer, excluding vaccines.

The Company recognized the \$40.0 million upfront payment as revenue over the twenty-eight month term that ended in June 2010, which was the Company's period of continuing involvement under the research collaboration. The Company has recognized a total of \$12.1 million of milestone revenue related to the initiation of clinical trials of IMO-2055.

In November 2011, the Company and Merck KGaA entered into a termination agreement terminating the license agreement. Under the termination agreement:

- the license agreement was terminated and the Company regained all rights for developing TLR9 agonists for the treatment of cancer, including all rights to IMO-2055 and any follow-on TLR9 agonists;
- Merck KGaA agreed to continue to conduct the Phase 2 trial of IMO-2055 in combination with cetuximab that was then ongoing and other specified related activities;
- Merck KGaA agreed to complete and analyze all clinical trials that Merck KGaA had initiated or for which Merck KGaA had assumed sponsorship and to finalize clinical study reports;
- the Company gained rights to the data from the Phase 2 trial of IMO-2055 in combination with cetuximab, as well as to the data from the Phase 1 trials conducted in other cancer indications;
- the Company agreed to reimburse Merck KGaA a maximum of €1.8 million (\$2.4 million using a December 31, 2012 exchange rate) of Merck KGaA's costs for the third-party contract research organization that is coordinating the Phase 2 trial of IMO-2055 in combination with cetuximab, payable in eleven installments comprised of ten monthly installments to be invoiced by Merck KGaA to the Company commencing on March 1, 2012 and a final payment payable by the Company to Merck KGaA upon Merck KGaA's completion of certain specified activities. As of December 31, 2012, the Company has paid €0.8 of the €1.8 million (\$1.1 million (using exchange rates in effect at the time that the payments were made) of the \$2.4 million);
- the Company agreed to pay to Merck KGaA one-time €1.0 million (\$1.3 million using a December 31, 2012 exchange rate) milestone payments upon occurrence of each of the following milestones: (i) partnering of IMO-2055 between the Company and any third party, (ii) initiation of any Phase 2 or Phase 3 clinical trial for IMO-2055 and (iii) regulatory submission of IMO-2055 in any country; and
- Merck KGaA granted the Company an option to obtain a license to certain manufacturing and formulation know-how owned or developed by Merck KGaA under the License Agreement and to Merck KGaA's IMOXine trademark. The Company's option to license the IMOXine trademark has expired. If the Company elects to exercise its option with respect to the manufacturing and formulation know-how, the Company has agreed to pay a low single digit royalty on net sales of IMO-2055, with respect to such license.

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**NOTES TO FINANCIAL STATEMENTS — (Continued)**

The Company recorded the €1.8 million (\$2.4 million using a November 30, 2011 exchange rate) that it has agreed to reimburse Merck KGaA in installment payments as research and development expense for the fourth quarter of 2011 as such amount represented the cost of regaining the Company's rights to IMO-2055 and follow-on compounds for use in the treatment of cancer, excluding cancer vaccines. As of December 31, 2012, €1.0 million (\$1.3 million using a December 31, 2012 exchange rate) of these installments remained payable under the termination agreement and is recorded under accrued expenses in the condensed balance sheet.

*(c) Other License Agreements*

The Company has out-licensed and in-licensed therapies related to antisense technology.

*Out-licenses.* In 2001 the Company entered into an agreement with Isis Pharmaceuticals, Inc. (Isis), under which it granted Isis a license, with the right to sublicense, to its antisense chemistry and delivery patents and patent applications; and it retained the right to use these patents and applications in its own drug discovery and development efforts and in collaborations with third parties. During 2001, Isis paid the Company \$15.0 million in cash and issued 857,143 shares of its common stock having an aggregate fair market value on the dates on which title to the shares was received of \$17.3 million and is required to pay the Company a low to mid double-digit percentage of specified sublicense income it receives from some types of sublicenses of its patents and patent applications. As of December 31, 2012, the Company has received \$0.3 million in sublicense income from Isis. Also under the agreement, the Company licensed from Isis specified antisense patents and patent applications, principally Isis' suite of RNase H patents and patent applications. The Company also paid to Isis \$0.7 million and issued 1,005,499 shares of common stock having a fair market value of approximately \$1.2 million on the date of issuance for this license and is obligated to pay Isis an annual maintenance fee and low single-digit royalties on net sales of antisense products sold that are covered by Isis's patent rights. The Company has the right to use these patents and patent applications in its drug discovery and development efforts and in some types of third-party collaborations. As of December 31, 2012, the Company has only paid Isis annual maintenance fees and has not paid any royalties. The agreement may be terminated for an uncured material breach by either party. The licenses granted under the Isis agreement terminate upon the last to expire of the patents and patent applications licensed under the agreement. The Company may terminate at any time the sublicense by Isis to it of the patents and patent applications.

In addition, the Company is a party to two other license agreements involving the license of its antisense patents and patent applications for oligonucleotide chemistry and delivery and for specific gene targets, under which the Company typically is entitled to receive license fees, sublicensing income, research payments, payments upon achievement of developmental milestones, and royalties on product sales. As of December 31, 2012, we had received a total of \$1.5 million under these agreements.

*In-licenses.* The Company's principal in-license related to antisense technology is with University of Massachusetts Medical Center for antisense chemistry and for certain gene targets. Under the terms of the license agreement with University of Massachusetts Medical Center, the Company is the worldwide, exclusive licensee under a number of U.S. issued patents and various patent applications owned by University of Massachusetts Medical Center relating to the chemistry of antisense oligonucleotides and their use. Many of these patents and patent applications have corresponding applications on file or corresponding patents in other major industrial countries. The patents licensed to the Company by University of Massachusetts Medical Center expire at dates ranging from 2013 to 2019. This license expires upon the expiration of the last to expire of the patents covered by the license. Under the

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**NOTES TO FINANCIAL STATEMENTS — (Continued)**

agreement, the Company has agreed to pay a low single-digit royalty on net product sales, a low double-digit percentage of any sublicense license income received, and a small annual license maintenance fee. Since 1999, the Company has paid approximately \$1.7 million to University of Massachusetts Medical Center under this license agreement.

Additionally, the Company has entered into five other royalty-bearing license agreements under which it has acquired rights to antisense related patents, patent applications, and technology. Under all of these in-licenses, the Company is obligated to pay low to mid single-digit royalties on its net sales of products or processes covered by a valid claim of a licensed patent or patent application. Under some of these in-licenses, the Company is required to pay a low double-digit specified percentage of any sublicense income, and all of these in-licenses impose various commercialization, sublicensing, insurance, and other obligations on us, and its failure to comply with these requirements could result in termination of the in-licenses.

**6. Series D Redeemable Convertible Preferred Stock and Warrants**

The following securities were issued in connection with the Company's November 4, 2011 financing discussed in Note 13.

*(a) Redeemable Convertible Preferred Stock*

The Series D preferred stock has the rights and preferences set forth in the Certificate of Designations, Preferences and Rights of Series D preferred stock of the Company (the Series D Certificate of Designations) as summarized below.

- *Dividends* — The holders of the Series D preferred stock are entitled to receive dividends payable quarterly in arrears at the rate of 7% per annum. Such dividends shall be paid in cash through December 31, 2014 and thereafter in cash or with shares of common stock, as determined by the Company in its sole discretion, except that the Company may not pay any dividends to a holder of Series D preferred stock in shares of common stock to the extent the issuance of such shares would result in the holder of Series D preferred stock and its affiliates beneficially owning more than 19.99% of (i) the common stock outstanding or (ii) the combined voting power of the securities of the Company outstanding immediately after giving effect to the issuance of such shares of common stock unless the Company's stockholders approve a proposal to increase the 19.99% ownership limitation to 35% (the Nasdaq Proposal). As of December 31, 2012, the Company had accrued a dividend of \$160,000 for payment in January 2013. Under the terms of the Series D preferred stock, the 4.6% dividends that the Company pays to the Series E preferred stockholders under the terms of the Series E preferred stock will also be paid to the Series D preferred stockholders on an as-converted to common stock basis, which results in Series D preferred stockholders being entitled to an additional 2.2% per annum cash dividend payable quarterly in arrears. The Company has agreed that, at its 2013 annual meeting of stockholders, it will propose an amendment to the Series D Certificate of Designations to, among other things, modify the terms of the Series D preferred stock requiring payment of dividends to Series D preferred stockholders upon payment of dividends to Series E stockholders. If such amendment is approved by the Company's stockholders, the Series E preferred stockholders will become entitled to receive dividends payable in cash quarterly in arrears at the rate of 8% per annum and the Series D preferred stockholders would cease to be entitled to corresponding dividends. If such amendment is submitted to the Company's stockholders and it is not approved, the holders of the Series E preferred stock will no longer be entitled to receive dividends.
- *Liquidation, Redemption by Holders and Other Events* — In the event of a liquidation, dissolution or winding up of the Company, whether voluntary or involuntary, after payment or provision for payment of debts and other liabilities of the Company, the holders of the Series D



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preferred stock then outstanding shall be entitled to be paid out of the assets of the Company available for distribution to its stockholders an amount equal to the greater of (a) the original per share purchase price of the Series D preferred stock (\$8.1375 per share) plus all accrued or declared but unpaid dividends thereon and (b) the amount that the holder of Series D preferred stock would be entitled to receive with respect to each share of Series D preferred stock pursuant to such liquidation if all of the outstanding shares of Series D preferred stock had been converted into common stock as of the date immediately prior to the date fixed for determination of stockholders entitled to receive a distribution in such liquidation. Such amount will be paid before any cash distribution may be made or any other assets distributed in respect of junior securities to the holders of any junior securities including, without limitation, common stock and Series A preferred stock of the Company. The holders of shares of Series D preferred stock then outstanding shall be entitled to require the Company to purchase such shares of Series D preferred stock at a price equal to the original Series D preferred stock purchase price per share plus all accrued or declared but unpaid dividends thereon upon the occurrence of specified fundamental changes such as mergers, consolidations, business combinations, stock purchases or similar transactions resulting in a person or group unaffiliated with any holder of Series D preferred stock owning 66.67% or more of the outstanding voting securities of the Company or successor entity.

- *Conversion* — Each share of Series D preferred stock is convertible, at the option of the holder thereof, at any time and from time to time, and without the payment of additional consideration by the holder thereof, into such number of fully paid and nonassessable shares of common stock as is determined by dividing the Series D preferred stock original issue price by the Series D preferred stock conversion price in effect at the time of conversion. The Series D preferred stock conversion price was initially equal to \$1.63 and the Series D preferred stock issue price is initially equal to the \$8.1375 original purchase price of the Series D preferred stock. Accordingly, each share of Series D preferred stock was initially convertible at the option of the holder into five fully paid and nonassessable shares of the common stock. As a result of the Company's Series E financing in November 2012, the Series D preferred stock conversion price was adjusted to the \$1.46 per share minimum resulting in each share of Series D preferred stock becoming convertible at the option of the holder into 5.5736 fully paid and nonassessable shares of the common stock. No holder may convert its shares to the extent such conversion would result in the holder and its affiliates beneficially owning more than 19.99% of the common stock outstanding unless the Company's stockholders approve the Nasdaq Proposal. The Series D preferred stock conversion price, and the rate at which shares of Series D preferred stock may be converted into shares of common stock, may be subject to adjustment for stock dividends, stock splits and other events, as provided in the Series D Certificate of Designations.
- *Redemption by Company* — After November 4, 2013 and following notice the Company may redeem, for cash payment equal to the original Series D preferred stock issue price per share plus any accrued or declared but unpaid dividends thereon, all or a portion of the Series D preferred stock if the closing price of the common stock for 20 or more trading days in a period of 30 consecutive trading days is greater than or equal to 200% of the Series D preferred stock conversion price.

As of December 31, 2012 there were 1,124,260 shares of Series D preferred stock designated, issued and outstanding.

The Series D preferred stock was first assessed under ASC 480, "Distinguishing Liabilities from Equity" and it was determined that it was not within the scope of ASC 480 so the preferred stock was not considered a liability under ASC 480. The preferred stock was then assessed under ASC 815, "Derivatives and Hedging."

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The Series D preferred stock contains three embedded features: (1) optional redemption by the Company; (2) optional redemption by the holders and (3) optional conversion by the holders. Each embedded feature meets the definition of a derivative. The Company believes that the Series D preferred stock is an equity host for the purposes of assessing the embedded derivatives for potential bifurcation. The Company noted the following regarding these embedded features:

- a. Optional Redemption by the Company and Optional Redemption by the Holders — the redemption features were assessed under ASC 815-40 to determine if they were eligible for the exemption from derivative accounting. In order to meet the exemption the feature must be “indexed to the company’s own stock” and meet specified criteria for equity classification. Both redemption features met these requirements and were not bifurcated, or accounted for separately from the preferred stock.
- b. Optional Conversion by the Holder — the optional conversion by the holder feature was determined to be clearly and closely related to the preferred stock host. As such the conversion feature did not require bifurcation under ASC 815.

The Series D preferred stock was then assessed under ASC 470, “Debt , ” to determine if there was a beneficial conversion feature (BCF). The BCF compares the carrying value of the preferred stock after the value of any derivatives has been allocated from the proceeds (in this case, the Warrant Liability) to the transaction date value of number of shares that the holder can convert into. The calculation resulted in a BCF of \$4,445,000. The BCF was recorded in additional paid-in capital.

The following is a summary of the changes in the Series D preferred stock during 2012 and 2011 (000s):

Gross proceeds from November 4, 2011 Series D financing (including \$351 paid for the warrants)	\$ 9,500
Less — allocation of proceeds to:	
fair value of warrants	(3,152)
beneficial conversion feature	(4,445)
transaction costs	(427)
Net proceeds allocated to Series D preferred stock	1,476
Accretion of beneficial conversion feature	4,445
Fair value of Series D preferred stock — November 4, 2011	<u>\$ 5,921</u>
Fair value of Series D preferred stock — December 31, 2011	\$ 5,921
Beneficial conversion feature related to Series E financing	(1,238)
Accretion of beneficial conversion feature	1,238
Fair value of Series D preferred stock — December 31, 2012	<u>\$ 5,921</u>

Because the Series D preferred stock is redeemable upon events outside the control of the Company, the Company has recorded it in temporary equity. The initial carrying value of the Series D preferred stock was \$1,476,000, after discounts for the proceeds allocated to the warrant liability and the BCF, and the recording of the transaction costs. The conversion option of the Series D preferred stock was immediately exercisable. As a result, the \$4,445,000 discount related to the BCF was immediately accreted to preferred dividends, resulting in an increase in the carrying value of the Series D preferred stock to \$5,921,000 at November 4, 2011. The sale of shares and warrants in our November 2012 Series E financing triggered an anti-dilution adjustment under the terms of the Series D preferred stock, resulting in the conversion price of the Series D preferred stock being reduced and fixed at the minimum \$1.46 per

**IDERA PHARMACEUTICALS, INC.**  
**NOTES TO FINANCIAL STATEMENTS — (Continued)**

share and the Series D preferred stock no longer being subject to any anti-dilution adjustments which resulted in an additional \$1,238,000 discount related to the additional BCF. The additional BCF was immediately accreted to preferred dividends in 2012 which resulted in the carrying value of the Series D preferred stock remaining at \$5,921,000. The Series D preferred stock is redeemable by the holder for the original \$9,149,000 purchase price plus unpaid accrued dividends upon a fundamental change, as described above. The Company has determined that the occurrence of a fundamental change is not probable at this time and is not currently accreting the difference between the \$5,921,000 fair value of the Series D preferred stock and the redemption value of \$9,149,000 purchase price plus unpaid accrued dividends. If the occurrence of a fundamental change becomes probable, the Company will accrete this \$3,228,000 difference at that time.

The Series D Convertible Preferred Stock and Warrant Purchase Agreement was amended in connection with the Series E financing. The amendments consisted of changes to voting rights limitations and restrictions on the transferability of securities issued in the Series D financing. There is no specific guidance on accounting for amendments to preferred stock agreements. However it is generally accepted that such changes should be analyzed to determine if they represent a modification or an extinguishment of the preferred stock. The Company has adopted a qualitative approach to assessing whether amendments are accounted for as modifications or extinguishments. The Company considers the nature of the changes to the preferred stock agreement, including whether the amendments significantly change a substantial contractual term or fundamentally change the nature of the stock; and whether the amendment of the terms would have changed the initial accounting for the stock. If the amendments significantly change a substantial term; fundamentally change the nature of the preferred shares; or change the accounting for the stock, then the change is accounted for as an extinguishment. Otherwise the amendments are accounted for as modifications.

The Company has considered the nature of these amendments and whether the amendments significantly change any substantial terms that affect the initial accounting for the Series D preferred stock. The Company determined that these amendments were not to substantial terms of the agreement and did not fundamentally change the nature of the Series D preferred stock. In addition, the Company assessed the original accounting for the Series D preferred stock and determined that the accounting did not change as a result of the amendments. Thus, the changes were considered a modification and not an extinguishment.

The Company then considered the appropriate model for accounting for the modification of the Series D preferred stock. The Company considered the debt and the share based payment modification guidance and determined that the share based modification rules included in ASC 718-20-35 were more appropriate. The model under ASC 718-20-35 requires the measurement of the fair value of the Series D preferred stock immediately before and after the modification. The Company determined that the change in fair value resulting from the modification was de minimis, as the amendments did not affect substantial terms of the agreement and did not affect the Company's financial statements.

*(b) Warrants*

The Series D warrants had an initial exercise price of \$1.63 per common share (subject to adjustment therein) and may be exercised at the holder's option at any time on or before November 4, 2016. The sale of shares of Series E preferred stock and Series E warrants in our November 2012 Series E financing triggered an anti-dilution adjustment under the terms of the Series D warrants, resulting in the conversion price of the Series D warrants being reduced and fixed at the minimum \$1.46 per share and the Series D warrants no longer being subject to any anti-dilution adjustments. The Series D warrants

**IDERA PHARMACEUTICALS, INC.**  
**NOTES TO FINANCIAL STATEMENTS — (Continued)**

provide that the Company shall not effect any exercise of the Series D warrants, and the Series D warrants may not be exercised with respect to any portion of the Series D warrants, to the extent that such exercise would result in the holder and its affiliates beneficially owning more than 19.99% of (i) the number of shares of common stock outstanding or (ii) the combined voting power of the securities of the Company outstanding immediately after giving effect to the issuance of shares of Common Stock issuable upon exercise of the Series D warrants unless the stockholders of the Company approve the Nasdaq Proposal, in which case, the 19.99% limitation will be increased, with respect to the holders of Series D preferred stock, to 35%. After November 4, 2013, the Company may redeem the Series D warrants for \$0.01 per share of common stock issuable on exercise of the Series D warrants following notice to the holder if the closing price of the common stock for 20 or more trading days in a period of 30 consecutive trading days is greater than or equal to \$6.51 (subject to adjustment for stock splits, stock dividends, combinations, recapitalizations, reclassifications, and similar transactions affecting the common stock).

The Series D warrants were first assessed under ASC 480, “Distinguishing Liabilities from Equity,” and it was determined that they were not within its scope so the warrants were not considered a liability under ASC 480. The Series D warrants were then assessed under ASC 815, “Derivatives and Hedging,” and were determined to be derivative instruments since the price protection features do not meet the “indexed to the company’s own stock” exemption requirements in ASC 815-40. The Series D warrants were recorded at fair value as of the transaction date and were being marked to fair value through earnings each quarter. The sale of shares of Series E preferred stock and Series E warrants in our November 2012 Series E financing triggered an anti-dilution adjustment under the terms of the Series D warrants, resulting in the exercise price of the Series D warrants being reduced and fixed at the minimum \$1.46 per share and the Series D warrants no longer being subject to any anti-dilution adjustments. Since the exercise price of the Series D warrants became fixed, the Series D warrants then met the exception under ASC 815-40 as they were now “indexed to the company’s own stock” and met certain criteria for equity classification. Accordingly, the Series D warrants were marked to fair value through earnings as of November 9, 2012 and the remaining \$0.5 million was reclassified to stockholders equity at that time. See Note 2(m).

The Series D warrants were also amended in connection with the Series E financing. The amendments consisted of changes in limitations on the Company’s right to redeem the Series D warrants and the Series D warrant holder’s right to exercise the Series D warrants. There is no specific guidance on accounting for amendments to warrant agreements. However it is generally accepted that such changes should be analyzed to determine if they represent a modification or an extinguishment of the warrant. The Company has adopted a qualitative approach to assessing whether amendments are accounted for as modifications or extinguishments. The Company considers the nature of the changes to the warrant agreement, including whether the amendments significantly change a substantial contractual term or fundamentally change the nature of the warrant; and whether the amendment of the terms would have changed the initial accounting for the Series D warrant. If the amendments significantly change a substantial term; fundamentally change the nature of the Series D warrant; or change the accounting for the Series D warrant, then the change is accounted for as an extinguishment. Otherwise the amendments are accounted for as modifications.

The Company has considered the nature of these amendments and whether the amendments significantly change any substantial terms that affect the initial accounting for the Series D warrants. The Company determined that these amendments were not to substantial terms of the agreement and did not fundamentally change the nature of the Series D warrants. In addition, the Company assessed the original accounting for the Series D warrants and determined that the accounting did not change as a result of the amendments. Thus, the changes were considered a modification and not an extinguishment.

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**NOTES TO FINANCIAL STATEMENTS — (Continued)**

The Company then considered the appropriate model for accounting for the modification of the Series D warrants. The Company considered the debt and the share based payment modification guidance and determined that the share based modification rules included in ASC 718-20-35 were more appropriate. The model under ASC 718-20-35 requires the measurement of the fair value of the Series D warrants immediately before and after the modification. The Company determined that the change in fair value resulting from the modification was de minimis, as the amendments did not affect substantial terms of the agreement and did not affect the Company's financial statements.

**7. Non-redeemable Preferred Stock, Common Stock and Other Stockholders' Equity**

*(a) Common Stock*

Pursuant to the terms of a unit purchase agreement dated as of May 5, 1998, the Company issued and sold a total of 1,199,684 shares of common stock (the Put Shares) at a price of \$16.00 per share. Under the terms of the unit purchase agreement, the initial purchasers (the Put Holders) of the Put Shares have the right (the Put Right) to require the Company to repurchase the Put Shares. The Put Right may not be exercised by any Put Holder unless: 1) the Company liquidates, dissolves or winds up its affairs pursuant to applicable bankruptcy law, whether voluntarily or involuntarily; 2) all of the Company's indebtedness and obligations, including without limitation the indebtedness under the Company's then outstanding notes, has been paid in full; and 3) all rights of the holders of any series or class of capital stock ranking prior and senior to the common stock with respect to liquidation, including without limitation the Series A convertible preferred stock, have been satisfied in full. The Company may terminate the Put Right upon written notice to the Put Holders if the closing sales price of its common stock exceeds \$32.00 per share for the twenty consecutive trading days prior to the date of notice of termination. Because the Put Right is not transferable, in the event that a Put Holder has transferred Put Shares since May 5, 1998, the Put Right with respect to those shares has terminated. As a consequence of the Put Right, in the event the Company is liquidated, holders of shares of common stock that do not have Put Rights with respect to such shares may receive smaller distributions per share upon the liquidation than if there were no Put Rights outstanding.

As of December 31, 2012, the Company has repurchased or received documentation of the transfer of 399,950 Put Shares and 35,780 of the Put Shares continued to be held in the name of Put Holders. The Company cannot determine at this time what portion of the Put Rights of the remaining 763,954 Put Shares have terminated.

*(b) Warrants*

The Company has the following warrants outstanding and exercisable for the purchase of common stock at December 31, 2012:

<u>Expiration Date</u>	<u>Shares</u>	<u>Weighted Average Exercise Price Per share</u>
August 5, 2015	1,628,402	\$ 3.71
November 4, 2016	2,810,650	1.46
November 9, 2017	8,484,840	0.70
Total	<u>12,923,892</u>	1.24

See note 6(b).

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**NOTES TO FINANCIAL STATEMENTS — (Continued)**

*(c) Stock Options*

Under the 2008 Stock Incentive Plan, the Company may grant options to purchase common stock, stock appreciation rights, restricted stock awards and other forms of stock-based compensation. Stock options generally vest over three to four years, and expire no later than 10 years from the date of grant. A total of 3,700,000 shares of common stock may be issued pursuant to awards granted under the plan subject to reduction in the event that there are any “full-value awards,” as defined in the plan. The maximum number of shares of common stock with respect to which awards may be granted to any participant under the plan is 500,000 per calendar year. The Compensation Committee of the Board of Directors has the authority to select the employees to whom options are granted and determine the terms of each option, including (i) the number of shares of common stock subject to the option; (ii) when the option becomes exercisable; (iii) the option exercise price, which must be at least 100% (110% in the case of incentive stock options granted to those holding 10% or more of the voting power of the Company) of the fair market value of the common stock as of the date of grant and (iv) the duration of the option, which may not exceed 10 years. Stock options may not be re-priced without shareholder approval. Discretionary awards to non-employee directors are granted and administered by a committee comprised of independent directors. As of December 31, 2012, options to purchase a total of 3,880,054 shares of common stock were outstanding under the 2008 Stock Incentive Plan. As of December 31, 2012, 2,098,208 shares of common stock remain available for grant under the 2008 Stock Incentive Plan.

The Company is no longer granting stock options or other awards pursuant to the share-based compensation plans that were utilized prior to the approval of the 2008 Stock Incentive Plan. Under these earlier plans, stock options generally vested over three to four years, and expired no later than 10 years from the date of grant. As of December 31, 2012, options to purchase a total of 1,775,458 shares of common stock were outstanding under these plans.

The following table summarizes information related to the outstanding and exercisable options during 2012 (in thousands, except per share amounts and years):

	<u>Stock Options</u>	<u>Weighted- Average Exercise Price</u>	<u>Weighted- Average Remaining Contractual Life (in years)</u>	<u>Aggregate Intrinsic Value</u>
Outstanding at December 31, 2011	5,943	\$ 4.96		
Granted	188	0.92		
Exercised	—	—		
Forfeited	(355)	1.93		
Expired	(120)	7.77		
Outstanding at December 31, 2012	<u>5,656</u>	4.96	6.55	\$ 6
Exercisable at December 31, 2012	4,187	5.94	5.89	—
Total exercisable or expected to vest	<u>5,589</u>	4.99	6.53	6

*(d) Employee Stock Purchase Plan*

The Company’s 1995 Employee Stock Purchase Plan (the Stock Purchase Plan), as amended, provides for the issuance of up to 500,000 shares of common stock to participating employees of the Company or its subsidiaries. Participation is limited to employees that would not own 5% or more of the total combined voting power or value of the stock of the Company after the grant.

**IDERA PHARMACEUTICALS, INC.**  
**NOTES TO FINANCIAL STATEMENTS — (Continued)**

Under the Stock Purchase Plan, on the first day of a designated payroll deduction period, the “Offering Period,” the Company will grant to each eligible employee who has elected to participate in the Stock Purchase Plan an option to purchase shares of common stock as follows: the employee may authorize an amount, a whole percentage from 1% to 10% of such employee’s regular pay, to be deducted by the Company from such pay during the Offering Period. On the last day of the Offering Period, the employee is deemed to have exercised the option, at the option exercise price, to the extent of accumulated payroll deductions. Under the terms of the Stock Purchase Plan, the option price is an amount equal to 85% of the fair market value per share of the common stock on either the first day or the last day of the Offering Period, whichever is lower. In no event may an employee purchase in any one Offering Period a number of shares that is more than 15% of the employee’s annualized base pay divided by 85% of the market value of a share of common stock on the commencement date of the Offering Period. The Compensation Committee may, in its discretion, choose an Offering Period of 12 months or less for each of the Offerings and choose a different Offering Period for each Offering.

Offering periods are three months in duration and commence on March 1, June 1, September 1, and December 1. In 2012, 2011, and 2010, the Company issued 4,746, 26,155, and 43,496 shares of common stock, respectively, under the Stock Purchase Plan.

*(e) Preferred Stock*

The Restated Certificate of Incorporation of the Company permits its Board of Directors to issue up to 5,000,000 shares of preferred stock, par value \$0.01 per share, in one or more series, to designate the number of shares constituting such series, and fix by resolution, the powers, privileges, preferences and relative, optional or special rights thereof, including liquidation preferences and dividends, and conversion and redemption rights of each such series. The Company has designated 1,500,000 shares as Series A convertible preferred stock, 1,124,260 shares of Series D redeemable convertible preferred stock (see Note 6) and 424,242 shares of Series E convertible preferred stock (see Note 7(g)). As of December 31, 2012 and 2011, there were 655 shares of Series A convertible preferred stock outstanding.

*(f) Series A Convertible Preferred Stock*

The dividends on the Series A convertible preferred stock are payable semi-annually in arrears at the rate of 1% per annum, at the election of the Company, either in cash or additional duly designated, fully paid and nonassessable shares of Series A preferred stock. The Company paid dividends in stock until 2004 when it elected to pay further dividends in cash. In the event of liquidation, dissolution or winding up of the Company, after payment of debts and other liabilities of the Company, the holders of the Series A convertible preferred stock then outstanding will be entitled to a distribution of \$1 per share out of any assets available to shareholders. The Series A preferred stock is non-voting. All remaining shares of Series A preferred stock rank as to payment upon the occurrence of any liquidation event senior to the common stock. Shares of Series A preferred stock are convertible, in whole or in part, at the option of the holder into fully paid and nonassessable shares of common stock at \$34.00 per share, subject to adjustment.

*(g) Series E Convertible Preferred Stock*

The Series E convertible preferred stock was issued in connection with the Company’s November 9, 2012 financing discussed in Note 13. On November 9, 2012, the board of directors of the Company designated 424,242 shares as Series E preferred stock, having the rights and preferences set forth in the Certificate of Designations, Preferences and Rights of Series E preferred stock (Series E Certificate of Designations) as summarized below.

**IDERA PHARMACEUTICALS, INC.**  
**NOTES TO FINANCIAL STATEMENTS — (Continued)**

- *Dividends* — The holders of Series E preferred stock are entitled to receive cash dividends payable quarterly in arrears at the Initial Dividend Rate (as defined below) with the first payment date being March 31, 2013. The Company has agreed that, at its 2013 annual meeting of stockholders it will propose an amendment to the Series D Certificate of Designations to, among other things, modify the terms of the Series D preferred stock that require payment of dividends to Series D preferred stockholders upon payment of dividends to Series E stockholders. If the stockholders of the Company approve the amendment to Series D Certificate of Designations, the dividend rate with respect to the Series E preferred dividends will increase from the Initial Dividend Rate to the rate of 8% per annum. The Initial Dividend Rate is also subject to increase to 8% per annum in the event that, as of any Series E preferred dividend payment date, there are no shares of Series D preferred stock outstanding. In the event that the amendment to Series D Certificate of Designations is submitted to the stockholders of the Company and it is not approved, then the holders of the Series E preferred stock will no longer be entitled to any Series E preferred dividends. The Company will not submit the amendment to Series D Certificate of Designations to the stockholders for approval if there are no shares of Series D preferred stock then outstanding. The term “Initial Dividend Rate” means 4.6% per annum or such other percentage per annum as may be approved by the Company and by the holders of at least a majority of the then outstanding shares of Series E preferred stock.
- *Liquidation and Other Events* — In the event of a liquidation, dissolution or winding up of the Company (other than a Sale of the Corporation as defined in the Series E Certificate of Designations), whether voluntary or involuntary, after payment or provision for payment of debts and other liabilities of the Company, the holders of the Series E preferred stock then outstanding will be entitled to be paid out of the assets of the Company available for distribution to its stockholders an amount equal to the greater of (a) the original per share purchase price of the Series E preferred stock (\$14.00 per share) plus all accrued or declared but unpaid dividends thereon and (b) the amount that the holder of Series E preferred stock would be entitled to receive with respect to each share of Series E preferred stock pursuant to such liquidation if all of the outstanding shares of Series E preferred stock had been converted into common stock as of the date immediately prior to the date fixed for determination of stockholders entitled to receive a distribution in such liquidation. Such amount will be paid before any cash distribution may be made or any other assets distributed in respect of the holders of common stock, Series A convertible preferred stock, Series D preferred stock or any other class of capital stock of the Company ranking junior to the Series E preferred stock as to liquidation. In the event of a sale of the corporation, after payment to the holders of the Series A preferred stock, Series D preferred stock and any other class of capital stock of the Company ranking senior to the Series E preferred stock, the remaining assets of the Company available for distribution to its stockholders will be distributed among the holders of shares of Series E preferred stock and common stock on a pro rata (and as converted to common stock) basis based on the number of shares held by each such holder.
- *Voting* — Unless and until the stockholders of the Company approve the Nasdaq Proposal, the Series E preferred stock will have no voting rights. Subject to and effective upon the date that the stockholders of the Company approve the Nasdaq Proposal, each holder of outstanding shares of Series E preferred stock will be entitled to cast a number of votes equal to the lesser of (a) the number of whole shares of common stock into which the shares of Series E preferred stock held by such holder are convertible and (b) the product of the Voting Adjustment Percentage, as defined in the Series E Certificate of Designations, multiplied by the number of whole shares of common stock into which the shares of Series E preferred stock held by such holder are



**IDERA PHARMACEUTICALS, INC.**  
**NOTES TO FINANCIAL STATEMENTS — (Continued)**

convertible. The intent of the Voting Adjustment Percentage is to provide that the maximum aggregate voting power that the holders of Series E preferred stock and their affiliates may hold does not exceed 35% of the total outstanding voting power of the Company at any time. The Voting Adjustment Percentage does not modify the provisions set forth in the Series E Purchase Agreement that require the Series E purchasers and their affiliates to vote any shares held by them in excess of the number of shares equal to 19.99% or 25%, as applicable, of the outstanding common stock (including shares of common stock issuable upon conversion or exercise of securities that are convertible into or exercisable for shares of common stock held by the Series E purchasers and their affiliates) in the same manner and percentage as the holders of the common stock (other than the Series E purchasers and their affiliates) vote on such matter.

- *Protective Provisions* — For so long as at least 84,849 shares of Series E preferred stock, subject to adjustment, remain outstanding, the Company has agreed that it will not, directly or indirectly, (a) amend the Certificate of Incorporation or bylaws of the Company in a manner that adversely and uniquely affects the Series E preferred stock, (b) except as expressly permitted by the Series E Certificate of Designations, purchase or redeem or pay or declare any dividend or make any distribution on, any shares of capital stock of the Company, or (c) recapitalize or reclassify any of the common stock, without in each case the written consent or affirmative vote of the holders of at least 51% of the then outstanding shares of Series E preferred stock.
- *Conversion* — Each share of Series E preferred stock is convertible, at the option of the holder thereof, at any time and from time to time, and without the payment of additional consideration by the holder thereof, into such number of fully paid and nonassessable shares of common stock as is determined by dividing the Series E preferred stock original issue price by the Series E preferred stock conversion price in effect at the time of conversion. The Series E preferred stock conversion price is initially equal to \$0.70 and the Series E preferred stock issue price is initially equal to the \$14.00 original purchase price of the Series E preferred stock. Accordingly, each share of Series E preferred stock is initially convertible at the option of the holder into 20 fully paid and nonassessable shares of the common stock. No holder may convert its shares to the extent such conversion would result in the holder and its affiliates beneficially owning more than 19.99% of the outstanding common stock or outstanding voting power of the Company (including shares of common stock issuable upon conversion of the Series E preferred stock), unless the stockholders of the Company approve the Nasdaq Proposal, in which case, the 19.99% limitation will be increased, with respect to any holder of Series E preferred stock, to 35%. The initial Series E preferred stock conversion price, and the rate at which shares of Series E preferred stock may be converted into shares of common stock, are subject to adjustment for stock dividends, stock splits and other similar events, as provided in the Series E Certificate of Designations.
- *Redemption by Company* — After the later of November 9, 2014 and the date that no shares of Series D preferred stock remain outstanding, the Company may redeem all or a portion of the Series E preferred stock for a cash payment equal to the original Series E preferred stock issue price per share plus any accrued or declared but unpaid dividends thereon following notice to the holders of the Series E preferred stock if the closing price of the common stock for 20 or more trading days in a period of 30 consecutive trading days is greater than or equal to 400% of the Series E preferred stock conversion price. The Company may not redeem any shares of Series E preferred stock from a holder that cannot convert such shares of Series E preferred stock into common stock as a result of the beneficial ownership limitations described above under “Conversion.” In such event, the Company may redeem such nonredeemable shares pursuant to

**IDERA PHARMACEUTICALS, INC.**  
**NOTES TO FINANCIAL STATEMENTS — (Continued)**

alternative redemption provisions set forth in the Series E Certificate of Designations following notice to the holders of the nonredeemable shares, for a cash payment equal to the greater of the 20 consecutive trading day average closing price per share of the common stock ending on the trading day immediately prior to redemption date plus any dividends accrued or declared but unpaid thereon and the Series E conversion price plus any dividends accrued or declared but unpaid thereon.

The Series E preferred stock was first considered under ASC 480 and it was determined that it was not mandatorily redeemable. The Company identified the following three embedded features within the Series E preferred stock: (1) optional conversion by the holder; (2) optional redemption by the company; and (3) an alternative redemption by the company. The Series E preferred stock was determined to be an equity host. The optional conversion by the holder was assessed to be clearly and closely related to the Series E preferred stock and thus not subject to bifurcation under ASC 815. The optional redemption by the company and the alternative redemption by the company were both indexed to the Company's own stock and met the criteria for equity classification under ASC 815-40 and thus were not required to be bifurcated. The Series E preferred stock is redeemable only at the Company's option. In addition, the Series E preferred stock only has preferences in the event of a final liquidation or termination of the Company. In the event of a deemed liquidation, the Series E preferred stock has no preferences and ranks together with the common stockholders. Thus, the Series E preferred stock is not within the scope of ASC 480-10-S99 and will be classified in stockholders' equity.

The Series E preferred stock was issued together with warrants to purchase 8,484,840 shares of common stock (the Series E warrants). Since the Series E preferred stock and the Series E warrants were classified in stockholders' equity, the gross proceeds from the financing were allocated between the Series E preferred stock and the Series E warrants based on their relative fair values at the time of the November 9, 2012 Series E financing. The fair value of the Series E warrants was computed using the Black Scholes Model and was determined to be \$2,949,000. The \$2,322,000 prorated value of the Series E warrants was recorded as additional paid-in capital.

The Series E preferred stock was then considered under ASC 470-20 to determine if a BCF existed. As of the transaction date, a BCF of \$1,262,000 was computed using the initial stated conversion rate. Since the conversion feature is immediately exercisable, the \$1,262,000 BCF was accreted immediately to preferred dividends.

The following is a summary of the changes in the Series E preferred stock during 2012 (in thousands):

Gross proceeds from November 9, 2012 Series E financing (including \$1,061 paid for the warrants)	\$ 7,000
Less — allocation of proceeds to:	
fair value allocated to warrants	(2,322)
beneficial conversion feature	(1,262)
transaction costs	(977)
Net proceeds allocated to Series E preferred stock	2,439
Accretion of beneficial conversion feature	1,262
Carrying Value of Series E preferred stock — November 9, 2012	\$ 3,701
Carrying Value of Series E preferred stock — December 31, 2012	\$ 3,701

**IDERA PHARMACEUTICALS, INC.**  
**NOTES TO FINANCIAL STATEMENTS — (Continued)**

**8. Commitments and Contingencies**

*(a) Lease Commitments*

In June 2007, the Company relocated its operations to a newly leased facility with a lease term through May 31, 2014, with one five-year renewal option exercisable by the Company. During 2012, 2011 and 2010, rent expense, including real estate taxes, was \$1,596,000, \$1,582,000, and \$1,531,000, respectively. As part of the lease, the Company is required to restrict approximately \$311,000 of cash for a security deposit as of December 31, 2012. The lease is classified as an operating lease. Future minimum commitments as of December 31, 2012 under the Company's lease agreement are approximately:

<u>December 31,</u>	<u>Operating Lease</u> <u>(In thousands)</u>
2013	\$ 1,488
2014	628
	<u>\$ 2,116</u>

*(b) External Collaborations*

The Company is a party to six royalty-bearing license agreements under which it has acquired rights to antisense related patents, patent applications, and technology. Each of these in-licenses automatically terminates upon the expiration of the last to expire patent included in the license. The Company has annual minimum payments due under these agreements of \$35,000.

*(c) Contract Obligations*

The Company has an employment agreement, which expires October 2015, with its chairman, president and chief executive officer. As of December 31, 2012, future minimum commitments under this agreement were approximately \$549,000 for each of the years ended December 31, 2013 and 2014, and \$440,000 for the year ended December 31, 2015.

*(d) Related-Party Transactions*

In November 2011, the Company issued and sold shares of Series D preferred stock and Series D warrants pursuant to a Convertible Preferred Stock and Warrant Purchase Agreement with Pillar I, an investment partnership managed by one of the Company's directors and significant shareholders, which is described in Note 13. In November 2012, the Company issued and sold shares of Series E preferred stock and Series E warrants pursuant to a Convertible Preferred Stock and Warrant Purchase Agreement with Pillar II, an investment partnership managed by two of the Company's directors and one of its significant shareholders, which is described in Note 13.

The Company paid certain directors consulting fees of approximately \$1,000, \$32,000 and \$53,000 in 2012, 2011 and 2010, respectively. The \$1,000 paid in 2012 was associated with services performed in 2011. The Company issued common stock in lieu of Director board and committee fees of approximately \$1,000, \$38,000, and \$6,000 during 2012, 2011 and 2010, respectively.

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**NOTES TO FINANCIAL STATEMENTS — (Continued)**

**9. Income Taxes**

Subject to the limitations described below, at December 31, 2012, the Company had cumulative net operating loss carryforwards (NOLs) of approximately \$173.3 million and \$67.3 million available to reduce federal and state taxable income which expire through 2032. In addition, the Company had cumulative federal and state tax credit carryforwards of \$5.0 million and \$5.2 million, respectively, available to reduce federal and state income taxes which expire through 2032 and 2027, respectively. The federal and state NOLs include approximately \$1.9 million and \$1.6 million, respectively, of deductions related to the exercise of stock options subsequent to the adoption of ASC 718 — “Stock Compensation.” This amount represents an excess tax benefit as defined under ASC 718 and has not been included in the gross deferred tax asset reflected for NOLs.

The Tax Reform Act of 1986 contains provisions, which limit the amount of net operating loss and tax credit carryforwards that companies may utilize in any one year in the event of cumulative changes in ownership over a three-year period in excess of 50%. The Company has completed several financings since the effective date of the Tax Reform Act of 1986, which as of December 31, 2012, have resulted in ownership changes in excess of 50%, and that will significantly limit the Company’s ability to utilize its NOL and tax credit carryforwards. The Company has not prepared an analysis to determine the effect of the ownership change limitation on its ability to utilize its net operating loss and tax credit carryforwards as of December 31, 2012. Ownership changes in future periods may place additional limits on the Company’s ability to utilize NOLs and tax credit carryforwards.

As of December 31, 2012 and 2011, the components of the deferred tax assets are approximately as follows:

	<u>2012</u>	<u>2011</u>
	(In thousands)	
Operating loss carryforwards	\$ 61,717	\$ 75,817
Tax credit carryforwards	8,455	9,163
Other	4,935	4,844
	<u>75,107</u>	<u>89,824</u>
Valuation allowance	<u>(75,107)</u>	<u>(89,824)</u>
	<u>\$ —</u>	<u>\$ —</u>

The Company has provided a valuation allowance for its deferred tax asset due to the uncertainty surrounding the ability to realize this asset. The decreases in the operating loss carryforward deferred tax asset and the valuation allowance in the current year is primarily attributable to the expiration of NOLs.

**IDERA PHARMACEUTICALS, INC.**  
**NOTES TO FINANCIAL STATEMENTS — (Continued)**

The difference between the 34% U.S. federal corporate tax rate and the Company's effective tax rate is as follows for the years ended December 31, 2012, 2011 and 2010:

	<u>2012</u>	<u>2011</u>	<u>2010</u>
Expected federal income tax rate	(34.0)%	(34.0)%	(34.0)%
Expiring credits and NOLs	116.3	66.3	74.2
Change in valuation allowance	(76.6)	(22.5)	(34.1)
Federal and state credits	(0.6)	(3.3)	(6.4)
State income taxes, net of federal benefit	(5.2)	(5.4)	(4.8)
Permanent differences	0.1	(1.0)	2.6
State rate change	—	—	0.3
Other	—	(0.1)	2.2
Effective tax rate	<u>0.0%</u>	<u>0.0%</u>	<u>0.0%</u>

The Company applies ASC 740-10, "Accounting for Uncertainty in Income Taxes, an interpretation of ASC 740." ASC 740-10 clarifies the accounting for uncertainty in income taxes recognized in financial statements and requires the impact of a tax position to be recognized in the financial statements if that position is more likely than not of being sustained by the taxing authority. The Company had no unrecognized tax benefits resulting from uncertain tax positions at December 31, 2012 and 2011.

The Company has not, as of yet, conducted a study of its research and development credit carryforwards. Such a study might result in an adjustment to the Company's research and development credit carryforwards, however, until a study is completed and any adjustment is known, no amounts are being presented as an uncertain tax position under ASC 740-10. A full valuation allowance has been provided against the Company's research and development credits and, if an adjustment is required, this adjustment would be offset by an adjustment to the valuation allowance. Thus, there would be no impact to the statements of operations and comprehensive loss if an adjustment was required.

The Company files income tax returns in the U.S. federal and Massachusetts jurisdictions. The Company is no longer subject to tax examinations for years before 2009, except to the extent that it utilizes NOLs or tax credit carryforwards that originated before 2009. The Company does not believe there will be any material changes in its unrecognized tax positions over the next 12 months. The Company has not incurred any interest or penalties. In the event that the Company is assessed interest or penalties at some point in the future, they will be classified in the statements of operations and comprehensive loss as general and administrative expense.

The American Taxpayer Relief Act of 2012 (the Act) was enacted on January 2, 2013. The Act retroactively reinstates the federal research and development credit from January 1, 2012, through December 31, 2013. The effect of the change in the tax law related to fiscal 2012 is estimated to be approximately \$0.5 million, which will increase the deferred tax asset and related valuation allowance in the first quarter of 2013, the quarter in which the law was enacted.

#### **10. Employee Benefit Plan**

The Company has an employee benefit plan under Section 401(k) of the Internal Revenue Code. The plan allows employees to make contributions up to a specified percentage of their compensation. Under the plan, the Company matches a portion of the employees' contributions up to a defined maximum. The

**IDERA PHARMACEUTICALS, INC.**  
**NOTES TO FINANCIAL STATEMENTS — (Continued)**

Company is currently contributing up to 3% of employee base salary, by matching 50% of the first 6% of annual base salary contributed by each employee. Approximately \$106,000, \$132,000, and \$139,000 of 401(k) benefits were charged to operating expenses during 2012, 2011 and 2010, respectively.

### 11. Net Loss per Common Share Applicable to Common Stockholders

For the years ended December 31, 2012 and 2011, basic and diluted net loss per common share applicable to common stockholders is computed using the weighted average number of shares of common stock outstanding during the period. Diluted net loss per common share applicable to common stockholders is the same as basic net loss per common share applicable to common stockholders as the effects of the Company's potential common stock equivalents are antidilutive. Total antidilutive securities were 33,332,000 and 16,005,000 at December 31, 2012 and 2011, respectively, and consist of stock options, preferred stock and warrants.

For the year ended December 31, 2012, net loss per common share applicable to common stockholders reflects \$3.2 million in preferred stock accretion and dividends, including \$1.2 million related to the BCF of the Series D preferred stock that has been accreted to preferred dividends, \$0.7 million in dividends payable on shares of our Series D preferred stock and \$1.3 million related to the BCF of the Series E preferred stock that has been accreted to preferred dividends. For the year ended December 31, 2011, net loss per common share applicable to common stockholders reflects \$4.5 million in preferred stock accretion and dividends, including \$4.4 million related to the BCF of the Series D preferred stock that has been accreted to preferred dividends, and \$0.1 million in dividends payable on shares of our Series D preferred stock.

### 12. Supplemental Disclosure of Cash Flow Information

Supplemental disclosure of cash flow information for the periods presented is as follows:

	Year Ended December 31,		
	2012	2011	2010
	(In thousands)		
Supplemental disclosure of non cash financing and investing activities:			
Accretion of Series D redeemable preferred stock beneficial conversion feature	\$ 1,238	\$ 4,445	\$ —
Accretion of Series E preferred stock beneficial conversion feature	\$ 1,262	\$ —	\$ —
Reclassification of Series D warrants from liabilities to stockholders' equity	\$ 503	\$ —	\$ —

### 13. Financings

#### *Series E Preferred Stock and Warrant Financing*

In November 2012, the Company entered into a Convertible Preferred Stock and Warrant Purchase Agreement (Series E Purchase Agreement) with Pillar II and the other purchaser named therein (together, the Series E Purchasers). Pursuant to the Series E Purchase Agreement, the Company issued and sold to the Series E Purchasers, for an aggregate purchase price of approximately \$7.0 million, 424,242 shares of

**IDERA PHARMACEUTICALS, INC.**  
**NOTES TO FINANCIAL STATEMENTS — (Continued)**

its Series E preferred stock and Series E warrants to purchase up to 8,484,840 shares of its common stock. The shares of Series E preferred stock are convertible, subject to limitations, into an aggregate of 8,484,840 shares of common stock at a conversion price of \$0.70 per share. The initial exercise price of the Series E warrants is \$0.70 per share. The Series E warrants are exercisable immediately, and will expire if not exercised on or prior to November 9, 2017. The Company has agreed to pay to the holders of the Series E preferred stock quarterly dividends payable in cash in arrears at the rate of 4.6% per annum with the first dividend payment being due on March 31, 2013. Under the terms of the Series D preferred stock, any dividends paid to the holders of Series E preferred stock will also be paid to the holders of the Series D preferred stock on an as-converted to common stock basis. The Company has agreed that, at its 2013 annual meeting of stockholders, it will, among other things, propose an amendment to the Series D Certificate of Designations to, among other things, modify the terms of the Series D preferred stock that require payment of dividends to Series D preferred stockholders upon payment of dividends to Series E stockholders. If such amendment is approved by the Company's stockholders, the holders of the Series E preferred stock will become entitled to receive dividends payable in cash quarterly in arrears at the rate of 8% per annum and the holders of the Series D preferred stock would cease to be entitled to corresponding dividends. If such amendment is submitted to the Company's stockholders and it is not approved, the holders of the Series E preferred stock will no longer be entitled to receive dividends.

The net proceeds to the Company, excluding the proceeds of any exercise of the warrants, were approximately \$6.0 million. The Company intends to use these funds for research and clinical development activities, the manufacturing of its product candidates, working capital and general corporate purposes, including the advancement of the Company's autoimmune disease program in at least two indications.

The securities offered by the Company in the private placement were not registered under the Securities Act of 1933, as amended (the Securities Act), and cannot be offered or sold in the United States absent registration or an applicable exemption from registration requirements. In January 2013, the Company filed a registration statement with the Securities and Exchange Commission that became effective on January 17, 2013, registering the resale of the shares of common stock issuable upon conversion of the Series E preferred stock and the shares of common stock issuable upon exercise of the Series E warrants issued in the private placement.

The Company is subject to specified cash penalties if it fails to maintain an effective registration statement with the Securities and Exchange Commission registering the resale of the shares of Common Stock issuable upon conversion of the Series E preferred stock and the shares of Common Stock issuable upon exercise of the Series E warrants. Such penalties are limited to a cumulative maximum penalty equal to 10% of the aggregate purchase price paid to the Company for the Series E preferred stock. The Company is required to maintain the registration statement's effectiveness until no unregistered shares of Common Stock issued or issuable upon conversion of the Series E preferred stock or upon exercise of the Series E warrants remain outstanding or issuable, as applicable.

*Series D Preferred Stock and Warrant Financing*

In November 2011, the Company entered into a Convertible Preferred Stock and Warrant Purchase Agreement (Series D Purchase Agreement) with Pillar I. Pursuant to the Series D Purchase Agreement, the Company issued and sold to Pillar I, for an aggregate purchase price of \$9.5 million, 1,124,260 shares of its Series D preferred stock initially convertible into 5,621,300 shares of its common stock, and Series D

**IDERA PHARMACEUTICALS, INC.**  
**NOTES TO FINANCIAL STATEMENTS — (Continued)**

warrants to purchase 2,810,650 shares of its common stock. Each share of Series D preferred stock was initially convertible, subject to limitations, at a conversion price of \$1.63 per share. The initial exercise price of the Series D warrants was \$1.63 per share.

The sale of shares of Series E preferred stock and Series E warrants in the Company's November 2012 Series E financing triggered anti-dilution adjustments under the terms of the Series D preferred stock and the Series D warrants. The anti-dilution adjustment under the Series D preferred stock resulted in the conversion price of the Series D preferred stock being reduced and fixed at \$1.46 per share, and such shares no longer being subject to any anti-dilution adjustments. Each share of Series D preferred stock became convertible into 5.5736 shares of the Company's common stock and, as a result, the 1,124,260 shares of Series D preferred stock became convertible, subject to limitations, into 6,266,175 shares of the Company's common stock. The anti-dilution adjustment under the Series D warrants resulted in the exercise price of the Series D warrants being reduced and fixed at the minimum \$1.46 per share and the Series D warrants no longer being subject to any anti-dilution adjustments.

The net proceeds to the Company, excluding the proceeds of any exercise of the Series D warrants, were approximately \$9.1 million which was allocated as described in Note 6(a). The Company used these funds for research and product development activities, including costs of conducting preclinical studies and clinical trials, and for general corporate purposes.

The securities offered by the Company in the private placement were not registered under the Securities Act and cannot be offered or sold in the United States absent registration or an applicable exemption from registration requirements. In December 2011, the Company filed a registration statement with the Securities and Exchange Commission that became effective on December 21, 2011, registering the resale of the shares of common stock issuable upon conversion of the Series D preferred stock and the shares of common stock issuable upon exercise of the warrants issued in the private placement. In February 2013, the Company filed a registration statement with the Securities and Exchange Commission that became effective on February 8, 2013, covering the resale of additional shares of common stock issuable upon conversion of the Series D preferred stock.

The Company is subject to specified cash penalties if it fails to maintain an effective registration statement with the Securities and Exchange Commission registering the resale of the shares of common stock issuable upon conversion of the Series D preferred stock and the shares of common stock issuable upon exercise of the Series D warrants. Such penalties are limited to a cumulative maximum penalty equal to 10% of the aggregate purchase price paid to the Company by Pillar I for the Series D preferred stock. The Company is required to maintain the registration statement's effectiveness until no unregistered shares of common stock issued or issuable upon conversion of the Series D preferred stock or upon exercise of the Series D warrants remain outstanding or issuable, as applicable.

*Registered Direct Common Stock Financing*

On August 5, 2010, the Company raised \$15.1 million in gross proceeds from a registered direct offering of common stock and warrants to institutional investors. In the offering, the Company sold 4,071,005 shares of common stock and warrants to purchase 1,628,402 shares of common stock. The common stock and the warrants were sold in units at a price of \$3.71 per unit, with each unit consisting of one share of common stock and warrants to purchase 0.40 shares of common stock. The warrants to purchase common stock have an exercise price of \$3.71 per share, are exercisable immediately, and will expire if not exercised on or prior to August 5, 2015. The net proceeds to the Company from the offering, excluding the proceeds of any future exercise of the warrants, were approximately \$14.1 million.





**Idera Pharmaceuticals, Inc.**

**Common Stock**

**Warrants to Purchase Shares of Common Stock**

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**PROSPECTUS**

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, 2013

**PART II**  
**INFORMATION NOT REQUIRED IN PROSPECTUS**

**Item 13. Other Expenses of Issuance and Distribution.**

The following table indicates the expenses to be incurred in connection with the offering described in this registration statement, other than underwriting discounts and commissions, all of which will be paid by us. All amounts are estimated except the Securities and Exchange Commission registration fee and the the FINRA filing fee.

	<u>Amount</u>
Securities and Exchange Commission registration fee	\$ 5,456
FINRA filing fee	6,500
Accountants' fees and expenses	30,000
Legal fees and expenses	500,000
Blue Sky fees and expenses	—
Transfer Agent's fees and expenses	—
Printing and engraving expenses	—
Miscellaneous	213,410
Total expenses	<u>\$755,366</u>

**Item 14. Indemnification of Directors and Officers.**

Article EIGHTH of the registrant's Restated Certificate of Incorporation provides that no director of the registrant shall be personally liable for any monetary damages for any breach of fiduciary duty as a director, except to the extent that the Delaware General Corporation Law prohibits the elimination or limitation of liability of directors for breach of fiduciary duty.

Article NINTH of the registrant's Restated Certificate of Incorporation provides that a director or officer of the registrant (a) shall be indemnified by the registrant against all expenses (including attorneys' fees), judgments, fines and amounts paid in settlement incurred in connection with any litigation or other legal proceeding (other than an action by or in the right of the registrant) brought against him by virtue of his position as a director or officer of the registrant if he acted in good faith and in a manner he reasonably believed to be in, or not opposed to, the best interests of the registrant, and, with respect to any criminal action or proceeding, had no reasonable cause to believe his conduct was unlawful and (b) shall be indemnified by the registrant against all expense (including attorneys' fees) and amounts paid in settlement incurred in connection with any action by or in the right of the registrant brought against him by virtue of his position as a director or officer of the registrant if he acted in good faith and in a manner he reasonably believed to be in, or not opposed to, the best interests of the registrant, except that no indemnification shall be made with respect to any matter as to which such person shall have been adjudged to be liable to the registrant, unless a court determines that, despite such adjudication but in view of all of the circumstances, he is entitled to indemnification of such expenses. Notwithstanding the foregoing, to the extent that a director or officer has been successful, on the merits or otherwise, including, without limitation, the dismissal of an action without prejudice, he is required to be indemnified by the registrant against all expenses (including attorneys' fees) incurred in connection therewith. Expenses shall be advanced to a director or officer at his request, provided that he undertakes to repay the amount advanced if it is ultimately determined that he is not entitled to indemnification for such expenses.

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Indemnification is required to be made unless the registrant determines that the applicable standard of conduct required for indemnification has not been met. In the event of a determination by the registrant that the director or officer did not meet the applicable standard of conduct required for indemnification, or if the registrant fails to make an indemnification payment within 60 days after such payment is claimed by such person, such person is permitted to petition the court to make an independent determination as to whether such person is entitled to indemnification. As a condition precedent to the right of indemnification, the director or officer must give the registrant notice of the action for which indemnity is sought and the registrant has the right to participate in such action or assume the defense thereof.

Article NINTH of the registrant's Restated Certificate of Incorporation further provides that the indemnification provided therein is not exclusive, and provides that in the event that the Delaware General Corporation Law is amended to expand the indemnification permitted to directors or officers the registrant must indemnify those persons to the full extent permitted by such law as so amended.

Section 145 of the Delaware General Corporation law provides that a corporation has the power to indemnify a director, officer, employee or agent of the corporation and certain other persons serving at the request of the corporation in related capacities against amounts paid and expense incurred in connection with an action or proceeding to which he is or is threatened to be made a party by reason of such position, if such person shall have acted in good faith and in a manner he reasonably believed to be in or not opposed to the best interests of the corporation, and, in any criminal proceeding, if such person had no reasonable cause to believe his conduct was unlawful; provided that, in the case of actions brought by or in the right of the corporation, no indemnification shall be made with respect to any matter as to which such person shall have been adjudged to be liable to the corporation unless and only to the extent that the adjudicating court determines that such indemnification is proper under the circumstances.

Idera Pharmaceuticals has obtained directors and officers insurance for the benefit of its directors and its officers.

**Item 15. Recent Sales of Unregistered Securities.**

Set forth below is information regarding shares of capital stock issued by us within the past three years. Also included is the consideration received by us for such shares and information relating to the section of the Securities Act, or rule of the Securities and Exchange Commission, under which exemption from registration was claimed.

(a) Issuance of Capital Stock and Warrants

(1) In November 2012, we issued and sold an aggregate of 424,242 shares of Series E preferred stock and related warrants to purchase shares of our common stock, or Series E warrants, to purchase up to 8,484,840 shares of common stock for approximately \$7.0 million in gross proceeds to Pillar Pharmaceuticals II, L.P., an investment fund managed by two of our directors. The conversion price of the Series E preferred stock and the exercise price of the Series E warrants is \$0.70. In January 2013, we filed a registration statement registering the resale of the shares of common stock issuable upon conversion of the Series E preferred stock and the shares of common stock issuable upon exercise of the Series E warrants. See "Certain Relationships and Related Person Transactions" for additional details about this financing transaction.

(2) In November 2011, we issued and sold to Pillar Pharmaceuticals I, L.P. an aggregate of 1,124,260 shares of our Series D preferred stock and related warrants to purchase shares of our common stock, or Series D warrants, to purchase 2,810,650 shares of our common stock for an aggregate purchase price of approximately \$9.5 million in gross proceeds to Pillar Pharmaceuticals I, L.P., an investment fund managed by one of our directors. The conversion price of the Series D preferred stock and the exercise price of the Series D warrants is \$1.46. In December 2011, we filed a registration

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statement registering the resale of the shares of common stock issuable upon conversion of the Series D preferred stock and the shares of common stock issuable upon exercise of the Series D warrants. See “Certain Relationships and Related Person Transactions” for additional details about this financing transaction.

No underwriters were involved in the foregoing issuances of securities. The securities described in paragraph (a)(1) and (a)(2) of Item 15 were issued to accredited investors in reliance upon the exemption from the registration requirements of the Securities Act, as set forth in Section 4(2) under the Securities Act, including Regulation D promulgated thereunder, relative to transactions by an issuer not involving any public offering, to the extent an exemption from such registration was required.

**(b) Stock Option Grants**

Since January 1, 2010, we have issued options to certain directors, employees and consultants to purchase an aggregate of 2,946,750 shares of common stock as of January 31, 2013. Since January 1, 2010, no options to purchase shares of common stock had been exercised, and, as of January 31, 2013, options to purchase 2,439,336 shares of common stock remained outstanding at a weighted average exercise price of \$1.81 per share.

The issuances of stock options and the shares of common stock issuable upon the exercise of the options described in this paragraph (b) of Item 15 were issued pursuant to written compensatory plans or arrangements with our employees, directors and consultants, in reliance on the exemption provided by Rule 701 promulgated under the Securities Act, or pursuant to Section 4(2) under the Securities Act, relative to transactions by an issuer not involving any public offering, to the extent an exemption from such registration was required.

The securities described in paragraph (b) of Item 15 are deemed restricted securities for purposes of the Securities Act. All certificates representing the issued shares of capital stock described in this paragraph (b) of Item 15 included appropriate legends setting forth that the securities have not been registered and the applicable restrictions on transfer.

**Item 16. Exhibits and Financial Statement Schedules.**

(a) Exhibits. The Exhibit Index annexed to this prospectus, and immediately preceding the exhibits, is incorporated herein by reference.

(b) Financial Statement Schedules.

**Item 17. Undertakings.**

The undersigned registrant hereby undertakes to provide to the underwriter, at the closing specified in the underwriting agreement, certificates in such denominations and registered in such names as required by the underwriter to permit prompt delivery to each purchaser.

Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the registrant of expenses incurred or paid by a director, officer or controlling person of the registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Securities Act and will be governed by the final adjudication of such issue.

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The undersigned hereby undertakes that:

- (1) For purposes of determining any liability under the Securities Act, the information omitted from the form of prospectus filed as part of this registration statement in reliance upon Rule 430A and contained in a form of prospectus filed by the registrant pursuant to Rule 424(b)(1) or (4) or 497(h) under the Securities Act shall be deemed to be part of this registration statement as of the time it was declared effective.
- (2) For the purpose of determining any liability under the Securities Act, each post-effective amendment that contains a form of prospectus shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.
- (3) For the purpose of determining liability under the Securities Act to any purchaser, each prospectus filed pursuant to Rule 424(b) as part of a registration statement relating to an offering, other than registration statements relying on Rule 430B or other than prospectuses filed in reliance on Rule 430A, shall be deemed to be part of and included in the registration statement as of the date it is first used after effectiveness. Provided, however, that no statement made in a registration statement or prospectus that is part of the registration statement or made in a document incorporated or deemed incorporated by reference into the registration statement or prospectus that is part of the registration statement will, as to a purchaser with a time of contract of sale prior to such first use, supersede or modify any statement that was made in the registration statement or prospectus that was part of the registration statement or made in any such document immediately prior to such date of first use.
- (4) In a primary offering of securities of the undersigned registrant pursuant to this registration statement, regardless of the underwriting method used to sell the securities to the purchaser, if the securities are offered or sold to such purchaser by means of any of the following communications, the undersigned registrant will be a seller to the purchaser and will be considered to offer or sell such securities to such purchaser:
  - (i) Any preliminary prospectus or prospectus of the undersigned registrant relating to the offering required to be filed pursuant to Rule 424;
  - (ii) Any free writing prospectus relating to the offering prepared by or on behalf of the undersigned registrant or used or referred to by the undersigned registrant;
  - (iii) The portion of any other free writing prospectus relating to the offering containing material information about the undersigned registrant or its securities provided by or on behalf of the undersigned registrant; and
  - (iv) Any other communication that is an offer in the offering made by the undersigned registrant to the purchaser.



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Pursuant to the requirements of the Securities Act of 1933, this Registration Statement has been signed by the following persons in the capacities held on the dates indicated.

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ SUDHIR AGRAWAL, D. PHIL.</u> Sudhir Agrawal, D. Phil.	Chairman of the Board of Directors, President and Chief Executive Officer (Principal Executive Officer)	May 1, 2013
* <u>Louis J. Arcudi III, MBA</u>	Senior Vice President of Operations, Chief Financial Officer, Treasurer and Secretary (Principal Financial and Accounting Officer)	May 1, 2013
* <u>Youssef El Zein</u>	Director	May 1, 2013
* <u>C. Keith Hartley</u>	Director	May 1, 2013
* <u>Robert W. Karr, M.D.</u>	Director	May 1, 2013
* <u>Malcolm MacCoss, Ph.D.</u>	Director	May 1, 2013
* <u>William S. Reardon, CPA</u>	Director	May 1, 2013
* <u>Eve E. Slater, M.D., F.A.C.C.</u>	Director	May 1, 2013
* <u>Abdul-Wahab Umari</u>	Director	May 1, 2013
*By: <u>/s/ SUDHIR AGRAWAL, D. PHIL.</u> Sudhir Agrawal, D. Phil. Attorney-in-fact		

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<u>Exhibit Number</u>	<u>Description</u>	<u>Filed Herewith</u>	<u>Incorporated by Reference to</u>		
			<u>Form</u>	<u>Filing Date</u>	<u>SEC File No.</u>
1.1	Underwriting Agreement	X			
3.1	Restated Certificate of Incorporation of Idera Pharmaceuticals, Inc., as amended.		10-Q	August 9, 2012	001-31918
3.2	Amended and Restated Bylaws of Idera Pharmaceuticals, Inc.		S-1	November 6, 1995	33-99024
3.3	Certificate of Ownership and Merger.		8-K	September 15, 2005	001-31918
4.1	Specimen Certificate for shares of Common Stock, \$.001 par value, of Idera Pharmaceuticals, Inc.		S-1	December 8, 1995	33-99024
4.2	Certificate of Designations, Preferences and Rights of Series E Preferred Stock of the Company		8-K	November 14, 2012	001-31918
4.3	Form of Warrant	X			
4.4	Form of Pre-Funded Warrant	X			
5.1	Opinion of Wilmer Cutler Pickering Hale and Dorr LLP	X			
10.1††	2008 Stock Incentive Plan, as amended		8-K	June 17, 2011	001-31918
10.2††	2005 Stock Incentive Plan, as amended		10-Q	August 14, 2006	001-31918
10.3††	Amended and Restated 1997 Stock Incentive Plan.		10-Q	May 15, 2001	000-27352
10.4††	1995 Director Stock Option Plan.		8-K	June 10, 2008	001-31918
10.5††	1995 Employee Stock Purchase Plan, as amended		8-K	June 17, 2011	001-31918
10.6††	Non-Employee Director Nonstatutory Stock Option Agreement Granted under 1997 Stock Incentive Plan.		10-K	March 25, 2005	001-31918
10.7††	Form of Incentive Stock Option Agreement Granted Under the 2005 Stock Incentive Plan.		8-K	June 21, 2005	001-31918
10.8††	Form of Nonstatutory Stock Option Agreement Granted Under the 2005 Stock Incentive Plan.		8-K	June 21, 2005	001-31918
10.9††	Form of Incentive Stock Option Agreement Granted Under the 2008 Stock Incentive Plan.		8-K	June 10, 2008	001-31918
10.10††	Form of Nonstatutory Stock Option Agreement Granted Under the 2008 Stock Incentive Plan.		8-K	June 10, 2008	001-31918
10.11††	Form of Nonstatutory Stock Option Agreement (Non-Employee Directors) Granted Under the 2008 Stock Incentive Plan.		8-K	June 10, 2008	001-31918



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<u>Exhibit Number</u>	<u>Description</u>	<u>Filed Herewith</u>	<u>Incorporated by Reference to</u>		
			<u>Form</u>	<u>Filing Date</u>	<u>SEC File No.</u>
10.12††	Form of Restricted Stock Agreement Under the 2008 Stock Incentive Plan.		8-K	June 10, 2008	001-31918
10.13††	Policy on Treatment of Stock Options in the Event of Retirement, approved December 14, 2010.		10-K	March 10, 2011	001-31918
10.14††	Employment Agreement dated October 19, 2005 between Idera Pharmaceuticals, Inc. and Dr. Sudhir Agrawal		10-Q	November 9, 2005	001-31918
10.15††	Amendment dated December 17, 2008 to Employment Agreement by and between Idera Pharmaceuticals, Inc. and Dr. Sudhir Agrawal dated October 19, 2005.		8-K	December 18, 2008	001-31918
10.16††	Amended and Restated Employment Letter Agreement by and between Idera Pharmaceuticals, Inc. and Louis J. Arcudi, III, Dated December 2, 2011.		10-K	March 14, 2012	001-31918
10.17††	Director Compensation Program		10-K	March 14, 2012	001-31918
10.18†	License Agreement dated February 21, 1990 and restated as of September 8, 1993 between Idera Pharmaceuticals, Inc. and University of Massachusetts Medical Center.		S-1	November 6, 1995	33-99024
10.19†	Amendment No. 1 to License Agreement, dated as of February 21, 1990 and restated as of September 8, 1993, by and between University of Massachusetts Medical Center and Idera Pharmaceuticals, Inc., dated as of November 26, 1996.		10-Q	August 14, 1997	000-27352
10.20†	Collaboration and License Agreement by and between Isis Pharmaceuticals, Inc., and Idera Pharmaceuticals, Inc., dated May 24, 2001.		10-Q	August 20, 2001	000-27352
10.21	Amendment No. 1 to the Collaboration and License Agreement, dated as of May 24, 2001 by and between Isis Pharmaceuticals, Inc. and Idera Pharmaceuticals, Inc., dated as of August 14, 2002.		10-K	March 31, 2003	000-27352
10.22	Master Agreement relating to the Cross License of Certain Intellectual Property and Collaboration by and between Isis Pharmaceuticals, Inc. and Idera Pharmaceuticals, Inc., dated May 24, 2001.		10-Q	August 20, 2001	000-27352
10.23†	Exclusive License and Research Collaboration Agreement by and between Merck, Inc. and Idera Pharmaceuticals, Inc., dated December 8, 2006.		8-K	March 6, 2007	001-31918

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<u>Exhibit Number</u>	<u>Description</u>	<u>Filed Herewith</u>	<u>Incorporated by Reference to</u>		
			<u>Form</u>	<u>Filing Date</u>	<u>SEC File No.</u>
10.24†	License Agreement by and between Merck KGaA and Idera Pharmaceuticals, Inc., dated December 18, 2007.		10-K	March 11, 2008	001-31918
10.25†	Amendment dated February 12, 2009 to the License Agreement by and between Merck KGaA and Idera Pharmaceuticals, Inc., dated December 18, 2007.		10-K	March 11, 2009	001-31918
10.26	Letter Agreement dated June 2, 2010 to the License Agreement by and between Merck KGaA and Idera Pharmaceuticals, Inc., dated December 18, 2007.		10-Q	August 5, 2011	001-31918
10.27	Letter Agreement dated May 27, 2011 to the License Agreement by and between Merck KGaA and Idera Pharmaceuticals, Inc., dated December 18, 2007.		10-Q	August 5, 2011	001-31918
10.28*	Termination Agreement dated November 30, 2011 by and between Idera Pharmaceuticals, Inc. and Merck KGaA concerning the License Agreement between Idera Pharmaceuticals, Inc. and Merck KGaA dated December 18, 2007 as amended.		10-K	March 14, 2012	001-31918
10.29	Unit Purchase Agreement by and among Idera Pharmaceuticals, Inc. and certain persons and entities listed therein, dated April 1, 1998.		10-K	April 1, 2002	000-27352
10.30	Registration Rights Agreement dated as of May 20, 2005 by and among Idera Pharmaceuticals, Inc., Purchasers and Pillar Investment Limited.		10-Q	August 9, 2005	001-31918
10.31	Registration Rights Agreement, dated March 24, 2006, by and among Idera Pharmaceuticals, Inc. and the Investors named therein.		8-K	March 29, 2006	001-31918
10.32	Registration Rights Agreement, dated March 24, 2006, by and among Idera Pharmaceuticals, Inc., Biotech Shares Ltd. and Youssef El Zein.		8-K	March 29, 2006	001-31918
10.33	Amendment No. 1 to the Registration Rights Agreement dated March 24, 2006, by and among Idera Pharmaceuticals, Inc. and Biotech Shares Ltd.		10-Q	August 14, 2006	001-31918
10.34	Form of Warrant issued to Investors in Idera Pharmaceuticals, Inc.'s August 5, 2010 Financing.		10-Q	November 4, 2010	001-31918
10.35	Consulting Agreement dated as of April 1, 2010 between Idera Pharmaceuticals, Inc. and Malcolm MacCoss, Ph.D.		10-Q	May 4, 2010	001-31918

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<u>Exhibit Number</u>	<u>Description</u>	<u>Filed Herewith</u>	<u>Incorporated by Reference to</u>		
			<u>Form</u>	<u>Filing Date</u>	<u>SEC File No.</u>
10.36	Amendment dated as of December 31, 2010 amending Consulting Agreement dated as of April 1, 2010 between Idera Pharmaceuticals, Inc. and Malcolm MacCoss, Ph.D		10-K	March 14, 2012	001-31918
10.37	Consulting Agreement dated as of January 1, 2011 between Idera Pharmaceuticals, Inc. and Karr Pharma Consulting, LLC.		10-K	March 14, 2012	001-31918
10.38	Amendment dated December 19, 2011 amending Consulting Agreement dated as of January 1, 2011 between Idera Pharmaceuticals, Inc. and Karr Pharma Consulting, LLC.		10-K	March 14, 2012	001-31918
10.39	Convertible Preferred Stock and Warrant Purchase Agreement, dated November 4, 2011, among the Company and the Purchaser named therein.		8-K	November 10, 2011	001-31918
10.40	Amendment No. 1, dated November 9, 2012, to Convertible Preferred Stock and Warrant Purchase Agreement, dated November 4, 2011, between the Company and the Purchaser named therein		8-K	November 14, 2012	001-31918
10.41	Registration Rights Agreement, November 4, 2011, among the Company and the Purchaser named therein.		8-K	November 10, 2011	001-31918
10.42	Form of Warrant issued to Purchaser pursuant to Convertible Preferred Stock and Warrant Purchase Agreement, dated November 4, 2011, among the Company and the Purchaser named therein.		8-K	November 10, 2011	001-31918
10.43	Amendment No. 1, dated November 9, 2012, to Warrant, dated November 4, 2011, between the Company and the Registered Holder named therein		8-K	November 14, 2012	001-31918
10.44	Convertible Preferred Stock and Warrant Purchase Agreement, dated November 9, 2012, among the Company and the Purchasers named therein.		8-K	November 14, 2012	001-31918
10.45	Registration Rights Agreement, November 9, 2012, among the Company and the Purchasers named therein.		8-K	November 14, 2012	001-31918
10.46	Form of Warrant issued to each Purchaser pursuant to Convertible Preferred Stock and Warrant Purchase Agreement, dated November 9, 2012, among the Company and the Purchasers named therein.		8-K	November 14, 2012	001-31918

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<u>Exhibit Number</u>	<u>Description</u>	<u>Filed Herewith</u>	<u>Incorporated by Reference to</u>		
			<u>Form</u>	<u>Filing Date</u>	<u>SEC File No.</u>
10.47	Sales Agreement, dated as of April 12, 2012, by and between the Company and Cowen and Company, LLC.		8-K	April 12, 2012	001-31918
10.48	Lease Agreement dated October 31, 2006 between the Company and ARE-MA-Region No. 23, LLC.		10-K/A	May 8, 2007	001-31918
10.49	Agreement, dated as of April 22, 2013, by and among the Company, Pillar Pharmaceuticals I, L.P. and Pillar Pharmaceuticals II, L.P.		8-K	April 23, 2013	001-31918
10.50	Agreement, dated April 30, 2013, by and among the Company, Pillar Pharmaceuticals I, L.P., Pillar Pharmaceuticals II, L.P. and Participations Besancon	X			
23.1	Consent of Independent Registered Public Accounting Firm.	X			
23.2	Consent of Wilmer Cutler Pickering Hale and Dorr LLP (included in Exhibit 5.1)	X			
24.1	Power of Attorney (included on signature page)		S-1	March 11, 2013	333-187155
101.INS**	XBRL Instance Document		S-1	March 11, 2013	333-187155
101.SCH**	XBRL Taxonomy Extension Schema		S-1	March 11, 2013	333-187155
101.CAL**	XBRL Taxonomy Extension Calculation Linkbase Document		S-1	March 11, 2013	333-187155
101.DEF**	XBRL Taxonomy Extension Definition Linkbase Document		S-1	March 11, 2013	333-187155
101.LAB**	XBRL Taxonomy Extension Labels Linkbase Document		S-1	March 11, 2013	333-187155
101.PRE**	XBRL Taxonomy Extension Presentation Linkbase Document		S-1	March 11, 2013	333-187155

† Confidential treatment granted as to certain portions, which portions are omitted and filed separately with the Commission.

†† Management contract or compensatory plan or arrangement required to be filed as an Exhibit to the Registration Statement on Form S-1.

\* Confidential treatment requested as to certain portions, which portions are omitted and filed separately with the Commission.

\*\* Pursuant to Rule 406T of Regulation S-T, the Interactive Data Files on Exhibit 101 hereto are deemed not filed or part of a registration statement or prospectus for purposes of Sections 11 or 12 of the Securities Act of 1933, as amended, are deemed not filed for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, and otherwise are not subject to liability under those sections.

[•] Shares of Common Stock  
Warrants to Purchase [•] Shares of Common Stock  
and  
Warrants to Purchase [•] Shares of Common Stock  
IDERA PHARMACEUTICALS, INC.  
PURCHASE AGREEMENT

May , 2013

PIPER JAFFRAY & CO.  
As Representative of the several  
Underwriters named in Schedule I hereto  
c/o Piper Jaffray & Co.  
800 Nicollet Mall  
Minneapolis, Minnesota 55402

Ladies and Gentlemen:

Idera Pharmaceuticals, Inc., a Delaware corporation (the “*Company*”), proposes to sell to the several Underwriters named in Schedule I hereto (the “*Underwriters*”) an aggregate of (i) [•] authorized but unissued shares (the “*Firm Shares*”) of common stock, par value \$0.001 per share (the “*Common Stock*”), of the Company, (ii) warrants of the Company, in the form set forth in Exhibit C hereto, to purchase [•] shares of Common Stock at an exercise price of \$[•] per share (the “*Firm Warrants*”) and (iii) warrants of the Company, in the form set forth in Exhibit D hereto, to purchase [•] shares of Common Stock at an exercise price of \$0.01 per share (the “*Pre-Funded Warrants*”). Each Firm Share is being sold together with a Firm Warrant to purchase \$[•] of a share of Common Stock at an exercise price of \$[•] per share. Each Pre-Funded Warrant is being sold together with a Firm Warrant. The Firm Shares, Firm Warrants and the Pre-Funded Warrants purchased pursuant to this Agreement are herein collectively called the “*Securities*.”

The Company hereby confirms its agreement with respect to the sale of the Securities to the several Underwriters, for whom you are acting as representative (the “*Representative*”).

1. *Registration Statement and Prospectus*. A registration statement on Form S-1 (File No. 333-187155) (the “*initial registration statement*”) with respect to the Securities, including a preliminary form of prospectus, has been prepared by the Company in conformity with the requirements of the Securities Act of 1933, as amended (the “*Act*”), and the rules and regulations (“*Rules and Regulations*”) of the Securities and Exchange Commission (the “*Commission*”) thereunder and has been filed with the Commission; one or more amendments to such registration statement have also been so prepared and have been, or will be, so filed; and, if the Company has elected to rely upon Rule 462(b) of the Rules and Regulations to increase the size of the offering the Company will prepare and file with the Commission a registration statement with respect to such increase pursuant to Rule 462(b) (the “*additional registration statement*”). Copies of such registration statements and amendments and each related preliminary prospectus have been delivered to you.

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If the Company has elected not to rely upon Rule 430A of the Rules and Regulations, the Company has prepared and will promptly file an amendment to the registration statement and an amended prospectus. If the Company has elected to rely upon Rule 430A of the Rules and Regulations, it will prepare and file a prospectus pursuant to Rule 424(b) of the Rules and Regulations that discloses the information previously omitted from the prospectus in reliance upon Rule 430A (“**Rule 430A Information**”). “**Original Registration Statement**” as of any time means the initial registration statement, in the form then filed with the Commission, including all amendments to the initial registration statement as of such time, all information contained in the additional registration statement (if any) and then deemed to be a part of the initial registration statement pursuant to the General Instructions of Form S-1 and all information (if any) included in a prospectus then deemed to be a part of the initial registration statement pursuant to Rule 430C of the Rules and Regulations or retroactively deemed to be a part of the initial registration statement pursuant to Rule 430A(b) of the Rules and Regulations. “**Rule 462(b) Registration Statement**” as of any time means the additional registration statement in the form then filed with the Commission, including the contents of the Original Registration Statement incorporated by reference therein and including all information (if any) included in a prospectus then deemed to be a part of the additional registration statement pursuant to Rule 430C or retroactively deemed to be a part of the additional registration statement pursuant to Rule 430A(b). “**Registration Statement**” as of any time means the Original Registration Statement and any Rule 462(b) Registration Statement as of such time. For purposes of the foregoing definitions, information contained in a form of prospectus that is deemed retroactively to be a part of the Registration Statement pursuant to Rule 430A shall be considered to be included in the Registration Statement as of the time specified in Rule 430A. For purposes of this Agreement, “**Effective Time**” with respect to the Original Registration Statement or the Rule 462(b) Registration Statement means the date and time as of which such Registration Statement was declared effective by the Commission or has become effective upon filing pursuant to Rule 462(b). “**Registration Statement**” without reference to a time means the Registration Statement as of its Effective Time. “**Statutory Prospectus**” as of any time means the prospectus included in the Registration Statement immediately prior to that time, including any information in a prospectus deemed to be a part thereof pursuant to Rule 430A or 430C. For purposes of the preceding sentence, information contained in a form of prospectus that is deemed retroactively to be a part of the Registration Statement pursuant to Rule 430A shall be considered to be included in the Statutory Prospectus as of the actual time that form of prospectus is filed with the Commission pursuant to Rule 424(b) and not retroactively. “**Prospectus**” means the Statutory Prospectus that discloses the public offering price and other final terms of the Securities and the offering and otherwise satisfies Section 10(a) of the Act. “**Preliminary Prospectus**” as of any time means any Statutory Prospectus included in the Registration Statement prior to the time it becomes or became effective under the Act and any prospectus that omits Rule 430A Information. All references in this Agreement to the Registration Statement, any Preliminary Prospectus, the Prospectus or any amendment or supplement to any of the foregoing, shall be deemed to include the copy filed with the Commission pursuant to its Electronic Data Gathering, Analysis and Retrieval System (“**EDGAR**”).

**2. Representations and Warranties of the Company.** The Company represents and warrants to, and agrees with, the several Underwriters as follows:

(a) No order preventing or suspending the use of any Preliminary Prospectus has been issued by the Commission and the Preliminary Prospectus included in the Time of Sale Disclosure Package (as defined below), at the time of filing thereof or the time of first use within the meaning of the Rules and Regulations, complied in all material respects with the requirements of the Act and the Rules and Regulations and did not contain an untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading except that the foregoing shall not apply to statements in or omissions from any Preliminary Prospectus in reliance upon, and in conformity with, written information furnished to the Company by you, or by any Underwriter through you, specifically for use in the preparation thereof; it being understood and agreed that the only such information furnished by any Underwriter consists of the information described as such in Section 6(f).

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(b) As of the time any part of each of the Original Registration Statement and the 462(b) Registration Statement (or any post-effective amendment thereto) became effective and at all other subsequent times until expiration of the Prospectus Delivery Period (as defined below), upon the filing or first use within the meaning of the Rules and Regulations of the Prospectus (or any supplement to the Prospectus) and at all other subsequent times until expiration of the Prospectus Delivery Period and at the Closing Date (as defined below), (A) the Registration Statement and the Prospectus (in each case, as so amended and/or supplemented) conformed or will conform in all material respects to the requirements of the Act and the Rules and Regulations, (B) the Registration Statement (as so amended) did not or will not include an untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary to make the statements therein not misleading, and (C) the Prospectus (as so supplemented) did not or will not include an untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary to make the statements therein, in light of the circumstances in which they are or were made, not misleading; except that each of the foregoing shall not apply to statements in or omissions from any such document in reliance upon, and in conformity with, written information furnished to the Company by you, or by any Underwriter through you, specifically for use in the preparation thereof, it being understood and agreed that the only such information furnished by any Underwriter consists of the information described as such in Section 6(f). If the Registration Statement has been declared effective by the Commission, no stop order suspending the effectiveness of the Registration Statement has been issued, and no proceeding for that purpose has been initiated or communicated to the Company, or, to the Company's knowledge, threatened by the Commission.

(c) Neither (A) the Issuer General Free Writing Prospectus(es) issued at or prior to the Time of Sale and set forth on Schedule II, the information on Schedule III and the Statutory Prospectus as of the Time of Sale, all considered together (collectively, the "**Time of Sale Disclosure Package**"), nor (B) any individual Issuer Limited-Use Free Writing Prospectus, when considered together with the Time of Sale Disclosure Package, includes or included as of the Time of Sale any untrue statement of a material fact or omit or omitted as of the Time of Sale to state any material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading. The preceding sentence does not apply to statements in or omissions from any Statutory Prospectus or any Issuer Free Writing Prospectus based upon and in conformity with written information furnished to the Company by you or by any Underwriter through you specifically for use therein; it being understood and agreed that the only such information furnished by any Underwriter consists of the information described as such in Section 6(f). As used in this paragraph and elsewhere in this Agreement:

(1) "**Time of Sale**" means [ ] [a/p]m (Eastern time) on the date of this Agreement.

(2) "**Issuer Free Writing Prospectus**" means any "issuer free writing prospectus," as defined in Rule 433 under the Act, relating to the Securities that (A) is required to be filed with the Commission by the Company, or (B) is exempt from filing pursuant to Rule 433(d)(5)(i) under the Act because it contains a description of the Securities or of the offering that does not reflect the final terms, or pursuant to Rule 433(d)(8)(ii) because it is a "bona fide electronic road show," as defined in Rule 433 of the Rules and Regulations which is made available without restriction, in each case in the form filed or required to be filed with the Commission or, if not required to be filed, in the form retained in the Company's records pursuant to Rule 433(g) under the Act.

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(3) “**Issuer General Free Writing Prospectus**” means any Issuer Free Writing Prospectus that is intended for general distribution to prospective investors, as evidenced by its being specified in Schedule II to this Agreement.

(4) “**Issuer Limited-Use Free Writing Prospectus**” means any Issuer Free Writing Prospectus that is not an Issuer General Free Writing Prospectus.

(d) (A) Each Issuer Free Writing Prospectus, as of its issue date and at all subsequent times through the completion of the public offer and sale of the Securities or until any earlier date that the Company notified or notifies the Representative as described in Section 4(c)(B), did not, does not and will not include any information that conflicted, conflicts or will conflict with the information contained in the Registration Statement, any Statutory Prospectus or the Prospectus. The foregoing sentence does not apply to statements in or omissions from any Issuer Free Writing Prospectus based upon and in conformity with written information furnished to the Company by you or by any Underwriter through you specifically for use therein; it being understood and agreed that the only such information furnished by any Underwriter consists of the information described as such in Section 6(f).

(B) (1) At the time of filing the Registration Statement and (2) at the date hereof, the Company was not and is not an “ineligible issuer,” as defined in Rule 405 under the Act, including the Company in the preceding three years not having been convicted of a felony or misdemeanor or having been made the subject of a judicial or administrative decree or order as described in Rule 405 under the Act (without taking account of any determination by the Commission pursuant to Rule 405 that it is not necessary that the Company be considered an ineligible issuer), nor an “excluded issuer” as defined in Rule 164 under the Act.

(C) Each Issuer Free Writing Prospectus satisfied, as of its issue date and at all subsequent times through the completion of the public offer and sale of the Securities, all other conditions to use thereof as set forth in Rules 164 and 433 under the Act.

(e) The consolidated financial statements of the Company, together with the related notes, set forth in the Registration Statement, the Time of Sale Disclosure Package and Prospectus comply in all material respects with the requirements of the Act and fairly present in all material respects the financial condition of the Company as of the dates indicated and the results of operations and changes in cash flows for the periods therein specified in conformity with generally accepted accounting principles in the United States (“**GAAP**”) consistently applied throughout the periods involved (except as may be otherwise specified in such financial statement or the notes thereto and except in the case of unaudited financial statements, which are subject to normal, immaterial year-end adjustments and do not contain certain footnotes as permitted by the applicable rules of the Commission); the supporting schedules included in the Registration Statement present fairly, in all material respects, the information required to be stated therein; there are no non-GAAP financial measures (as such term is defined by the Rules and Regulations) in the Registration Statement, the Time of Sale Disclosure Package and the Prospectus; and, except as disclosed in the Time of Sale Disclosure Package and the Prospectus, there are no material off-balance sheet arrangements (as defined in Regulation S-K under the Act, Item 303(a)(4)(ii)) or any other relationships with unconsolidated entities or other persons, that would reasonably be expected to have a material current or, to the Company’s knowledge, material future effect on the Company’s financial condition, results of operations, liquidity, capital expenditures, capital resources or significant components of revenue or expenses. No other financial statements or schedules are required to be included in the Registration Statement, the Time of Sale Disclosure Package or the Prospectus. Ernst & Young LLP, which has expressed its opinion with respect to the financial statements and schedules filed as a part of the Registration Statement and included in the Registration Statement, the Time of Sale Disclosure Package and the Prospectus, is (x) an independent public accounting firm within the meaning of the Act and the Rules and Regulations, (y) a registered public accounting firm (as defined in Section 2(a)(12) of the Sarbanes-Oxley Act of 2002 (the “**Sarbanes-Oxley Act**”)) and (z) not in violation of the auditor independence requirements of the Sarbanes-Oxley Act.



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(f) The Company has been duly organized and is validly existing as a corporation in good standing under the laws of its jurisdiction of incorporation. The Company has full corporate power and authority to own its properties and conduct its business as currently being carried on and as described in the Registration Statement, the Time of Sale Disclosure Package and the Prospectus, and is duly qualified to do business as a foreign corporation in good standing in each jurisdiction in which it owns or leases real property or in which the conduct of its business makes such qualification necessary, except where the failure to so qualify would have or reasonably be expected to result in a Material Adverse Effect. As used in this Agreement, “**Material Adverse Effect**” shall mean a material adverse effect upon the results of operations, assets, prospects, business or financial condition of the Company, taken as a whole.

(g) Except as contemplated in the Time of Sale Disclosure Package and in the Prospectus, subsequent to the respective dates as of which information is given in the Time of Sale Disclosure Package, the Company has not incurred any material liabilities or obligations, direct or contingent, other than in the ordinary course of business, or entered into any material transactions, or declared or paid any dividends or made any distribution of any kind with respect to its capital stock; and there has not been any change in the capital stock (other than a change in the number of outstanding shares of Common Stock due to the issuance of shares upon the exercise or conversion of outstanding options, warrants, rights or convertible securities), or any material change in the short-term or long-term debt, or any issuance of options, warrants, convertible securities or other rights to purchase the capital stock, of the Company (except pursuant to equity compensation plans or arrangements described in the Time of Sale Disclosure Package and in the Prospectus), or any Material Adverse Change or any development which would reasonably be expected to result in any Material Adverse Change. As used in this Agreement, “**Material Adverse Change**” means a material adverse change in the general affairs, condition (financial or otherwise), business, prospects, management, properties, operations or results of operations of the Company, taken as a whole.

(h) Except as set forth in the Time of Sale Disclosure Package and in the Prospectus, there is not pending or, to the knowledge of the Company, threatened or contemplated, any action, suit or proceeding (a) to which the Company is a party or (b) which has as the subject thereof any officer or director of the Company, any employee benefit plan sponsored by the Company or any property or assets owned or leased by the Company before or by any court or Governmental Authority (as defined below), or any arbitrator, which, individually or in the aggregate, would reasonably be expected to result in any Material Adverse Change, or would materially and adversely affect the ability of the Company to perform its obligations under this Agreement or which are otherwise material in the context of the sale of the Securities. There are no current or, to the knowledge of the Company, pending, legal, governmental or regulatory actions, suits or proceedings (x) to which the Company is subject or (y) which has as the subject thereof any officer or director of the Company, any employee plan sponsored by the Company or any property or assets owned or leased by the Company, that are required to be described in the Registration Statement, Time of Sale Disclosure Package and Prospectus by the Act or by the Rules and Regulations and that have not been so described.

(i) There are no statutes, regulations, contracts or documents that are required to be described in the Registration Statement, in the Time of Sale Disclosure Package and in the Prospectus or required to be filed as exhibits to the Registration Statement by the Act or by the Rules and Regulations that have not been so described or filed.

(j) This Agreement has been duly authorized, executed and delivered by the Company, and constitutes a valid, legal and binding obligation of the Company, enforceable in accordance with its terms, except as rights to indemnity hereunder may be limited by federal or state securities laws and except as

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such enforceability may be limited by bankruptcy, insolvency, reorganization or similar laws affecting the rights of creditors generally and subject to general principles of equity. The execution, delivery and performance of this Agreement and the consummation of the transactions herein contemplated will not (A) materially conflict with or result in a material breach or material violation of any of the terms or provisions of, or constitute a material default under, or result in the creation or imposition of any material lien, charge or encumbrance upon any property or assets of the Company pursuant to any indenture, mortgage, deed of trust, loan agreement or other agreement or instrument to which the Company is a party or by which the Company is bound or to which any of the property or assets of the Company is subject, (B) result in any violation of the provisions of the Company's charter or by-laws or (C) violate, in any material respect, any law or statute or any judgment, order, rule, regulation or decree of any court or arbitrator or federal, state, local or foreign governmental agency or regulatory authority having jurisdiction over the Company or any of its properties or assets (each, a "**Governmental Authority**"). No consent, approval, authorization or order of, or registration or filing with any Governmental Authority is required to be obtained or made by the Company for the execution, delivery and performance of this Agreement by the Company or for the consummation thereby of the transactions contemplated hereby, including the issuance or sale of the Securities by the Company, except such as may be required under the Act or state or applicable foreign securities laws, the rules of the Financial Industry Regulatory Authority ("**FINRA**") or state securities or blue sky laws; and the Company has full corporate power and authority to enter into this Agreement and to consummate the transactions contemplated hereby, including the authorization, issuance and sale of the Securities as contemplated by this Agreement.

(k) All of the issued and outstanding shares of capital stock of the Company, including the outstanding shares of Common Stock, are duly authorized and validly issued, fully paid and nonassessable, have been issued in compliance with all federal and state and foreign securities laws and applicable exemptions therefrom, were not issued in violation of or subject to any preemptive rights or other rights to subscribe for or purchase securities that have not been waived or satisfied in writing (a copy of which has been delivered to counsel to the Representative), and the holders thereof are not subject to personal liability solely by reason of being such holders; the Firm Shares which may be sold hereunder by the Company have been duly authorized and, when issued, delivered and paid for in accordance with the terms of this Agreement, will have been validly issued and will be fully paid and nonassessable, and the holders thereof will not be subject to personal liability solely by reason of being such holders; and the capital stock of the Company, including the Common Stock, conforms in all material respects to the description thereof in the Registration Statement, in the Time of Sale Disclosure Package and in the Prospectus. Except as otherwise stated in the Registration Statement, in the Time of Sale Disclosure Package and in the Prospectus, there are no preemptive rights or other rights to subscribe for or to purchase, or any restriction upon the voting or transfer of, any shares of Common Stock pursuant to the Company's charter, by-laws or any agreement or other instrument to which the Company is a party or by which the Company is bound. Except as disclosed in the Registration Statement, in the Time of Sale Disclosure Package and in the Prospectus, neither the filing of the Registration Statement nor the offering or sale of the Securities as contemplated by this Agreement gives rise to any rights for or relating to the registration of any shares of Common Stock or other securities of the Company (collectively "**Registration Rights**"), and any person to whom the Company has granted Registration Rights has agreed not to exercise such rights until after expiration of the Lock-Up Period (as defined below). Except as described in the Registration Statement, in the Time of Sale Disclosure Package and in the Prospectus, there are no options, warrants, agreements, contracts or other rights in existence to purchase or acquire from the Company any shares of the capital stock of the Company. The Company has an authorized and outstanding capitalization as set forth in the Registration Statement, in the Time of Sale Disclosure Package and in the Prospectus under the caption "Capitalization," in each case as of the dates set forth therein. The Common Stock (including the Firm Shares and the shares underlying the Firm Warrants and the Pre-Funded Warrants) conforms in all material respects to the description thereof contained in the Time of Sale Disclosure Package and the Prospectus. The description of the Company's stock option, stock bonus and other stock plans or arrangements and the options or other rights granted thereunder, set forth in the Time of Sale Disclosure Package and the Prospectus accurately and fairly presents the information required to be shown with respect to such plans, arrangements, options and rights.

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(l) The Firm Warrants and the Pre-Funded Warrants have been duly authorized for issuance and sale by the Company and, when executed, issued and delivered by the Company pursuant to this Agreement against payment of the consideration set forth herein, will constitute legal, valid and binding obligations of the Company, enforceable in accordance with their terms, except as the enforceability thereof may be limited by bankruptcy, insolvency, reorganization, moratorium or similar laws affecting creditors' rights generally and general principles of equity. The shares of Common Stock issuable upon exercise of the Firm Warrants and the Pre-Funded Warrants have been duly authorized and validly reserved for issuance upon exercise of the Warrants in a number sufficient to meet the current exercise requirements. Upon exercise of the Firm Warrants and the Pre-Funded Warrants in accordance with their terms, the shares of Common Stock issuable thereupon will be duly and validly issued and fully paid and non-assessable, free of statutory and contractual preemptive rights, resale rights, rights of first refusal and similar rights and free of any voting or transfer restrictions pursuant to the Company's charter or bylaws or any agreement or other instrument to which the Company is a party that have not been validly waived. The certificates for such shares of Common Stock will be in due and proper form. The warrants of the Company (including the Firm Warrants and the Pre-Funded Warrants) conform in all material respects to the description thereof contained in the Time of Sale Disclosure Package and the Prospectus.

(m) The Company holds, and is operating in compliance in all material respects with, all franchises, grants, authorizations, licenses, permits, easements, consents, certificates and orders of any Governmental Authority or self-regulatory body required for the conduct of its business except where the failure to possess or comply with such permits, individually or in the aggregate, has not and would not have or reasonably be expected to result in a Material Adverse Effect ("**Material Permits**") and, to the Company's knowledge, all such Material Permits are valid and in full force and effect; and the Company has not received notice of any revocation or modification of any such Material Permit or has reason to believe that any such Material Permit will not be renewed in the ordinary course; and the Company is in compliance in all material respects with all applicable federal, state, local and foreign laws, regulations, orders and decrees.

(n) The Company has good and marketable title to all property (whether real or personal) that is material to the business and is described in the Registration Statement, in the Time of Sale Disclosure Package and in the Prospectus as being owned by it, in each case free and clear of all material liens, claims, security interests, other encumbrances or defects except such as are described in the Registration Statement, in the Time of Sale Disclosure Package and in the Prospectus and except such as do not materially and adversely affect the value of such property and do not materially and adversely interfere with the use made and proposed to be made of such property by the Company. The property held under lease by the Company is held by it under valid subsisting and enforceable leases with only such exceptions as are not material and do not interfere with the use made and proposed to be made of such property and buildings by the Company.

(o) The Company owns, or possesses valid and enforceable licenses to use all Intellectual Property that, to the Company's knowledge, is necessary for the conduct of the Company's business as now conducted or as described in the Registration Statement, the Time of Sale Disclosure Package and the Prospectus to be conducted, except as such failure to own, possess, or acquire such rights would not or would not reasonably be expected to result in a Material Adverse Effect. Furthermore, (A) to the knowledge of the Company, there is no infringement, misappropriation or violation by third parties of any such Intellectual Property; (B) there is no pending or, to the knowledge of the Company, threatened, action, suit, proceeding or claim by others challenging the rights in or to any such Intellectual Property, and the Company is unaware of any facts which would form a reasonable basis for any such claim; (C) the Company Intellectual Property, and to the knowledge of the Company, the Intellectual Property licensed to the

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Company, has not been adjudged invalid or unenforceable, in whole or in part, and there is no pending or threatened action, suit, proceeding or claim by others challenging the validity or scope of any such licensed Intellectual Property, and the Company is unaware of any facts which would form a reasonable basis for any such claim; (D) there is no pending or, to the Company's knowledge, threatened action, suit, proceeding or claim by others that the Company infringes, misappropriates or otherwise violates any Intellectual Property or other proprietary rights of others, the Company has not received any written notice of such claim and the Company is unaware of any other fact which would form a reasonable basis for any such claim; and (E) to the Company's knowledge, no employee of the Company is in or has ever been in violation of any term of any employment contract, patent disclosure agreement, invention assignment agreement, non-competition agreement, non-solicitation agreement, nondisclosure agreement or any restrictive covenant to or with a former employer where the basis of such violation relates to such employee's employment with the Company or actions undertaken by the employee while employed with the Company. "**Intellectual Property**" shall mean all patents, patent applications, trade and service marks, trade and service mark registrations, trade names, copyrights, licenses, inventions, trade secrets, domain names, technology, know-how and other intellectual property. "**Company Intellectual Property**" shall mean all Intellectual Property owned, in whole or in part, by Company. The Company has obtained assignments of Company Intellectual Property from its employees. There are no outstanding options, licenses or agreements of any kind that have been entered into by the Company, and to the knowledge of the Company, by any third party, that relate to the Company Intellectual Property that are required by applicable law to be described in the Registration Statement, the Time of Sale Disclosure Package or the Prospectus that are not described therein in all material respects. To the knowledge of the Company, the Company has duly and properly filed or caused to be filed with the United States Patent and Trademark Office (the "**PTO**") and applicable foreign and international patent authorities all pending or issued patent applications owned by the Company (the "**Patent Applications**"). To the knowledge of the Company, the Company has complied with the PTO's duty of candor, good faith and disclosure and best mode requirement for the Patent Applications, and all other requirements for patentability and enforceability of any resultant patents, and have made no material misrepresentation in the Patent Applications with an intent to deceive the PTO. To the knowledge of the Company, the Company has complied with the relevant foreign filing requirements underlying patentability and enforceability of any resultant patents for the Patent Applications pending in countries outside of the United States. The Company is not aware of any information material to a determination of patentability regarding the Patent Applications not submitted to or possessed by the PTO or, if required, similar foreign authority by the Company with respect to the prosecution of any Patent Applications. The Company has no knowledge of any information which would preclude the Company from having clear title to any Patent Applications, or would preclude the patentability, validity or enforceability of any patents or patent applications included in the Company Intellectual Property.

(p) The Company is not in violation of its charter, by-laws or other organizational documents, or in breach of or otherwise in default, and no event has occurred which, with notice or lapse of time or both, would constitute such a default in the performance of any material obligation, agreement or condition contained in any bond, debenture, note, indenture, loan agreement or any other material contract, lease or other instrument to which it is subject or by which any of them may be bound, or to which any of the material property or assets of the Company is subject.

(q) The Company (i) has accurately and timely prepared and filed all foreign, federal and state income and all other tax returns, reports and declarations required by any jurisdiction to which it is subject, (ii) has paid, when due, all taxes and other governmental assessments and charges that are material in amount, shown or determined to be due on such returns, reports and declarations, except those being contested in good faith, with respect to which adequate reserves have been set aside on the books of the Company and (iii) has set aside on its books provisions reasonably adequate for the payment of all taxes for periods subsequent to the periods to which such returns, reports or declarations apply, except, in the case of clauses (i) and (ii) above, where the failure to so pay or file any such tax, assessment, charge or return would not have or reasonably be expected to result in a Material Adverse Effect. There are no unpaid taxes in any material amount claimed to be due by the Company by the taxing authority of any jurisdiction.

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(r) The Company has not distributed and will not distribute any prospectus or other offering material in connection with the offering and sale of the Securities other than any Preliminary Prospectus, the Time of Sale Disclosure Package or the Prospectus or other materials permitted by the Act to be distributed by the Company; provided, however, that, except as set forth on Schedule III, the Company has not made and will not make any offer relating to the Securities that would constitute a “free writing prospectus” as defined in Rule 405 under the Act, except in accordance with the provisions of Section 4(q) of this Agreement.

(s) The Common Stock is registered pursuant to Section 12(b) of the Securities Exchange Act of 1934, as amended (“*Exchange Act*”) and is included or approved for listing on the Nasdaq Capital Market and the Company has taken no action designed to, or likely to have the effect of, terminating the registration of the Common Stock under the Exchange Act or delisting the Common Stock from the Nasdaq Capital Market nor has the Company received any notification that the Commission or the Nasdaq Capital Market is contemplating terminating such registration or listing, except as set forth in the Time of Sale Disclosure Package and the Prospectus. The Company has complied in all material respects with the applicable requirements of the Nasdaq Capital Market for maintenance of inclusion of the Common Stock thereon, except as disclosed in the Time of Sale Disclosure Package and the Prospectus. The Company has filed an application to include the Firm Shares, the shares of Common Stock underlying the Firm Warrants, and the shares of Common Stock underlying the Pre-Funded Warrants on the Nasdaq Capital Market. Except as previously disclosed to counsel for the Underwriters in writing or as set forth in the Time of Sale Disclosure Package and the Prospectus, there are no affiliations with members of FINRA among the Company’s officers or directors or, to the knowledge of the Company, any five percent or greater stockholders of the Company or any beneficial owner of the Company’s unregistered equity securities that were acquired during the 180-day period immediately preceding the initial filing date of the Registration Statement.

(t) The Company, directly or indirectly, owns no capital stock or other equity or ownership or proprietary interest in any corporation, partnership, association, trust or other entity.

(u) The Company maintains a system of internal accounting controls sufficient to provide reasonable assurances that (i) transactions are executed in accordance with management’s general or specific authorization; (ii) transactions are recorded as necessary to permit preparation of financial statements in conformity with generally accepted accounting principles in the United States and to maintain accountability for assets; (iii) access to assets is permitted only in accordance with management’s general or specific authorization; and (iv) the recorded accountability for assets is compared with existing assets at reasonable intervals and appropriate action is taken with respect to any differences. Except as disclosed in the Registration Statement, in the Time of Sale Disclosure Package and in the Prospectus, the Company’s internal control over financial reporting is effective and none of the Company, its board of directors and audit committee is aware of any “significant deficiencies” or “material weaknesses” (each as defined by the Public Company Accounting Oversight Board) in its internal control over financial reporting, or any fraud, whether or not material, that involves management or other employees of the Company who have a significant role in the Company’s internal controls; and since the end of the latest audited fiscal year, there has been no change in the Company’s internal control over financial reporting (whether or not remediated) that has materially affected, or is reasonably likely to materially affect, the Company’s internal control over financial reporting. Since the end of the latest audited fiscal year, there has been no change in the Company’s internal control over financial reporting (whether or not remediated) that has materially affected, or is reasonably likely to materially affect, the Company’s internal control over financial reporting. The Company’s board of directors has, subject to the exceptions, cure periods and the phase-in periods specified in the applicable NASDAQ

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Marketplace Rules (“**Exchange Rules**”) and the Exchange Act and the rules and regulations thereunder, validly appointed an audit committee to oversee internal accounting controls whose composition satisfies the applicable requirements of the Exchange Rules and the Company’s board of directors and/or the audit committee has adopted a charter that satisfies the requirements of the Exchange Rules.

(v) Other than as contemplated by this Agreement and except as disclosed in the Registration Statement, in the Time of Sale Disclosure Package and in the Prospectus, the Company has not incurred any liability for any finder’s or broker’s fee or agent’s commission in connection with the execution and delivery of this Agreement or the consummation of the transactions contemplated hereby.

(w) The Company is insured by insurers of recognized financial responsibility against such losses and risks and in such amounts as the Company believes to be prudent and customary in the businesses and locations in which the Company is engaged, including, but not limited to, directors and officers insurance coverage; all policies of insurance and any fidelity or surety bonds insuring the Company or its business, assets, employees, officers and directors are in full force and effect; the Company is in compliance with the terms of such policies and instruments in all material respects; there are no material claims by the Company under any such policy or instrument as to which any insurance company is denying liability or defending under a reservation of rights clause; the Company has not been refused any insurance coverage sought or applied for; and the Company has no reason to believe that it will not be able to renew its existing insurance coverage as and when such coverage expires or to obtain similar coverage from other insurers as may be necessary to continue its business without a significant increase in cost.

(x) The documents incorporated by reference in the Time of Sale Disclosure Package and in the Prospectus, when they became effective or were filed with the Commission, as the case may be, conformed in all material respects to the requirements of the Act or the Exchange Act, as applicable, and were filed on a timely basis with the Commission and none of such documents, when they were filed or became effective, as the case may be, contained an untrue statement of a material fact or omitted to state a material fact necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading; any additional documents so filed and incorporated by reference in the Time of Sale Disclosure Package or in the Prospectus, when such documents are filed with the Commission, will conform in all material respects to the requirements of the Exchange Act, and will not contain an untrue statement of a material fact or omit to state a material fact necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading.

(y) The Company is not and, after giving effect to the offering and sale of the Securities, will not be an “investment company,” as such term is defined in the Investment Company Act of 1940, as amended.

(z) The Company is in compliance in all material respects with all of the provisions of the Sarbanes-Oxley Act of 2002 which are applicable to it as of the Closing Date. The Company has established disclosure controls and procedures (as such term is defined in Rule 13a-15(e) and 15d-15(e) under the Exchange Act) for the Company and designed such disclosure controls and procedures to ensure that information required to be disclosed by the Company in the reports it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the Commission’s rules and forms. The Company has utilized such controls and procedures in preparing and evaluating the disclosures in the Registration Statement, in the Time of Sale Disclosure Package and in the Prospectus.

(aa) The Company and, to the knowledge of the Company, any of its officers and directors, supervisors, managers, agents, or employees, has not violated, and the Company’s participation in the offering will not violate, and the Company has instituted and maintains policies and procedures designed to ensure continued compliance with, each of the following laws: (a) anti-bribery laws, including but not

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limited to, any applicable law, rule, or regulation of any locality, including but not limited to any law, rule, or regulation promulgated to implement the OECD Convention on Combating Bribery of Foreign Public Officials in International Business Transactions, signed December 17, 1997, including the U.S. Foreign Corrupt Practices Act of 1977, as amended, or any other law, rule or regulation of similar purposes and scope; (b) anti-money laundering laws, including but not limited to, applicable federal, state, international, foreign or other laws, regulations or government guidance regarding anti-money laundering, including, without limitation, Title 18 U.S. Code section 1956 and 1957, the Patriot Act, the Bank Secrecy Act, and international anti-money laundering principles or procedures by an intergovernmental group or organization, such as the Financial Action Task Force on Money Laundering, of which the United States is a member and with which designation the United States representative to the group or organization continues to concur, all as amended, and any Executive order, directive, or regulation pursuant to the authority of any of the foregoing, or any orders or licenses issued thereunder or (c) laws and regulations imposing U.S. economic sanctions measures, including, but not limited to, the International Emergency Economic Powers Act, the Trading with the Enemy Act, the United Nations Participation Act and the Syria Accountability and Lebanese Sovereignty Act, all as amended, and any Executive Order, directive, or regulation pursuant to the authority of any of the foregoing, including the regulations of the United States Treasury Department set forth under 31 CFR, Subtitle B, Chapter V, as amended, or any orders or licenses issued thereunder.

(bb) Neither the Company nor, to the Company's knowledge, any director, officer or employee of the Company, is currently subject to any U.S. sanctions administered by the Office of Foreign Assets Control of the U.S. Department of the Treasury.

(cc) To the knowledge of the Company, no transaction has occurred between or among the Company, on the one hand, and any of the Company's officers, directors or 5% stockholders or any affiliate or affiliates of any such officer, director or 5% stockholders that is required to be described under the Rules and Regulations that is not so described in the Registration Statement, the Time of Sale Disclosure Package and the Prospectus. The Company has not, directly or indirectly, extended or maintained credit, or arranged for the extension of credit, or renewed an extension of credit, in the form of a personal loan to or for any of its directors or executive officers in violation of applicable laws, including Section 402 of the Sarbanes-Oxley Act.

(dd) To the knowledge of the Company, except as disclosed in the Registration Statement, the Time of Disclosure Package and the Prospectus, the Company is not in violation of any statute, any rule, regulation, decision or order of any Governmental Authority or any court, domestic or foreign, relating to the use, disposal or release of hazardous or toxic substances or relating to the protection or restoration of the environment or human exposure to hazardous or toxic substances (collectively, "**Environmental Laws**"), owns or operates any real property contaminated with any substance that is in violation of any Environmental Laws, is liable for any off-site disposal or contamination pursuant to any Environmental Laws, or is subject to any claim relating to any Environmental Laws, which violation, contamination, liability or claim, individually or in the aggregate, has had or would have a Material Adverse Effect; and the Company is not aware of any pending investigation which would reasonably be expected to lead to such a claim.

(ee) The Company (A) is in compliance, in all material respects, with any and all applicable foreign, federal, state and local laws, rules, regulations, treaties, statutes and codes promulgated by any and all governmental authorities (including pursuant to the Occupational Health and Safety Act) relating to the protection of human health and safety in the workplace ("**Occupational Laws**"); (B) has received all material permits, licenses or other approvals required of it under applicable Occupational Laws to conduct its business as currently conducted; and (C) is in compliance, in all material respects, with all terms and conditions of such permit, license or approval. No action, proceeding, revocation proceeding, writ, injunction or claim is pending or, to the Company's knowledge, threatened in writing against the Company relating to Occupational Laws.

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(ff) To the knowledge of the Company, no “prohibited transaction” as defined under Section 406 of ERISA or Section 4975 of the Code and not exempt under ERISA Section 408 and the regulations and published interpretations thereunder has occurred with respect to any Employee Benefit Plan. At no time has the Company or any ERISA Affiliate maintained, sponsored, participated in, contributed to or has or had any liability or obligation in respect of any Employee Benefit Plan subject to Part 3 of Subtitle B of Title I of ERISA, Title IV of ERISA, or Section 412 of the Code or any “multiemployer plan” as defined in Section 3(37) of ERISA or any multiple employer plan for which the Company or any ERISA Affiliate has incurred or could reasonably be expected to incur any liability under Section 4063 or 4064 of ERISA. No Employee Benefit Plan provides or promises, or at any time provided or promised, retiree health, retiree life insurance, or other retiree welfare benefits except as may be required by the Consolidated Omnibus Budget Reconciliation Act of 1985, as amended, or similar state law. Each Employee Benefit Plan is and has been operated in material compliance with its terms and all applicable laws, including, with respect to Employee Benefit Plans subject to ERISA and the Code, ERISA and the Code and, to the knowledge of the Company, no event has occurred (including a “reportable event” as such term is defined in Section 4043 of ERISA) and no condition exists that would subject the Company or any ERISA Affiliate to any material tax, fine, lien, penalty or liability imposed by ERISA, the Code or other applicable law, except as would not reasonably be expected to have a Material Adverse Effect. Each Employee Benefit Plan intended to be qualified under Code Section 401(a) is so qualified and has a favorable determination or opinion letter from the IRS upon which it can rely, and any such determination or opinion letter remains in effect and has not been revoked, and to the knowledge of the Company, (i) nothing has occurred since the date of any such determination or opinion letter that is reasonably likely to adversely affect such qualification and (ii) the Company does not have any obligations under any collective bargaining agreement with any union and no organization efforts are underway with respect to Company employees. As used in this Agreement, “Code” means the Internal Revenue Code of 1986, as amended; “Employee Benefit Plan” means any “employee benefit plan” within the meaning of Section 3(3) of ERISA sponsored, maintained, or contributed to by the Company, including, without limitation, all stock purchase, stock option, stock-based severance, employment, change-in-control, medical, disability, fringe benefit, bonus, incentive, deferred compensation, employee loan and all other employee benefit plans, agreements, programs, policies or other arrangements, whether or not subject to ERISA, under which (A) any current or former employee, director or independent contractor of the has any present or future right to benefits and which are contributed to, sponsored by or maintained by the Company or (B) the Company has within the past five (5) years had or currently has any present or known future obligation or liability; “**ERISA**” means the Employee Retirement Income Security Act of 1974, as amended; “**ERISA Affiliate**” means any member of the Company’s controlled group as defined in Code Section 414(b), (c), (m) or (o).

(gg) Except as disclosed in the Registration Statement, the Time of Sale Disclosure Package and the Prospectus, the Company has not granted rights to develop, manufacture, produce, assemble, distribute, license, market or sell its product candidates to any other person and is not bound by any agreement that affects the exclusive right of the Company to develop, manufacture, produce, assemble, distribute, license, market or sell its products.

(hh) No labor problem or dispute with the employees of the Company exists or, to the knowledge of the Company, is threatened or imminent, and the Company is not aware of any existing or imminent labor disturbance by the employees of any of its principal suppliers, contractors or customers, that would reasonably be expected to have a Material Adverse Effect. No executive officer of the Company (as defined in Rule 501(f) of the Securities Act) has notified the Company that such officer intends to leave the Company or otherwise terminate such officer’s employment with the Company. To the Company’s knowledge, no executive officer is, or is now expected to be, in violation of any term of any material term of



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any employment contract, confidentiality, disclosure or proprietary information agreement or non-competition agreement, or any other contract or agreement or any restrictive covenant in favor of a third party, and to the Company's knowledge, the continued employment of each such executive officer does not subject the Company to any liability with respect to any of the foregoing matters. The Company is in compliance with all U.S. federal, state, local and foreign laws and regulations relating to employment and employment practices, terms and conditions of employment and wages and hours, except where the failure to be in compliance would not, individually or in the aggregate, have or reasonably be expected to result in a Material Adverse Effect.

(ii) Any third-party statistical and market-related data included in the Registration Statement, the Time of Sale Disclosure Package and the Prospectus is based on or derived from sources that the Company believes to be reliable and accurate in all material respects.

(jj) There are no outstanding loans, advances (except normal advances for business expenses in the ordinary course of business) or guarantees or indebtedness, in each case made by or from the Company to or for the benefit of any of the officers or directors of the Company, except as disclosed in the Time of Sale Disclosure Package and the Prospectus.

(kk) Except as disclosed in the Time of Sale Disclosure Package and the Prospectus, the Company (i) does not have any material lending or other relationship with any bank or lending affiliate of any Underwriter and (ii) does not intend to use any of the proceeds from the sale of the Securities hereunder to repay any outstanding debt owed to any affiliate of any Underwriter.

(ll) As to each product subject to the jurisdiction of the U.S. Food and Drug Administration ("FDA") under the Federal Food, Drug and Cosmetic Act, as amended, and the regulations thereunder ("FDCA") that is manufactured, packaged, labeled, tested, distributed, sold, and/or marketed by the Company (each such product, a "**Pharmaceutical Product**"), such Pharmaceutical Product is being manufactured, packaged, labeled, tested, distributed, sold and/or marketed by the Company in compliance with all applicable requirements under FDCA and similar laws, rules and regulations relating to registration, investigational use, premarket clearance, licensure, or application approval, good manufacturing practices, good laboratory practices, good clinical practices, product listing, quotas, labeling, advertising, record keeping and filing of reports, except where the failure to be in compliance would not have or reasonably be expected to result in a Material Adverse Effect. There is no pending, completed or, to the Company's knowledge, threatened, action (including any lawsuit, arbitration, or legal or administrative or regulatory proceeding, charge, complaint, or investigation) against the Company by the FDA or any other governmental entity, which (i) contests the premarket clearance, licensure, registration, or approval of, the uses of, the distribution of, the manufacturing or packaging of, the testing of, the sale of, or the labeling and promotion of any Pharmaceutical Product, (ii) withdraws its approval of, requests the recall, suspension, or seizure of, or withdraws or orders the withdrawal of advertising or sales promotional materials relating to, any Pharmaceutical Product, (iii) imposes a clinical hold on any clinical investigation by the Company other than with respect to IMO-3100, except as disclosed in the Time of Sale Disclosure Package and the Prospectus, (iv) enjoins production at any facility of the Company, (v) enters or proposes to enter into a consent decree of permanent injunction with the Company, or (vi) otherwise alleges any violation of any laws, rules or regulations by the Company, and which, either individually or in the aggregate, would have or reasonably be expected to result in a Material Adverse Effect. The properties, business and operations of the Company have been and are being conducted in all material respects in accordance with all applicable laws, rules and regulations of the FDA. The Company has not been informed by the FDA that the FDA will prohibit the marketing, sale, license or use in the United States of any product proposed to be developed, produced or marketed by the Company nor has the FDA expressed any concern as to approving or clearing for marketing any product being developed or proposed to be developed by the Company.

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(mm) To the knowledge of the Company, the descriptions of the results of the studies, tests and trials contained in the Time of Sale Disclosure Package and the Prospectus are accurate in all material respects and there are no other studies or tests, the results of which could reasonably be expected to discredit or call into question the results described in the Time of Sale Disclosure Package and the Prospectus.

(nn) Except as would not, individually or in the aggregate, have a Material Adverse Effect, the Company is in compliance in all material respects with all applicable rules and regulations of the FDA, and all applicable U.S. and foreign laws, statutes, ordinances, rules and regulations.

Any certificate signed by any officer of the Company and delivered to you or to counsel for the Underwriters in connection with this Agreement shall be deemed a representation and warranty by the Company to each Underwriter as to the matters covered thereby.

### **3. *Purchase, Sale and Delivery of Securities.***

(a) On the basis of the representations, warranties and agreements herein contained, but subject to the terms and conditions herein set forth, the Company agrees to issue and sell [●] Firm Shares, Firm Warrants to purchase [●] shares of Common Stock and Pre-Funded Warrants to purchase [●] shares of Common Stock to the several Underwriters, and each Underwriter agrees, severally and not jointly, to purchase from the Company the number of Firm Shares set forth opposite the name of such Underwriter in Schedule I hereto. The purchase price for each Firm Share shall be \$[●] per share, \$[●] for each Firm Warrant to purchase one share of Common Stock and \$[●] for each Pre-Funded Warrant to purchase one share of Common Stock. The obligation of each Underwriter to the Company shall be to purchase from the Company that number of Firm Shares (to be adjusted by the Representative to avoid fractional shares), Firm Warrants (to be adjusted by the Representative to avoid fractional warrants) and Pre-Funded Warrants (to be adjusted by the Representative to avoid fractional shares) set forth opposite the name of such Underwriter in Schedule I. In making this Agreement, each Underwriter is contracting severally and not jointly; except as provided in paragraph (b) of this Section 3 and in Section 8 hereof, the agreement of each Underwriter is to purchase only the respective number of Firm Shares, Firm Warrants and Pre-Funded Warrants specified in Schedule I.

The Firm Shares, Firm Warrants and Pre-Funded Warrants will be delivered by the Company to you for the accounts of the several Underwriters, against payment of the purchase price therefor by wire transfer of same day funds payable to the order of the Company, at the offices of Dechert LLP, 1095 Avenue of the Americas, New York, New York 10036, or such other location as may be agreed upon by the Company and the Representative, at 10:00 a.m. Eastern time on the third (or if the Securities are priced, as contemplated by Rule 15c6-1(c) under the Exchange Act, after 4:30 p.m. Eastern time, the fourth) full business day following the date hereof, or at such other time and date as you and the Company determine pursuant to Rule 15c6-1(a) under the Exchange Act, such time and date of delivery being herein referred to as the “**Closing Date**.” If the Representative so elects, delivery of the Firm Shares, Firm Warrants and/or Pre-Funded Warrants may be made by credit through full fast transfer to the accounts at The Depository Trust Company designated by the Representative. Certificates representing the Firm Shares, warrants of the Company in the form of Exhibit C hereto representing the Firm Warrants and warrants of the Company in the form of Exhibit D hereto representing the Pre-Funded Warrants, in definitive form and in such denominations and registered in such names as you may request upon at least two business days’ prior notice to the Company, or evidence of their issuance, will be made available for checking at a reasonable time preceding the Closing Date at the offices of Dechert LLP, 1095 Avenue of the Americas, New York, New York 10036, or such other location as may be agreed upon by the Company and the Representative.

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(b) It is understood that you, individually and not as Representative of the several Underwriters, may (but shall not be obligated to) make payment to the Company on behalf of any Underwriter for the Securities to be purchased by such Underwriter. Any such payment by you shall not relieve any such Underwriter of any of its obligations hereunder. Nothing herein contained shall constitute any of the Underwriters an unincorporated association or partner with the Company.

4. **Covenants.** The Company covenants and agrees with the several Underwriters as follows:

(a) If the Original Registration Statement has not already been declared effective by the Commission, the Company will use its best efforts to cause the Original Registration Statement and any post-effective amendments thereto to become effective as promptly as possible; the Company will notify you promptly of the time when the Original Registration Statement or any post-effective amendment to the Original Registration Statement has become effective or any supplement to the Prospectus has been filed and of any request by the Commission for any amendment or supplement to the Original Registration Statement or Prospectus or additional information; if the Company has elected to rely on Rule 430A of the Rules and Regulations, the Company will prepare and file a Prospectus containing the information omitted therefrom pursuant to Rule 430A of the Rules and Regulations with the Commission within the time period required by, and otherwise in accordance with the provisions of, Rules 424(b) and 430A of the Rules and Regulations; if the Company has elected to rely upon Rule 462(b) of the Rules and Regulations to increase the size of the offering registered under the Act and the Rule 462(b) Registration Statement has not yet been filed and become effective, the Company will prepare and file the Rule 462 Registration Statement with the Commission within the time period required by, and otherwise in accordance with the provisions of, Rule 462(b) and the Act; the Company will prepare and file with the Commission, promptly upon your request, any amendments or supplements to the Registration Statement or Prospectus that, based on the advice of counsel, may be necessary or advisable in connection with the distribution of the Securities by the Underwriters; and the Company will furnish the Representative and counsel for the Underwriters a copy of any proposed amendment or supplement to the Registration Statement or Prospectus and will not file any amendment or supplement to the Registration Statement or Prospectus to which you shall reasonably object by notice to the Company after having been furnished a copy a reasonable time prior to the filing.

(b) The Company will advise you, promptly after it shall receive notice or obtain knowledge thereof, of the issuance by the Commission of any stop order suspending the effectiveness of the Registration Statement, or any post-effective amendment thereto or preventing or suspending the use of any Preliminary Prospectus, the Time of Sale Disclosure Package, the Prospectus or any Issuer Free Writing Prospectus, of the suspension of the qualification of the Securities for offering or sale in any jurisdiction, or of the initiation or threatening of any proceeding for any such purpose; and the Company will promptly use its best efforts to prevent the issuance of any stop order or to obtain its withdrawal if such a stop order should be issued. Additionally, the Company agrees that it shall comply with the provisions of Rules 424(b) and 430A, as applicable, under the Act and will use its reasonable efforts to confirm that any filings made by the Company under Rule 424(b), Rule 433 or Rule 462 were received in a timely manner by the Commission.

(c) (A) Within the time during which a prospectus (assuming the absence of Rule 172) relating to the Securities is required to be delivered under the Act by any Underwriter or dealer (the "**Prospectus Delivery Period**"), the Company will use its best efforts to comply with all requirements imposed upon it by the Act, as now and hereafter amended, and by the Rules and Regulations, as from time to time in force, so far as necessary to permit the continuance of sales of or dealings in the Securities as contemplated by the provisions hereof, the Time of Sale Disclosure Package and the Prospectus. If during such period any event occurs as a result of which the Prospectus (or if the Prospectus is not yet available to prospective purchasers, the Time of Sale Disclosure Package) would include an untrue statement of a material fact or omit to state a material fact necessary to make the statements therein, in the light of the

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circumstances then existing, not misleading, or if during such period it is necessary to amend the Registration Statement or supplement the Prospectus (or if the Prospectus is not yet available to prospective investors, the Time of Sale Disclosure Package) to comply with the Act, the Company will promptly notify you and will amend the Registration Statement or supplement the Prospectus (or, if the Prospectus is not yet available to prospective purchasers, the Time of Sale Disclosure Package) (at the expense of the Company) so as to correct such statement or omission or effect such compliance.

(B) If at any time following issuance of an Issuer Free Writing Prospectus and through the Prospectus Delivery Period, there occurred or occurs an event or development as a result of which such Issuer Free Writing Prospectus conflicted or would conflict, during such time, with the information contained in the Registration Statement, the most recent Statutory Prospectus or the Prospectus relating to the Securities or included or, during such time, would include an untrue statement of a material fact or omitted or would omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances prevailing at that subsequent time, not misleading, the Company has promptly notified or promptly will notify the Representative and has promptly amended or will promptly amend or supplement, at its own expense, such Issuer Free Writing Prospectus to eliminate or correct such conflict, untrue statement or omission.

(d) The Company shall take or cause to be taken all necessary action to qualify the Securities for sale under the securities laws of such jurisdictions as you reasonably designate and to continue such qualifications in effect so long as required for the distribution of the Securities, except that the Company shall not be required in connection therewith to qualify as a foreign corporation or to execute a general consent to service of process in any state or subject itself to taxation in any jurisdiction if it is not otherwise so subject.

(e) The Company will furnish, at its own expense, to the Underwriters and counsel for the Underwriters copies of the Registration Statement (one of which will be signed and will include all consents and exhibits filed therewith), and to the Underwriters and any dealer each Preliminary Prospectus, the Time of Sale Disclosure Package, the Prospectus, any Issuer Free Writing Prospectus and all amendments and supplements to such documents, in each case as soon as available and in such quantities as you may from time to time reasonably request.

(f) The Company will make generally available to its security holders as soon as practicable, but in no event later than 15 months after the end of the Company's current fiscal quarter, an earnings statement (which need not be audited) covering a 12-month period beginning after the effective date of the Original Registration Statement (or if later the Rule 462(b) Registration Statement) that shall satisfy the provisions of Section 11(a) of the Act and Rule 158 of the Rules and Regulations.

(g) During a period of five years commencing with the date hereof, the Company will furnish to the Representative, as the Representative may from time to time reasonably request in writing, copies of all periodic and special reports furnished to the stockholders of the Company generally, and all public information, documents and reports filed with the Commission, the FINRA or any securities exchange (other than any such information, documents and reports that are filed with the Commission electronically via EDGAR or any successor system).

(h) The Company, whether or not the transactions contemplated hereunder are consummated or this Agreement is prevented from becoming effective under the provisions of Section 9 hereof or is terminated, will pay or cause to be paid (A) all expenses (including transfer taxes allocated to the respective transferees) incurred in connection with the delivery to the Underwriters of the Securities, (B) all expenses and fees (including, without limitation, fees and expenses of the Company's accountants and counsel but, except as otherwise provided below, not including fees of the Underwriters' counsel) in

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connection with the preparation, printing, filing, delivery, and shipping of the Registration Statement (including the financial statements therein and all amendments, schedules, and exhibits thereto), the Securities, each Preliminary Prospectus, the Time of Sale Disclosure Package, the Prospectus, any Issuer Free Writing Prospectus and any amendment thereof or supplement thereto, and the printing, delivery, and shipping of this Agreement and other underwriting documents, including Blue Sky Memoranda (covering the states and other applicable jurisdictions), (C) all filing fees and reasonable fees and disbursements of the Underwriters' counsel incurred in connection with the qualification of the Securities for offering and sale by the Underwriters or by dealers under the securities or blue sky laws of the states and other jurisdictions which you shall designate, (D) the fees and expenses of any transfer agent or registrar, (E) the filing fees and reasonable fees and disbursements of Underwriters' counsel incident to any required review and approval by FINRA of the terms of the sale of the Securities, (F) listing fees, if any, (G) the cost and expenses of the Company relating to investor presentations or any "road show" undertaken in connection with marketing of the Securities, and (H) all other costs and expenses of the Company incident to the performance of its obligations hereunder that are not otherwise specifically provided for herein and (I) all other reasonable out-of-pocket documented costs and expenses of the Underwriter (including reasonable fees and disbursements of counsel) incident to the performance of its obligations hereunder not otherwise specifically provided for herein, provided however such costs and expenses provided for in this clause (I) shall not exceed \$150,000 in the aggregate, without the Company's prior written consent. If the sale of the Firm Shares, Firm Warrants and Pre-Funded Warrants provided for herein is not consummated by reason of action by the Company pursuant to Section 8 hereof which prevents this Agreement from becoming effective, if this Agreement is terminated by the Representative pursuant to Section 9 hereof prior to the Closing, or if the sale of the Firm Shares, Firm Warrants and Pre-Funded Warrants provided for herein is not consummated by reason of any failure, refusal or inability on the part of the Company to perform any agreement on its or their part to be performed, or because any other condition of the Underwriters' obligations hereunder required to be fulfilled by the Company prior to the Closing is not fulfilled, the Company will reimburse the several Underwriters for all reasonable out-of-pocket disbursements (including but not limited to reasonable fees and disbursements of counsel, printing expenses, travel expenses, postage, facsimile and telephone charges) incurred by the Underwriters in connection with their investigation, preparing to market and marketing the Securities or in contemplation of performing their obligations hereunder.

(i) The Company will apply the net proceeds from the sale of the Securities to be sold by it hereunder for the purposes set forth in the Time of Sale Disclosure Package and in the Prospectus and will file such reports with the Commission with respect to the sale of the Securities and the application of the proceeds therefrom as may be required in accordance with Rule 463 of the Rules and Regulations.

(j) The Company will not, without the prior written consent of the Representative, from the date of execution of this Agreement and continuing to and including the date 90 days after the date of the Prospectus (the "**Lock-Up Period**"), (A) offer, pledge, announce the intention to sell, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase or otherwise transfer or dispose of, directly or indirectly, any shares of Stock or any securities convertible into or exercisable or exchangeable for Common Stock or (B) enter into any swap or other agreement that transfers, in whole or in part, any of the economic consequences of ownership of the Common Stock, whether any such transaction described in clause (A) or (B) above is to be settled by delivery of Common Stock or such other securities, in cash or otherwise, except (i) to the Underwriters pursuant to this Agreement, (ii) to directors, officers, employees and consultants of the Company pursuant to employee benefit plans, equity incentive plans or other employee compensation plans existing on the date hereof and as described in the Prospectus or otherwise approved by the Company's stockholders, (iii) pursuant to the exercise or conversion of any options, warrants, rights or convertible securities outstanding on the date hereof, of which the Representative has been advised in writing, (iv) securities of the Company issued in connection with a joint venture or collaboration or other strategic or commercial relationship existing prior to, on or following the date hereof or (v) warrants of the Company to be issued to the Pillar Entities (as defined

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below) and affiliates on the Closing Date to purchase up to a total of 2,000,000 shares of the Company's Common Stock (the "**Pillar Warrants**") in accordance with those certain agreements entered into as of April 22, 2013 and April 30, 2013 by and among the Company and Pillar Pharmaceuticals I, L.P. and Pillar Pharmaceuticals II, L.P. (collectively, the "**Pillar Entities**"), subject to adjustment as described in the Pillar Warrants; provided, that in the case of clauses (iv) and (v), any recipient (as applicable) agrees to be bound in writing by the restrictions set forth herein for the remainder of the Lock-Up Period. The Company agrees not to accelerate the vesting of any option or warrant or the lapse of any repurchase right prior to the expiration of the Lock-Up Period. If (1) during the last 17 days of the Lock-Up Period, (a) the Company issues an earnings release, (b) the Company publicly announces material news or (c) a material event relating to the Company occurs; or (2) prior to the expiration of the Lock-Up Period, the Company announces that it will release earnings results during the 16-day period beginning on the last day of the Lock-Up Period, then if, within three days of that issuance or occurrence, the Representative publishes or otherwise distributes a research report or makes a public appearance concerning the Company, the restrictions in this Agreement, unless otherwise waived by the Representative in writing, shall continue to apply until the expiration of the date that is 18 calendar days after the date on which (a) the Company issues the earnings release, (b) the Company publicly announces material news or (c) a material event relating to the Company occurs. The Company will provide the Representative, any co-managers and each shareholder subject to the Lock-Up Agreement (as defined below) with prior notice of any such announcement that gives rise to the extension of the Lock-Up Period.

(k) The Company has caused to be delivered to you prior to the date of this Agreement a letter, in the form of Exhibit A hereto (the "**Lock-Up Agreement**"), from each of the Company's directors and officers. The Company will issue stop-transfer instructions to the transfer agent for the Common Stock with respect to any transaction or contemplated transaction that would constitute a breach of or default under the applicable Lock-Up Agreement.

(l) The Company has not taken and will not take, directly or indirectly, any action designed to or which would reasonably be expected to cause or result in, or which has constituted, the stabilization or manipulation of the price of any security of the Company to facilitate the sale or resale of the Securities, and has not effected any sales of Common Stock which are required to be disclosed in response to Item 701 of Regulation S-K under the Act which have not been so disclosed in the Registration Statement.

(m) Other than as contemplated by this Agreement, the Company will not incur any liability for any finder's or broker's fee or agent's commission in connection with the execution and delivery of this Agreement or the consummation of the transactions contemplated hereby.

(n) During the Prospectus Delivery Period, the Company will file on a timely basis with the Commission such periodic and other reports as required by the Rules and Regulations.

(o) the Company will maintain such controls and other procedures, including without limitation those required by Sections 302 and 906 of the Sarbanes-Oxley Act and the applicable regulations thereunder, that are designed to ensure that information required to be disclosed by the 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 Commission's rules and forms, including without limitation, controls and procedures designed to ensure that information required to be disclosed by the 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 officer and its principal financial officer, or persons performing similar functions, as appropriate to allow timely decisions regarding required disclosure, to ensure that material information relating to Company is made known to them by others within those entities.

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(p) The Company will comply with all applicable provisions of the Sarbanes-Oxley Act.

(q) The Company represents and agrees that, unless it obtains the prior written consent of the Representative, and each Underwriter severally represents and agrees that, unless it obtains the prior written consent of the Company and the Representative, it has not made and will not make any offer relating to the Securities that would constitute an “issuer free writing prospectus,” as defined in Rule 433 under the Act, or that would otherwise constitute a “free writing prospectus,” as defined in Rule 405 under the Act, required to be filed with the Commission; provided that the prior written consent of the parties hereto shall be deemed to have been given in respect of the free writing prospectuses included in Schedule III. Any such free writing prospectus consented to by the Company and the Representative is hereinafter referred to as a “**Permitted Free Writing Prospectus**.” The Company represents that it has treated or agrees that it will treat each Permitted Free Writing Prospectus as an “issuer free writing prospectus,” as defined in Rule 433, and has complied and will comply with the requirements of Rules 164 and 433 applicable to any Permitted Free Writing Prospectus, including timely Commission filing where required, legending and record keeping. The Company represents that it has satisfied and agrees that it will satisfy the conditions in Rule 433 to avoid a requirement to file with the Commission any electronic road show

**5. Conditions of Underwriters' Obligations**. The obligations of the several Underwriters hereunder are subject to the accuracy, as of the date hereof and at the Closing Date (as if made at such Closing Date), of and compliance with all representations, warranties and agreements of the Company contained herein, to the performance by the Company and to the following additional conditions:

(a) The Registration Statement shall have become effective not later than 5:00 p.m., Eastern time, on the date of this Agreement, or such later time and date as you, as Representative of the several Underwriters, shall approve and all filings required by Rules 424, 430A and 433 of the Rules and Regulations shall have been timely made (without reliance on Rule 424(b)(8) or Rule 164(b)); no stop order suspending the effectiveness of the Registration Statement or any part thereof or any amendment thereof, nor suspending or preventing the use of the Time of Sale Disclosure Package, the Prospectus or any Issuer Free Writing Prospectus shall have been issued; no proceedings for the issuance of such an order shall have been initiated or threatened; and any request of the Commission for additional information (to be included in the Registration Statement, the Time of Sale Disclosure Package, the Prospectus, any Issuer Free Writing Prospectus or otherwise) shall have been complied with to your satisfaction.

(b) The Representative shall not have advised the Company that (i) the Registration Statement or any amendment thereof or supplement thereto contains an untrue statement of a material fact which, based on the advice of counsel, is material or omits to state a material fact which, based on the advice of counsel, is required to be stated therein or necessary to make the statements therein not misleading, or (ii) the Time of Sale Disclosure Package or the Prospectus, or any amendment thereof or supplement thereto, or any Issuer Free Writing Prospectus contains an untrue statement of fact which, based on the advice of counsel, is material, or omits to state a fact which, based on the advice of counsel, is material and is required to be stated therein, or necessary to make the statements therein, in light of the circumstances under which they are made, not misleading.

(c) Except as contemplated in the Time of Sale Disclosure Package and in the Prospectus, subsequent to the respective dates as of which information is given in the Time of Sale Disclosure Package and the Prospectus, the Company shall have not incurred any material liabilities or obligations, direct or contingent, or entered into any material transactions outside the ordinary course of business, or declared or paid any dividends or made any distribution of any kind with respect to its capital stock; and there shall not have been any change in the capital stock (other than a change in the number of

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outstanding shares of Common Stock due to the issuance of shares upon the exercise or conversion of outstanding options, warrants, rights or convertible securities), or any material change in the short-term or long-term debt of the Company, or any issuance of options, warrants, convertible securities or other rights to purchase the capital stock of the Company except pursuant to equity compensation plans or arrangements described in the Time of Sale Disclosure Package and in the Prospectus, or any Material Adverse Change or any development that would result in a Material Adverse Change (whether or not arising in the ordinary course of business), that in your judgment, makes it impractical or inadvisable to offer or deliver the Securities on the terms and in the manner contemplated in the Time of Sale Disclosure Package and in the Prospectus.

(d) On the Closing Date, there shall have been furnished to you, as Representative of the several Underwriters, the opinion and negative assurance letter of Wilmer Cutler Pickering Hale and Dorr LLP, corporate counsel for the Company, dated as of the Closing Date and addressed to you in a form mutually agreed upon.

(e) On the Closing Date, there shall have been furnished to you, as Representative of the several Underwriters, the opinion of the Company's internal intellectual property counsel, dated as of the Closing Date and addressed to you in a form mutually agreed upon.

(f) On the Closing Date, there shall have been furnished to the Underwriter, the opinion and letter of negative assurance of Dechert LLP, counsel for the Underwriter, dated as of the Closing Date and addressed to the Underwriters with respect to the formation of the Company, the validity of the Securities, the Registration Statement, the Time of Sale Disclosure Package or the Prospectus and other related matters as you reasonably may request, and such counsel shall have received such papers and information as they reasonably request to enable them to pass upon such matters.

(g) On the date hereof and on the Closing Date you, as Representative of the several Underwriters, shall have received a letter from Ernst & Young LLP, dated such date and addressed to you, confirming that it is an independent registered public accounting firm within the meaning of the Act and are in compliance with the applicable requirements relating to the qualifications of accountants under Rule 2-01 of Regulation S-X of the Commission, and stating, as of the date of such letter (or, with respect to matters involving changes or developments since the respective dates as of which specified financial information is given in the Time of Sale Disclosure Package, as of a date not prior to the date hereof or more than five days prior to the date of such letter), the conclusions and findings of said firm with respect to the financial information and other matters covered by its letter delivered to you concurrently with the execution of this Agreement, and the effect of the letter so to be delivered on the Closing Date shall be to confirm the conclusions and findings set forth in such prior letter.

(h) On the Closing Date, there shall have been furnished to you, as Representative of the Underwriters, a certificate, dated as of the Closing Date and addressed to you, signed by the chief executive officer and by the chief financial officer of the Company, to the effect that:

(i) The representations and warranties of the Company in this Agreement are true and correct, in all material respects, as if made at and as of the Closing Date, and the Company has complied in all material respects with all the agreements and satisfied all the conditions on its part to be performed or satisfied under this Agreement at or prior to the Closing Date;

(ii) No stop order or other order suspending the effectiveness of the Registration Statement or any part thereof or any amendment thereof or the qualification of the Securities for offering or sale, nor suspending or preventing the use of the Time of



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Sale Disclosure Package, the Prospectus or any Issuer Free Writing Prospectus, has been issued, and, no proceeding for that purpose has been instituted or, to the best of their knowledge, is contemplated by the Commission or any state or regulatory body; and

(iii) The signers of said certificate have examined the Registration Statement, the Time of Sale Disclosure Package and the Prospectus, and any amendments thereof or supplements thereto, and in their opinion (A) each part of the Registration Statement and the Prospectus, and any amendments thereof or supplements thereto contain, and contained when such part of the Registration Statement, or any amendment thereof, became effective, all statements and information required to be included therein, the Registration Statement, or any amendment thereof, does not contain and did not contain when such part of the Registration Statement, or any amendment thereof, became effective, any untrue statement of a material fact or omit to state any material fact required to be stated therein or necessary to make the statements therein not misleading, and the Prospectus, as amended or supplemented, does not include and did not include as of its date or the time of first use within the meaning of the Rules and Regulations, any untrue statement of material fact or omit to state and did not omit to state as of its date or the time of first use within the meaning of the rules and Regulations a material fact necessary to make the statements therein, in light of the circumstances under which they were made, not misleading, (B) neither (1) the Time of Sale Disclosure Package nor (2) any individual Issuer Limited-Use Free Writing Prospectus, when considered together with the Time of Sale Disclosure Package, include, nor included as of the Time of Sale any untrue statement of a material fact or omits, or omitted as of the Time of Sale, to state any material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading, (C) since the Time of Sale there has occurred no event required to be set forth in an amended or supplemented prospectus which has not been so set forth, (D) subsequent to the respective dates as of which information is given in the Time of Sale Disclosure Package and in the Prospectus, the Company has not incurred any material liabilities or obligations, direct or contingent, or entered into any material transactions, not in the ordinary course of business, or declared or paid any dividends or made any distribution of any kind with respect to its capital stock, and except as disclosed in the Time of Sale Disclosure Package and in the Prospectus, there has not been any change in the capital stock (other than a change in the number of outstanding shares of Common Stock due to the issuance of shares upon the exercise or conversion of outstanding options, warrants, rights or convertible securities), or any material change in the short-term or long-term debt, or any issuance of options, warrants, convertible securities or other rights to purchase the capital stock, except pursuant to equity compensation plans or arrangements described in the Time of Sale Disclosure Package and in the Prospectus, of the Company, or any other Material Adverse Change or any development which could reasonably be expected to result in any Material Adverse Change (whether or not arising in the ordinary course of business), and (E) except as stated in the Time of Sale Disclosure Package and in the Prospectus, there is not pending, or, to the knowledge of the Company, threatened or contemplated, any action, suit or proceeding to which the Company is a party before or by any court, Governmental Agency or any arbitrator, which could reasonably be expected to result in any Material Adverse Change.

(i) The Underwriters shall have received all of the Lock-Up Agreements referenced in [Section 4\(k\)](#).

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(j) At the Closing Date, the Underwriters shall have received a certificate, signed on behalf of the Company by the Chief Financial Officer of the Company, dated as of the Closing Date, substantially in the form of Exhibit B hereto.

(k) The Underwriters shall have received on the Closing Date a certificate of the Secretary of the Company.

(l) The Underwriters shall not have received any unresolved objection from FINRA as to the fairness and reasonableness of the amount of compensation allowable or payable to the Underwriters in connection with the issuance and sale of the Securities.

(m) The Firm Shares, the shares of Common Stock underlying the Firm Warrants and the shares of Common Stock underlying the Pre-Funded Warrants to be delivered on the Closing Date will have been approved for listing on the NASDAQ Capital Market, subject to official notice of issuance.

(n) The Company shall have furnished to you and counsel for the Underwriters such additional documents, certificates and evidence as you or they may have reasonably requested.

All such opinions, certificates, letters and other documents mentioned above and elsewhere in this Agreement will be in compliance with the provisions hereof only if they are satisfactory in form and substance to you and counsel for the Underwriters. The Company will furnish you with such conformed copies of such opinions, certificates, letters and other documents as you shall reasonably request.

#### **6. Indemnification and Contribution.**

(a) The Company agrees to indemnify and hold harmless each Underwriter, its affiliates, directors and officers and each person, if any, who controls such Underwriter within the meaning of Section 15 of the Act or Section 20 of the Exchange Act, from and against any losses, claims, damages or liabilities, joint or several, to which such Underwriter may become subject, under the Act or otherwise (including in settlement of any litigation, or any investigation or proceeding by any governmental agency or body, commenced or threatened, if such settlement is effected with the written consent of the Company), insofar as such losses, claims, damages or liabilities (or actions in respect thereof) arise out of or are based upon (i) an untrue statement or alleged untrue statement of a material fact contained in the Registration Statement, including the 430A Information and any other information deemed to be a part of the Registration Statement at the time of effectiveness and at any subsequent time pursuant to the Rules and Regulations, if applicable, any Preliminary Prospectus, the Time of Sale Disclosure Package, the Prospectus, or any amendment or supplement thereto, any Issuer Free Writing Prospectus or in any materials or information provided to investors by, or with the written approval of, the Company in connection with the marketing of the offering of the Common Stock ("**Marketing Materials**"), including any road show or investor presentations made to investors by the Company (whether in person or electronically), (ii) arise out of or are based upon the omission or alleged omission to state therein a material fact required to be stated therein or necessary to make the statements therein, in light of (other than in the case of the Registration Statement) the circumstances under which they are made, not misleading or (iii) any breach by the Company of any of its representations, warranties and agreements contained in this Agreement, and will reimburse each Underwriter for any legal or other expenses reasonably incurred by it in connection with preparing, investigating or defending against such loss, claim, damage, liability or action as such expenses are incurred; *provided, however*, that the Company will not be liable in any such case to the extent that any such loss, claim, damage, liability or action arises out of or is based upon an untrue statement or alleged untrue statement or omission or alleged omission made in the Registration Statement, any Preliminary Prospectus, the Time of Sale Disclosure Package, the Prospectus, or any such amendment or supplement, any Issuer Free Writing

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Prospectus or in any Marketing Materials, in reliance upon and in conformity with written information furnished to the Company by you, or by any Underwriter through you, specifically for use in the preparation thereof; it being understood and agreed that the only information furnished by an Underwriter consists of the information described as such in Section 6(f).

(b) Each Underwriter will, severally and not jointly, indemnify and hold harmless the Company, its affiliates, directors and officers and each person, if any, who controls the Company within the meaning of Section 15 of the Act and Section 20 of the Exchange Act, from and against any losses, claims, damages or liabilities to which the Company may become subject, under the Act or otherwise (including in settlement of any litigation, or any investigation or proceeding by any governmental agency or body, commenced or threatened, if such settlement is effected with the written consent of such Underwriter), insofar as such losses, claims, damages or liabilities (or actions in respect thereof) arise out of or are based upon an untrue statement or alleged untrue statement of a material fact contained in the Registration Statement, any Preliminary Prospectus, the Time of Sale Disclosure Package, the Prospectus, or any amendment or supplement thereto, or any Issuer Free Writing Prospectus or arise out of or are based upon the omission or alleged omission to state therein a material fact required to be stated therein or necessary to make the statements therein, in light of (other than in the case of the Registration Statement) the circumstances under which they are made, not misleading, in each case to the extent, but only to the extent, that such untrue statement or alleged untrue statement or omission or alleged omission was made in the Registration Statement, any Preliminary Prospectus, the Time of Sale Disclosure Package, the Prospectus, or any such amendment or supplement, or any Issuer Free Writing Prospectus in reliance upon and in conformity with written information furnished to the Company by you, or by such Underwriter through you, specifically for use in the preparation thereof (it being understood and agreed that the only information furnished by an Underwriter consists of the information described as such in Section 6(f)), and will reimburse the Company for any legal or other expenses reasonably incurred by the Company in connection with investigating or defending against any such loss, claim, damage, liability or action as such expenses are incurred.

(c) Promptly after receipt by an indemnified party under subsection (a) or (b) above of notice of the commencement of any action, such indemnified party shall, if a claim in respect thereof is to be made against the indemnifying party under such subsection, notify the indemnifying party in writing of the commencement thereof; but the omission so to notify the indemnifying party shall not relieve the indemnifying party from any liability that it may have to any indemnified party except to the extent such indemnifying party has been materially prejudiced by such failure (through the forfeiture of substantive rights or defenses). In case any such action shall be brought against any indemnified party, and it shall notify the indemnifying party of the commencement thereof, the indemnifying party shall be entitled to participate in, and, to the extent that it shall wish, jointly with any other indemnifying party similarly notified, to assume the defense thereof, with counsel reasonably satisfactory to such indemnified party, and after notice from the indemnifying party to such indemnified party of the indemnifying party's election so to assume the defense thereof, the indemnifying party shall not be liable to such indemnified party under such subsection for any legal or other expenses subsequently incurred by such indemnified party in connection with the defense thereof other than reasonable costs of investigation; provided, however, that the indemnified party shall have the right to employ counsel to represent jointly the indemnified party and those other indemnified parties and their respective directors, officers, employees and controlling persons who may be subject to liability arising out of any claim in respect of which indemnity may be sought under this Section 6 if (i) the indemnified party and the indemnifying party shall have so mutually agreed; (ii) the indemnifying party has failed within a reasonable time to retain counsel reasonably satisfactory to the indemnified party; (iii) the indemnified party and its directors, officers, employees and controlling persons shall have reasonably concluded that there may be legal defenses available to them that are different from or in addition to those available to the indemnifying party; or (iv) the named parties in any such proceeding (including any impleaded parties) include both the indemnified parties or their respective directors, officers, employees or controlling persons, on the one hand, and the indemnifying party, on the other hand, and representation of both sets of parties by

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the same counsel would be inappropriate due to actual or potential differing interests between them, and in any such event the reasonable fees and expenses of such separate counsel shall be paid by the indemnifying party. An indemnifying party shall not be obligated under any settlement agreement relating to any action under this Section 6 to which it has not agreed in writing. In addition, no indemnifying party shall, without the prior written consent of the indemnified party (which consent shall not be unreasonably withheld or delayed), effect any settlement of any pending or threatened proceeding unless such settlement includes an unconditional release of such indemnified party for all liability on claims that are the subject matter of such proceeding and does not include a statement as to, or an admission of, fault, culpability or a failure to act by or on behalf of an indemnified party.

(d) If the indemnification provided for in this Section 6 is unavailable or insufficient to hold harmless an indemnified party under subsection (a) or (b) above, then each indemnifying party shall contribute to the amount paid or payable by such indemnified party as a result of the losses, claims, damages or liabilities referred to in subsection (a) or (b) above, (i) in such proportion as is appropriate to reflect the relative benefits received by the Company on the one hand and the Underwriters on the other from the offering of the Securities or (ii) if the allocation provided by clause (i) above is not permitted by applicable law, in such proportion as is appropriate to reflect not only the relative benefits referred to in clause (i) above but also the relative fault of the Company on the one hand and the Underwriters on the other in connection with the statements or omissions that resulted in such losses, claims, damages or liabilities, as well as any other relevant equitable considerations. The relative benefits received by the Company on the one hand and the Underwriters on the other shall be deemed to be in the same proportion as the total net proceeds from the offering (before deducting expenses) received by the Company bear to the total underwriting discounts and commissions received by the Underwriters, in each case as set forth in the table on the cover page of the Prospectus. The relative fault shall be determined by reference to, among other things, whether the untrue or alleged untrue statement of a material fact or the omission or alleged omission to state a material fact relates to information supplied by the Company or the Underwriters and the parties' relevant intent, knowledge, access to information and opportunity to correct or prevent such untrue statement or omission. The Company and the Underwriters agree that it would not be just and equitable if contributions pursuant to this subsection (d) were to be determined by pro rata allocation (even if the Underwriters were treated as one entity for such purpose) or by any other method of allocation which does not take account of the equitable considerations referred to in the first sentence of this subsection (d). The amount paid by an indemnified party as a result of the losses, claims, damages or liabilities referred to in the first sentence of this subsection (d) shall be deemed to include any legal or other expenses reasonably incurred by such indemnified party in connection with investigating or defending against any action or claim which is the subject of this subsection (d). Notwithstanding the provisions of this subsection (d), in no event shall an Underwriter be required to contribute any amount in excess of the amount by which the total underwriting discounts and commissions received by such Underwriter with respect to the offering of the Securities exceeds the amount of any damages that such Underwriter has otherwise been required to pay by reason of such untrue or alleged untrue statement or omission or alleged omission. No person guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Act) shall be entitled to contribution from any person who was not guilty of such fraudulent misrepresentation. The Underwriters' obligations in this subsection (d) to contribute are several in proportion to their respective underwriting obligations and not joint.

(e) The obligations of the Company under this Section 6 shall be in addition to any liability which the Company may otherwise have and shall extend, upon the same terms and conditions, to each person, if any, who controls any Underwriter within the meaning of the Act; and the obligations of the Underwriters under this Section 6 shall be in addition to any liability that the respective Underwriters may otherwise have and shall extend, upon the same terms and conditions, to each director of the Company (including any person who, with his consent, is named in the Registration Statement as about to become a director of the Company), to each officer of the Company who has signed the Registration Statement and to each person, if any, who controls the Company within the meaning of the Act.

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(f) The Underwriters severally confirm and the Company acknowledges that the statements with respect to the public offering of the Securities by the Underwriters regarding the names and corresponding share amounts set forth in the table of underwriters and paragraphs [2], [12] and [13] under the caption "Underwriting" in the Time of Sale Disclosure Package and in the Prospectus, are correct and constitute the only information concerning such Underwriters furnished in writing to the Company by or on behalf of the Underwriters specifically for inclusion in the Registration Statement, any Preliminary Prospectus, the Time of Sale Disclosure Package, the Prospectus or any Issuer Free Writing Prospectus.

**7. Representations and Agreements to Survive Delivery.** All representations, warranties, and agreements of the Company herein or in certificates delivered pursuant hereto, and the agreements of the several Underwriters and the Company contained in Section 6 hereof, shall remain operative and in full force and effect regardless of any investigation made by or on behalf of any Underwriter or any controlling person thereof, or the Company or any of its officers, directors, or controlling persons thereof, and shall survive delivery of, and payment for, the Securities to and by the Underwriters hereunder.

**8. Termination of this Agreement.**

(a) You, as Representative of the several Underwriters, shall have the right to terminate this Agreement by giving notice as hereinafter specified at any time at or prior to the Closing Date, if (i) the Company shall have failed, refused or been unable, at or prior to the Closing Date, to perform any agreement on its part to be performed hereunder, (ii) any other condition of the Underwriters' obligations hereunder is not fulfilled, (iii) trading on the NASDAQ Stock Market, the New York Stock Exchange or the NYSE Amex shall have been wholly suspended, (iv) minimum or maximum prices for trading shall have been fixed, or maximum ranges for prices for securities shall have been required, on the NASDAQ Stock Market, the New York Stock Exchange or the NYSE Amex, by such Exchange or by order of the Commission or any other Governmental Authority, (v) a banking moratorium shall have been declared by federal or state authorities, or (vi) there shall have occurred any outbreak or escalation of hostilities or any change in financial markets or any calamity or crisis that, in your judgment, is material and adverse and makes it impractical or inadvisable to proceed with the completion of the sale of and payment for the Securities. Any such termination shall be without liability of any party to any other party except that the provisions of Section 4(h) and Section 6 hereof shall at all times be effective.

(b) If you elect to terminate this Agreement as provided in this Section, the Company and shall be notified promptly by you by telephone, confirmed by letter.

**9. Default by the Company.** If the Company shall fail at the Closing Date to sell and deliver the number of Securities which it is obligated to sell hereunder, then this Agreement shall terminate without any liability on the part of any Underwriter or, except as provided in Section 4(h) and Section 6 hereof, any non defaulting party. No action taken pursuant to this Section 9 shall relieve the Company so defaulting from liability, if any, in respect of such default.

**10. Notices.** Except as otherwise provided herein, all communications hereunder shall be in writing and, if to the Underwriter, shall be mailed or delivered to Piper Jaffray & Co., U.S. Bancorp Center, 800 Nicollet Mall, Minneapolis, Minnesota 55402, Attention: General Counsel, with a copy to Dechert LLP, 1095 Avenue of the Americas, New York, New York 10036, Attention: David S. Rosenthal; and if to the Company, shall be mailed or delivered to Idera Pharmaceuticals, Inc., 167 Sidney Street, Cambridge, MA 02139, Attention: Chief Executive Officer, with a copy to Wilmer Cutler Pickering Hale and Dorr LLP, 60 State Street, Boston, MA 02019, Attention: Stuart M. Falber. Any party to this Agreement may change such address for notices by sending to the parties to this Agreement written notice of a new address for such purpose.

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11. **Persons Entitled to Benefit of Agreement.** This Agreement shall inure to the benefit of and be binding upon the parties hereto and their respective successors and assigns and the controlling persons, officers and directors referred to in Section 6. Nothing in this Agreement is intended or shall be construed to give to any other person, firm or corporation any legal or equitable remedy or claim under or in respect of this Agreement or any provision herein contained. The term “*successors and assigns*” as herein used shall not include any purchaser, as such purchaser, of any of the Securities from any of the several Underwriters.

12. **Absence of Fiduciary Relationship.** The Company acknowledges and agrees that: (a) the Representative has been retained solely to act as an underwriter in connection with the sale of the Securities and that no fiduciary, advisory or agency relationship between the Company and the Representative has been created in respect of any of the transactions contemplated by this Agreement, irrespective of whether the Representative has advised or are advising the Company on other matters; (b) the price and other terms of the Securities set forth in this Agreement were established by the Company following discussions and arms-length negotiations with the Representative and the Company is capable of evaluating and understanding and understands and accepts the terms, risks and conditions of the transactions contemplated by this Agreement; (c) it has been advised that the Representative and its affiliates are engaged in a broad range of transactions which may involve interests that differ from those of the Company and that the Representative has no obligation to disclose such interest and transactions to the Company by virtue of any fiduciary, advisory or agency relationship; (d) it has been advised that the Representative is acting, in respect of the transactions contemplated by this Agreement, solely for the benefit of the Representative and the other Underwriters, and not on behalf of the Company; (e) it, he or she waives to the fullest extent permitted by law, any claims it may have against the Representative for breach of fiduciary duty or alleged breach of fiduciary duty in respect of any of the transactions contemplated by this Agreement and agrees that the Representative shall have no liability (whether direct or indirect) to the Company in respect of such a fiduciary duty claim on behalf of or in right of the Company, including stockholders, employees or creditors of the Company.

13. **Governing Law.** This Agreement shall be governed by and construed in accordance with the laws of the State of New York.

14. **Counterparts.** This Agreement may be executed in one or more counterparts and, if executed in more than one counterpart, the executed counterparts shall each be deemed to be an original and all such counterparts shall together constitute one and the same instrument.

15. **General Provisions.** This Agreement constitutes the entire agreement of the parties to this Agreement and supersedes all prior written or oral and all contemporaneous oral agreements, understandings and negotiations with respect to the subject matter hereof. This Agreement may not be amended or modified unless in writing by all of the parties hereto, and no condition herein (express or implied) may be waived unless waived in writing by each party whom the condition is meant to benefit. The Section headings herein are for the convenience of the parties only and shall not affect the construction or interpretation of this Agreement.

[Signature Page Follows]

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Please sign and return to the Company the enclosed duplicates of this Agreement whereupon this Agreement will become binding between the Company and the Underwriters in accordance with its terms.

Very truly yours,

**IDERA PHARMACEUTICALS, INC.**

By: \_\_\_\_\_

Name:

Title:

The foregoing Purchase Agreement is hereby confirmed and accepted as of the date first above written.

**PIPER JAFFRAY & CO.**

By: \_\_\_\_\_

Name: David W. Stadinski

Title: Managing Director

*[Signature Page to Purchase Agreement]*

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**SCHEDULE I**

<u>Underwriter</u>	<u>Number of Firm Shares</u>	<u>Number of Firm Warrants</u>	<u>Number of Pre- Funded Warrants</u>
Piper Jaffray & Co.	[ ]	[ ]	[ ]
[Name]	[ ]	[ ]	[ ]
[Name]	[ ]	[ ]	[ ]
[Name]	[ ]	[ ]	[ ]
[Name]	[ ]	[ ]	[ ]
Total	<u>[•]</u>	<u>[•]</u>	<u>[•]</u>



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**SCHEDULE II**

**Issuer General Free Writing Prospectuses**

[None].

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**SCHEDULE III**

**Pricing Information**

Number of Firm Shares to be Issued: [●]

Number of Firm Warrants to be Issued: [●]

Number of Pre-Funded Warrants to be Issued: [●]

Public Offering Price: \$      per Firm Share

Public Offering Price: \$      per Firm Warrant

Public Offering Price: \$      per Pre-Funded Warrant

Underwriting Discounts and Commissions:    %

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EXHIBIT A

Form of Lock-Up Agreement

March , 2013

Piper Jaffray & Co.  
800 Nicollet Mall  
Minneapolis, Minnesota 55402

Re: Public Offering of Shares of Common Stock

Ladies and Gentlemen:

The undersigned understands that Piper Jaffray & Co (the “**Underwriter**”) proposes to enter into the Purchase Agreement (the “**Purchase Agreement**”) with Idera Pharmaceuticals, Inc., a Delaware corporation (the “**Company**”), providing for the offering (the “**Offering**”) of shares (the “**Shares**”) of common stock, \$0.001 par value per share (the “**Common Stock**”), of the Company. Capitalized terms used herein and not otherwise defined shall have the meanings set forth in the Purchase Agreement.

In order to induce the Underwriter to enter into the Purchase Agreement, the undersigned hereby agrees that, commencing on the date hereof and continuing until the ninetieth (90th) day following the date of the final prospectus filed by the Company with the Securities and Exchange Commission in connection with such Offering (the “**Lock-Up Period**”), the undersigned will not, without the prior written consent of the Underwriter, directly or indirectly, (1) offer, sell, contract to sell, pledge, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, lend, or otherwise transfer or dispose of any shares of the Common Stock, or any securities convertible into or exercisable or exchangeable for the Common Stock; (2) enter into any swap or other arrangement that transfers to another, in whole or in part, any of the economic consequences of ownership of the Common Stock, or any securities convertible into or exchangeable for the Common Stock, regardless of whether any such transaction described in clause (1) or (2) above is to be settled by delivery of the Common Stock or such other securities, or by delivery of cash or otherwise; (3) make any demand for, or exercise any right with respect to, the registration of any shares of the Common Stock or any security convertible into or exercisable or exchangeable for the Common Stock; or (4) publicly announce any intention to do any of the foregoing.

The undersigned agrees that the foregoing restrictions preclude the undersigned from engaging in any hedging or other transaction which is designed to or which reasonably could be expected to lead to or result in a sale or disposition of the undersigned’s shares of Common Stock even if such shares of Common Stock would be disposed of by someone other than the undersigned. Such prohibited hedging or other transactions would include without limitation any short sale or any purchase, sale or grant of any right (including without limitation any put or call option) with respect to any of the undersigned’s Securities or with respect to any security that includes, relates to, or derives any significant part of its value from such shares of Common Stock.

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Notwithstanding the foregoing, the restrictions set forth in clause (1) and (2) above shall not apply to: (a) transfers (i) as a bona fide gift or gifts, *provided* that the donee or donees thereof agree to be bound in writing by the restrictions set forth herein for the remainder of the Lock-Up Period, (ii) by will, other testamentary document or intestate succession, (iii) to any trust for the direct or indirect benefit of the undersigned or the immediate family of the undersigned or (iv) if the undersigned is an entity, to any affiliate of the undersigned or any investment fund or other entity controlled or managed by the undersigned in a transaction, *provided* that in connection with transactions described in clauses (ii), (iii) and (iv) above, the recipient (as applicable) agrees to be bound in writing by the restrictions set forth herein for the remainder of the Lock-Up Period and the related transfer shall not involve a disposition for value; (b) the exercise, conversion or exchange of any options, warrants, rights or convertible securities outstanding on the date hereof as described in the Registration Statement, including any exercise effected by the delivery or sale of Common Stock held by the undersigned to the Company (including, without limitation, to finance a “cashless” exercise, to satisfying tax withholding obligations or to exchange “underwater” options with the Company); or (c) the establishment of a trading plan pursuant to Rule 10b5-1 under the Securities Exchange Act of 1934, as amended (the “*Exchange Act*”), for the transfer of shares of Common Stock or other securities, *provided* that such plan does not provide for the transfer of shares of Common Stock or other securities during the Lock-Up Period and no public announcement or filing under the Exchange Act regarding the establishment of such plan shall be required of or voluntarily made by or on behalf of the undersigned or the Company during the Lock-Up Period. For purposes of this Lock-Up Agreement, “immediate family” shall mean any relationship by blood, marriage or adoption, not more remote than first cousin.

Anything herein to the contrary notwithstanding, if

(1) during the last 17 days of the Lock-Up Period the Company issues an earnings release or other material news or a material event relating to the Company occurs; or

(2) prior to the expiration of the Lock-Up Period, the Company announces that it will release earnings results during the 16-day period beginning on the last day of the Lock-Up Period,

the Lock-Up Period shall be extended and the restrictions imposed by this letter shall continue to apply until the expiration of the 18-day period beginning on the date of issuance of the earnings release or the occurrence of the material news or material event, if, within three days of that issuance or occurrence, the Underwriter publishes or otherwise distributes a research report or makes a public appearance concerning the Company, unless the Underwriter waives, in writing, such extension.

The undersigned hereby acknowledges and agrees that written notice of any extension of the Lock-Up Period pursuant to the previous paragraph will be delivered by the Underwriter to the Company (in accordance with the notice provision in the Purchase Agreement) and that any such notice properly delivered will be deemed to have been given to, and received by, the undersigned. The undersigned hereby further agrees that, prior to engaging in any transaction or taking any other action that is subject to the terms of this

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Lock-Up Agreement during the period from the date of this Lock-Up Agreement to and including the 34th day following the expiration of the initial Lock-Up Period, it will give notice thereof to the Company and will not consummate such transaction or take any such action unless it has received written confirmation from the Company that the Lock-Up Period (as such may have been extended pursuant to the previous paragraph) has expired. Notwithstanding the foregoing, if the Company has “actively traded securities” within the meaning of Rule 101(c)(1) of Regulation M of the Exchange Act, and otherwise satisfies the requirements set forth in Rule 139 of the Securities Act of 1933 that would permit Piper Jaffray & Co. or any underwriter to publish issuer-specific research reports pursuant to Rule 139, the Lock-Up Period shall not be extended upon the occurrence of (1) or (2) above.

The undersigned hereby agrees and consents to the entry of stop transfer instructions with the Company’s transfer agent against the transfer of securities of the Company held by the undersigned during the Lock-Up Period (as may have been extended pursuant hereto), except in compliance with this Lock-Up Agreement.

Anything to the contrary notwithstanding, if (i) the Purchase Agreement does not become effective by June 1, 2013, (ii) after becoming effective, the Purchase Agreement (other than the provisions thereof which survive termination) shall terminate or be terminated prior to payment for and delivery of the Shares to be sold thereunder, (iii) prior to the Purchase Agreement becoming effective, the Company notifies the Underwriters in writing that it does not intend to proceed with the Offering, or (iv) the Offering is not completed by June 1, 2013, this Lock-Up Agreement shall lapse and become null and void and the undersigned shall be released from all obligations under this Lock-Up Agreement.

The undersigned hereby represents and warrants that the undersigned has full power and authority to enter into this Lock-Up Agreement. This Lock-Up Agreement may not be revoked by the undersigned or the Company. All authority herein conferred or agreed to be conferred shall survive the death or incapacity of the undersigned and any obligations of the undersigned shall be binding upon the heirs, personal representatives, successors and assigns of the undersigned.

The undersigned understands that the Underwriters are entering into the Purchase Agreement and proceeding with the Offering in reliance upon this Agreement.

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This Lock-Up Agreement shall be governed by and construed in accordance with the laws of the State of New York, without regard to the conflict of laws principles thereof.

Very truly yours,

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Printed Name of Holder

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Signature

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Printed Name of Person Signing (and indicate capacity of person signing if signing on behalf of an entity)

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**EXHIBIT B**

**IDERA PHARMACEUTICALS, INC.**

**CHIEF FINANCIAL OFFICER'S CERTIFICATE**

Louis Arcudi, III, solely in his capacity as Chief Financial Officer of Idera Pharmaceuticals, Inc., a Delaware corporation (the “*Company*”), pursuant to Section 5(i) of that certain Purchase Agreement, dated as of March [ ], 2013 (the “*Purchase Agreement*”), by and between the Company and Piper Jaffray & Co., as representative of the several underwriters named therein (the “*Underwriters*”), hereby certifies on behalf of the Company that (capitalized terms used and not defined herein have the meanings ascribed to them in the Purchase Agreement):

1. I, or members of my staff, have read the amounts circled on the copies of certain pages of the Registration Statement, Time of Sale Disclosure Package and Prospectus attached hereto as Exhibit A.
2. With regard to these amounts, I, or members of my staff, compared such amounts to the corresponding amounts included in or derived from the Company’s internal accounting records or schedules prepared by management from such accounting records for the applicable periods and found them to be in agreement.
3. Based on such examination and review, nothing came to my attention that caused me to believe that such amounts are not accurate and complete in all material respects as of the date indicated and as of the date hereof.
4. This certificate is to assist the Underwriters in conducting and documenting their investigation of the affairs of the Company in connection with the offering of the Securities covered by the Registration Statement, Time of Sale Disclosure Package and the Prospectus.

[Signature page follows]

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**IN WITNESS WHEREOF**, the undersigned has executed this certificate this [ ] day of [ ], 2013.

IDERA PHARMACEUTICALS, INC.

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By: Louis Arcudi, III  
Title: Chief Financial Officer



**IDERA PHARMACEUTICALS, INC.**  
**WARRANT TO PURCHASE COMMON STOCK**

Number of Shares: [ ]  
 (subject to adjustment)  
 Original Issue Date: [ ], 2013

Warrant No.

Idera Pharmaceuticals, Inc., a Delaware corporation (the “*Company*”), hereby certifies that, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, or its permitted registered assigns (the “*Holder*”), is entitled, subject to the terms set forth below, to purchase from the Company up to a total of shares of common stock, \$0.001 par value per share (the “*Common Stock*”), of the Company (each such share, a “*Warrant Share*” and all such shares, the “*Warrant Shares*”) at an exercise price per share equal to \$ per share (as adjusted from time to time as provided in Section 9 herein, the “*Exercise Price*”), upon surrender of this Warrant to Purchase Common Stock (including any Warrants to Purchase Common Stock issued in exchange, transfer or replacement hereof, the “*Warrant*”) at any time and from time to time on or after the date hereof (the “*Original Issue Date*”) and through and including 5:30 P.M., New York City time, on the date that is following the Original Issue Date (the “*Expiration Date*”), and subject to the following terms and conditions:

1. Definitions. For purposes of this Warrant, the following terms shall have the following meanings:

(a) “*Commission*” means the United States Securities and Exchange Commission.

(b) “*Closing Sale Price*” means, for any security as of any date, the last trade price for such security on the Principal Trading Market for such security, as reported by Bloomberg Financial Markets, or, if such Principal Trading Market begins to operate on an extended hours basis and does not designate the last trade price, then the last trade price of such security prior to 4:00 P.M., New York City time, as reported by Bloomberg Financial Markets, or if the foregoing do not apply, the last trade price of such security in the over-the-counter market on the electronic bulletin board for such security as reported by Bloomberg Financial Markets, or, if no last trade price is reported for such security by Bloomberg Financial Markets, the average of the bid and ask prices, of any market makers for such security as reported in the “pink sheets” by Pink Sheets LLC. If the Closing Sale Price cannot be calculated for a security on a particular date on any of the foregoing bases, the Closing Sale Price of such security on such date shall be the fair market value as mutually determined by the Company and the Holder. If the Company and the Holder are unable to agree upon the fair market value of such security, then the Board of Directors of the Company shall use its good faith judgment to determine the fair market value. The Board of Directors’ determination shall be binding upon all parties absent demonstrable error. All such determinations shall be appropriately adjusted for any stock dividend, stock split, stock combination or other similar transaction during the applicable calculation period.

(c) “*Principal Trading Market*” means the Trading Market on which the Common Stock is primarily listed on and quoted for trading, which, as of the Original Issue Date shall be the Nasdaq Capital Market.

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(d) “*Registration Statement*” means the Company’s Registration Statement on Form S-1, as amended (File No. 333-187155), initially filed on March 11, 2013.

(e) “*Securities Act*” means the Securities Act of 1933, as amended.

(f) “*Transfer Agent*” means Computershare Shareowner Services LLC, the Company’s transfer agent for the Common Stock and Warrants.

2. Registration of Warrants. The Company shall register this Warrant, upon records to be maintained by the Company for that purpose (the “*Warrant Register*”), in the name of the record Holder (which shall include the initial Holder or, as the case may be, any registered assignee to which this Warrant is permissibly assigned hereunder) from time to time. The Company may deem and treat the registered Holder of this Warrant as the absolute owner hereof for the purpose of any exercise hereof or any distribution to the Holder, and for all other purposes, absent actual notice to the contrary.

3. Registration of Transfers. Subject to compliance with all applicable securities laws, the Company shall, or will cause its Transfer Agent to, register the transfer of all or any portion of this Warrant in the Warrant Register, upon surrender of this Warrant, and payment for all applicable transfer taxes. Upon any such registration or transfer, a new warrant to purchase Common Stock in substantially the form of this Warrant (any such new warrant, a “*New Warrant*”) evidencing the portion of this Warrant so transferred shall be issued to the transferee, and a New Warrant evidencing the remaining portion of this Warrant not so transferred, if any, shall be issued to the transferring Holder. The acceptance of the New Warrant by the transferee thereof shall be deemed the acceptance by such transferee of all of the rights and obligations in respect of the New Warrant that the Holder has in respect of this Warrant. The Company shall, or will cause its Transfer Agent to, prepare, issue and deliver at the Company’s own expense any New Warrant under this Section 3. Until due presentment for registration of transfer, the Company may treat the registered Holder hereof as the owner and holder for all purposes, and the Company shall not be affected by any notice to the contrary.

4. Exercise and Duration of Warrants.

(a) All or any part of this Warrant shall be exercisable by the registered Holder in any manner permitted by Section 10 of this Warrant at any time and from time to time on or after the Original Issue Date and through and including 5:30 P.M. New York City time, on the Expiration Date. At 5:30 P.M., New York City time, on the Expiration Date, the portion of this Warrant not exercised prior thereto shall be and become void and of no value and this Warrant shall be terminated and no longer outstanding.

(b) The Holder may exercise this Warrant by delivering to the Company (i) an exercise notice, in the form attached as Schedule 1 hereto (the “*Exercise Notice*”), completed and duly signed, and (ii) payment of the Exercise Price for the number of Warrant Shares as to which this Warrant is being exercised (which may take the form of a “cashless exercise” if so indicated in the Exercise Notice and if a “cashless exercise” may occur at such time pursuant to Section 10 below), and the date on which the last of such items is delivered to the Company (as determined in accordance with the notice provisions hereof) is an “*Exercise Date*.” The Holder shall not be required to deliver the original Warrant in order to effect an exercise hereunder. Execution and delivery of the Exercise Notice shall have the same effect as cancellation of the original Warrant and issuance of a New Warrant evidencing the right to purchase the remaining number of Warrant Shares.

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5. Delivery of Warrant Shares.

(a) Upon exercise of this Warrant, the Company shall promptly (but in no event later than three (3) Trading Days after the Exercise Date), upon the request of the Holder, credit such aggregate number of shares of Common Stock to which the Holder is entitled pursuant to such exercise to the Holder's or its designee's balance account with The Depository Trust Company ("DTC") through its Deposit Withdrawal Agent Commission system, or if the Transfer Agent is not participating in the Fast Automated Securities Transfer Program (the "FAST Program") or if the certificates are required to bear a legend regarding restriction on transferability, issue and dispatch by overnight courier to the address as specified in the Exercise Notice, a certificate, registered in the Company's share register in the name of the Holder or its designee, for the number of shares of Common Stock to which the Holder is entitled pursuant to such exercise. The Holder, or any Person permissibly so designated by the Holder to receive Warrant Shares, shall be deemed to have become the holder of record of such Warrant Shares as of the Exercise Date, irrespective of the date such Warrant Shares are credited to the Holder's DTC account or the date of delivery of the certificates evidencing such Warrant Shares, as the case may be.

(b) If by the close of the third (3<sup>rd</sup>) Trading Day after the Exercise Date, the Company fails to deliver to the Holder a certificate representing the required number of Warrant Shares in the manner required pursuant to Section 5(a) or fails to credit the Holder's balance account with DTC for such number of Warrant Shares to which the Holder is entitled, and if after such third (3<sup>rd</sup>) Trading Day and prior to the receipt of such Warrant Shares, the Holder purchases (in an open market transaction or otherwise) shares of Common Stock to deliver in satisfaction of a sale by the Holder of the Warrant Shares which the Holder anticipated receiving upon such exercise (a "Buy-In"), then the Company shall, within three (3) Trading Days after the Holder's request and in the Holder's sole discretion, either (1) pay in cash to the Holder an amount equal to the Holder's total purchase price (including brokerage commissions, if any) for the shares of Common Stock so purchased (the "Buy-In Price"), at which point the Company's obligation to deliver such certificate (and to issue such Warrant Shares) shall terminate or (2) promptly honor its obligation to deliver to the Holder a certificate or certificates representing such Warrant Shares and pay cash to the Holder in an amount equal to the excess (if any) of Holder's total purchase price (including brokerage commissions, if any) for the shares of Common Stock so purchased in the Buy-In over the product of (A) the number of shares of Common Stock purchased in the Buy-In, times (B) the closing bid price of a share of Common Stock on the Exercise Date.

(c) To the extent permitted by law, the Company's obligations to issue and deliver Warrant Shares in accordance with and subject to the terms hereof (including the limitations set forth in Section 11 below) are absolute and unconditional, irrespective of any action or inaction by the Holder to enforce the same, any waiver or consent with respect to any provision hereof, the recovery of any judgment against any Person or any action to enforce the same, or any setoff, counterclaim, recoupment, limitation or termination, or any breach or alleged breach by the Holder or any other Person of any obligation to the Company or any violation or alleged violation of law by the Holder or any other Person, and irrespective of any other circumstance that might otherwise limit such obligation of the Company to the Holder in connection with the issuance of Warrant Shares. Nothing herein shall limit the Holder's right to pursue any other remedies available to it hereunder, at law or in equity including, without limitation, a decree of specific performance and/or injunctive relief with respect to the Company's failure to timely deliver certificates representing shares of Common Stock upon exercise of the Warrant as required pursuant to the terms hereof.

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6. Charges, Taxes and Expenses. Issuance and delivery of certificates for shares of Common Stock upon exercise of this Warrant shall be made without charge to the Holder for any issue or transfer tax, transfer agent fee or other incidental tax or expense in respect of the issuance of such certificates, all of which taxes and expenses shall be paid by the Company; *provided, however*, that the Company shall not be required to pay any tax that may be payable in respect of any transfer involved in the registration of any certificates for Warrant Shares or the Warrants in a name other than that of the Holder or an Affiliate thereof. The Holder shall be responsible for all other tax liability that may arise as a result of holding or transferring this Warrant or receiving Warrant Shares upon exercise hereof.

7. Replacement of Warrant. If this Warrant is mutilated, lost, stolen or destroyed, the Company shall issue or cause to be issued in exchange and substitution for and upon cancellation hereof, or in lieu of and substitution for this Warrant, a New Warrant, but only upon receipt of evidence reasonably satisfactory to the Company of such loss, theft or destruction (in such case) and, in each case, a customary and reasonable indemnity and surety bond, if requested by the Company. Applicants for a New Warrant under such circumstances shall also comply with such other reasonable regulations and procedures and pay such other reasonable third-party costs as the Company may prescribe. If a New Warrant is requested as a result of a mutilation of this Warrant, then the Holder shall deliver such mutilated Warrant to the Company as a condition precedent to the Company's obligation to issue the New Warrant.

8. Reservation of Warrant Shares. The Company covenants that it will at all times while this Warrant is outstanding reserve and keep available out of the aggregate of its authorized but unissued and otherwise unreserved Common Stock, solely for the purpose of enabling it to issue Warrant Shares upon exercise of this Warrant as herein provided, the number of Warrant Shares that are initially issuable and deliverable upon the exercise of this entire Warrant, free from preemptive rights or any other contingent purchase rights of persons other than the Holder (taking into account the adjustments and restrictions of Section 9). The Company covenants that all Warrant Shares so issuable and deliverable shall, upon issuance and the payment of the applicable Exercise Price in accordance with the terms hereof, be duly and validly authorized, issued and fully paid and nonassessable. The Company will take all such action as may be reasonably necessary to assure that such shares of Common Stock may be issued as provided herein without violation of any applicable law or regulation, or of any requirements of any securities exchange or automated quotation system upon which the Common Stock may be listed.

9. Certain Adjustments. The Exercise Price and number of Warrant Shares issuable upon exercise of this Warrant are subject to adjustment from time to time as set forth in this Section 9.

(a) Stock Dividends and Splits. If the Company, at any time while this Warrant is outstanding, (i) pays a stock dividend on its Common Stock or otherwise makes a distribution on any class of capital stock, other than Series E Preferred Stock or Series D Preferred Stock issued and outstanding on the Original Issue Date and in accordance with the terms of such stock on the Original Issue Date or as amended, as described in the Registration Statement, that is payable in shares of Common Stock, (ii) subdivides its outstanding shares of Common Stock into a larger number of shares of Common Stock, (iii) combines its outstanding shares of Common Stock into a smaller number of shares of Common Stock or (iv) issues by reclassification of shares of capital stock any additional shares of Common Stock of the Company, then in each such case the Exercise Price shall be multiplied by a fraction, the numerator of which shall be the number of shares of Common Stock outstanding immediately before such event and the denominator of which shall be the number of shares of Common Stock outstanding immediately after such event. Any adjustment made pursuant

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to clause (i) of this paragraph shall become effective immediately after the record date for the determination of stockholders entitled to receive such dividend or distribution, provided, however, that if such record date shall have been fixed and such dividend is not fully paid on the date fixed therefor, the Exercise Price shall be recomputed accordingly as of the close of business on such record date and thereafter the Exercise Price shall be adjusted pursuant to this paragraph as of the time of actual payment of such dividends. Any adjustment pursuant to clause (ii) or (iii) of this paragraph shall become effective immediately after the effective date of such subdivision or combination.

(b) Pro Rata Distributions. If the Company, at any time while this Warrant is outstanding, distributes to all holders of Common Stock for no consideration (i) evidences of its indebtedness, (ii) any security (other than a distribution of Common Stock covered by the preceding paragraph) or (iii) rights or warrants to subscribe for or purchase any security, or (iv) any other asset (in each case, "*Distributed Property*"), then, upon any exercise of this Warrant that occurs after the record date fixed for determination of stockholders entitled to receive such distribution, the Holder shall be entitled to receive, in addition to the Warrant Shares otherwise issuable upon such exercise (if applicable), the Distributed Property that such Holder would have been entitled to receive in respect of such number of Warrant Shares had the Holder been the record holder of such Warrant Shares immediately prior to such record date without regard to any limitation on exercise contained therein.

(c) Fundamental Transactions. If, at any time while this Warrant is outstanding (i) the Company effects any merger or consolidation of the Company with or into another Person, in which the Company is not the surviving entity or the stockholders of the Company immediately prior to such merger or consolidation do not own, directly or indirectly, at least 50% of the voting power of the surviving entity immediately after such merger or consolidation, (ii) the Company effects any sale to another Person of all or substantially all of its assets in one or a series of related transactions, (iii) pursuant to any tender offer or exchange offer (whether by the Company or another Person), holders of capital stock who tender shares representing more than 50% of the voting power of the capital stock of the Company and the Company or such other Person, as applicable, accepts such tender for payment, (iv) the Company consummates a stock purchase agreement or other business combination (including, without limitation, a reorganization, recapitalization, spin-off or scheme of arrangement) with another Person whereby such other Person acquires more than the 50% of the voting power of the capital stock of the Company or (v) the Company effects any reclassification of the Common Stock or any compulsory share exchange pursuant to which the Common Stock is effectively converted into or exchanged for other securities, cash or property (other than as a result of a subdivision or combination of shares of Common Stock covered by Section 9(a) above) (in any such case, a "*Fundamental Transaction*"), then following such Fundamental Transaction the Holder shall have the right to receive, upon exercise of this Warrant, the same amount and kind of securities, cash or property as it would have been entitled to receive upon the occurrence of such Fundamental Transaction if it had been, immediately prior to such Fundamental Transaction, the holder of the number of Warrant Shares then issuable upon exercise in full of this Warrant without regard to any limitations on exercise contained herein (the "*Alternate Consideration*"). The Company shall not effect any Fundamental Transaction in which the Company is not the surviving entity or the Alternate Consideration includes securities of another Person unless prior to or simultaneously with the consummation thereof, any successor to the Company, surviving entity or other Person (including any purchaser of assets of the Company) shall assume the obligation to deliver to the Holder, such Alternate Consideration as, in accordance with the foregoing provisions, the Holder may be entitled to receive, and the other obligations under this Warrant. The provisions of this paragraph (c) shall similarly apply to subsequent transactions analogous of a Fundamental Transaction type.

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(d) Number of Warrant Shares. Simultaneously with any adjustment to the Exercise Price pursuant to paragraphs (a) of this Section 9, the number of Warrant Shares that may be purchased upon exercise of this Warrant shall be increased or decreased proportionately, so that after such adjustment the aggregate Exercise Price payable hereunder for the increased or decreased number of Warrant Shares shall be the same as the aggregate Exercise Price in effect immediately prior to such adjustment.

(e) Calculations. All calculations under this Section 9 shall be made to the nearest cent or the nearest share, as applicable.

(f) Notice of Adjustments. Upon the occurrence of each adjustment pursuant to this Section 9, the Company at its expense will, at the written request of the Holder, promptly compute such adjustment, in good faith, in accordance with the terms of this Warrant and prepare a certificate setting forth such adjustment, including a statement of the adjusted Exercise Price and adjusted number or type of Warrant Shares or other securities issuable upon exercise of this Warrant (as applicable), describing the transactions giving rise to such adjustments and showing in detail the facts upon which such adjustment is based. Upon written request, the Company will promptly deliver a copy of each such certificate to the Holder and to the Company's transfer agent.

(g) Notice of Corporate Events. If, while this Warrant is outstanding, the Company (i) declares a dividend or any other distribution of cash, securities or other property in respect of its Common Stock, including, without limitation, any granting of rights or warrants to subscribe for or purchase any capital stock of the Company or any subsidiary, (ii) authorizes or approves, enters into any agreement contemplating or solicits stockholder approval for any Fundamental Transaction or (iii) authorizes the voluntary dissolution, liquidation or winding up of the affairs of the Company, then, except if such notice and the contents thereof shall be deemed to constitute material non-public information, the Company shall deliver to the Holder a notice of such transaction at least ten (10) days prior to the applicable record or effective date on which a Person would need to hold Common Stock in order to participate

in or vote with respect to such transaction; *provided, however*, that the failure to deliver such notice or any defect therein shall not affect the validity of the corporate action required to be described in such notice. In addition, if while this Warrant is outstanding, the Company authorizes or approves, enters into any agreement contemplating or solicits stockholder approval for any Fundamental Transaction contemplated by Section 9(c), other than a Fundamental Transaction under clause (iii) of Section 9(c), the Company shall deliver to the Holder a notice of such Fundamental Transaction at least seventy five (75) days prior to the date such Fundamental Transaction is consummated. To the extent that any notice provided hereunder constitutes, or contains, material, non-public information regarding the Company or any of its subsidiaries, the Company shall simultaneously file such notice with the Commission pursuant to a Current Report on Form 8-K.

10. Payment of Exercise Price. Notwithstanding anything contained herein to the contrary, if a registration statement registering the issuance of the Warrant Shares under the Securities Act is not effective or available for the issuance of the Warrant Shares and an exemption from registration under the Securities Act is not available for the issuance of the Warrant Shares, the Holder may, in its sole discretion, satisfy its obligation to pay the Exercise Price through a “cashless exercise”, in which event the Company shall issue to the Holder the number of Warrant Shares determined as follows:

$$X = Y [(A-B)/A]$$

where:

“X” equals the number of Warrant Shares to be issued to the Holder;

“Y” equals the total number of Warrant Shares with respect to which this Warrant is then being exercised;

“A” equals the average of the Closing Sale Prices of the shares of Common Stock (as reported by Bloomberg Financial Markets) for the five (5) consecutive Trading Days ending on the date immediately preceding the Exercise Date; and

“B” equals the Exercise Price then in effect for the applicable Warrant Shares at the time of such exercise.

For purposes of Rule 144 promulgated under the Securities Act, it is intended, understood and acknowledged that the Warrant Shares issued in a “cashless exercise” transaction shall be deemed to have been acquired by the Holder, and the holding period for the Warrant Shares shall be deemed to have commenced, on the date this Warrant was originally (provided that the Commission continues to take the position that such treatment is proper at the time of such exercise).

#### 11. Limitations on Exercise.

(a) Notwithstanding anything to the contrary contained herein, the number of Warrant Shares that may be acquired by the Holder upon any exercise of this Warrant (or otherwise in respect hereof) shall be limited to the extent necessary to ensure that, following such exercise (or other issuance), the total number of shares of Common Stock then beneficially owned by the Holder and its Affiliates and any other Persons whose beneficial ownership of Common Stock would be aggregated with the Holder’s for purposes of Section 13(d) of the Exchange Act, does not exceed 4.999% of the total number of then issued and outstanding shares of Common Stock (including for such purpose the shares of Common Stock issuable upon such exercise), it being acknowledged by the Holder that the Company is not representing to such Holder that such calculation is in compliance with Section 13(d) of the Exchange Act and such Holder is solely responsible for any schedules required to be filed in accordance therewith. To the extent that the limitation contained in this Section 11(a) applies, the determination of whether this Warrant is exercisable (in relation to other securities owned by such Holder) and of which a portion of this Warrant is exercisable shall be in the sole discretion of a Holder, and

the submission of a Notice of Exercise shall be deemed to be the Holder's determination of whether this Warrant is exercisable (in relation to other securities owned by such Holder) and of which portion of this Warrant is exercisable, in each case subject to such aggregate percentage limitation, and the Company shall have no obligation to verify or confirm the accuracy of such determination. In addition, a determination under this Section 11(a) as to any group status shall be determined in accordance with Section 13(d) of the Exchange Act and the rules and regulations promulgated thereunder. For purposes of this Section 11(a), in determining the number of outstanding shares of Common Stock, the Holder may rely on the number of outstanding shares of Common Stock as reflected in (x) the Company's most recent Form 10-Q or Form 10-K, as the case may be, (y) a more recent public announcement by the Company or (z) any other notice by the Company or the Transfer Agent setting forth the number of shares of Common Stock outstanding. Upon the written request of the Holder, the Company shall within three (3) Trading Days confirm orally and in writing to such Holder the number of shares of Common Stock then outstanding. By written notice to the Company, which will not be effective until the sixty-first (61<sup>st</sup>) day after such notice is delivered to the Company, the Holder may waive the provisions of this Section 11(a) (but such waiver will not affect any other holder) to change the beneficial ownership limitation to such percentage of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock upon exercise of this Warrant as the Holder shall determine, in its sole discretion, subject to Section 11(b), and the provisions of this Section 11(a) shall continue to apply. Upon such a change by a Holder of the beneficial ownership limitation from such 4.999% limitation to such other percentage limitation, the beneficial ownership limitation may not be further waived by such Holder. Notwithstanding the foregoing, at any time following notice of a Fundamental Transaction under Section 9(g)(ii) with respect to a Section 9(c)(iii) Fundamental Transaction, the Holder may waive and/or change the beneficial ownership limitation effective immediately upon written notice to the Company and may reinstate a beneficial ownership limitation at any time thereafter effective immediately upon written notice to the Company.

(b) Notwithstanding anything to the contrary contained herein, including Section 11(a), the Company shall not effect any exercise of this Warrant, and the Holder shall not be entitled to exercise this Warrant for a number of Warrant Shares in excess of that number of Warrant Shares which, upon giving effect to such exercise, would cause (i) the aggregate number of shares of Common Stock beneficially owned by the Holder and its Affiliates and any other Persons whose beneficial ownership of Common Stock would be aggregated with the Holder's for purposes of Section 13(d) of the Exchange Act, to exceed 19.99% of the total number of issued and outstanding shares of Common Stock of the Company following such exercise, or (ii) the combined voting power of the securities of the Company beneficially owned by the Holder and its Affiliates and any other Persons whose beneficial ownership of Common Stock would be aggregated with the Holder's for purposes of Section 13(d) of the Exchange Act to exceed 19.99% of the combined voting power of all of the securities of the Company then outstanding following such exercise. For purposes of this Section 11(b), the aggregate number of shares of Common Stock or voting securities beneficially owned by the Holder and its Affiliates and any other Persons whose beneficial ownership of Common Stock would be aggregated with the Holder's for purposes of Section 13(d) of the Exchange Act shall include the shares of Common Stock issuable upon the exercise of this Warrant with respect to which such determination is being made, but shall exclude the number of shares of Common Stock which would be issuable upon (x) exercise of the remaining unexercised and non-cancelled portion of this Warrant by the Holder and (y) exercise or conversion of the unexercised, non-converted or non-cancelled portion of any other securities of the Company that do not have voting power (including without limitation any securities of the Company which would entitle the holder thereof to acquire at any time Common Stock, including without limitation any debt, preferred stock, right, option, warrant or other instrument that is at any time convertible into or exercisable or exchangeable for, or otherwise entitles the holder thereof to receive, Common Stock), is subject to a limitation on conversion or exercise analogous to the limitation contained herein and is beneficially owned by the Holder or any of its Affiliates and other Persons whose beneficial ownership of Common Stock would be aggregated with the Holder's for purposes of Section 13(d) of the Exchange Act.

(c) This Section 11 shall not restrict the number of shares of Common Stock which a Holder may receive or beneficially own in order to determine the amount of securities or other consideration that such Holder may receive in the event of a Fundamental Transaction as contemplated in Section 9 of this Warrant.

12. No Fractional Shares. No fractional Warrant Shares will be issued in connection with any exercise of this Warrant. In lieu of any fractional shares that would otherwise be issuable, the number of Warrant Shares to be issued shall be rounded down to the next whole number and the Company shall pay the Holder in cash the fair market value (based on the Closing Sale Price) for any such fractional shares.

### 13. Redemption of Warrants.

(a) At any time on or after the date that is following the Original Issue Date, subject to the terms of this Section 13, the Company shall have the right to redeem all or a portion of this Warrant for a redemption price (the "*Redemption Price*") equal to the result obtained by multiplying (i) \$0.01 by (ii) the number of Warrant Shares that the Holder is entitled to purchase upon exercise of all or the portion of this Warrant that is being redeemed (such Redemption Price being subject to adjustment for stock splits, stock dividends, combinations, recapitalizations, reclassifications, and similar transactions affecting the Common Stock).

(b) The Company shall exercise this redemption right by providing at least thirty (30) days' prior written notice to the Holder of such redemption (the "*Redemption Notice*"). Such Redemption Notice shall be provided to the Holder in accordance with Section 14 of this Warrant. The Redemption Notice shall specify the time, manner and place of redemption, including without limitation the date on which this Warrant shall be redeemed (the "*Redemption Date*") and the Redemption Price payable to the Holder (assuming that this Warrant is not exercised on or prior to the Redemption Date).



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(c) Notwithstanding the foregoing, the Company may not redeem any part of this Warrant which may not be exercised by the redeeming Holder as of the date of the Redemption Notice under Section 11 of this Warrant.

14. Notices. Any and all notices or other communications or deliveries hereunder (including, without limitation, any Exercise Notice) shall be in writing and shall be deemed given and effective on the earliest of (i) the date of transmission, if such notice or communication is delivered via facsimile or confirmed e-mail at the facsimile number or e-mail address specified in the books and records of the Transfer Agent prior to 5:30 P.M., New York City time, on a Trading Day, (ii) the next Trading Day after the date of transmission, if such notice or communication is delivered via facsimile or confirmed e-mail at the facsimile number or e-mail address specified in the books and records of the Transfer Agent on a day that is not a Trading Day or later than 5:30 P.M., New York City time, on any Trading Day, (iii) the Trading Day following the date of mailing, if sent by nationally recognized overnight courier service specifying next business day delivery, or (iv) upon actual receipt by the Person to whom such notice is required to be given, if by hand delivery.

15. Warrant Agent. The Transfer Agent shall serve as warrant agent under this Warrant. Upon thirty (30) days' notice to the Holder, the Company may appoint a new warrant agent. Any corporation into which the Company or any new warrant agent may be merged or any corporation resulting from any consolidation to which the Company or any new warrant agent shall be a party or any corporation to which the Company or any new warrant agent transfers substantially all of its corporate trust or shareholders services business shall be a successor warrant agent under this Warrant without any further act. Any such successor warrant agent shall promptly cause notice of its succession as warrant agent to be mailed (by first class mail, postage prepaid) to the Holder at the Holder's last address as shown on the Warrant Register.

16. Miscellaneous.

(a) No Rights as a Stockholder. The Holder, solely in such Person's capacity as a holder of this Warrant, shall not be entitled to vote or receive dividends or be deemed the holder of share capital of the Company for any purpose, nor shall anything contained in this Warrant be construed to confer upon the Holder, solely in such Person's capacity as the Holder of this Warrant, any of the rights of a stockholder of the Company or any right to vote, give or withhold consent to any corporate action (whether any reorganization, issue of stock, reclassification of stock, consolidation, merger, amalgamation, conveyance or otherwise), receive notice of meetings, receive dividends or subscription rights, or otherwise, prior to the issuance to the Holder of the Warrant Shares which such Person is then entitled to receive upon the due exercise of this Warrant. In addition, nothing contained in this Warrant shall be construed as imposing any liabilities on the Holder to purchase any securities (upon exercise of this Warrant or otherwise) or as a stockholder of the Company, whether such liabilities are asserted by the Company or by creditors of the Company.

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(b) Authorized Shares. (i) Except and to the extent as waived or consented to by the Holder, the Company shall not by any action, including, without limitation, amending its certificate or articles of incorporation or through any reorganization, transfer of assets, consolidation, merger, dissolution, issue or sale of securities or any other voluntary action, avoid or seek to avoid the observance or performance of any of the terms of this Warrant, but will at all times in good faith assist in the carrying out of all such terms and in the taking of all such actions as may be necessary or appropriate to protect the rights of Holder as set forth in this Warrant against impairment. Without limiting the generality of the foregoing, the Company will (a) not increase the par value of any Warrant Shares above the amount payable therefor upon such exercise immediately prior to such increase in par value, (b) take all such action as may be necessary or appropriate in order that the Company may validly and legally issue fully paid and nonassessable Warrant Shares upon the exercise of this Warrant, and (c) use commercially reasonable efforts to obtain all such authorizations, exemptions or consents from any public regulatory body having jurisdiction thereof as may be necessary to enable the Company to perform its obligations under this Warrant.

(ii) Before taking any action which would result in an adjustment in the number of Warrant Shares for which this Warrant is exercisable or in the Exercise Price, the Company shall obtain all such authorizations or exemptions thereof, or consents thereto, as may be necessary from any public regulatory body or bodies having jurisdiction thereof.

(c) Successors and Assigns. Subject to the restrictions on transfer set forth in this Warrant and compliance with applicable securities laws, this Warrant may be assigned by the Holder. This Warrant may not be assigned by the Company without the written consent of the Holder except to a successor in the event of a Fundamental Transaction. This Warrant shall be binding on and inure to the benefit of the Company and the Holder and their respective successors and assigns. Subject to the preceding sentence, nothing in this Warrant shall be construed to give to any Person other than the Company and the Holder any legal or equitable right, remedy or cause of action under this Warrant. This Warrant may be amended only in writing signed by the Company and the Holder, or their successors and assigns.

(d) Amendment and Waiver. Except as otherwise provided herein, the provisions of the Warrants may be amended and the Company may take any action herein prohibited, or omit to perform any act herein required to be performed by it, only if the Company has obtained the written consent of the Holders of Warrants representing no less than a majority of the Warrant Shares obtainable upon exercise of the Warrants then outstanding.

(e) Acceptance. Receipt of this Warrant by the Holder shall constitute acceptance of and agreement to all of the terms and conditions contained herein.

(f) Governing Law; Jurisdiction. ALL QUESTIONS CONCERNING THE CONSTRUCTION, VALIDITY, ENFORCEMENT AND INTERPRETATION OF THIS WARRANT SHALL BE GOVERNED BY AND CONSTRUED AND ENFORCED IN ACCORDANCE WITH THE LAWS OF THE STATE OF NEW YORK WITHOUT REGARD TO THE PRINCIPLES OF CONFLICTS OF LAW THEREOF. EACH OF THE COMPANY AND THE HOLDER HEREBY IRREVOCABLY SUBMITS TO THE EXCLUSIVE JURISDICTION OF THE STATE AND FEDERAL COURTS SITTING IN THE CITY OF NEW YORK, BOROUGH OF MANHATTAN, FOR THE ADJUDICATION OF ANY DISPUTE HEREUNDER OR IN CONNECTION HERewith OR WITH ANY TRANSACTION CONTEMPLATED HEREBY OR DISCUSSED HEREIN (INCLUDING WITH

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RESPECT TO THE ENFORCEMENT OF ANY OF THE TRANSACTION DOCUMENTS), AND HEREBY IRREVOCABLY WAIVES, AND AGREES NOT TO ASSERT IN ANY SUIT, ACTION OR PROCEEDING, ANY CLAIM THAT IT IS NOT PERSONALLY SUBJECT TO THE JURISDICTION OF ANY SUCH COURT. EACH OF THE COMPANY AND THE HOLDER HEREBY IRREVOCABLY WAIVES PERSONAL SERVICE OF PROCESS AND CONSENTS TO PROCESS BEING SERVED IN ANY SUCH SUIT, ACTION OR PROCEEDING BY MAILING A COPY THEREOF VIA REGISTERED OR CERTIFIED MAIL OR OVERNIGHT DELIVERY (WITH EVIDENCE OF DELIVERY) TO SUCH PERSON AT THE ADDRESS IN EFFECT FOR NOTICES TO IT AND AGREES THAT SUCH SERVICE SHALL CONSTITUTE GOOD AND SUFFICIENT SERVICE OF PROCESS AND NOTICE THEREOF. NOTHING CONTAINED HEREIN SHALL BE DEEMED TO LIMIT IN ANY WAY ANY RIGHT TO SERVE PROCESS IN ANY MANNER PERMITTED BY LAW. EACH OF THE COMPANY AND THE HOLDER HEREBY WAIVES ALL RIGHTS TO A TRIAL BY JURY.

(g) Headings. The headings herein are for convenience only, do not constitute a part of this Warrant and shall not be deemed to limit or affect any of the provisions hereof.

(h) Severability. In case any one or more of the provisions of this Warrant shall be invalid or unenforceable in any respect, the validity and enforceability of the remaining terms and provisions of this Warrant shall not in any way be affected or impaired thereby, and the Company and the Holder will attempt in good faith to agree upon a valid and enforceable provision which shall be a commercially reasonable substitute therefor, and upon so agreeing, shall incorporate such substitute provision in this Warrant.

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IN WITNESS WHEREOF, the Company has caused this Warrant to be duly executed by its authorized officer as of the date first indicated above.

IDERA PHARMACEUTICALS, INC.

By: \_\_\_\_\_

Name:

Title:

SCHEDULE 1

FORM OF EXERCISE NOTICE

[To be executed by the Holder to purchase shares of Common Stock under the Warrant]

Ladies and Gentlemen:

(1) The undersigned is the Holder of Warrant No. \_\_\_\_\_ (the "*Warrant*") issued by Idera Pharmaceuticals, Inc., a Delaware corporation (the "*Company*"). Capitalized terms used herein and not otherwise defined herein have the respective meanings set forth in the Warrant.

(2) The undersigned hereby exercises its right to purchase \_\_\_\_\_ Warrant Shares pursuant to the Warrant.

(3) The Holder intends that payment of the Exercise Price shall be made as (check one):

- Cash Exercise
- "Cashless Exercise" under Section 10 of the Warrant

(4) If the Holder has elected a Cash Exercise, the Holder shall pay the sum of \$ \_\_\_\_\_ in immediately available funds to the Company in accordance with the terms of the Warrant.

(5) Pursuant to this Exercise Notice, the Company shall deliver to the Holder Warrant Shares determined in accordance with the terms of the Warrant.

(6) By its delivery of this Exercise Notice, the undersigned represents and warrants to the Company that in giving effect to the exercise evidenced hereby the Holder will not beneficially own in excess of the number of shares of Common Stock (as determined in accordance with Section 13(d) of the Securities Exchange Act of 1934) permitted to be owned under Section 11(a) or Section 11(b), as applicable, of the Warrant to which this notice relates.

Dated: \_\_\_\_\_

Name of Holder: \_\_\_\_\_

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

(Signature must conform in all respects to name of Holder as specified on the face of the Warrant)

**IDERA PHARMACEUTICALS, INC.**  
**WARRANT TO PURCHASE COMMON STOCK**

Number of Shares: [ ]  
 (subject to adjustment)  
 Original Issue Date: [ ], 2013

Warrant No.

Idera Pharmaceuticals, Inc., a Delaware corporation (the “*Company*”), hereby certifies that, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, or its permitted registered assigns (the “*Holder*”), is entitled, subject to the terms set forth below, to purchase from the Company up to a total of shares of common stock, \$0.001 par value per share (the “*Common Stock*”), of the Company (each such share, a “*Warrant Share*” and all such shares, the “*Warrant Shares*”) at an exercise price per share equal to \$0.01 per share (as adjusted from time to time as provided in Section 9 herein, the “*Exercise Price*”), upon surrender of this Warrant to Purchase Common Stock (including any Warrants to Purchase Common Stock issued in exchange, transfer or replacement hereof, the “*Warrant*”) at any time and from time to time on or after the date hereof (the “*Original Issue Date*”) and through and including 5:30 P.M., New York City time, on the date that is following the Original Issue Date (the “*Expiration Date*”), and subject to the following terms and conditions:

1. Definitions. For purposes of this Warrant, the following terms shall have the following meanings:

(a) “*Commission*” means the United States Securities and Exchange Commission.

(b) “*Closing Sale Price*” means, for any security as of any date, the last trade price for such security on the Principal Trading Market for such security, as reported by Bloomberg Financial Markets, or, if such Principal Trading Market begins to operate on an extended hours basis and does not designate the last trade price, then the last trade price of such security prior to 4:00 P.M., New York City time, as reported by Bloomberg Financial Markets, or if the foregoing do not apply, the last trade price of such security in the over-the-counter market on the electronic bulletin board for such security as reported by Bloomberg Financial Markets, or, if no last trade price is reported for such security by Bloomberg Financial Markets, the average of the bid and ask prices, of any market makers for such security as reported in the “pink sheets” by Pink Sheets LLC. If the Closing Sale Price cannot be calculated for a security on a particular date on any of the foregoing bases, the Closing Sale Price of such security on such date shall be the fair market value as mutually determined by the Company and the Holder. If the Company and the Holder are unable to agree upon the fair market value of such security, then the Board of Directors of the Company shall use its good faith judgment to determine the fair market value. The Board of Directors’ determination shall be binding upon all parties absent demonstrable error. All such determinations shall be appropriately adjusted for any stock dividend, stock split, stock combination or other similar transaction during the applicable calculation period.

(c) “*Principal Trading Market*” means the Trading Market on which the Common Stock is primarily listed on and quoted for trading, which, as of the Original Issue Date shall be the Nasdaq Capital Market.

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(d) “*Registration Statement*” means the Company’s Registration Statement on Form S-1, as amended (File No. 333-187155), initially filed on March 11, 2013.

(e) “*Securities Act*” means the Securities Act of 1933, as amended.

(f) “*Transfer Agent*” means Computershare Shareowner Services LLC, the Company’s transfer agent for the Common Stock and Warrants.

2. Registration of Warrants. The Company shall register this Warrant, upon records to be maintained by the Company for that purpose (the “*Warrant Register*”), in the name of the record Holder (which shall include the initial Holder or, as the case may be, any registered assignee to which this Warrant is permissibly assigned hereunder) from time to time. The Company may deem and treat the registered Holder of this Warrant as the absolute owner hereof for the purpose of any exercise hereof or any distribution to the Holder, and for all other purposes, absent actual notice to the contrary.

3. Registration of Transfers. Subject to compliance with all applicable securities laws, the Company shall, or will cause its Transfer Agent to, register the transfer of all or any portion of this Warrant in the Warrant Register, upon surrender of this Warrant, and payment for all applicable transfer taxes. Upon any such registration or transfer, a new warrant to purchase Common Stock in substantially the form of this Warrant (any such new warrant, a “*New Warrant*”) evidencing the portion of this Warrant so transferred shall be issued to the transferee, and a New Warrant evidencing the remaining portion of this Warrant not so transferred, if any, shall be issued to the transferring Holder. The acceptance of the New Warrant by the transferee thereof shall be deemed the acceptance by such transferee of all of the rights and obligations in respect of the New Warrant that the Holder has in respect of this Warrant. The Company shall, or will cause its Transfer Agent to, prepare, issue and deliver at the Company’s own expense any New Warrant under this Section 3. Until due presentment for registration of transfer, the Company may treat the registered Holder hereof as the owner and holder for all purposes, and the Company shall not be affected by any notice to the contrary.

4. Exercise and Duration of Warrants.

(a) All or any part of this Warrant shall be exercisable by the registered Holder in any manner permitted by Section 10 of this Warrant at any time and from time to time on or after the Original Issue Date and through and including 5:30 P.M. New York City time, on the Expiration Date. At 5:30 P.M., New York City time, on the Expiration Date, the portion of this Warrant not exercised prior thereto shall be and become void and of no value and this Warrant shall be terminated and no longer outstanding.

(b) The Holder may exercise this Warrant by delivering to the Company (i) an exercise notice, in the form attached as Schedule 1 hereto (the “*Exercise Notice*”), completed and duly signed, and (ii) payment of the Exercise Price for the number of Warrant Shares as to which this Warrant is being exercised (which may take the form of a “cashless exercise” if so indicated in the Exercise Notice and if a “cashless exercise” may occur at such time pursuant to Section 10 below), and the date on which the last of such items is delivered to the Company (as determined in accordance with the notice provisions hereof) is an “*Exercise Date*.” The Holder shall not be required to deliver the original Warrant in order to effect an exercise hereunder. Execution and delivery of the Exercise Notice shall have the same effect as cancellation of the original Warrant and issuance of a New Warrant evidencing the right to purchase the remaining number of Warrant Shares.

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5. Delivery of Warrant Shares.

(a) Upon exercise of this Warrant, the Company shall promptly (but in no event later than three (3) Trading Days after the Exercise Date), upon the request of the Holder, credit such aggregate number of shares of Common Stock to which the Holder is entitled pursuant to such exercise to the Holder's or its designee's balance account with The Depository Trust Company ("DTC") through its Deposit Withdrawal Agent Commission system, or if the Transfer Agent is not participating in the Fast Automated Securities Transfer Program (the "FAST Program") or if the certificates are required to bear a legend regarding restriction on transferability, issue and dispatch by overnight courier to the address as specified in the Exercise Notice, a certificate, registered in the Company's share register in the name of the Holder or its designee, for the number of shares of Common Stock to which the Holder is entitled pursuant to such exercise. The Holder, or any Person permissibly so designated by the Holder to receive Warrant Shares, shall be deemed to have become the holder of record of such Warrant Shares as of the Exercise Date, irrespective of the date such Warrant Shares are credited to the Holder's DTC account or the date of delivery of the certificates evidencing such Warrant Shares, as the case may be.

(b) If by the close of the third (3<sup>rd</sup>) Trading Day after the Exercise Date, the Company fails to deliver to the Holder a certificate representing the required number of Warrant Shares in the manner required pursuant to Section 5(a) or fails to credit the Holder's balance account with DTC for such number of Warrant Shares to which the Holder is entitled, and if after such third (3<sup>rd</sup>) Trading Day and prior to the receipt of such Warrant Shares, the Holder purchases (in an open market transaction or otherwise) shares of Common Stock to deliver in satisfaction of a sale by the Holder of the Warrant Shares which the Holder anticipated receiving upon such exercise (a "Buy-In"), then the Company shall, within three (3) Trading Days after the Holder's request and in the Holder's sole discretion, either (1) pay in cash to the Holder an amount equal to the Holder's total purchase price (including brokerage commissions, if any) for the shares of Common Stock so purchased (the "Buy-In Price"), at which point the Company's obligation to deliver such certificate (and to issue such Warrant Shares) shall terminate or (2) promptly honor its obligation to deliver to the Holder a certificate or certificates representing such Warrant Shares and pay cash to the Holder in an amount equal to the excess (if any) of Holder's total purchase price (including brokerage commissions, if any) for the shares of Common Stock so purchased in the Buy-In over the product of (A) the number of shares of Common Stock purchased in the Buy-In, times (B) the closing bid price of a share of Common Stock on the Exercise Date.

(c) To the extent permitted by law, the Company's obligations to issue and deliver Warrant Shares in accordance with and subject to the terms hereof (including the limitations set forth in Section 11 below) are absolute and unconditional, irrespective of any action or inaction by the Holder to enforce the same, any waiver or consent with respect to any provision hereof, the recovery of any judgment against any Person or any action to enforce the same, or any setoff, counterclaim, recoupment, limitation or termination, or any breach or alleged breach by the Holder or any other Person of any obligation to the Company or any violation or alleged violation of law by the Holder or any other Person, and irrespective of any other circumstance that might otherwise limit such obligation of the Company to the Holder in connection with the issuance of Warrant Shares. Nothing herein shall limit the Holder's right to pursue any other remedies available to it hereunder, at law or in equity including, without limitation, a decree of specific performance and/or injunctive relief with respect to the Company's failure to timely deliver certificates representing shares of Common Stock upon exercise of the Warrant as required pursuant to the terms hereof.



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6. Charges, Taxes and Expenses. Issuance and delivery of certificates for shares of Common Stock upon exercise of this Warrant shall be made without charge to the Holder for any issue or transfer tax, transfer agent fee or other incidental tax or expense in respect of the issuance of such certificates, all of which taxes and expenses shall be paid by the Company; *provided, however*, that the Company shall not be required to pay any tax that may be payable in respect of any transfer involved in the registration of any certificates for Warrant Shares or the Warrants in a name other than that of the Holder or an Affiliate thereof. The Holder shall be responsible for all other tax liability that may arise as a result of holding or transferring this Warrant or receiving Warrant Shares upon exercise hereof.

7. Replacement of Warrant. If this Warrant is mutilated, lost, stolen or destroyed, the Company shall issue or cause to be issued in exchange and substitution for and upon cancellation hereof, or in lieu of and substitution for this Warrant, a New Warrant, but only upon receipt of evidence reasonably satisfactory to the Company of such loss, theft or destruction (in such case) and, in each case, a customary and reasonable indemnity and surety bond, if requested by the Company. Applicants for a New Warrant under such circumstances shall also comply with such other reasonable regulations and procedures and pay such other reasonable third-party costs as the Company may prescribe. If a New Warrant is requested as a result of a mutilation of this Warrant, then the Holder shall deliver such mutilated Warrant to the Company as a condition precedent to the Company's obligation to issue the New Warrant.

8. Reservation of Warrant Shares. The Company covenants that it will at all times while this Warrant is outstanding reserve and keep available out of the aggregate of its authorized but unissued and otherwise unreserved Common Stock, solely for the purpose of enabling it to issue Warrant Shares upon exercise of this Warrant as herein provided, the number of Warrant Shares that are initially issuable and deliverable upon the exercise of this entire Warrant, free from preemptive rights or any other contingent purchase rights of persons other than the Holder (taking into account the adjustments and restrictions of Section 9). The Company covenants that all Warrant Shares so issuable and deliverable shall, upon issuance and the payment of the applicable Exercise Price in accordance with the terms hereof, be duly and validly authorized, issued and fully paid and nonassessable. The Company will take all such action as may be reasonably necessary to assure that such shares of Common Stock may be issued as provided herein without violation of any applicable law or regulation, or of any requirements of any securities exchange or automated quotation system upon which the Common Stock may be listed.

9. Certain Adjustments. The Exercise Price and number of Warrant Shares issuable upon exercise of this Warrant are subject to adjustment from time to time as set forth in this Section 9.

(a) Stock Dividends and Splits. If the Company, at any time while this Warrant is outstanding, (i) pays a stock dividend on its Common Stock or otherwise makes a distribution on any class of capital stock, other than Series E Preferred Stock or Series D Preferred Stock issued and outstanding on the Original Issue Date and in accordance with the terms of such stock on the Original Issue Date or as amended, as described in the Registration Statement, that is payable in shares of Common Stock, (ii) subdivides its outstanding shares of Common Stock into a larger number of shares of Common Stock, (iii) combines its outstanding shares of Common Stock into a smaller number of shares of Common Stock or (iv) issues by reclassification of shares of capital stock any additional shares of Common Stock of the Company, then in each such case the Exercise Price shall be multiplied by a fraction, the numerator of which shall be the number of shares of Common Stock outstanding immediately before such event and the denominator of which shall be the number of shares of Common Stock outstanding immediately after such event. Any adjustment made pursuant

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to clause (i) of this paragraph shall become effective immediately after the record date for the determination of stockholders entitled to receive such dividend or distribution, provided, however, that if such record date shall have been fixed and such dividend is not fully paid on the date fixed therefor, the Exercise Price shall be recomputed accordingly as of the close of business on such record date and thereafter the Exercise Price shall be adjusted pursuant to this paragraph as of the time of actual payment of such dividends. Any adjustment pursuant to clause (ii) or (iii) of this paragraph shall become effective immediately after the effective date of such subdivision or combination.

(b) Pro Rata Distributions. If the Company, at any time while this Warrant is outstanding, distributes to all holders of Common Stock for no consideration (i) evidences of its indebtedness, (ii) any security (other than a distribution of Common Stock covered by the preceding paragraph) or (iii) rights or warrants to subscribe for or purchase any security, or (iv) any other asset (in each case, "*Distributed Property*"), then, upon any exercise of this Warrant that occurs after the record date fixed for determination of stockholders entitled to receive such distribution, the Holder shall be entitled to receive, in addition to the Warrant Shares otherwise issuable upon such exercise (if applicable), the Distributed Property that such Holder would have been entitled to receive in respect of such number of Warrant Shares had the Holder been the record holder of such Warrant Shares immediately prior to such record date without regard to any limitation on exercise contained therein.

(c) Fundamental Transactions. If, at any time while this Warrant is outstanding (i) the Company effects any merger or consolidation of the Company with or into another Person, in which the Company is not the surviving entity or the stockholders of the Company immediately prior to such merger or consolidation do not own, directly or indirectly, at least 50% of the voting power of the surviving entity immediately after such merger or consolidation, (ii) the Company effects any sale to another Person of all or substantially all of its assets in one or a series of related transactions, (iii) pursuant to any tender offer or exchange offer (whether by the Company or another Person), holders of capital stock who tender shares representing more than 50% of the voting power of the capital stock of the Company and the Company or such other Person, as applicable, accepts such tender for payment, (iv) the Company consummates a stock purchase agreement or other business combination (including, without limitation, a reorganization, recapitalization, spin-off or scheme of arrangement) with another Person whereby such other Person acquires more than the 50% of the voting power of the capital stock of the Company or (v) the Company effects any reclassification of the Common Stock or any compulsory share exchange pursuant to which the Common Stock is effectively converted into or exchanged for other securities, cash or property (other than as a result of a subdivision or combination of shares of Common Stock covered by Section 9(a) above) (in any such case, a "*Fundamental Transaction*"), then following such Fundamental Transaction the Holder shall have the right to receive, upon exercise of this Warrant, the same amount and kind of securities, cash or property as it would have been entitled to receive upon the occurrence of such Fundamental Transaction if it had been, immediately prior to such Fundamental Transaction, the holder of the number of Warrant Shares then issuable upon exercise in full of this Warrant without regard to any limitations on exercise contained herein (the "*Alternate Consideration*"). The Company shall not effect any Fundamental Transaction in which the Company is not the surviving entity or the Alternate Consideration includes securities of another Person unless prior to or simultaneously with the consummation thereof, any successor to the Company, surviving entity or other Person (including any purchaser of assets of the Company) shall assume the obligation to deliver to the Holder, such Alternate Consideration as, in accordance with the foregoing provisions, the Holder may be entitled to receive, and the other obligations under this Warrant. The provisions of this paragraph (c) shall similarly apply to subsequent transactions analogous of a Fundamental Transaction type.

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(d) Number of Warrant Shares. Simultaneously with any adjustment to the Exercise Price pursuant to paragraphs (a) of this Section 9, the number of Warrant Shares that may be purchased upon exercise of this Warrant shall be increased or decreased proportionately, so that after such adjustment the aggregate Exercise Price payable hereunder for the increased or decreased number of Warrant Shares shall be the same as the aggregate Exercise Price in effect immediately prior to such adjustment.

(e) Calculations. All calculations under this Section 9 shall be made to the nearest cent or the nearest share, as applicable.

(f) Notice of Adjustments. Upon the occurrence of each adjustment pursuant to this Section 9, the Company at its expense will, at the written request of the Holder, promptly compute such adjustment, in good faith, in accordance with the terms of this Warrant and prepare a certificate setting forth such adjustment, including a statement of the adjusted Exercise Price and adjusted number or type of Warrant Shares or other securities issuable upon exercise of this Warrant (as applicable), describing the transactions giving rise to such adjustments and showing in detail the facts upon which such adjustment is based. Upon written request, the Company will promptly deliver a copy of each such certificate to the Holder and to the Company's transfer agent.

(g) Notice of Corporate Events. If, while this Warrant is outstanding, the Company (i) declares a dividend or any other distribution of cash, securities or other property in respect of its Common Stock, including, without limitation, any granting of rights or warrants to subscribe for or purchase any capital stock of the Company or any subsidiary, (ii) authorizes or approves, enters into any agreement contemplating or solicits stockholder approval for any Fundamental Transaction or (iii) authorizes the voluntary dissolution, liquidation or winding up of the affairs of the Company, then, except if such notice and the contents thereof shall be deemed to constitute material non-public information, the Company shall deliver to the Holder a notice of such transaction at least ten (10) days prior to the applicable record or effective date on which a Person would need to hold Common Stock in order to participate

in or vote with respect to such transaction; *provided, however*, that the failure to deliver such notice or any defect therein shall not affect the validity of the corporate action required to be described in such notice. In addition, if while this Warrant is outstanding, the Company authorizes or approves, enters into any agreement contemplating or solicits stockholder approval for any Fundamental Transaction contemplated by Section 9(c), other than a Fundamental Transaction under clause (iii) of Section 9(c), the Company shall deliver to the Holder a notice of such Fundamental Transaction at least seventy five (75) days prior to the date such Fundamental Transaction is consummated. To the extent that any notice provided hereunder constitutes, or contains, material, non-public information regarding the Company or any of its subsidiaries, the Company shall simultaneously file such notice with the Commission pursuant to a Current Report on Form 8-K.

10. Payment of Exercise Price. Notwithstanding anything contained herein to the contrary, if a registration statement registering the issuance of the Warrant Shares under the Securities Act is not effective or available for the issuance of the Warrant Shares and an exemption from registration under the Securities Act is not available for the issuance of the Warrant Shares, the Holder may, in its sole discretion, satisfy its obligation to pay the Exercise Price through a “cashless exercise”, in which event the Company shall issue to the Holder the number of Warrant Shares determined as follows:

$$X = Y [(A-B)/A]$$

where:

“X” equals the number of Warrant Shares to be issued to the Holder;

“Y” equals the total number of Warrant Shares with respect to which this Warrant is then being exercised;

“A” equals the average of the Closing Sale Prices of the shares of Common Stock (as reported by Bloomberg Financial Markets) for the five (5) consecutive Trading Days ending on the date immediately preceding the Exercise Date; and

“B” equals the Exercise Price then in effect for the applicable Warrant Shares at the time of such exercise.

For purposes of Rule 144 promulgated under the Securities Act, it is intended, understood and acknowledged that the Warrant Shares issued in a “cashless exercise” transaction shall be deemed to have been acquired by the Holder, and the holding period for the Warrant Shares shall be deemed to have commenced, on the date this Warrant was originally (provided that the Commission continues to take the position that such treatment is proper at the time of such exercise).

#### 11. Limitations on Exercise.

(a) Notwithstanding anything to the contrary contained herein, the number of Warrant Shares that may be acquired by the Holder upon any exercise of this Warrant (or otherwise in respect hereof) shall be limited to the extent necessary to ensure that, following such exercise (or other issuance), the total number of shares of Common Stock then beneficially owned by the Holder and its Affiliates and any other Persons whose beneficial ownership of Common Stock would be aggregated with the Holder’s for purposes of Section 13(d) of the Exchange Act, does not exceed 4.999% of the total number of then issued and outstanding shares of Common Stock (including for such purpose the shares of Common Stock issuable upon such exercise), it being acknowledged by the Holder that the Company is not representing to such Holder that such calculation is in compliance with Section 13(d) of the Exchange Act and such Holder is solely responsible for any schedules required to be filed in accordance therewith. To the extent that the limitation contained in this Section 11(a) applies, the determination of whether this Warrant is exercisable (in relation to other securities owned by such Holder) and of which a portion of this Warrant is exercisable shall be in the sole discretion of a Holder, and

the submission of a Notice of Exercise shall be deemed to be the Holder's determination of whether this Warrant is exercisable (in relation to other securities owned by such Holder) and of which portion of this Warrant is exercisable, in each case subject to such aggregate percentage limitation, and the Company shall have no obligation to verify or confirm the accuracy of such determination. In addition, a determination under this Section 11(a) as to any group status shall be determined in accordance with Section 13(d) of the Exchange Act and the rules and regulations promulgated thereunder. For purposes of this Section 11(a), in determining the number of outstanding shares of Common Stock, the Holder may rely on the number of outstanding shares of Common Stock as reflected in (x) the Company's most recent Form 10-Q or Form 10-K, as the case may be, (y) a more recent public announcement by the Company or (z) any other notice by the Company or the Transfer Agent setting forth the number of shares of Common Stock outstanding. Upon the written request of the Holder, the Company shall within three (3) Trading Days confirm orally and in writing to such Holder the number of shares of Common Stock then outstanding. By written notice to the Company, which will not be effective until the sixty-first (61<sup>st</sup>) day after such notice is delivered to the Company, the Holder may waive the provisions of this Section 11(a) (but such waiver will not affect any other holder) to change the beneficial ownership limitation to such percentage of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock upon exercise of this Warrant as the Holder shall determine, in its sole discretion, subject to Section 11(b), and the provisions of this Section 11(a) shall continue to apply. Upon such a change by a Holder of the beneficial ownership limitation from such 4.999% limitation to such other percentage limitation, the beneficial ownership limitation may not be further waived by such Holder. Notwithstanding the foregoing, at any time following notice of a Fundamental Transaction under Section 9(g)(ii) with respect to a Section 9(c)(iii) Fundamental Transaction, the Holder may waive and/or change the beneficial ownership limitation effective immediately upon written notice to the Company and may reinstate a beneficial ownership limitation at any time thereafter effective immediately upon written notice to the Company.

(b) Notwithstanding anything to the contrary contained herein, including Section 11(a), the Company shall not effect any exercise of this Warrant, and the Holder shall not be entitled to exercise this Warrant for a number of Warrant Shares in excess of that number of Warrant Shares which, upon giving effect to such exercise, would cause (i) the aggregate number of shares of Common Stock beneficially owned by the Holder and its Affiliates and any other Persons whose beneficial ownership of Common Stock would be aggregated with the Holder's for purposes of Section 13(d) of the Exchange Act, to exceed 19.99% of the total number of issued and outstanding shares of Common Stock of the Company following such exercise, or (ii) the combined voting power of the securities of the Company beneficially owned by the Holder and its Affiliates and any other Persons whose beneficial ownership of Common Stock would be aggregated with the Holder's for purposes of Section 13(d) of the Exchange Act to exceed 19.99% of the combined voting power of all of the securities of the Company then outstanding following such exercise. For purposes of this Section 11(b), the aggregate number of shares of Common Stock or voting securities beneficially owned by the Holder and its Affiliates and any other Persons whose beneficial ownership of Common Stock would be aggregated with the Holder's for purposes of Section 13(d) of the Exchange Act shall include the shares of Common Stock issuable upon the exercise of this Warrant with respect to which such determination is being made, but shall exclude the number of shares of Common Stock which would be issuable upon (x) exercise of the remaining unexercised and non-cancelled portion of this Warrant by the Holder and (y) exercise or conversion of the unexercised, non-converted or non-cancelled portion of any other securities of the Company that do not have voting power (including without limitation any securities of the Company which would entitle the holder thereof to acquire at any time Common Stock, including without limitation any debt, preferred stock, right, option, warrant or other instrument that is at any time convertible into or exercisable or exchangeable for, or otherwise entitles the holder thereof to receive, Common Stock), is subject to a limitation on conversion or exercise analogous to the limitation contained herein and is beneficially owned by the Holder or any of its Affiliates and other Persons whose beneficial ownership of Common Stock would be aggregated with the Holder's for purposes of Section 13(d) of the Exchange Act.

(c) This Section 11 shall not restrict the number of shares of Common Stock which a Holder may receive or beneficially own in order to determine the amount of securities or other consideration that such Holder may receive in the event of a Fundamental Transaction as contemplated in Section 9 of this Warrant.

12. No Fractional Shares. No fractional Warrant Shares will be issued in connection with any exercise of this Warrant. In lieu of any fractional shares that would otherwise be issuable, the number of Warrant Shares to be issued shall be rounded down to the next whole number and the Company shall pay the Holder in cash the fair market value (based on the Closing Sale Price) for any such fractional shares.

### 13. Redemption of Warrants.

(a) At any time on or after the date that is following the Original Issue Date, subject to the terms of this Section 13, the Company shall have the right to redeem all or a portion of this Warrant for a redemption price (the "*Redemption Price*") equal to the result obtained by multiplying (i) \$0.01 by (ii) the number of Warrant Shares that the Holder is entitled to purchase upon exercise of all or the portion of this Warrant that is being redeemed (such Redemption Price being subject to adjustment for stock splits, stock dividends, combinations, recapitalizations, reclassifications, and similar transactions affecting the Common Stock).

(b) The Company shall exercise this redemption right by providing at least thirty (30) days' prior written notice to the Holder of such redemption (the "*Redemption Notice*"). Such Redemption Notice shall be provided to the Holder in accordance with Section 14 of this Warrant. The Redemption Notice shall specify the time, manner and place of redemption, including without limitation the date on which this Warrant shall be redeemed (the "*Redemption Date*") and the Redemption Price payable to the Holder (assuming that this Warrant is not exercised on or prior to the Redemption Date).

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(c) Notwithstanding the foregoing, the Company may not redeem any part of this Warrant which may not be exercised by the redeeming Holder as of the date of the Redemption Notice under Section 11 of this Warrant.

14. Notices. Any and all notices or other communications or deliveries hereunder (including, without limitation, any Exercise Notice) shall be in writing and shall be deemed given and effective on the earliest of (i) the date of transmission, if such notice or communication is delivered via facsimile or confirmed e-mail at the facsimile number or e-mail address specified in the books and records of the Transfer Agent prior to 5:30 P.M., New York City time, on a Trading Day, (ii) the next Trading Day after the date of transmission, if such notice or communication is delivered via facsimile or confirmed e-mail at the facsimile number or e-mail address specified in the books and records of the Transfer Agent on a day that is not a Trading Day or later than 5:30 P.M., New York City time, on any Trading Day, (iii) the Trading Day following the date of mailing, if sent by nationally recognized overnight courier service specifying next business day delivery, or (iv) upon actual receipt by the Person to whom such notice is required to be given, if by hand delivery.

15. Warrant Agent. The Transfer Agent shall serve as warrant agent under this Warrant. Upon thirty (30) days' notice to the Holder, the Company may appoint a new warrant agent. Any corporation into which the Company or any new warrant agent may be merged or any corporation resulting from any consolidation to which the Company or any new warrant agent shall be a party or any corporation to which the Company or any new warrant agent transfers substantially all of its corporate trust or shareholders services business shall be a successor warrant agent under this Warrant without any further act. Any such successor warrant agent shall promptly cause notice of its succession as warrant agent to be mailed (by first class mail, postage prepaid) to the Holder at the Holder's last address as shown on the Warrant Register.

16. Miscellaneous.

(a) No Rights as a Stockholder. The Holder, solely in such Person's capacity as a holder of this Warrant, shall not be entitled to vote or receive dividends or be deemed the holder of share capital of the Company for any purpose, nor shall anything contained in this Warrant be construed to confer upon the Holder, solely in such Person's capacity as the Holder of this Warrant, any of the rights of a stockholder of the Company or any right to vote, give or withhold consent to any corporate action (whether any reorganization, issue of stock, reclassification of stock, consolidation, merger, amalgamation, conveyance or otherwise), receive notice of meetings, receive dividends or subscription rights, or otherwise, prior to the issuance to the Holder of the Warrant Shares which such Person is then entitled to receive upon the due exercise of this Warrant. In addition, nothing contained in this Warrant shall be construed as imposing any liabilities on the Holder to purchase any securities (upon exercise of this Warrant or otherwise) or as a stockholder of the Company, whether such liabilities are asserted by the Company or by creditors of the Company.

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(b) Authorized Shares. (i) Except and to the extent as waived or consented to by the Holder, the Company shall not by any action, including, without limitation, amending its certificate or articles of incorporation or through any reorganization, transfer of assets, consolidation, merger, dissolution, issue or sale of securities or any other voluntary action, avoid or seek to avoid the observance or performance of any of the terms of this Warrant, but will at all times in good faith assist in the carrying out of all such terms and in the taking of all such actions as may be necessary or appropriate to protect the rights of Holder as set forth in this Warrant against impairment. Without limiting the generality of the foregoing, the Company will (a) not increase the par value of any Warrant Shares above the amount payable therefor upon such exercise immediately prior to such increase in par value, (b) take all such action as may be necessary or appropriate in order that the Company may validly and legally issue fully paid and nonassessable Warrant Shares upon the exercise of this Warrant, and (c) use commercially reasonable efforts to obtain all such authorizations, exemptions or consents from any public regulatory body having jurisdiction thereof as may be necessary to enable the Company to perform its obligations under this Warrant.

(ii) Before taking any action which would result in an adjustment in the number of Warrant Shares for which this Warrant is exercisable or in the Exercise Price, the Company shall obtain all such authorizations or exemptions thereof, or consents thereto, as may be necessary from any public regulatory body or bodies having jurisdiction thereof.

(c) Successors and Assigns. Subject to the restrictions on transfer set forth in this Warrant and compliance with applicable securities laws, this Warrant may be assigned by the Holder. This Warrant may not be assigned by the Company without the written consent of the Holder except to a successor in the event of a Fundamental Transaction. This Warrant shall be binding on and inure to the benefit of the Company and the Holder and their respective successors and assigns. Subject to the preceding sentence, nothing in this Warrant shall be construed to give to any Person other than the Company and the Holder any legal or equitable right, remedy or cause of action under this Warrant. This Warrant may be amended only in writing signed by the Company and the Holder, or their successors and assigns.

(d) Amendment and Waiver. Except as otherwise provided herein, the provisions of the Warrants may be amended and the Company may take any action herein prohibited, or omit to perform any act herein required to be performed by it, only if the Company has obtained the written consent of the Holders of Warrants representing no less than a majority of the Warrant Shares obtainable upon exercise of the Warrants then outstanding.

(e) Acceptance. Receipt of this Warrant by the Holder shall constitute acceptance of and agreement to all of the terms and conditions contained herein.

(f) Governing Law; Jurisdiction. ALL QUESTIONS CONCERNING THE CONSTRUCTION, VALIDITY, ENFORCEMENT AND INTERPRETATION OF THIS WARRANT SHALL BE GOVERNED BY AND CONSTRUED AND ENFORCED IN ACCORDANCE WITH THE LAWS OF THE STATE OF NEW YORK WITHOUT REGARD TO THE PRINCIPLES OF CONFLICTS OF LAW THEREOF. EACH OF THE COMPANY AND THE HOLDER HEREBY IRREVOCABLY SUBMITS TO THE EXCLUSIVE JURISDICTION OF THE STATE AND FEDERAL COURTS SITTING IN THE CITY OF NEW YORK, BOROUGH OF MANHATTAN, FOR THE ADJUDICATION OF ANY DISPUTE HEREUNDER OR IN CONNECTION HERewith OR WITH ANY TRANSACTION CONTEMPLATED HEREBY OR DISCUSSED HEREIN (INCLUDING WITH

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RESPECT TO THE ENFORCEMENT OF ANY OF THE TRANSACTION DOCUMENTS), AND HEREBY IRREVOCABLY WAIVES, AND AGREES NOT TO ASSERT IN ANY SUIT, ACTION OR PROCEEDING, ANY CLAIM THAT IT IS NOT PERSONALLY SUBJECT TO THE JURISDICTION OF ANY SUCH COURT. EACH OF THE COMPANY AND THE HOLDER HEREBY IRREVOCABLY WAIVES PERSONAL SERVICE OF PROCESS AND CONSENTS TO PROCESS BEING SERVED IN ANY SUCH SUIT, ACTION OR PROCEEDING BY MAILING A COPY THEREOF VIA REGISTERED OR CERTIFIED MAIL OR OVERNIGHT DELIVERY (WITH EVIDENCE OF DELIVERY) TO SUCH PERSON AT THE ADDRESS IN EFFECT FOR NOTICES TO IT AND AGREES THAT SUCH SERVICE SHALL CONSTITUTE GOOD AND SUFFICIENT SERVICE OF PROCESS AND NOTICE THEREOF. NOTHING CONTAINED HEREIN SHALL BE DEEMED TO LIMIT IN ANY WAY ANY RIGHT TO SERVE PROCESS IN ANY MANNER PERMITTED BY LAW. EACH OF THE COMPANY AND THE HOLDER HEREBY WAIVES ALL RIGHTS TO A TRIAL BY JURY.

(g) Headings. The headings herein are for convenience only, do not constitute a part of this Warrant and shall not be deemed to limit or affect any of the provisions hereof.

(h) Severability. In case any one or more of the provisions of this Warrant shall be invalid or unenforceable in any respect, the validity and enforceability of the remaining terms and provisions of this Warrant shall not in any way be affected or impaired thereby, and the Company and the Holder will attempt in good faith to agree upon a valid and enforceable provision which shall be a commercially reasonable substitute therefor, and upon so agreeing, shall incorporate such substitute provision in this Warrant.

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IN WITNESS WHEREOF, the Company has caused this Warrant to be duly executed by its authorized officer as of the date first indicated above.

IDERA PHARMACEUTICALS, INC.

By: \_\_\_\_\_

Name:

Title:

SCHEDULE 1

FORM OF EXERCISE NOTICE

[To be executed by the Holder to purchase shares of Common Stock under the Warrant]

Ladies and Gentlemen:

(1) The undersigned is the Holder of Warrant No. \_\_\_\_\_ (the "*Warrant*") issued by Idera Pharmaceuticals, Inc., a Delaware corporation (the "*Company*"). Capitalized terms used herein and not otherwise defined herein have the respective meanings set forth in the Warrant.

(2) The undersigned hereby exercises its right to purchase \_\_\_\_\_ Warrant Shares pursuant to the Warrant.

(3) The Holder intends that payment of the Exercise Price shall be made as (check one):

- Cash Exercise
- "Cashless Exercise" under Section 10 of the Warrant

(4) If the Holder has elected a Cash Exercise, the Holder shall pay the sum of \$ \_\_\_\_\_ in immediately available funds to the Company in accordance with the terms of the Warrant.

(5) Pursuant to this Exercise Notice, the Company shall deliver to the Holder Warrant Shares determined in accordance with the terms of the Warrant.

(6) By its delivery of this Exercise Notice, the undersigned represents and warrants to the Company that in giving effect to the exercise evidenced hereby the Holder will not beneficially own in excess of the number of shares of Common Stock (as determined in accordance with Section 13(d) of the Securities Exchange Act of 1934) permitted to be owned under Section 11(a) or Section 11(b), as applicable, of the Warrant to which this notice relates.

Dated: \_\_\_\_\_

Name of Holder: \_\_\_\_\_

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

(Signature must conform in all respects to name of Holder as specified on the face of the Warrant)

May 1, 2013

Idera Pharmaceuticals, Inc.  
167 Sidney Street  
Cambridge, MA 02139

Re: Registration Statement on Form S-1

Ladies and Gentlemen:

This opinion is furnished to you in connection with a Registration Statement on Form S-1 (File No. 333-187155) (the "Registration Statement") filed with the Securities and Exchange Commission (the "Commission") under the Securities Act of 1933, as amended (the "Securities Act"), for the registration of shares of Common Stock, par value \$0.001 per share (the "Common Stock"), of Idera Pharmaceuticals, Inc., a Delaware corporation (the "Company") and warrants to purchase shares of the Company's Common Stock, with a proposed maximum aggregate offering price of up to \$40,000,000 million (respectively, the "Shares" and the "Warrants" and, collectively, the "Securities").

The Securities are to be sold by the Company pursuant to an underwriting agreement (the "Underwriting Agreement") to be entered into by and among the Company and Piper Jaffray & Co., as representatives of the several underwriters named in the Underwriting Agreement, the form of which has been filed as Exhibit 1.1 to the Registration Statement.

We are acting as counsel for the Company in connection with the issue and sale by the Company of the Securities. We have examined signed copies of the Registration Statement as filed with the Commission. We have also examined and relied upon the Underwriting Agreement, minutes of meetings and actions of the stockholders and the Board of Directors of the Company as provided to us by the Company, stock record books of the Company as provided to us by the Company, the Certificate of Incorporation and By-Laws of the Company, each as restated and/or amended to date, and such other documents as we have deemed necessary for purposes of rendering the opinions hereinafter set forth.

In our examination of the foregoing documents, we have assumed the genuineness of all signatures, the authenticity of all documents submitted to us as originals, the conformity to original documents of all documents submitted to us as copies, the authenticity of the originals of such latter documents and the legal competence of all signatories to such documents.

Our opinions set forth below are qualified to the extent that they may be subject to or affected by (i) applicable bankruptcy, insolvency, reorganization, moratorium, fraudulent conveyance or similar laws relating to or affecting the rights of creditors generally, (ii) statutory or decisional law concerning recourse by creditors to security in the absence of notice or hearing,

Wilmer Cutler Pickering Hale and Dorr LLP, 60 State Street, Boston, Massachusetts 02109

Beijing Berlin Boston Brussels Frankfurt London Los Angeles New York Oxford Palo Alto Waltham Washington

May 1, 2013

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(iii) duties and standards imposed on creditors and parties to contracts, including, without limitation, requirements of good faith, reasonableness and fair dealing, and (iv) general equitable principles. We express no opinion as to the availability of any equitable or specific remedy upon any breach of any of the agreements as to which we are opining herein, or any of the agreements, documents or obligations referred to therein, or to the successful assertion of any equitable defenses, inasmuch as the availability of such remedies or the success of any equitable defense may be subject to the discretion of a court.

We also express no opinion herein as to any provision of any agreement (a) which may be deemed to or construed to waive any right of the Company, (b) to the effect that rights and remedies are not exclusive, that every right or remedy is cumulative and may be exercised in addition to or with any other right or remedy and does not preclude recourse to one or more other rights or remedies, (c) relating to the effect of invalidity or unenforceability of any provision of the Warrants on the validity or enforceability of any other provision thereof, (d) which is in violation of public policy, including, without limitation, any provision relating to indemnification and contribution with respect to securities law matters, (e) which provides that the terms of the Warrants may not be waived or modified except in writing or (f) relating to choice of law or consent to jurisdiction.

We also express no opinion herein as to the laws of any state or jurisdiction other than the state laws of the Commonwealth of Massachusetts, the General Corporation Law of the State of Delaware and the federal laws of the United States of America.

Based upon and subject to the foregoing, we are of the opinion that:

1. The Shares have been duly authorized for issuance and, when the Shares are issued and paid for in accordance with the terms and conditions of the Underwriting Agreement, the Shares will be validly issued, fully paid and nonassessable.
2. The Warrants have been duly authorized for issuance and, when the Warrants are issued and paid for in accordance with the terms and conditions of the Underwriting Agreement, the Warrants will have been duly executed and delivered by the Company and will constitute valid and legally binding obligations of the Company.
3. The shares of the Company's Common Stock issuable upon exercise of the Warrants (the "Warrant Shares") have been duly authorized for issuance and, when issued and paid for in accordance with the provisions of the Warrants, including the payment of the exercise price therefor, the Warrant Shares will be validly issued, fully paid and nonassessable.

May 1, 2013

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Please note that we are opining only as to the matters expressly set forth herein, and no opinion should be inferred as to any other matters. This opinion is based upon currently existing statutes, rules, regulations and judicial decisions, and we disclaim any obligation to advise you of any change in any of these sources of law or subsequent legal or factual developments which might affect any matters or opinions set forth herein.

We hereby consent to the filing of this opinion with the Commission as an exhibit to the Registration Statement in accordance with the requirements of Item 601(b)(5) of Regulation S-K under the Securities Act and to the use of our name therein and in the related Prospectus under the caption "Legal Matters." In giving such consent, we do not hereby admit that we are in the category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations of the Commission.

Sincerely,

WILMER CUTLER PICKERING  
HALE AND DORR LLP

By: /s/ Stuart M. Falber  
Stuart M. Falber, Partner

**AGREEMENT**

This Agreement (this "AGREEMENT") is entered into as of April 30, 2013 by and among Idera Pharmaceuticals, Inc., a Delaware corporation (the "COMPANY"), Pillar Pharmaceuticals I, L.P. ("PILLAR I"), Pillar Pharmaceuticals II, L.P. ("PILLAR II"), and Participations Besancon ("BESANCON" and, together with Pillar I and Pillar II, the "PILLAR ENTITIES"). The parties hereby agree as follows:

**ARTICLE 1****WARRANTS AND COMPANY DELIVERABLES**

1.1 Authorization. The Company has duly authorized the issuance to the Pillar Entities, at the Effective Time (as defined in Section 1.2 below) and pursuant to the terms and conditions hereof, warrants to purchase an aggregate of 1,000,000 shares of its common stock, par value \$0.001 per share (the "COMMON STOCK"), in the form attached hereto as Exhibit A (the "WARRANTS").

1.1 Issuance of Warrants; Exercise Price. Upon the Effective Time, the Company will issue the Warrants to the Pillar Entities, with each such Pillar Entity receiving its pro rata share thereof, in consideration of the agreements of and waivers of rights by the Pillar Entities hereunder and for no additional cash consideration. The Warrants shall be exercisable for shares of Common Stock at an exercise price per share equal to the greater of (a) \$0.79 (the closing price of the Common Stock on the trading day immediately prior to the date hereof (subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Common Stock)) and (b) to the extent that warrants to purchase shares of Common Stock are issued in the Qualified Financing, the per share exercise price of the warrants issued in such Qualified Financing. As used in this Agreement, the term "QUALIFIED FINANCING" means the issuance and sale of equity securities of the Company (which, for the avoidance of doubt, shall be equity securities which the Company's independent public accountants shall consider to be stockholders' equity on the Company's balance sheet and not debt) from and after the date hereof in one or more closings resulting in aggregate gross proceeds to the Company of at least \$12.5 million, and the term "EFFECTIVE TIME" means the time and date upon which the Qualified Financing is consummated. For the avoidance of doubt, "gross proceeds" refers to the aggregate purchase price of the equity securities issued and sold in the Qualified Financing prior to any deduction of underwriting discounts, selling commissions and other costs and expenses incurred in connection therewith.

1.2 Company Deliverables. Upon the Effective Time, the Company shall execute and deliver to the Pillar Entities (a) copies the Warrants (with the original Warrants delivered to the applicable Pillar Entity within three business days following the Effective Time) and (b) a Registration Rights Agreement in the form attached hereto as Exhibit B (the "REGISTRATION RIGHTS AGREEMENT"), each dated as of the Effective Time. The Registration Rights Agreement shall become effective upon the due execution thereof by the Pillar Entities.

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## ARTICLE 2

### ADDITIONAL AGREEMENTS AND WAIVERS

#### 2.1 Waiver of Rights in Connection with a Liquidation of the Company.

(A) Series D Preferred Stock. Effective from and after the Effective Time and until the Amendments (as defined in Section 2.2(b)) have been approved by the stockholders of the Company and filed by the Company with, and accepted by, the Delaware Secretary of State, Pillar I, as the sole holder of the Company's outstanding Series D Convertible Preferred Stock, par value \$0.01 per share (the "SERIES D PREFERRED STOCK") hereby (i) irrevocably waives the right of the holders of the Series D Preferred Stock under Section 2.1 of the Certificate of Designations, Preferences and Rights of Series D Preferred Stock, as amended from time to time (the "SERIES D CERTIFICATE OF DESIGNATIONS") to receive, in the event of a voluntary or involuntary liquidation, dissolution or winding up of the Company (herein, a "LIQUIDATION"), an amount per share of Series D Preferred Stock equal to the Series D Original Issue Price (as defined in the Series D Certificate of Designations) plus any dividends accrued or declared but unpaid thereon to the extent such amount is greater than the amount that would have been payable with respect to such share had all shares of Series D Preferred Stock been converted into Common Stock pursuant to Section 4 of the Series D Certificate of Designations immediately prior to such Liquidation (the "SERIES D LIQUIDATION PREFERENCE RIGHT") and (ii) irrevocably agrees that in accordance with Section 2.1 of the Certificate of Designations upon a Liquidation the holders of the Series D Preferred Stock shall receive under Section 2.1 of the Series D Certificate of Designations an amount per share of Series D Preferred Stock equal to the amount that would be payable with respect to such share had all shares of Series D Preferred Stock been converted into Common Stock pursuant to Section 4 of the Series D Certificate of Designations immediately prior to such Liquidation. In connection with this Section 2.1(A), and in accordance with Section 8 of the Series D Certificate of Designations, simultaneously upon the execution of this Agreement Pillar I, in its capacity as the holder of 100% of the issued and outstanding shares of Series D Preferred Stock, has delivered to the Company an irrevocable waiver of the Series D Liquidation Preference Right.

(B) Series E Preferred Stock. Effective from and after the Effective Time and until the Amendments have been approved by the stockholders of the Company and filed by the Company with, and accepted by, the Delaware Secretary of State, each of Pillar II and Besancon, together the holders of 100% of the Company's outstanding Series E Convertible Preferred Stock, par value \$0.01 per share (the "SERIES E PREFERRED STOCK"), hereby (i) irrevocably waive the right of the holders of the Series E Preferred Stock under Section 2.1.1 of the Certificate of Designations, Preferences and Rights of Series E Preferred Stock, as amended from time to time (the "SERIES E CERTIFICATE OF DESIGNATIONS") to receive, in the event of a Liquidation, an amount per share of Series E Preferred Stock equal to the Series E Original Issue Price (as defined in the Series E Certificate of Designations) plus any dividends accrued or declared but unpaid thereon to the extent such amount is greater than the amount that would have been payable with respect to such share had all shares of Series E Preferred Stock been converted into Common Stock pursuant to Section 4 of the Series E Certificate of Designations immediately prior to such Liquidation (the "SERIES E LIQUIDATION

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PREFERENCE RIGHT”) and (ii) irrevocably agree that in accordance with Section 2.1.1 of the Certificate of Designations upon a Liquidation the holders of the Series E Preferred Stock shall receive under Section 2.1.1 of the Series E Certificate of Designations an amount per share of Series E Preferred Stock equal to the amount that would be payable with respect to such share had all shares of Series E Preferred Stock been converted into Common Stock pursuant to Section 4 of the Series E Certificate of Designations immediately prior to such Liquidation. In connection with this Section 2.1(B), and in accordance with Section 7 of the Series E Certificate of Designations, simultaneously upon the execution of this Agreement Pillar II and Besancon, together the holders of 100% of the Series E Preferred Stock, have delivered an irrevocable waiver of the Series E Liquidation Preference Right.

## 2.2 Proxy Statement.

(A) Effective from and after the Effective Time, the Company shall use its best efforts to file a preliminary proxy statement with the Securities and Exchange Commission with respect to its next annual meeting of stockholders that will, among other things, seek stockholder approval of the Amendments and include a recommendation of the Company’s Board of Directors (the “BOARD”) that the stockholders of the Company approve such Amendments (unless the Board determines in good faith, that its fiduciary duties require it to do otherwise). In order to be approved at a meeting of the stockholders of the Company: (I) the Amendment described in clause (i) of Section 2.2(B) shall require (a) the affirmative vote of the holders of a majority of the combined voting power of the outstanding shares of Common Stock and Series D Preferred Stock, voting as a single class, calculated on an as converted to Common Stock basis and (b) the affirmative vote of the holders of a majority of the outstanding shares of the Series D Preferred Stock, voting separately as a series; and (II) the Amendment described in clause (ii) of Section 2.2(B) shall require (a) the affirmative vote of the holders of a majority of the combined voting power of the outstanding shares of Common Stock and Series D Preferred Stock, voting as a single class, calculated on an as converted to Common Stock basis and (b) the affirmative vote of the holders of a majority of the outstanding shares of the Series E Preferred Stock, voting separately as a series. Notwithstanding anything to the contrary set forth in any prior voting agreement between the Company and the Pillar Entities, each Pillar Entity acknowledges that any amendments to the Company’s certificate of incorporation, the Series D Certificate of Designations and the Series E Certificate of Designation shall require, among other things, the affirmative vote of the holders of a majority of the combined voting power of the outstanding shares of Common Stock and Series D Preferred Stock, voting as a single class, calculated on an as converted to Common Stock basis.

(B) As used in this Agreement, the term “AMENDMENTS” shall mean: (i) an amendment to the Series D Certificate of Designations in the form attached hereto as Exhibit C (provided, however, that the Company shall not, and shall have no obligation to, submit the matters contemplated by this clause (i) to the stockholders of the Company if there are no shares of Series D Preferred Stock then outstanding); and (ii) an amendment to the Series E Certificate of Designations in the form attached hereto as Exhibit D (provided, however, that the Company shall not, and shall have no obligation to, submit the matters contemplated by this clause (ii) to the stockholders of the Company if there are no shares of Series E Preferred Stock then outstanding).



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### 2.3 Voting Agreements.

(A) Effective from and after the Effective Time, each Pillar Entity hereby (i) agrees to vote, and to cause its affiliates to vote, all shares of the Company's voting stock held by such Pillar Entity (or its affiliates) (and over which such Pillar Entity (or its affiliates) has the power to vote) in favor of the resolutions set forth in the forms of Amendments attached hereto, subject to restrictions on the voting of any Excess Shares (as defined in the prior voting agreements entered into by each Pillar Entity and the Company) and (ii) constitutes and appoints as the proxies of the party and hereby grants a power of attorney to the officers of the Company, and each of them, with full power of substitution, with respect to the matters set forth in clause (i) of this Section 2.3(A), and hereby authorizes each of them to represent and to vote, if and only if such Pillar Entity (a) fails to vote or (b) attempts to vote (whether by proxy, in person or by written consent), in a manner which is inconsistent with the terms of clause (i) of this Section 2.3(A), all shares of voting stock held by such Pillar Entity and its affiliates in accordance with the terms of clause (i) of this Section 2.3(A), or to take any action necessary to effect clause (i) of this Section 2.3(A). The parties acknowledge and agree that the voting agreements set forth in this Section 2.3(A) are in addition to, and not in lieu of, the prior voting agreements entered into by each Pillar Entity and the Company.

(B) Each of the proxy and power of attorney granted pursuant to Section 2.3(A) is given in consideration of the issuance of the Warrants to the Pillar Entities and the agreements and covenants of the Company and the parties in connection with the matters and transactions contemplated by this Agreement and, as such, each is coupled with an interest and shall be irrevocable unless and until this Agreement terminates or expires or the Amendments have been approved by the stockholders of the Company and filed by the Company with, and accepted by, the Delaware Secretary of State.

2.4 Restrictions on Transfer. Notwithstanding anything to the contrary set forth in this Agreement, without the prior written consent of the Company, the Pillar Entities shall not, and shall cause their respective affiliates to not, sell or transfer any shares of Common Stock, Series D Preferred Stock or Series E Preferred Stock, held by such Pillar Entity (or its affiliates) to any person, entity or group unless such proposed transferee agrees in a written instrument executed by such transferee, the applicable Pillar Entity and the Company to take and hold such securities subject to, among other things, this Agreement and to be bound by the terms of this Agreement, including the waiver of rights, voting agreements and restrictions on transfer set forth in Section 2.1(A) or Section 2.1(B), as applicable, and in Section 2.3 and this Section 2.4, respectively.

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2.5 Return of Stock Certificates: Re-Legending.

(A) Each Pillar Entity agrees that it shall deliver (and shall cause its affiliates to deliver) to the Company, in each case within three business days following the Effective Time, each certificate held by such Pillar Entity (or its affiliate) that represents shares of Common Stock, Series D Preferred Stock or Series E Preferred Stock for endorsement by the Company with the following legend (in addition to any other legends that such certificate then bears):

“THE SHARES EVIDENCED HEREBY ARE SUBJECT TO AN AGREEMENT, DATED APRIL 30, 2013, BETWEEN THE COMPANY AND THE HOLDER OF SUCH SHARES, AS MAY BE AMENDED FROM TIME TO TIME (A COPY OF WHICH MAY BE OBTAINED UPON WRITTEN REQUEST FROM THE COMPANY) WHICH PROVIDES FOR, AMONG OTHER THINGS, CERTAIN VOTING AGREEMENTS, WAIVERS OF RIGHTS AND RESTRICTIONS ON TRANSFER, AND (I) MAY BE TRANSFERRED ONLY IN ACCORDANCE WITH THE TERMS OF THAT AGREEMENT AND (II) BY ACCEPTING ANY INTEREST IN SUCH SHARES THE PERSON ACCEPTING SUCH INTEREST SHALL BE DEEMED TO AGREE TO AND SHALL BECOME BOUND BY ALL THE PROVISIONS OF THAT AGREEMENT, INCLUDING THE VOTING AGREEMENTS, WAIVERS OF RIGHTS AND RESTRICTIONS ON TRANSFER SET FORTH THEREIN.”

(B) The Company, by its execution of this Agreement, agrees that it will cause any certificates delivered to it pursuant to Section 2.5(A) and any certificates evidencing shares of Common Stock, Series D Preferred Stock or Series E Preferred Stock issued after the date hereof upon exercise or conversion of any securities of the Company held by the Pillar Entities to bear the legend required by this Section 2.5, and it shall supply, free of charge, a copy of this Agreement to any holder of a certificate evidencing such shares upon written request from such holder to the Company at its principal office. The parties to this Agreement do hereby agree that the failure to cause the certificates evidencing any shares of Common Stock, Series D Preferred Stock or Series E Preferred Stock to bear the legend required by this Section 2.5 and/or the failure of the Company to supply, free of charge, a copy of this Agreement as provided hereunder shall not affect the validity or enforcement of the waivers of rights, voting agreements, restrictions on transfer or other terms set forth in this Agreement.

(C) The legend required pursuant to Section 2.5(A) shall be removed from the certificates representing such shares of Common Stock, Series D Preferred Stock and Series E Preferred Stock at the request of the holder thereof, at such time as the Amendments have been approved by the stockholders of the Company and filed by the Company with, and accepted by, the Delaware Secretary of State.

2.6 Reservation of Common Stock. From and after the Effective Time, the Company shall at all times reserve and keep available out of its authorized but unissued shares of Common Stock, solely for the purpose of providing for the exercise of the Warrants, such number of shares of Common Stock as shall from time to time equal 100% of the number of shares sufficient to permit the exercise of the Warrants issued pursuant to this Agreement in accordance with their terms, without regard to any exercise limitations contained therein.

2.7 Expenses. Notwithstanding anything to the contrary set forth in this Agreement, all fees and expenses incurred in connection with this Agreement and the matters and transactions contemplated hereby shall be paid by the party incurring such fees and expenses, whether or not such matters or transactions are consummated.

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**ARTICLE 3**

**MISCELLANEOUS**

3.1 Notices. All notices required or permitted hereunder shall be in writing and shall be deemed effectively given: (i) upon delivery to the party to be notified, (ii) when received by email or confirmed facsimile, or (iii) one business day after deposit with a nationally recognized overnight carrier, specifying next business day delivery, with written verification of receipt. All communications shall be sent to the Company and the Pillar Entities as follows or at such other addresses as the Company or either Pillar Entity may designate upon 10 days' advance written notice to the other party:

(A) if to the Company, to:

Idera Pharmaceuticals, Inc.  
167 Sidney Street  
Cambridge, MA 02139  
Attention: Chief Executive Officer  
Facsimile: (617) 679-5592  
Email: sagrawal@iderapharma.com

with a copy to:

Wilmer Cutler Pickering Hale and Dorr LLP  
60 State Street  
Boston, Massachusetts 02109  
Attention: Stuart Falber  
Facsimile: (617) 526-5000  
Email: stuart.falber@wilmerhale.com

(B) if to a Pillar Entity, to such Pillar Entity's address as set forth on its respective signature page hereto.

3.2 Changes. This Agreement may not be modified or amended except pursuant to an instrument in writing signed by the Company and either Pillar Entity (and any such modification or amendment so signed shall be binding on both Pillar Entities). No provision hereunder may be waived other than in a written instrument executed by the waiving party.

3.3 Headings. The headings of the various sections of this Agreement have been inserted for convenience of reference only and shall not be deemed to be part of this Agreement.

3.4 Severability. In case any provision contained in this Agreement should be invalid, illegal or unenforceable in any respect, the validity, legality and enforceability of the remaining provisions contained herein shall not in any way be affected or impaired thereby.

3.5 Governing Law. This Agreement shall be governed by and construed in accordance with the laws of the State of Delaware without regard to principles of conflicts of law.

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3.6 Counterparts. This Agreement may be executed in two or more counterparts, each of which shall constitute an original, but all of which, when taken together, shall constitute but one instrument, and shall become effective when one or more counterparts have been signed by each party hereto and delivered (including by facsimile) to the other parties.

3.7 Entire Agreement; Termination. This Agreement, the Registration Rights Agreement, the Warrants and the instruments referenced herein contain the entire understanding of the parties with respect to the matters covered herein and therein and, except as specifically set forth herein or therein, neither the Company nor any Pillar Entity makes any representation, warranty, covenant or undertaking with respect to such matters. This Agreement shall terminate and be of no further force and effect at 5:00 p.m. on June 1, 2013 to the extent that a Qualified Financing has not been consummated prior to such time and date.

3.8 Assignment. Except as otherwise expressly provided herein, the provisions hereof shall inure to the benefit of, and be binding upon, the parties hereto and their respective permitted successors, assigns, heirs, executors and administrators. This Agreement and the rights of the Pillar Entities hereunder may not be assigned by any Pillar Entity without the prior written consent of the Company, except such consent shall not be required in cases of (a) assignments by a Pillar Entity as permitted under Section 2.4 (provided, that such assignee agrees in writing to be bound by the terms of this Agreement) and (b) assignments of the Warrants by a Pillar Entity as permitted under the terms of the Warrants (provided, that such assignee agrees in writing to be bound by the terms of the Warrants).

3.9 Further Assurances. Each party agrees to cooperate fully with the other parties and to execute such further instruments, documents and agreements and to give such further written assurance as may be reasonably requested by any other party to evidence and reflect the transactions described herein and contemplated hereby and to carry into effect the intents and purposes of this Agreement.

3.10 Transfers in Violation of this Agreement; Specific Performance. Any transfer not made in compliance with the requirements of this Agreement shall be null and void ab initio, shall not be recorded on the books of the Company or its transfer agent and shall not be recognized by the Company. Each Pillar Entity acknowledges and agrees that any breach of this Agreement by a Pillar Entity would result in substantial harm to the Company and its stockholders for which monetary damages alone could not adequately compensate. Therefore, each Pillar Entity unconditionally and irrevocably agrees that the Company shall be entitled to seek and obtain protective orders, injunctive relief and other remedies available at law or in equity (including without limitation, seeking specific performance or the rescission of purchases, sales and other transfers of the Warrants or shares of Common Stock, Series D Preferred Stock or Series E Preferred Stock not made in compliance with this Agreement).

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IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the date first set forth above.

IDERA PHARMACEUTICALS, INC.

By: /s/ Sudhir Agrawal  
Sudhir Agrawal  
Chairman, Chief Executive Officer and  
President

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IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the date first set forth above.

PILLAR PHARMACEUTICALS I, L.P.

By: Pillar Invest Corporation, its General  
Partner

By: /s/ Youssef El Zein

Name: Youssef El Zein

Title: General Partner

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IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the date first set forth above.

PILLAR PHARMACEUTICALS II, L.P.

By: Pillar Invest Corporation, its General  
Partner

By: /s/ Youssef El Zein

Name: Youssef El Zein

Title: General Partner

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IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the date first set forth above.

PARTICIPATIONS BESANCON

By: Pillar Invest Corporation, its General  
Partner

By: /s/ Youssef El Zein

Name: Youssef El Zein

Title: General Partner



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**EXHIBIT A**

**Form of Warrant**

**THIS WARRANT AND THE SHARES OF COMMON STOCK ISSUED UPON  
ITS EXERCISE ARE SUBJECT TO THE RESTRICTIONS ON  
TRANSFER SET FORTH IN SECTION 5 OF THIS WARRANT**

Warrant No. [●]

Number of Shares: [●]  
(subject to adjustment)

Original Issue Date: [●], 2013

Common Stock Purchase Warrant

(Void after June 1, 2014)

Idera Pharmaceuticals, Inc., a Delaware corporation (the “Company”), for value received, hereby certifies that [WARRANT HOLDER], or its registered assigns (the “Registered Holder”), is entitled, subject to the terms and conditions set forth below, to purchase from the Company, at any time or from time to time on or after the date of issuance and on or before 5:00 p.m. (Boston time) on June 1, 2014, [●] shares of Common Stock, \$0.001 par value per share, of the Company (“Common Stock”), at a purchase price of \$[●]<sup>1</sup> per share. The shares purchasable upon exercise of this Warrant, and the purchase price per share, each as adjusted from time to time pursuant to the provisions of this Warrant, are hereinafter referred to as the “Warrant Shares” and the “Purchase Price,” respectively.

The Warrant is one in a series of warrants (the “Series Warrant”) issued pursuant to that certain Agreement, dated April 30, 2013, among the Company, the Registered Holder and the other parties thereto.

1. Exercise.

(a) Exercise for Cash. The Registered Holder may, at its option, elect to exercise this Warrant, in whole or in part and at any time or from time to time, by surrendering this Warrant, with the purchase form appended hereto as Exhibit I duly executed by or on behalf of the Registered Holder, at the principal office of the Company, or at such other office or agency as the Company may designate, accompanied by payment in full, in lawful money of the United States, of the Purchase Price payable in respect of the number of Warrant Shares purchased upon such exercise.

(b) Cashless Exercise.

(i) During such periods as there is not an effective registration statement under the Securities Act of 1933, as amended (the “Securities Act”), registering, and

<sup>1</sup> NTD: A per share amount equal to the greater of (a) \$0.79 (the closing price of the Common Stock on the trading day immediately prior to the date hereof (subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Common Stock)) and (b) to the extent that warrants to purchase shares of Common Stock are issued in the Qualified Financing, the per share exercise price of the warrants issued in such Qualified Financing.

no current prospectus available for, the resale by the Registered Holder of any Warrant Shares (except to the extent due to any actions or inactions of the Registered Holders under the Registration Rights Agreement dated as of [ • ], 2013 by and among the Company and the Purchasers (as defined therein)), the Registered Holder may, at its option, elect to exercise this Warrant, in whole or in part, on a cashless basis, by surrendering this Warrant, with the purchase form appended hereto as Exhibit I duly executed by or on behalf of the Registered Holder, at the principal office of the Company, or at such other office or agency as the Company may designate, by canceling a portion of this Warrant in payment of the Purchase Price payable in respect of the number of Warrant Shares purchased upon such exercise. In the event of an exercise pursuant to this subsection 1(b), the number of Warrant Shares issued to the Registered Holder shall be determined according to the following formula:

$$X = \frac{Y(A-B)}{A}$$

Where: X = the number of Warrant Shares that shall be issued to the Registered Holder;  
Y = the number of Warrant Shares for which this Warrant is being exercised (which shall include both the number of Warrant Shares issued to the Registered Holder and the number of Warrant Shares subject to the portion of the Warrant being cancelled in payment of the Purchase Price);  
A = the Fair Market Value (as defined below) of one share of Common Stock; and  
B = the Purchase Price then in effect.

(ii) The Fair Market Value per share of Common Stock shall be determined as follows:

(A) If the Common Stock is listed on a national securities exchange, or another nationally recognized trading system as of the Exercise Date, the Fair Market Value per share of Common Stock shall be deemed to be the average of the high and low reported sale prices per share of Common Stock thereon on the trading day immediately preceding the Exercise Date ( provided that if no such price is reported on such day, the Fair Market Value per share of Common Stock shall be determined pursuant to clause (B)).

(B) If the Common Stock is not listed on a national securities exchange or another nationally recognized trading system as of the Exercise Date, the Fair Market Value per share of Common Stock shall be deemed to be the amount most recently determined by the Board of Directors of the Company (the "Board") to represent the fair market value per share of the Common Stock (including without limitation a determination for purposes of granting Common Stock options or issuing Common Stock under any plan, agreement or arrangement with employees of the Company); and, upon request of the Registered Holder, the Board (or a representative thereof) shall, as promptly as reasonably practicable but in any event

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not later than 10 days after such request, notify the Registered Holder of the Fair Market Value per share of Common Stock and furnish the Registered Holder with reasonable documentation of the Board's determination of such Fair Market Value. Notwithstanding the foregoing, if the Board has not made such a determination within the three-month period prior to the Exercise Date, then (A) the Board shall make, and shall provide or cause to be provided to the Registered Holder notice of, a determination of the Fair Market Value per share of the Common Stock within 15 days of a request by the Registered Holder that it do so, and (B) the exercise of this Warrant pursuant to this subsection 1(b) shall be delayed until such determination is made and notice thereof is provided to the Registered Holder.

(c) Exercise Date. Each exercise of this Warrant shall be deemed to have been effected immediately prior to the close of business on the day on which this Warrant shall have been surrendered to the Company as provided in subsection 1(a) or 1(b) above (the "Exercise Date"). At such time, the person or persons in whose name or names any certificates for Warrant Shares shall be issuable upon such exercise as provided in subsection 1(d) below shall be deemed to have become the holder or holders of record of the Warrant Shares represented by such certificates.

(d) Issuance of Certificates. The Company, at its expense, shall use its best efforts, as soon as practicable after the exercise of this Warrant in whole or in part, and in any event within three (3) business days thereafter, to cause to be issued in the name of, and delivered to, the Registered Holder, or as the Registered Holder (upon payment by the Registered Holder of any applicable transfer taxes) may direct:

(i) a certificate or certificates for the number of full Warrant Shares to which the Registered Holder shall be entitled upon such exercise plus, in lieu of any fractional share to which the Registered Holder would otherwise be entitled, cash in an amount determined pursuant to Section 3 hereof; and

(ii) in case such exercise is in part only, a new Warrant or Warrants (dated the date hereof) of like tenor, calling in the aggregate on the face or faces thereof for the number of Warrant Shares equal (without giving effect to any adjustment therein) to the number of such shares called for on the face of this Warrant minus the number of Warrant Shares for which this Warrant was so exercised (which, in the case of an exercise pursuant to subsection 1(b), shall include both the number of Warrant Shares issued to the Registered Holder pursuant to such partial exercise and the number of Warrant Shares subject to the portion of the Warrant being cancelled in payment of the Purchase Price).

(e) Exercise Limitation. Notwithstanding anything to the contrary contained herein, the Company shall not effect any exercise of this Warrant and the Registered Holder shall not be entitled to exercise this Warrant for a number of Warrant Shares in excess of that number of Warrant Shares which, upon giving effect to such exercise, would cause (i) the aggregate number of shares of Common Stock beneficially owned by the Registered Holder and its affiliates and any other persons whose beneficial ownership of Common Stock would be aggregated with the Registered Holder's for purposes of Section 13(d) of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), to exceed 19.99% of the total number of issued and outstanding shares of Common Stock of the Company following such exercise, or

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(ii) the combined voting power of the securities of the Company beneficially owned by the Registered Holder and its affiliates and any other persons whose beneficial ownership of Common Stock would be aggregated with the holder's for purposes of Section 13(d) of the Exchange Act to exceed 19.99% of the combined voting power of all of the securities of the Company then outstanding following such exercise, unless, in either case, the stockholders of the Company approve the Nasdaq Proposal (as defined by and in accordance with Section 5.11(B) of that certain Convertible Preferred Stock and Warrant Purchase Agreement, dated November 9, 2012, among the Company, Pillar Pharmaceuticals II, L.P. and the other parties thereto (the "Series E Purchase Agreement")), in which case, the 19.99% limitation under clause (i) and clause (ii) of this Section 1(e) shall be increased, with respect to the Registered Holder, to 35% for purposes of both clause (i) and clause (ii) of this Section 1(e). For purposes of this Section 1(e), the aggregate number of shares of Common Stock or voting securities beneficially owned by the Registered Holder and its affiliates and any other persons whose beneficial ownership of Common Stock would be aggregated with the Registered Holder's for purposes of Section 13(d) of the Exchange Act shall include the shares of Common Stock issuable upon the exercise of this Warrant with respect to which such determination is being made, but shall exclude the number of shares of Common Stock which would be issuable upon (x) exercise of the remaining unexercised and non-cancelled portion of this Warrant by the Registered Holder and (y) exercise or conversion of the unexercised, non-converted or non-cancelled portion of any other securities of the Company that do not have voting power (including without limitation any securities of the Company which would entitle the holder thereof to acquire at any time Common Stock, including without limitation any debt, preferred stock, right, option, warrant or other instrument that is at any time convertible into or exercisable or exchangeable for, or otherwise entitles the holder thereof to receive, Common Stock), subject to a limitation on conversion or exercise analogous to the limitation contained herein beneficially owned by the Registered Holder or any of its affiliates and other persons whose beneficial ownership of Common Stock would be aggregated with the Registered Holder's for purposes of Section 13(d) of the Exchange Act.

## 2. Adjustments.

(a) Adjustment for Stock Splits and Combinations. If the Company shall at any time or from time to time after the Original Issue Date effect a subdivision of the outstanding Common Stock, the Purchase Price then in effect immediately before that subdivision shall be proportionately decreased. If the Company shall at any time or from time to time after the Original Issue Date combine the outstanding shares of Common Stock, the Purchase Price then in effect immediately before the combination shall be proportionately increased. Any adjustment under this paragraph shall become effective at the close of business on the date the subdivision or combination becomes effective.

(b) Adjustment for Certain Dividends and Distributions. In the event the Company at any time, or from time to time after the Original Issue Date shall make or issue, or fix a record date for the determination of holders of Common Stock entitled to receive, a dividend or other distribution payable in additional shares of Common Stock, then and in each such event the Purchase Price then in effect immediately before such event shall be decreased as of the time of such issuance or, in the event such a record date shall have been fixed, as of the close of business on such record date, by multiplying the Purchase Price then in effect by a fraction:

(A) the numerator of which shall be the total number of shares of Common Stock issued and outstanding immediately prior to the time of such issuance or the close of business on such record date, and

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(B) the denominator of which shall be the total number of shares of Common Stock issued and outstanding immediately prior to the time of such issuance or the close of business on such record date plus the number of shares of Common Stock issuable in payment of such dividend or distribution;

provided, however, that if such record date shall have been fixed and such dividend is not fully paid or if such distribution is not fully made on the date fixed therefor, the Purchase Price shall be recomputed accordingly as of the close of business on such record date and thereafter the Purchase Price shall be adjusted pursuant to this paragraph as of the time of actual payment of such dividends or distributions.

(c) Adjustment in Number of Warrant Shares. When any adjustment is required to be made in the Purchase Price pursuant to subsections 2(a) or 2(b), the number of Warrant Shares purchasable upon the exercise of this Warrant shall be changed to the number determined by dividing (i) an amount equal to the number of shares issuable upon the exercise of this Warrant immediately prior to such adjustment, multiplied by the Purchase Price in effect immediately prior to such adjustment, by (ii) the Purchase Price in effect immediately after such adjustment.

(d) Adjustments for Other Dividends and Distributions. In the event the Company at any time or from time to time after the Original Issue Date shall make or issue, or fix a record date for the determination of holders of Common Stock entitled to receive, a dividend or other distribution payable in securities of the Company (other than shares of Common Stock) or in cash or other property (other than regular cash dividends paid out of earnings or earned surplus, determined in accordance with generally accepted accounting principles), then and in each such event provision shall be made so that the Registered Holder shall receive upon exercise hereof, in addition to the number of shares of Common Stock issuable hereunder, the kind and amount of securities of the Company, cash or other property which the Registered Holder would have been entitled to receive had this Warrant been exercised on the date of such event and had the Registered Holder thereafter, during the period from the date of such event to and including the Exercise Date, retained any such securities receivable during such period, giving application to all adjustments called for during such period under this Section 2 with respect to the rights of the Registered Holder.

(e) Adjustment for Reorganization. If there shall occur any reorganization, recapitalization, reclassification, consolidation or merger involving the Company in which the Common Stock is converted into or exchanged for securities, cash or other property (other than a transaction covered by subsections 2(a), 2(b) or 2(d)) (collectively, a "Reorganization"), then, following such Reorganization, the Registered Holder shall receive upon exercise hereof the kind and amount of securities, cash or other property which the Registered Holder would have been entitled to receive pursuant to such Reorganization if such exercise had taken place immediately prior to such Reorganization. In any such case, appropriate adjustment (as determined in good faith by the Board) shall be made in the application of the provisions set forth herein with respect

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to the rights and interests thereafter of the Registered Holder, to the end that the provisions set forth in this Section 2 (including provisions with respect to changes in and other adjustments of the Purchase Price) shall thereafter be applicable, as nearly as reasonably may be, in relation to any securities, cash or other property thereafter deliverable upon the exercise of this Warrant.

(f) Certificate as to Adjustments. Upon the occurrence of each adjustment or readjustment of the Purchase Price pursuant to this Section 2, the Company at its expense shall, as promptly as reasonably practicable but in any event not later than ten (10) days thereafter, compute such adjustment or readjustment in accordance with the terms hereof and furnish to the Registered Holder a certificate setting forth such adjustment or readjustment (including the kind and amount of securities, cash or other property for which this Warrant shall be exercisable and the Purchase Price) and showing in detail the facts upon which such adjustment or readjustment is based. The Company shall, as promptly as reasonably practicable after the written request at any time of the Registered Holder (but in any event not later than ten (10) days thereafter), furnish or cause to be furnished to the Registered Holder a certificate setting forth (i) the Purchase Price then in effect and (ii) the number of shares of Common Stock and the amount, if any, of other securities, cash or property which then would be received upon the exercise of this Warrant.

3. Fractional Shares. The Company shall not be required upon the exercise of this Warrant to issue any fractional shares, but shall pay the value thereof to the Registered Holder in cash on the basis of the Fair Market Value per share of Common Stock, as determined pursuant to subsection 1(b)(ii) above.

4. [Intentionally Omitted].

5. Transfers, etc.

(a) The Warrants shall not be sold, transferred, assigned or hypothecated unless (i) there is an effective registration statement under the Securities Act covering such Warrants, (ii) the sale is made in accordance with Rule 144 under the Securities Act, or (iii) the Company receives an opinion of counsel for the holder of the Warrants reasonably satisfactory to the Company stating that such sale, transfer, assignment or hypothecation is exempt from the registration requirements of the Securities Act, and each such case upon all other conditions specified in this Section 5(a). Notwithstanding the provisions of the preceding sentence, no registration statement or opinion of counsel shall be required for any transfer of any Warrants by a holder thereof that is a partnership, a limited liability company or a corporation to (A) a partner of such partnership, a member of such limited liability company or a stockholder of such corporation, (B) an entity that controls, or is controlled by, or is under common control with such partnership, limited liability company or corporation, or (C) the estate of any such partner, member or stockholder (collectively, clauses (A) through (C) the "Permitted Transferees"); provided, that in each of the foregoing cases the proposed transferee of the Warrants agrees in writing to take and hold such Warrants subject to the provisions and upon the conditions specified in this Section 5.

(b) Each certificate representing Warrant Shares shall be stamped or otherwise imprinted with the following legends in substantially the following forms:

“THE SECURITIES REPRESENTED BY THIS CERTIFICATE HAVE NOT BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933, AS AMENDED, OR THE SECURITIES LAWS OF ANY STATE OF THE UNITED STATES OR IN ANY OTHER JURISDICTION.”

“THE SECURITIES REPRESENTED HEREBY MAY NOT BE OFFERED, SOLD OR OTHERWISE TRANSFERRED, PLEDGED OR HYPOTHECATED IN THE ABSENCE OF AN EFFECTIVE REGISTRATION STATEMENT FOR THE SECURITIES UNDER APPLICABLE SECURITIES LAWS UNLESS OFFERED, SOLD OR OTHERWISE TRANSFERRED, PLEDGED OR HYPOTHECATED PURSUANT TO AN AVAILABLE EXEMPTION FROM THE REGISTRATION REQUIREMENTS OF THOSE LAWS.”

“THE SECURITIES REPRESENTED BY THIS CERTIFICATE MAY BE TRANSFERRED ONLY IN ACCORDANCE WITH THE TERMS OF AN AGREEMENT BETWEEN THE COMPANY AND THE STOCKHOLDER, A COPY OF WHICH IS ON FILE WITH THE SECRETARY OF THE COMPANY.”

The foregoing legend (other than the last legend) shall be removed from the certificates representing such Warrant Shares, at the request of the holder thereof, at such time as (i) a period of at least one year, as determined in accordance with paragraph (d) of Rule 144 under the Act, has elapsed since the later of the date the Warrant Shares were acquired from the Company or an affiliate of the Company, and (ii) the Warrant Shares become eligible for resale pursuant to Rule 144(b)(1)(i) under the Securities Act.

(c) The Company will maintain a register containing the name and address of the Registered Holder of this Warrant. The Registered Holder may change its address as shown on the warrant register by written notice to the Company requesting such change.

(d) Subject to the provisions of Section 5 hereof, this Warrant and all rights hereunder are transferable, in whole or in part, upon surrender of this Warrant with a properly executed assignment (in the form of Exhibit II hereto) at the principal office of the Company (or, if another office or agency has been designated by the Company for such purpose, then at such other office or agency).

(e) [This Warrant and the Warrant Shares shall be subject to the restrictions on transfer set forth in Section 6.1 of that certain Convertible Preferred Stock and Warrant Purchase Agreement, dated November 4, 2011, as amended, between the Company and Pillar Pharmaceuticals I, L.P.]<sup>2</sup> [This Warrant and the Warrant Shares shall be subject to the restrictions on transfer set forth in Article 6 that certain Convertible Preferred Stock and Warrant Purchase Agreement, dated November 9, 2012, as amended, between the Company and Pillar Pharmaceuticals II, L.P. and Participations Besancon.]<sup>3</sup>

<sup>2</sup> NTD: To be included in warrant issued to Pillar Pharmaceuticals I, L.P.

<sup>3</sup> NTD: To be included in the Warrant issued to each of Pillar Pharmaceuticals II, L.P. and Participations Besancon.



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6. Notices of Record Date, etc. In the event:

(a) the Company shall take a record of the holders of its Common Stock (or other stock or securities at the time deliverable upon the exercise of this Warrant) for the purpose of entitling or enabling them to receive any dividend or other distribution, or to receive any right to subscribe for or purchase any shares of stock of any class or any other securities, or to receive any other right; or

(b) of any capital reorganization of the Company, any reclassification of the Common Stock of the Company, any consolidation or merger of the Company with or into another corporation (other than a consolidation or merger in which the Company is the surviving entity and its Common Stock is not converted into or exchanged for any other securities or property), or any transfer of all or substantially all of the assets of the Company; or

(c) of the voluntary or involuntary dissolution, liquidation or winding-up of the Company,

then, and in each such case, the Company will send or cause to be sent to the Registered Holder a notice specifying, as the case may be, (i) the record date for such dividend, distribution or right, and the amount and character of such dividend, distribution or right, or (ii) the effective date on which such reorganization, reclassification, consolidation, merger, transfer, dissolution, liquidation or winding-up is to take place, and the time, if any is to be fixed, as of which the holders of record of Common Stock (or such other stock or securities at the time deliverable upon the exercise of this Warrant) shall be entitled to exchange their shares of Common Stock (or such other stock or securities) for securities or other property deliverable upon such reorganization, reclassification, consolidation, merger, transfer, dissolution, liquidation or winding-up. Such notice shall be sent at least ten (10) days prior to the record date or effective date for the event specified in such notice.

7. Reservation of Stock. The Company will at all times reserve and keep available, solely for issuance and delivery upon the exercise of this Warrant, such number of Warrant Shares and other securities, cash and/or property, as from time to time shall be issuable upon the exercise of this Warrant.

8. Exchange or Replacement of Warrants.

(a) Upon the surrender by the Registered Holder, properly endorsed, to the Company at the principal office of the Company, the Company will, subject to the provisions of Section 5 hereof, issue and deliver to or upon the order of the Registered Holder, at the Company's expense, a new Warrant or Warrants of like tenor, in the name of the Registered Holder or as the Registered Holder (upon payment by the Registered Holder of any applicable transfer taxes) may direct, calling in the aggregate on the face or faces thereof for the number of shares of Common Stock (or other securities, cash and/or property) then issuable upon exercise of this Warrant.

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(b) Upon receipt of evidence reasonably satisfactory to the Company of the loss, theft, destruction or mutilation of this Warrant and (in the case of loss, theft or destruction) upon delivery of an indemnity agreement (with surety if reasonably required) in an amount reasonably satisfactory to the Company, or (in the case of mutilation) upon surrender and cancellation of this Warrant, the Company will issue, in lieu thereof, a new Warrant of like tenor.

9. Notices. All notices and other communications from the Company to the Registered Holder in connection herewith shall be mailed by certified or registered mail, postage prepaid, sent by email or confirmed facsimile or sent via a reputable nationwide overnight courier service guaranteeing next business day delivery, to the address last furnished to the Company in writing by the Registered Holder. All notices and other communications from the Registered Holder to the Company in connection herewith shall be mailed by certified or registered mail, postage prepaid, sent by email or confirmed facsimile or sent via a reputable nationwide overnight courier service guaranteeing next business day delivery, to the Company at its principal office set forth below. If the Company should at any time change the location of its principal office to a place other than as set forth below, it shall give prompt written notice to the Registered Holder and thereafter all references in this Warrant to the location of its principal office at the particular time shall be as so specified in such notice. All such notices and communications shall be deemed delivered (i) two (2) business days after being sent by certified or registered mail, return receipt requested, postage prepaid, (ii) upon receipt of email or confirmed facsimile or (iii) one (1) business day after being sent via a reputable nationwide overnight courier service guaranteeing next business day delivery.

Notices and other communications from the Registered Holder to the Company shall be sent to:

Idera Pharmaceuticals, Inc.  
167 Sidney Street  
Cambridge, MA 02139  
Attention: Chief Executive Officer  
Facsimile: (617) 679-5592  
Email: sagrawal@iderapharma.com

with a copy to:

Wilmer Cutler Pickering Hale and Dorr LLP  
60 State Street  
Boston, Massachusetts 02109  
Attention: Stuart Falber  
Facsimile: (617) 526-5000  
Email: stuart.falber@wilmerhale.com

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10. No Rights as Stockholder. Until the exercise of this Warrant, the Registered Holder shall not have or exercise any rights by virtue hereof as a stockholder of the Company. Notwithstanding the foregoing, in the event (i) the Company effects a split of the Common Stock by means of a stock dividend and the Purchase Price of and the number of Warrant Shares are adjusted as of the date of the distribution of the dividend (rather than as of the record date for such dividend), and (ii) the Registered Holder exercises this Warrant between the record date and the distribution date for such stock dividend, the Registered Holder shall be entitled to receive, on the distribution date, the stock dividend with respect to the shares of Common Stock acquired upon such exercise, notwithstanding the fact that such shares were not outstanding as of the close of business on the record date for such stock dividend.

11. Amendment or Waiver. Any term of this Warrant may be amended or waived only by an instrument in writing signed by the Company and the holders of Series Warrants exercisable for a number of shares of Common Stock equal to more than 50% of the total number of shares of Common Stock issuable upon exercise of all Series Warrants. No waivers of any term, condition or provision of this Warrant, in any one or more instances, shall be deemed to be, or construed as, a further or continuing waiver of any such term, condition or provision.

12. Section Headings. The section headings in this Warrant are for the convenience of the parties and in no way alter, modify, amend, limit or restrict the contractual obligations of the parties.

13. Governing Law. This Warrant will be governed by and construed in accordance with the internal laws of the State of Delaware (without reference to the conflicts of law provisions thereof).

14. Facsimile Signatures. This Warrant may be executed by facsimile signature.

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EXECUTED as of the Date of Issuance indicated above.

Idera Pharmaceuticals, Inc.

By: \_\_\_\_\_

Title: \_\_\_\_\_

PURCHASE FORM

To: \_\_\_\_\_

Dated: \_\_\_\_\_

The undersigned, pursuant to the provisions set forth in the attached Warrant (No. \_\_\_), hereby elects to purchase (*check applicable box*):

- \_\_\_\_\_ shares of the Common Stock of Idera Pharmaceuticals, Inc. covered by such Warrant; or
- the maximum number of shares of Common Stock covered by such Warrant pursuant to the cashless exercise procedure set forth in subsection 1(b).

The undersigned herewith makes payment of the full purchase price for such shares at the price per share provided for in such Warrant. Such payment takes the form of (*check applicable box or boxes*):

- \$\_\_\_ in lawful money of the United States; and/or
- the cancellation of such portion of the attached Warrant as is exercisable for a total of \_\_\_\_\_ Warrant Shares (using a Fair Market Value of \$\_\_\_ per share for purposes of this calculation) ; and/or
- the cancellation of such number of Warrant Shares as is necessary, in accordance with the formula set forth in subsection 1(b), to exercise this Warrant with respect to the maximum number of Warrant Shares purchasable pursuant to the cashless exercise procedure set forth in subsection 1(b).

Signature: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

ASSIGNMENT FORM

FOR VALUE RECEIVED, \_\_\_\_\_ hereby sells, assigns and transfers all of the rights of the undersigned under the attached Warrant (No. \_\_\_) with respect to the number of shares of Common Stock of Idera Pharmaceuticals, Inc. covered thereby set forth below, unto:

Name of Assignee

Address

No. of Shares

Dated: \_\_\_\_\_

Signature: \_\_\_\_\_

Signature Guaranteed:

By: \_\_\_\_\_

The signature should be guaranteed by an eligible guarantor institution (banks, stockbrokers, savings and loan associations and credit unions with membership in an approved signature guarantee medallion program) pursuant to Rule 17Ad-15 under the Securities Exchange Act of 1934.

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**EXHIBIT B**

**Registration Rights Agreement**

**IDERA PHARMACEUTICALS, INC.**  
**REGISTRATION RIGHTS AGREEMENT**

REGISTRATION RIGHTS AGREEMENT (this “AGREEMENT”), dated as of [ • ], 2013, by and among IDERA PHARMACEUTICALS, INC., a corporation organized under the laws of the State of Delaware (the “COMPANY”), and each of the persons or entities listed on Exhibit A hereto (the “PURCHASERS”).

WHEREAS:

In connection with that certain Agreement, dated as of even date herewith, by and among the Company, the Purchasers and the other parties thereto (the “PILLAR AGREEMENT”), the Company has agreed, upon the terms and subject to the conditions contained therein, to issue to the Purchasers warrants (the “WARRANTS”) to acquire shares of the Company’s common stock, par value \$0.001 per share (the “COMMON STOCK”). The shares of Common Stock issuable upon exercise of or otherwise pursuant to the Warrants are referred to herein as the “WARRANT SHARES.”

To induce the Purchasers to execute and deliver the Pillar Agreement, the Company has agreed to provide certain registration rights under the Securities Act of 1933, as amended, and the rules and regulations thereunder, or any similar successor statute (collectively, the “SECURITIES ACT”), and applicable state securities laws.

NOW, THEREFORE, in consideration of the premises and the mutual covenants contained herein and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Company and the Purchasers hereby agree as follows:

1. DEFINITIONS.

A. As used in this Agreement, the following terms shall have the following meanings:

i. “PURCHASERS” means the Purchasers and any transferees or assignees who agree to become bound by the provisions of this Agreement in accordance with Section 10 hereof.

ii. “REGISTER,” “REGISTERED,” and “REGISTRATION” refer to a registration effected by preparing and filing a Registration Statement or Statements in compliance with the Securities Act and pursuant to Rule 415 under the Securities Act or any successor rule providing for offering securities on a continuous basis (“RULE 415”), and the declaration or ordering of effectiveness of such Registration Statement by the United States Securities and Exchange Commission (the “SEC”).

iii. “REGISTRABLE SECURITIES” means (a) the Warrant Shares and (b) any shares of capital stock issued or issuable, from time to time (with any adjustments), in respect of the Warrant Shares by virtue of any stock split, stock dividend, recapitalization or similar event; provided, however, that shares of Common Stock that are Registrable Securities



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shall cease to be Registrable Securities upon the earliest of (A) the date such shares become eligible for sale pursuant to Rule 144(b)(1)(i) under the Securities Act; provided that a period of at least one year, as determined in accordance with paragraph (d) of Rule 144 under the Securities Act, has elapsed since the later of the date such shares were acquired from the Company or an affiliate of the Company, (B) the date that such shares are sold (I) pursuant to a registration statement, (II) to or through a broker, dealer or underwriter in a public securities transaction and/or (III) in a transaction exempt from the registration and prospectus delivery requirements of the Securities Act such that all transfer restrictions and restrictive legends with respect thereto, if any, are removed upon the consummation of such sale, or (C) any sale or transfer to any person or entity which by virtue of Section 10 of this Agreement is not entitled to the rights provided by this Agreement. Wherever reference is made in this Agreement to a request or consent of holders of a certain percentage of Registrable Securities, the determination of such percentage shall include shares of Common Stock issuable upon exercise of the Warrants, even if such exercise has not been effected.

iv. "REGISTRATION STATEMENT" means a registration statement of the Company under the Securities Act (including without limitation the Initial Registration Statement, the New Registration Statement and any Remainder Registration Statements, each, as defined below).

v. "SEC GUIDANCE" means (i) any publicly-available written or oral guidance, comments, requirements or requests of the SEC staff (ii) any written or oral guidance, requirements or requests by the SEC staff to the Company and (iii) the Securities Act.

B. Capitalized terms used herein and not otherwise defined herein shall have the respective meanings set forth in the Pillar Agreement.

## 2. REGISTRATION.

### A. MANDATORY REGISTRATION.

i. The Company shall file with the SEC and use its reasonable best efforts to cause to become effective a Registration Statement on Form S-3 (or, if Form S-3 is not then available, on such form of Registration Statement as is then available to effect a registration of all of the Registrable Securities) covering the resale of the Registrable Securities on or prior to the 90<sup>th</sup> day following the date of this Agreement (the "INITIAL REGISTRATION STATEMENT"). The Initial Registration Statement filed hereunder, to the extent allowable under the Securities Act, shall state that such Initial Registration Statement also covers such indeterminate number of additional shares of Common Stock as may become issuable upon exercise of the Warrants to prevent dilution resulting from stock splits, stock dividends or similar transactions.

ii. Notwithstanding the registration obligations set forth in this Section 2, in the event the SEC informs the Company that all of the Registrable Securities cannot, as a result of the application of Rule 415, be registered for resale as a secondary offering on a single registration statement, the Company shall promptly inform each of the Purchasers and use its commercially reasonable efforts to (a) file amendments to the Initial Registration Statement as

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required by the SEC and/or (b) withdraw the Initial Registration Statement and file a new registration statement (a "NEW REGISTRATION STATEMENT"), in either case covering the maximum number of Registrable Securities permitted to be registered by the SEC, on Form S-3 or such other form available to register for resale the Registrable Securities as a secondary offering; *provided, however*, that prior to filing such amendment or New Registration Statement, the Company shall be obligated to use its commercially reasonable efforts to advocate with the SEC for the registration of all of the Registrable Securities in accordance with the SEC Guidance, including without limitation, Compliance and Disclosure Interpretation 612.09 of the rules adopted under the Securities Act.

iii. Notwithstanding any other provision of this Agreement, if any SEC Guidance sets forth a limitation on the number of Registrable Securities permitted to be registered on a particular Registration Statement as a secondary offering (and notwithstanding that the Company used commercially reasonable efforts to advocate with the SEC for the registration of all or a greater number of Registrable Securities), unless otherwise directed in writing by a holder as to its Registrable Securities, the number of Registrable Securities to be registered on such Registration Statement will first be reduced by (a) Registrable Securities not acquired pursuant to the Pillar Agreement (whether pursuant to registration rights or otherwise) and (b) second by Registrable Securities that are Warrant Shares (applied, in the case that some Warrant Shares may be registered, to the holders on a pro rata basis based on the total number of unregistered Warrant Shares held by such holders).

iv. In the event the Company amends the Initial Registration Statement or files a New Registration Statement, as the case may be, under clause ii. above, the Company will use its commercially reasonable efforts to file with the SEC, as promptly as allowed by the SEC or the SEC Guidance provided to the Company or to registrants of securities in general, one or more registration statements on Form S-3 or such other form available to register for resale those Registrable Securities that were not registered for resale on the Initial Registration Statement, as amended, or the New Registration Statement (the "REMAINDER REGISTRATION STATEMENTS").

#### B. PAYMENTS BY THE COMPANY.

i. If the Initial Registration Statement or the New Registration Statement, as the case may be, is not declared effective by the SEC on or before [ • ], 2013 (the "REGISTRATION DEADLINE") or, (ii) if, after a Registration Statement has been declared effective by the SEC, sales of any of the Registrable Securities covered by such Registration Statement cannot be made pursuant to such Registration Statement because such Registration Statement has been suspended (by reason of a stop order or the Company's failure to update the Registration Statement or otherwise) except as a result of a permitted Suspension under Section 9, then the Company will make payments to the Purchasers in such amounts and at such times as shall be determined pursuant to this Section 2(B), as liquidated damages and not as a penalty for such delay in or reduction of their ability to sell the Registrable Securities (which remedy shall constitute the Purchasers exclusive monetary remedy). In such event, the Company shall pay to each Purchaser an amount equal to the product of (i) the aggregate exercise price of the Warrants then held by such Purchaser which are not able to be sold pursuant to a Registration Statement for such reasons (the "AGGREGATE WARRANT PRICE"), multiplied by (ii) one hundredths

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(.01), for each thirty (30) day period, (A) after the Registration Deadline and prior to the date the Initial Registration Statement or the New Registration Statement, as the case may be, is declared effective by the SEC, and (B) during which sales of any Registrable Securities covered by a Registration Statement cannot be made pursuant to any such Registration Statement after the Registration Statement has been declared effective; provided, however, that there shall be excluded from each such period any delays which are attributable to changes (other than corrections of Company mistakes with respect to information previously provided by the Purchasers) required by the Purchasers in the Registration Statement with respect to information relating to the Purchasers, including, without limitation, changes to the plan of distribution. Such amounts shall be paid in cash within five (5) trading days after the end of each thirty (30) day period that gives rise to such obligation.

ii. Notwithstanding the foregoing, in no event shall the Company be obligated to make payments hereunder (a) to more than one Purchaser in respect of the same Registrable Securities for the same period of time or (b) to any one Purchaser in an aggregate amount that exceeds 10% of the Aggregate Warrant Price of the Warrants then held by such Purchaser. All liquidated damages hereunder shall apply on a daily pro-rata basis for any portion of a 30-day period prior to the cure of any of the events specified in (A) or (B) of this Section 2(B).

iii. The Company shall not be liable for liquidated damages under this Agreement as to any Registrable Securities which are not permitted by the SEC to be included in the Initial Registration Statement or the New Registration Statement due solely to SEC Guidance relating to the inclusion of such Registrable Securities in a Registration Statement from the time that it is determined that such Registrable Securities are not permitted to be registered. In such case, the liquidated damages shall be calculated to only apply to the Registrable Securities which are permitted in accordance with SEC Guidance relating to the inclusion of such Registrable Securities in a Registration Statement to be included in such Initial Registration Statement or such New Registration Statement.

### 3. OBLIGATIONS OF THE COMPANY.

In connection with the registration of the Registrable Securities, the Company shall have the following obligations:

A. The Company shall prepare and file with the SEC such amendments (including post-effective amendments) and supplements to each Registration Statement and the prospectus used in connection with each Registration Statement as may be necessary to keep each such Registration Statement effective pursuant to Rule 415 at all times until no Registrable Securities thereunder remain outstanding (the "REGISTRATION PERIOD"), and, during such period, comply with the provisions of the Securities Act in order to enable the disposition of all Registrable Securities of the Company covered by the Registration Statement until such time as all of such Registrable Securities have been disposed of in accordance with the intended methods of disposition by the seller or sellers thereof as set forth in the Registration Statement.

B. In connection with the effectiveness of each Registration Statement, the Company shall furnish to each Purchaser whose Registrable Securities are included in the Registration

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Statement within three trading days of the date of effectiveness of the Registration Statement or any amendment thereto, a notice stating that the Registration Statement or amendment has been declared effective; and such number of copies of a prospectus, including a preliminary prospectus, and all amendments and supplements thereto and such other documents as such Purchaser may reasonably request in order to facilitate the disposition of the Registrable Securities owned by such Purchaser.

C. The Company shall use its reasonable best efforts to (i) register and qualify the Registrable Securities covered by Registration Statements under such other securities or “blue sky” laws of such jurisdictions in the United States as each Purchaser who holds Registrable Securities being offered reasonably requests, (ii) prepare and file in those jurisdictions such amendments (including post-effective amendments) and supplements to such registrations and qualifications as may be necessary to maintain the effectiveness thereof during the Registration Period, (iii) take such other actions as may be necessary to maintain such registrations and qualifications in effect at all times during the Registration Period, and (iv) take all other actions reasonably necessary or advisable to qualify the Registrable Securities for sale in such jurisdictions; provided, however, that the Company shall not be required in connection therewith or as a condition thereto to (a) qualify to do business in any jurisdiction where it would not otherwise be required to qualify but for this Section 3(C), (b) subject itself to general taxation in any such jurisdiction, (c) file a general consent to service of process in any such jurisdiction, (d) provide any undertakings that cause the Company undue expense or burden, or (e) make any change in its charter or by-laws, which in each case the Board of Directors of the Company determines to be contrary to the best interests of the Company and its stockholders.

D. The Company shall notify each Purchaser who holds Registrable Securities of the time when a supplement to any prospectus forming a part of a Registration Statement has been filed and of any request by the SEC for the amending or supplementing of such Registration Statement or prospectus. If the Company has delivered a Prospectus and after having done so the prospectus is amended to comply with the requirements of the Securities Act, the Company shall promptly notify each Purchaser who holds Registrable Securities covered by such prospectus and, if requested, such Purchasers shall immediately cease making offers of Registrable Securities pursuant to such prospectus and return all copies of such prospectus to the Company. The Company shall promptly provide the Purchasers with revised prospectuses and, following receipt of the revised prospectuses, the Purchasers shall be free to resume making offers of the Registrable Securities.

E. The Company shall provide a transfer agent and registrar, which may be a single entity, for the Registrable Securities not later than the effective date of the Initial Registration Statement or the New Registration Statement, as applicable.

F. The Company shall cooperate with the Purchasers who hold Registrable Securities to facilitate the timely preparation and delivery of certificates representing Registrable Securities to be offered pursuant to the Registration Statements and enable such certificates to be in such denominations or amounts, as the case may be, as Purchasers may reasonably request and registered in such names as the Purchasers may request.

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G. At the reasonable request of the Purchasers holding a majority in interest of the Registrable Securities covered by a Registration Statement, the Company shall prepare and file with the SEC such amendments (including post effective amendments) and supplements to such Registration Statement and the prospectus used in connection with such Registration Statement as may be necessary in order to change the plan of distribution set forth in such Registration Statement.

H. The Company shall use its reasonable best efforts to cause all Registrable Securities registered pursuant to this Agreement to be listed on each securities exchange or trading system on which similar securities issued by the Company are then listed.

4. OBLIGATIONS OF THE PURCHASERS. In connection with the registration of the Registrable Securities, the Purchasers shall have the following obligations:

A. It shall be a condition precedent to the obligations of the Company under Sections 2 and 3 with respect to the Registrable Securities of a particular Purchaser that such Purchaser shall furnish to the Company such information regarding itself, the Registrable Securities held by it and the intended method of disposition of the Registrable Securities held by it as shall be reasonably required to effect the registration of such Registrable Securities and shall execute such documents in connection with such registration as the Company may reasonably request. At least five (5) trading days prior to the first anticipated filing date of the Initial Registration Statement or the New Registration Statement, as the case may be, the Company shall notify each Purchaser of the information the Company requires from each such Purchaser.

B. Each Purchaser, by such Purchaser's acceptance of the Registrable Securities, agrees to cooperate with the Company as reasonably requested by the Company in connection with the preparation and filing of each Registration Statement hereunder, unless such Purchaser has notified the Company in writing of such Purchaser's election to exclude all of such Purchaser's Registrable Securities from such Registration Statement.

C. Each Purchaser agrees that, upon receipt of any notice from the Company of the happening of any event of the kind described in Sections 3(D) or 9, such Purchaser will immediately discontinue disposition of Registrable Securities pursuant to the Registration Statement covering such Registrable Securities until such Purchaser's receipt of the copies of the supplemented or amended prospectus contemplated by Sections 3(D) or 9.

5. EXPENSES OF REGISTRATION. All reasonable expenses incurred by the Company or the Purchasers in connection with registrations, filings or qualifications pursuant to Sections 2 and 3 above, including, without limitation, all registration, listing and qualifications fees, printers and accounting fees, the fees and disbursements of counsel for the Company and the fees and disbursements of one counsel selected by the Purchasers, shall be borne by the Company, excluding underwriting discounts, selling commissions and similar costs which shall be borne by the Purchasers.

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6. INDEMNIFICATION. In the event any Registrable Securities are included in a Registration Statement under this Agreement:

A. To the extent permitted by law, the Company will indemnify, hold harmless and defend (i) each Purchaser who holds such Registrable Securities, and (ii) the directors, officers, partners, members, employees and agents of such Purchaser and each person who controls any Purchaser within the meaning of Section 15 of the Securities Act or Section 20 of the Securities Exchange Act of 1934, as amended (the "EXCHANGE ACT"), if any, (each, an "INDEMNIFIED PERSON"), against any joint or several losses, claims, damages, liabilities or expenses (collectively, together with actions, proceedings or inquiries by any regulatory or self-regulatory organization, whether commenced or threatened, in respect thereof, "CLAIMS") to which any of them may become subject insofar as such Claims arise out of or are based upon: (i) any untrue statement or alleged untrue statement of a material fact in a Registration Statement or the omission or alleged omission to state therein a material fact required to be stated or necessary to make the statements therein not misleading, (ii) any untrue statement or alleged untrue statement of a material fact contained in any preliminary prospectus if used prior to the effective date of such Registration Statement, or contained in the final prospectus (as amended or supplemented, if the Company files any amendment thereof or supplement thereto with the SEC) or the omission or alleged omission to state therein any material fact necessary to make the statements made therein, in light of the circumstances under which the statements therein were made, not misleading, or (iii) any violation or alleged violation by the Company of the Securities Act, the Exchange Act, any other law, including, without limitation, any state securities law, or any rule or regulation thereunder relating to the offer or sale of the Registrable Securities (the matters in the foregoing clauses (i) through (iii), collectively, "VIOLATIONS"). Subject to the restrictions set forth in Section 6(C) with respect to the number of legal counsel, the Company shall reimburse the Purchasers and each other Indemnified Person, promptly as such expenses are incurred and are due and payable, for any reasonable legal fees or other reasonable expenses incurred by them in connection with investigating or defending any such Claim. Notwithstanding anything to the contrary contained herein, the obligations of the Company contained in this Section 6(A): (i) shall not apply to a Claim arising out of or based upon (A) a Violation which occurs in reliance upon and in conformity with information furnished in writing to the Company by such Indemnified Person expressly for use in the Registration Statement or any such amendment thereof or supplement thereto, (B) the failure of a Purchaser to comply with Section 4(C) or (C) the use by a Purchaser in connection with any sale or sales of Registrable Securities of a prospectus containing any untrue statement or omission of a material fact following notification by the Company that such prospectus contains an untrue statement or omission of a material fact and receipt by the Purchaser of a corrected prospectus; and (ii) shall not apply to amounts paid in settlement of any Claim if such settlement is effected without the prior written consent of the Company, which consent shall not be unreasonably withheld. Such indemnity shall remain in full force and effect regardless of any investigation made by or on behalf of the Indemnified Person and shall survive the transfer of the Registrable Securities by the Purchasers pursuant to Section 10 hereof.

B. Each Purchaser who holds such Registrable Securities agrees severally and not jointly to indemnify, hold harmless and defend, to the same extent and in the same manner set forth in Section 6(A), the Company, each of its directors, each of its officers who signs the Registration Statement, its employees, agents and each person, if any, who controls the Company within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act, and any other stockholder selling securities pursuant to the Registration Statement or any of its directors or officers or any person who controls such stockholder within the meaning of the

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Securities Act or the Exchange Act (collectively and together with an Indemnified Person, an "INDEMNIFIED PARTY"), against any Claim to which any of them may become subject, under the Securities Act, the Exchange Act or otherwise, insofar as such Claim arises out of or is based upon any Violation, in each case to the extent (and only to the extent) that such Violation occurs in reliance upon and in conformity with written information furnished to the Company by such Purchaser expressly for use in connection with such Registration Statement; and subject to Section 6(C) such Purchaser will reimburse any legal or other expenses (promptly as such expenses are incurred and are due and payable) reasonably incurred by them in connection with investigating or defending any such Claim; provided, however, that (I) the obligations of a Purchaser contained in this Section 6(B) shall not apply to amounts paid in settlement of any Claim if such settlement is effected without the prior written consent of such Purchaser, which consent shall not be unreasonably withheld, and (II) the Purchaser shall be liable under this Agreement (including this Section 6(B) and Section 7) for only that amount as does not exceed the gross proceeds actually received by such Purchaser as a result of the sale of Registrable Securities pursuant to such Registration Statement. Such indemnity shall remain in full force and effect regardless of any investigation made by or on behalf of such Indemnified Party and shall survive the transfer of the Registrable Securities by the Purchasers pursuant to Section 10 hereof.

C. Promptly after receipt by an Indemnified Person or Indemnified Party under this Section 6 of notice of the threat or commencement of any action (including any governmental action), such Indemnified Person or Indemnified Party shall, if a Claim in respect thereof is to be made against any indemnifying party under this Section 6, deliver to the indemnifying party a written notice of the commencement thereof, and the indemnifying party shall have the right to participate in, and, to the extent the indemnifying party so desires, jointly with any other indemnifying party similarly notified, to assume control of the defense thereof with counsel mutually satisfactory to the indemnifying party and the Indemnified Person or the Indemnified Party, as the case may be; provided, however, that such indemnifying party shall not be entitled to assume such defense and an Indemnified Person or Indemnified Party shall have the right to retain its own counsel with the fees and expenses to be paid by the indemnifying party, if, in the reasonable opinion of counsel retained by the indemnifying party, the representation by such counsel of the Indemnified Person or Indemnified Party and the indemnifying party would be inappropriate due to actual or potential conflicts of interest between such Indemnified Person or Indemnified Party and any other party represented by such counsel in such proceeding or the actual or potential defendants in, or targets of, any such action include both the Indemnified Person or the Indemnified Party and the indemnifying party and any such Indemnified Person or Indemnified Party reasonably determines, based upon the reasonable opinion of counsel, that there may be legal defenses available to such Indemnified Person or Indemnified Party which are in conflict with those available to such indemnifying party. The indemnifying party shall pay for only one separate legal counsel for the Indemnified Persons or the Indemnified Parties, as applicable, and such legal counsel shall be selected by Purchasers holding a majority-in-interest of the Registrable Securities included in the Registration Statement to which the Claim relates (with the approval of the Purchasers if it holds Registrable Securities included in such Registration Statement), if the Purchasers are entitled to indemnification hereunder, or by the Company, if the Company is entitled to indemnification hereunder, as applicable. The failure to deliver written notice to the indemnifying party within a reasonable time of the commencement of any such action shall not relieve such indemnifying party of any liability to the Indemnified Person or Indemnified Party under this Section 6, except to the extent that the indemnifying party is actually prejudiced in its ability to defend such action.

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D. The Indemnified Party shall cooperate fully with the indemnifying party in connection with any negotiation or defense of any such action or claim by the indemnifying party and shall furnish to the indemnifying party all information reasonably available to the Indemnified Party which relates to such action or claim.

E. No indemnifying party shall, except with the consent of each Indemnified Party (which consent shall not be unreasonably withheld), consent to entry of any judgment or enter into any settlement which does not include the giving by the claimant to such Indemnified Party a release from all liability in respect to such claim or litigation.

7. CONTRIBUTION. To the extent any indemnification by an indemnifying party required by the terms of this Agreement is prohibited or limited by law, the indemnifying party, in lieu of indemnifying the Indemnified Party, agrees to contribute with respect to any amounts for which it would otherwise be liable under Section 6 up to the amount paid or payable by the indemnifying party as a result of the Claims in such proportion as is appropriate to reflect the relative fault of the indemnifying party, on the one hand, and the Indemnified Person or Indemnified Party, as the case may be, on the other hand, with respect to the Violation giving rise to the applicable Claim; provided, however, that (i) no contribution shall be made under circumstances where the maker would not have been liable for indemnification under the fault standards set forth in Section 6, (ii) no person guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) shall be entitled to contribution from any seller of Registrable Securities who was not guilty of such fraudulent misrepresentation, and (iii) contribution (together with any indemnification or other obligations under this Agreement) by any seller of Registrable Securities shall be limited in amount to the amount of gross proceeds received by such seller from the sale of such Registrable Securities. The relative fault of the Company and the Purchasers shall be determined by reference to, among other things, whether the untrue or alleged untrue statement of material fact related to information supplied by the Company or the Purchasers and the parties' relative intent, knowledge, access to information and opportunity to correct or prevent such statement or omission.

8. REPORTS UNDER THE EXCHANGE ACT. With a view to making available to the Purchasers the benefits of Rule 144 promulgated under the Securities Act or any other similar rule or regulation of the SEC that may at any time permit each Purchaser to sell securities of the Company to the public, so long as the Registration Statement is effective and such Purchaser holds Registrable Securities, without registration ("RULE 144"), the Company agrees to:

i. file with the SEC in a timely manner and make and keep available all reports and other documents required of the Company under the Securities Act and the Exchange Act so long as the Company remains subject to such requirements and the filing and availability of such reports and other documents is required for the applicable provisions of Rule 144; and

ii. furnish to each Purchaser so long as such Purchaser owns Registrable Securities, promptly upon request, (i) a written statement by the Company that it has complied with the reporting requirements of Rule 144, the Securities Act and the Exchange Act, (ii) a copy



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of the most recent annual or quarterly report of the Company and such other reports and documents so filed by the Company, and (iii) such other information as may be reasonably requested to permit the Purchasers to sell such securities under Rule 144 without registration.

9. **SUSPENSION OF USE OF PROSPECTUS.** Subject to Section 2(B), the Company may, by written notice to the Purchasers, (i) delay the filing of, or effectiveness of, a Registration Statement; or (ii) suspend such Registration Statement after effectiveness and require that the Purchasers immediately cease sales of Registrable Securities pursuant to such Registration Statement, if (a) the Company reasonably believes that there is or may be in existence material nonpublic information or events involving the Company, the failure of which to be disclosed in the prospectus included in the registration statement would result in a Violation, and (b) the Company shall furnish to the Purchasers a certificate signed by the Chairman of the Board of Directors of the Company stating that in the good faith judgment of the Board of Directors of the Company, it would have a material adverse effect on the Company (which for this purpose shall include a material adverse effect on a pending transaction) to disclose such material nonpublic information or events in the prospectus included in the registration statement (a "SUSPENSION"). The Company shall not disclose such information or events to any Purchaser. If the Company requires the Purchasers to cease sales of Registrable Securities pursuant to a Suspension, the Company shall, as promptly as practicable following the termination of the circumstance which entitled the Company to do so, take such actions as may be necessary to reinstate the effectiveness of the Registration Statements covering such Registrable Securities, and/or give written notice to the Purchasers authorizing them to resume sales pursuant to the Registration Statements. If, as a result thereof, the prospectuses included in the Registration Statements have been amended to comply with the requirements of the Securities Act, the Company shall enclose such revised prospectuses with the notice to the Purchasers given pursuant hereto, and the Purchasers shall make no offers or sales of Registrable Securities pursuant to the Registration Statements other than by means of such revised prospectus. The Company shall not cause a Suspension on more than two occasions during any twelve (12) month period or for more than thirty (30) days per such occasion.

10. **ASSIGNMENT OF REGISTRATION RIGHTS.** The rights of the Purchasers hereunder, including the right to have the Company register Registrable Securities pursuant to this Agreement, shall be automatically assignable by each Purchaser to any affiliate of the Purchaser to which all or any portion of the Registrable Securities are transferred if: (i) the Purchaser agrees in writing with the transferee or assignee to assign such rights, and a copy of such agreement is furnished to the Company after such assignment, (ii) the Company is furnished with written notice of (a) the name and address of such transferee or assignee, and (b) the securities with respect to which such registration rights are being transferred or assigned, (iii) the transferee or assignee agrees in writing for the benefit of the Company to be bound by all of the provisions contained herein, and (iv) such transfer shall have been made in accordance with the applicable requirements of the Pillar Agreement and the Warrants, as applicable.

11. **AMENDMENT OF REGISTRATION RIGHTS.** Provisions of this Agreement may be amended and the observance thereof may be waived (either generally or in a particular instance and either retroactively or prospectively), only with written consent of the Company and Purchasers who hold a majority in interest of the Registrable Securities; provided, however, that no consideration shall be paid to a Purchaser by the Company in connection with an amendment

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hereto unless each Purchaser similarly affected by such amendment receives a pro-rata amount of consideration from the Company. Unless a Purchaser otherwise agrees, each amendment hereto must similarly affect each Purchaser. Any amendment or waiver effected in accordance with this Section 11 shall be binding upon each Purchaser and the Company.

12. MISCELLANEOUS.

A. A person or entity is deemed to be a holder of Registrable Securities whenever such person or entity owns of record such Registrable Securities. If the Company receives conflicting instructions, notices or elections from two or more persons or entities with respect to the same Registrable Securities, the Company shall act upon the basis of instructions, notice or election received from the registered owner of such Registrable Securities.

B. All notices required or permitted hereunder shall be in writing and shall be deemed effectively given: (i) upon delivery to the party to be notified, (ii) when received by email or confirmed facsimile, or (iii) one (1) business day after deposit with a nationally recognized overnight carrier, specifying next business day delivery, with written verification of receipt. All communications shall be sent to the Company and the Purchasers as follows or at such other addresses as the Company or the Purchasers may designate upon ten (10) days' advance written notice to the other party:

If to the Company:

Idera Pharmaceuticals, Inc.  
167 Sidney Street  
Cambridge, MA 02139  
Attn: Chief Executive Officer  
Fax: (617)-679-5592  
Email: [sagrawal@iderapharma.com](mailto:sagrawal@iderapharma.com)

with a copy simultaneously transmitted by like means to:

Wilmer Cutler Pickering Hale and Dorr LLP  
60 State Street  
Boston, Massachusetts 02109  
Attn: Stuart Falber  
Fax: (617) 526-5000  
Email: [stuart.falber@wilmerhale.com](mailto:stuart.falber@wilmerhale.com)

If to a Purchaser, at its address as set forth on the Schedule of Purchasers attached to the Pillar Agreement.

C. Failure of any party to exercise any right or remedy under this Agreement or otherwise, or delay by a party in exercising such right or remedy, shall not operate as a waiver thereof.

D. This Agreement shall be governed by and construed in accordance with the laws of the State of Delaware without regard to principles of conflicts of law.

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E. This Agreement, the Pillar Agreement (including all schedules and exhibits thereto) and the Warrants constitute the entire agreement among the parties hereto with respect to the subject matter hereof and thereof. There are no restrictions, promises, warranties or undertakings, other than those set forth or referred to herein and therein. This Agreement, the Pillar Agreement and the Warrants supersede all prior agreements and understandings among the parties hereto with respect to the subject matter hereof and thereof.

F. Subject to the requirements of Section 10 hereof, this Agreement shall inure to the benefit of and be binding upon the successors and assigns of each of the parties hereto.

G. The headings in this Agreement are for convenience of reference only and shall not limit or otherwise affect the meaning hereof.

H. This Agreement may be executed in two or more counterparts, each of which shall be deemed an original but all of which shall constitute one and the same agreement. This Agreement, once executed by a party, may be delivered to the other party hereto by facsimile transmission of a copy of this Agreement bearing the signature of the party so delivering this Agreement.

I. Each party shall do and perform, or cause to be done and performed, all such further acts and things, and shall execute and deliver all such other agreements, certificates, instruments and documents, as the other party may reasonably request in order to carry out the intent and accomplish the purposes of this Agreement and the consummation of the transactions contemplated hereby.

J. All consents, approvals and other determinations to be made by the Purchasers pursuant to this Agreement shall be made by the Purchasers holding a majority in interest of the Registrable Securities (determined as if all Warrant Shares then outstanding had been converted into or exercised for Registrable Securities) held by all Purchasers.

K. Each party to this Agreement has participated in the negotiation and drafting of this Agreement. As such, the language used herein shall be deemed to be the language chosen by the parties hereto to express their mutual intent, and no rule of strict construction will be applied against any party to this Agreement.

L. For purposes of this Agreement, the term "Business Day" means any day other than a Saturday or Sunday or a day on which banking institutions in the State of New York are authorized or obligated by law, regulation or executive order to close, and the term "Trading Day" means any day on which the Nasdaq Global Market, or if the Common Stock is not then traded on the Nasdaq Global Market the principal securities exchange or trading market where the Common Stock is then listed or traded, is open for trading.

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IN WITNESS WHEREOF, the parties have caused this Agreement to be duly executed as of the date first above written.

IDERA PHARMACEUTICALS, INC.

By: \_\_\_\_\_

Name: Sudhir Agrawal

Its: Chief Executive Officer and  
President

[SIGNATURE PAGE TO REGISTRATION RIGHTS AGREEMENT]

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PURCHASER:

PILLAR PHARMACEUTICALS [I], L.P.

By: Pillar Invest Corporation, its General Partner

By: \_\_\_\_\_

Name:

Title:

[SIGNATURE PAGE TO REGISTRATION RIGHTS AGREEMENT]

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EXHIBIT A

Purchaser

Pillar Pharmaceuticals I, L.P.

Pillar Pharmaceuticals II, L.P.

Participations Besancon

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**EXHIBIT C**

**Amendment to Series D Certificate of Designations**

**IDERA PHARMACEUTICALS, INC.  
CERTIFICATE OF AMENDMENT OF  
CERTIFICATE OF DESIGNATIONS, PREFERENCES AND RIGHTS OF  
SERIES D PREFERRED STOCK**

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Pursuant to Section 242 of the  
General Corporation Law of the State of Delaware

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Idera Pharmaceuticals, Inc., a Delaware corporation (the "Corporation"), in accordance with Section 103 of the General Corporation Law of the State of Delaware (the "General Corporation Law"), hereby certifies as follows:

A Certificate of Designations, Preferences and Rights of Series D Preferred Stock (the "Certificate of Designations") was filed with the Secretary of State of the State of Delaware on November 4, 2011 pursuant to Section 151 of the General Corporation Law. The Board of Directors of the Corporation pursuant to Section 242 of the General Corporation Law duly adopted a resolution setting forth a proposed amendment of the Certificate of Designations, and declaring such amendment advisable. The proposed amendment was duly adopted in accordance with the provisions of Sections 242 of the General Corporation Law. The resolutions setting forth the proposed amendment are as follows:

**RESOLVED**, that Section 2.1 of the Certificate of Designations be deleted in its entirety and that the following paragraph be inserted in lieu thereof:

"2.1 Payments to Holders of Series D Preferred Stock. In the event of any voluntary or involuntary liquidation, dissolution or winding up of the Corporation, the holders of shares of Series D Preferred Stock then outstanding shall be entitled to be paid out of the assets of the Corporation available for distribution to its stockholders before any payment shall be made to the holders of Common Stock, Series A Convertible Preferred Stock or any other class of capital stock of the Corporation ranking junior to the Series D Preferred Stock as to liquidation, by reason of their ownership thereof, an amount per share equal to such amount as would have been payable with respect to such share had all shares of Series D Preferred Stock been converted into Common Stock pursuant to Section 4 immediately prior to such liquidation, dissolution or winding up, disregarding for these purposes the limitations on conversion due to beneficial ownership set forth in Subsection 4.1.1. If upon any such liquidation, dissolution or winding up of the Corporation, the assets of the Corporation available for distribution to its stockholders shall be insufficient to pay the holders of shares of Series D Preferred Stock the full amount to which they shall be entitled under this Subsection 2.1, the holders of shares of Series D Preferred Stock shall share ratably in any distribution of the assets available for distribution in proportion to the respective amounts which would otherwise be payable in respect of the shares held by them upon such distribution if all amounts payable on or with respect to such shares were paid in full."

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IN WITNESS WHEREOF, this Certificate of Amendment has been executed by a duly authorized officer of the Corporation on this      day of      ,  
2013.

IDERA PHARMACEUTICALS, INC.

By: \_\_\_\_\_

Name: Sudhir Agrawal

Title: Chief Executive Officer

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**EXHIBIT D**

**Amendment to Series E Certificate of Designations**

**IDERA PHARMACEUTICALS, INC.**  
**CERTIFICATE OF AMENDMENT OF**  
**CERTIFICATE OF DESIGNATIONS, PREFERENCES AND RIGHTS OF**  
**SERIES E PREFERRED STOCK**

\_\_\_\_\_  
Pursuant to Section 242 of the  
General Corporation Law of the State of Delaware  
\_\_\_\_\_

Idera Pharmaceuticals, Inc., a Delaware corporation (the "Corporation"), in accordance with Section 103 of the General Corporation Law of the State of Delaware (the "General Corporation Law"), hereby certifies as follows:

A Certificate of Designations, Preferences and Rights of Series E Preferred Stock (the "Certificate of Designations") was filed with the Secretary of State of the State of Delaware on November 9, 2012 pursuant to Section 151 of the General Corporation Law. The Board of Directors of the Corporation pursuant to Section 242 of the General Corporation Law duly adopted a resolution setting forth a proposed amendment of the Certificate of Designations, and declaring such amendment advisable. The proposed amendment was duly adopted in accordance with the provisions of Sections 242 of the General Corporation Law. The resolutions setting forth the proposed amendment are as follows:

**RESOLVED**, that Section 2.1.1 of the Certificate of Designations be deleted in its entirety and that the following paragraph be inserted in lieu thereof:

"2.1.1 In the event of any voluntary or involuntary liquidation, dissolution or winding up of the Corporation, the holders of shares of Series E Preferred Stock then outstanding shall be entitled to be paid out of the assets of the Corporation available for distribution to its stockholders before any payment shall be made to the holders of Common Stock, Series A Convertible Preferred Stock, Series D Convertible Preferred Stock or any other class of capital stock of the Corporation ranking junior to the Series E Preferred Stock as to liquidation, by reason of their ownership thereof, an amount per share equal to such amount as would have been payable with respect to such share had all shares of Series E Preferred Stock been converted into Common Stock pursuant to Subsection 4 immediately prior to such liquidation, dissolution or winding up disregarding for these purposes the limitations on conversion due to beneficial ownership set forth in Subsection 4.1.2."

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IN WITNESS WHEREOF, this Certificate of Amendment has been executed by a duly authorized officer of the Corporation on this      day of      ,  
2013.

IDERA PHARMACEUTICALS, INC.

By: \_\_\_\_\_

Name: Sudhir Agrawal

Title: Chief Executive Officer

**Consent of Independent Registered Public Accounting Firm**

We consent to the reference to our firm under the caption “Experts” and to the use of our report dated March 11, 2013, in this Amendment No. 2 to Registration Statement (Form S-1), File No. 333-187155, and the related Prospectus of Idera Pharmaceuticals, Inc. dated May 1, 2013.

/s/ Ernst & Young LLP

Boston, Massachusetts  
April 30, 2013