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As filed with the Securities and Exchange Commission on October 29, 2013

Registration No. 333-191643

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

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AMENDMENT NO. 2  
TO  
**FORM S-1**  
REGISTRATION STATEMENT  
UNDER  
THE SECURITIES ACT OF 1933

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**TREVENA, INC.**

(Exact name of registrant as specified in its charter)

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**Delaware**  
(State or other jurisdiction of  
incorporation or organization)

**2834**  
(Primary Standard Industrial  
Classification Code Number)

**26-1469215**  
(I.R.S. Employer  
Identification Number)

**1018 West 8th Avenue, Suite A  
King of Prussia, PA 19406  
(610) 354-8840**

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

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**Maxine Gowen, Ph.D.**  
**President and Chief Executive Officer**  
**Trevena, Inc.**  
**1018 West 8th Avenue, Suite A  
King of Prussia, PA 19406  
(610) 354-8840**

(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 practicable after the effective date of this registration statement.

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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 number of the earlier effective registration statement for the same offering.

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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 under the Securities Exchange Act of 1934. (Check one):

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 that specifically states that this Registration Statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933, as amended, or until the registration statement shall become effective on such date as the Commission, acting pursuant to said Section 8(a), may determine.

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The information in this preliminary prospectus is not complete and may be changed. These securities may not be sold until the registration statement filed with the Securities and Exchange Commission is effective. This preliminary prospectus is not an offer to sell nor does it seek an offer to buy these securities in any jurisdiction where the offer or sale is not permitted.

Subject to Completion, dated \_\_\_\_\_, 2013

PROSPECTUS

Shares



**Trevena, Inc.**

Common Stock

This is an initial public offering of shares of common stock of Trevena, Inc. All of the shares of common stock are being sold by us.

Prior to this offering, there has been no public market for our common stock. It is currently estimated that the initial public offering price per share will be between \$ \_\_\_\_\_ and \$ \_\_\_\_\_. We have applied to list our common stock on The NASDAQ Global Market under the symbol "TRVN."

We are an "emerging growth company" as that term is used in the Jumpstart Our Business Startups Act of 2012 and, as such, have elected to comply with certain reduced public company reporting requirements.

See "Risk Factors" beginning on page 12 to read about factors you should consider before buying shares of our common stock.

	<u>Per Share</u>	<u>Total</u>
Initial public offering price	\$ _____	\$ _____
Underwriting discount(1)	\$ _____	\$ _____
Proceeds, before expenses, to Trevena	\$ _____	\$ _____

(1) We refer you to "Underwriting" beginning on page 162 of this prospectus for additional information regarding underwriter compensation.

To the extent that the underwriters sell more than \_\_\_\_\_ shares of common stock, the underwriters have the option to purchase up to an additional \_\_\_\_\_ shares from us at the initial public offering price less the underwriting discount.

**Neither the Securities and Exchange Commission nor any other regulatory body has approved or disapproved of these securities or passed upon the accuracy or adequacy of this prospectus. Any representation to the contrary is a criminal offense.**

The underwriters expect to deliver the shares against payment in New York, New York on \_\_\_\_\_, 2013.

**Barclays**

**Jefferies**

**Canaccord Genuity**

**JMP Securities**

**Needham & Company**

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

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We have not authorized anyone to provide any information or to make any representations other than those contained in this prospectus or in any free writing prospectuses we have prepared. We take no responsibility for, and can provide no assurance as to the reliability of, any other information that others may give you. This prospectus is an offer to sell only the shares offered hereby, but only under circumstances and in jurisdictions where it is lawful to do so. The information contained in this prospectus is current only as of its date.

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 who come into possession of this prospectus and any applicable free writing prospectus in jurisdictions outside the United States are required to inform themselves about and to observe any restrictions as to this offering and the distribution of this prospectus and any such free writing prospectus applicable to that jurisdiction.

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## PROSPECTUS SUMMARY

*This summary highlights information contained elsewhere in this prospectus and does not contain all of the information that you should consider in making your investment decision. Before investing in our common stock, you should carefully read this entire prospectus, including our financial statements and the related notes thereto and the information set forth under the sections "Risk Factors" and "Management's Discussion and Analysis of Financial Condition and Results of Operations," in each case included in this prospectus. Unless the context otherwise requires, we use the terms "Trevena," "company," "we," "us" and "our" in this prospectus to refer to Trevena, Inc.*

### Company Overview

We are a clinical stage biopharmaceutical company that discovers, develops and intends to commercialize therapeutics that use a novel approach to target G protein coupled receptors, or GPCRs. Using our proprietary product platform, we have identified and advanced two differentiated product candidates into the clinic. We have completed a Phase 2a clinical trial and plan to initiate a Phase 2b clinical trial of TRV027 for acute heart failure, or AHF. Forest Laboratories Holdings Limited, or Forest, has the exclusive option to license TRV027 from us. Our other lead program, TRV130, has completed a Phase 1b clinical trial to evaluate its potential to treat moderate to severe acute pain intravenously and we plan to complete two additional Phase 1 clinical trials and to initiate a Phase 2 trial in the first half of 2014. We have retained all worldwide development and commercialization rights to TRV130. We plan to develop and commercialize our two lead product candidates initially in the acute care hospital markets and to advance additional product candidates, including our two most advanced preclinical programs focused on central nervous system, or CNS, indications.

GPCRs are a large family of cell surface receptors that trigger two signaling pathways, G protein and b-arrestin, and are implicated in cellular function and disease processes. More than 30% of all currently marketed therapeutics target GPCRs. Currently available therapeutics that target GPCRs, or GPCR ligands, are typically not signal specific, and therefore either inhibit both the G protein and b-arrestin pathways (an antagonist ligand) or activate both pathways (an agonist ligand). This lack of signal specificity often results in a suboptimal therapeutic profile for these drugs because in many cases one of the pathways is associated with a beneficial therapeutic effect and the other is associated with an undesirable side effect (see Figure 1). We use our proprietary Advanced Biased Ligand Explorer, or ABLE, product platform to identify "biased" ligands, which are compounds that activate one of the two signaling pathways of the GPCR and inhibit the other (see Figure 2). This signaling specificity is the basis for our drug discovery and development approach, which is to identify and develop therapeutics targeting established GPCRs while offering a differentiated and superior therapeutic profile compared to currently available GPCR-targeted drugs.

We were founded in late 2007 to discover and develop product candidates based on biased ligands, a concept discovered by our scientific founder, Dr. Robert Lefkowitz, who was awarded the 2012 Nobel Prize in Chemistry in part for his elucidation of the multiple pathways that a GPCR engages. We believe that we are the first company to progress a GPCR biased ligand into clinical trials. The members of our executive management team have held senior positions at leading pharmaceutical and biotechnology companies and possess substantial experience across the spectrum of drug discovery, development and commercialization. Our principal investors are funds managed by Alta Partners, New Enterprise Associates, Polaris Venture Partners and HealthCare Ventures, as well as Forest.

Figure 1: Mechanism of current GPCR-targeted drugs

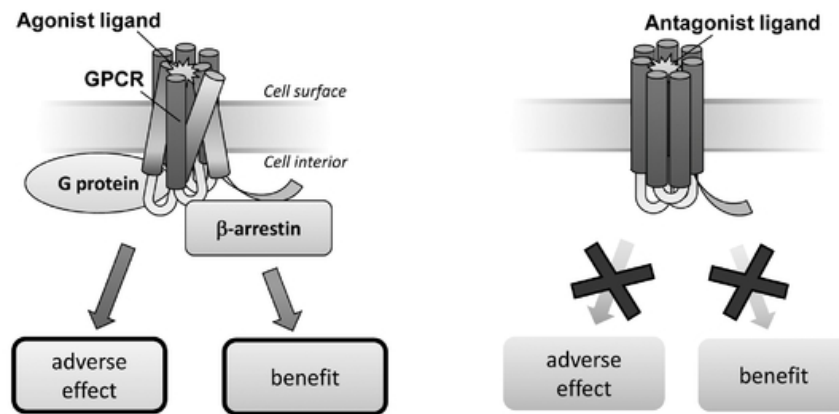
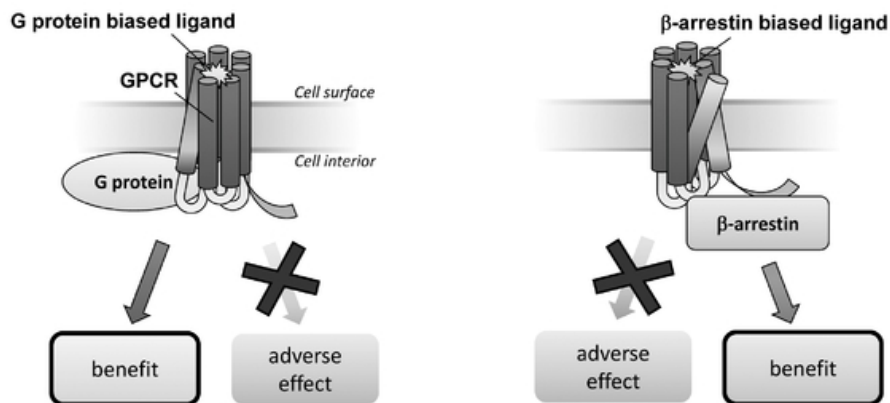


Figure 2: Mechanism of our biased ligands—the next generation of GPCR-targeted drugs




**Our Platform**

Our ABLE product platform is a collection of proprietary biological information, *in vitro* assays, know-how and expertise that we use to identify unique GPCR-targeted biased ligands with attractive pharmaceutical properties. *In vitro* assays are laboratory tests performed outside of a living organism. Our *in vitro* assays use cells that have the receptor of interest on the cell surface, where G protein and b-arrestin signaling from that receptor can be measured to determine if a particular ligand is biased, and if so whether it is a G protein or b-arrestin biased ligand. Our assays can also measure different cellular responses resulting from signaling through b-arrestin and can thereby help us to associate pharmacological responses with molecular signaling. Most components of our ABLE product platform are maintained as trade secrets, but the output of the product platform is reflected in the product candidates that we have advanced into clinical testing and the research we have published in numerous peer-reviewed journals. We believe the set of competencies reflected in our ABLE product platform

provides us with an important competitive advantage in identifying further opportunities for efficient and high-impact biased ligand drug discovery, development and commercialization.

**Our Pipeline**

	Target	Indication	Lead Op.	Preclinical	Phase 1	Phase 2	Phase 3	Ownership
<b>Cardiovascular Program</b>								
TRV027	Angiotensin II type 1 receptor	AHF	intravenous					Collaborator 
<b>CNS Portfolio</b>								
TRV130	$\mu$ -opioid receptor	Post-operative pain	intravenous					Wholly owned
TRV734	$\mu$ -opioid receptor	Acute/chronic pain	oral					Wholly owned
Delta opioid biased ligand	$\delta$ -opioid receptor	Parkinson's disease, depression, pain	oral					Wholly owned

**TRV027**

We are developing TRV027 as a first-line, intravenous, or IV, treatment in combination with standard diuretic therapy for AHF patients. TRV027 is a peptide-arrestin biased ligand that targets the angiotensin II type 1 receptor, or AT1R, which is a GPCR expressed on cells in the cardiovascular system. TRV027 inhibits G protein signaling and activates b-arrestin signaling. In our Phase 2a clinical trial, TRV027 rapidly reduced blood pressure and preserved renal, or kidney, function, while preserving cardiac performance. In the first quarter of 2014, we plan to commence enrollment of patients in a Phase 2b clinical trial to evaluate the safety and efficacy of TRV027 in AHF. We expect data from this trial to be available in the second half of 2015. If subsequent Phase 3 development is successful and TRV027 is approved by regulatory authorities, we believe TRV027 would be used as a first-line in-hospital AHF treatment. We also believe TRV027 could improve AHF symptoms, shorten length of hospital stay in the short term, and potentially lower readmission rates and mortality rates in the long term.

There are over 20 million people living with heart failure in the United States and Europe, according to the American Heart Association and the European Society of Cardiology. AHF, also sometimes referred to as acute decompensated heart failure, is heart failure requiring hospitalization. AHF patients present with severe dyspnea, a serious shortness of breath sometimes described as "air hunger," and fluid overload, leading to an inability to perform simple functions such as standing and walking short distances. This can also lead to organ dysfunction, including dysfunction in the kidneys and heart. The National Hospital Discharge Survey, or NHDS, reported over 5 million hospital discharges in the United States in 2010 where heart failure was listed as a component of the diagnosis, over 1 million of which listed heart failure as the primary diagnosis. Unlike current therapies, TRV027 has shown beneficial effects on the three key organ systems affected in heart failure, the blood vessels, heart and kidneys in our preclinical studies and Phase 1b and 2a clinical trials. In combination with standard diuretics, we believe these effects may translate into improvements in symptoms and outcomes

such as hospital readmission rates, length of hospital stay and mortality rates if TRV027 successfully completes Phase 3 development and is approved by regulatory authorities.

Safety and tolerability issues limit the effectiveness of currently available AHF treatments. We believe that TRV027's tolerability profile differentiates it from current therapies. In healthy subjects in our Phase 1 clinical trial, there were no significant adverse effects even at doses 20 times higher than the expected therapeutic dose. In addition, there were no TRV027-related serious adverse events in a Phase 2a trial in medically fragile, advanced chronic heart failure subjects and no clinically significant adverse events in subjects with heart failure and concomitant renal impairment. Finally, in preclinical toxicology studies, TRV027 had a favorable profile at doses up to 500 times the expected therapeutic dose.

In May 2013, we entered into an option agreement and a license agreement with Forest, under which we granted to Forest an exclusive option to license TRV027, which may be exercised at any time before we deliver our Phase 2b clinical trial results to Forest and during a specified period of time thereafter. If Forest exercises its option, the license agreement between us and Forest will become effective, and Forest will have an exclusive worldwide license to develop and commercialize TRV027 and specified related compounds. Forest will be responsible for subsequent development, regulatory approval and commercialization of TRV027 at Forest's expense. If Forest exercises the option, we could potentially receive up to \$430 million in the aggregate, including an upfront option exercise fee of \$65 million and milestone payments depending upon the achievement of future development and commercial milestones. We could also receive tiered royalties between 10% and 20% on net sales of licensed products worldwide, with the royalty rates on net sales of licensed products in the United States being somewhat higher than the royalty rates on net sales of licensed products outside the United States. A U.S. patent directed to TRV027 has issued and is expected to expire no earlier than 2031.

### **TRV130**

TRV130 is a small molecule G protein biased ligand at the  $\mu$ -opioid receptor, which we are developing as a first-line treatment for patients experiencing moderate to severe acute pain where IV administration is preferred. The  $\mu$ -opioid receptor is a well-established target for analgesics such as fentanyl and morphine, which are unbiased  $\mu$ -opioid agonists. TRV130 activates the  $\mu$ -opioid G protein pathway, associated with analgesia, and inhibits the b-arrestin pathway, which, in preclinical studies, was associated with respiratory depression and constipation. We believe that the management of moderate to severe, acute postoperative pain represents the largest opportunity for an intravenously administered  $\mu$ -opioid therapy like TRV130. Accordingly, we plan to focus our clinical trials on the treatment of surgical patients. We believe avoiding the side effects typically associated with the activation of the  $\mu$ -opioid receptor will position TRV130, if approved, to more effectively treat postoperative pain than currently available  $\mu$ -opioid therapies, thereby expediting postoperative recovery and hospital discharge.

According to data from IMS Health, a healthcare information firm, there were approximately 30 million reimbursement claims made for IV opioids by hospitals in the United States in 2010, of which 14 million were inpatient and 16 million were outpatient claims. We anticipate that the initial market opportunity for TRV130 will be in this acute care hospital setting, with a focus on postoperative pain. The IMS Health reimbursement data also show that 75% of inpatient claims and 50% of outpatient claims for IV opioids were surgery-related in 2010. Despite the development and adoption of guidelines for the management of postoperative pain and the extensive use of current treatments, significant unmet need remains. In a survey of 250 surgical patients in the United States, over 70% of the patients undergoing in-hospital procedures reported pain in the postoperative period before hospital discharge, of which almost 50% experienced severe or extreme pain. The dosing of the most effective class of analgesics currently available, m-opioid agonists, is limited by severe side effects such as respiratory depression, nausea and vomiting, constipation and postoperative ileus, which is a



condition that most commonly occurs after surgery involving interruption of movement of the intestines in which the bowel enters spasm and stops passing food and waste. In our Phase 1b trial in healthy subjects, using an evoked-pain model, TRV130 showed superior analgesia compared to a high dose of morphine, while causing less respiratory depression, nausea and vomiting. We believe these results suggest that TRV130 may have an improved profile compared to unbiased  $\mu$ -opioid agonists, which are the current standard of care in terms of efficacy, safety and tolerability.

Before moving forward with Phase 2 development, we are conducting two additional Phase 1 trials in healthy subjects to add to our clinical understanding of TRV130's pharmacokinetics, pharmacodynamics, and safety and tolerability profiles. We expect to conclude Phase 1 trials and initiate a Phase 2 trial in the first half of 2014. We intend to retain full commercialization rights in the United States for TRV130. After the availability of Phase 2 clinical data for TRV130, if positive, we may seek collaborators for commercializing TRV130 outside of the United States to offset risk and preserve capital. Patent applications have been filed covering TRV130 and methods of using TRV130.

#### **TRV734**

TRV734 is a small molecule G protein biased ligand targeting the  $\mu$ -opioid receptor, which we are developing as a first-line, orally administered compound for the treatment of moderate to severe acute and chronic pain. Like TRV130, TRV734 takes advantage of a well-established mechanism of pain relief by targeting the  $\mu$ -opioid receptor, but does so with enhanced selectivity for the G protein signaling pathway, which we believe, based on preclinical studies and clinical trials, is linked to analgesia as opposed to the b-arrestin signaling pathway associated with side effects. Subject to successful preclinical and clinical development and regulatory approval, we believe TRV734 may have an improved efficacy and side effect profile as compared to current commonly prescribed oral analgesics, such as oxycodone. We have filed patent applications covering TRV734 and methods of using TRV734.

We have completed full preclinical safety pharmacology, toxicology, genotoxicology and pharmaceutical development studies and are preparing to submit an investigational new drug application, or IND, to the U.S. Food and Drug Administration, or FDA. If the IND becomes effective, we expect to be able to initiate Phase 1 trials in the first half of 2014 that would include assessments of safety, tolerability and pharmacokinetics. We expect that these trials will also include the measurement of pupil constriction, which is a well-established surrogate for the analgesic efficacy of opioid drugs, potentially providing an early estimate of the analgesic dose range. We intend to seek a collaborator with experience in developing and commercializing controlled-substance therapeutics in chronic care pain markets, thereby leveraging their expertise while retaining rights to commercialize TRV734 in hospital and specialist markets in the United States.

#### ***d*-opioid receptor program**

We are pursuing a research program to identify an orally bioavailable small molecule G protein biased ligand targeting the  $\delta$ -opioid receptor for the treatment of CNS disorders, of which we intend to initially focus on Parkinson's disease, pain or depression. We expect to complete IND-enabling preclinical studies in 2015. We intend to maintain flexibility on whether to develop and commercialize this product candidate in collaboration with a pharmaceutical company licensee depending on the clinical indications we ultimately decide to pursue, but we intend to retain meaningful commercial rights in any event.

## **Our Strategy**

Our goal is to build a leading biopharmaceutical company leveraging our expertise in biased ligands to develop and commercialize innovative, best-in-class drugs targeting established GPCRs. Key elements of our business strategy to achieve this goal are to:

- Rapidly advance clinical development of our two lead product candidates, TRV027 and TRV130, to commercialization;
- Establish commercialization and marketing capabilities in the United States for any of our approved or anticipated to be approved products, initially in acute care markets;
- Expand our CNS product portfolio through the development of preclinical programs; and
- Leverage our ABLE product platform to continue to discover and develop a pipeline of innovative biased ligand therapeutics and expand our product platform's impact through external collaborations.

## **Financial Overview**

Our revenue to date has been generated primarily through research grants and a research collaboration. We have not generated any commercial product revenue. As of September 30, 2013, we had \$48.0 million of cash and cash equivalents and an accumulated deficit of \$75.4 million. We believe that existing cash plus the net proceeds from the offering will be sufficient to fund our operations through the end of 2015.

## **Risks Associated with Our Business**

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

- We will need substantial additional funding to pursue our business objectives. If we are unable to raise capital when needed, we could be forced to delay, reduce or eliminate our drug development programs or potential commercialization efforts.
- We are early in our development efforts and have only one product candidate, TRV027, in Phase 2 and one more, TRV130, for which we are planning a Phase 2 clinical trial. All of our other product candidates are still in preclinical development. If we, or Forest if it exercises its option to license TRV027, are unable to commercialize our product candidates or experience significant delays in doing so, our business will be materially harmed.
- If Forest exercises its option to license TRV027, that relationship will be important to our business. If Forest's development and commercialization of TRV027 is not successful, our business could be adversely affected.
- We have incurred significant losses since our inception. We expect to continue to incur losses over the next several years and may never achieve or maintain profitability.
- We face substantial competition, which may result in others discovering, developing or commercializing drugs before or more successfully than we do.
- Our future success depends on our ability to retain key executives and to attract, retain and motivate qualified personnel.

## Corporate Information

We were incorporated under the laws of the State of Delaware in November 2007. Our principal executive offices are located at 1018 West 8th Avenue, Suite A, King of Prussia, Pennsylvania 19406. Our telephone number is (610) 354-8840. Our website address is [www.trevenainc.com](http://www.trevenainc.com). The information contained on our website is not incorporated by reference into this prospectus, and you should not consider any information contained on, or that can be accessed through, our website as part of this prospectus or in deciding whether to purchase our common stock.

"Trevena", the Trevena logo and other trademarks or service marks of Trevena, Inc. appearing in this prospectus are the property of Trevena, Inc. This prospectus contains additional trade names, trademarks and service marks of others, which are the property of their respective owners.

## Implications of Being an Emerging Growth Company

As a company with less than \$1 billion in revenue during our last fiscal year, we qualify as an "emerging growth company" as defined in the Jumpstart Our Business Startups Act of 2012, or the JOBS Act. For so long as we remain an emerging growth company, we are permitted and intend to rely on exemptions from specified disclosure requirements that are applicable to other public companies that are not emerging growth companies. These exemptions include:

- Being permitted to provide only two years of audited financial statements, in addition to any required unaudited interim financial statements, with correspondingly reduced "Management's Discussion and Analysis of Financial Condition and Results of Operations" disclosure;
- Not being required to comply with the auditor attestation requirements in the assessment of our internal control over financial reporting;
- Not being required to comply with any requirement that may be adopted by the Public Company Accounting Oversight Board regarding mandatory audit firm rotation or a supplement to the auditor's report providing additional information about the audit and the financial statements;
- Reduced disclosure obligations regarding executive compensation; and
- Exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and shareholder approval of any golden parachute payments not previously approved.

We may take advantage of these provisions for up to five years or such earlier time that we are no longer an emerging growth company. We would cease to be an emerging growth company if we have more than \$1 billion in annual revenue, have more than \$700 million in market value of our capital stock held by non-affiliates or issue more than \$1 billion of non-convertible debt over a three-year period. We may choose to take advantage of some, but not all, of the available exemptions. We have taken advantage of some reduced reporting burdens in this prospectus. Accordingly, the information contained herein may be different than the information you receive from other public companies in which you hold stock.

In addition, the JOBS Act provides that an emerging growth company can take advantage of an extended transition period for complying with new or revised accounting standards. This provision allows an emerging growth company to delay the adoption of some accounting standards until those standards would otherwise apply to private companies. We have irrevocably elected not to avail ourselves of this exemption from new or revised accounting standards and, therefore, we will be subject to the same new or revised accounting standards as other public companies that are not emerging growth companies.

## THE OFFERING

Common stock offered by Trevena	shares.
Total common stock to be outstanding after this offering	shares ( shares if the underwriters elect to exercise their option to purchase additional shares from us in full).
Option to purchase additional shares of common stock	The underwriters have an option to purchase a maximum of additional shares from us. The underwriters can exercise this option at any time within 30 days from the date of this prospectus.
Use of proceeds	<p>We expect the net proceeds to us from this offering, after expenses, to be approximately \$ million, or approximately \$ million if the underwriters exercise their option to purchase additional shares from us in full, based on an assumed initial public offering price of \$ per share. We intend to use the net proceeds from this offering as follows:</p> <ul style="list-style-type: none"><li>• to advance the development of TRV027, TRV130 and TRV734 and pursue other preclinical programs; and</li><li>• the remaining proceeds will be used for working capital and general corporate purposes.</li></ul> <p>See "Use of Proceeds" on page 49 for additional information.</p>
Risk factors	See the section titled "Risk Factors" beginning on page 12 and the other information included in this prospectus for a discussion of factors you should carefully consider before deciding to invest in our common stock.
NASDAQ Global Market symbol	TRVN

The number of shares of our common stock that will be outstanding after this offering is based on 102,014,769 shares of common stock outstanding as of September 30, 2013, after giving effect to the conversion of our outstanding shares of preferred stock into 96,839,703 shares of common stock, and excludes:

- 17,386,829 shares of our common stock issuable upon the exercise of stock options outstanding under our 2008 Equity Incentive Plan as of September 30, 2013, at a weighted average exercise price of \$0.36 per share;
- 1,790,000 shares of our common stock issuable upon exercise of warrants outstanding as of September 30, 2013, at a weighted average exercise price of \$0.99 per share, of which warrants to purchase 1,650,000 shares will terminate upon the closing of this offering unless exercised prior to the closing of this offering; and
- shares of our common stock reserved for future issuance under our equity incentive plans and our employee stock purchase plan following this offering.

Except as otherwise indicated herein, all information in this prospectus, including the number of shares that will be outstanding after this offering, assumes or gives effect to:

- a -for- reverse stock split of our common stock expected to be completed prior to the completion of this offering;
- the net exercise of warrants that will expire upon the closing of this offering to acquire \_\_\_\_\_ shares of our common stock, assuming the conversion of preferred stock into common stock, and assuming an initial public offering price of \$ \_\_\_\_\_ per share, the midpoint of the price range set forth on the cover of this prospectus;
- the conversion of all outstanding shares of our preferred stock into an aggregate of 96,839,703 shares of our common stock, which will occur automatically upon the closing of this offering; and
- no exercise of the underwriters' option to purchase additional shares in this offering.

**SUMMARY FINANCIAL DATA**

The following tables set forth our summary financial data for the periods indicated. The following summary financial data for the years ended December 31, 2011 and 2012 are derived from our audited financial statements, which have been audited by Ernst & Young LLP, our independent registered public accounting firm, appearing elsewhere in this prospectus. We have derived the following summary of our statement of operations data for the nine months ended September 30, 2012 and 2013 and the period from November 9, 2007 (date of inception) to September 30, 2013 and the balance sheet data as of September 30, 2013 from our unaudited condensed financial statements appearing elsewhere in this prospectus.

The financial data for the nine months ended September 30, 2012 and 2013 and as of September 30, 2013 includes, in the opinion of our management, all adjustments, consisting only of normal recurring adjustments, that are necessary for a fair presentation of our financial position and results of operations for these periods. Our historical results are not necessarily indicative of the results to be expected in the future, and our operating results for the nine months ended September 30, 2013 are not necessarily indicative of the results that may be expected for the entire year ending December 31, 2013.

This summary financial data should be read together with the historical financial statements and related notes to those statements, as well as "Management's Discussion and Analysis of Financial Condition and Results of Operations," which are included elsewhere in this prospectus.

	Year Ended December 31,		Nine Months Ended September 30,		Period from November 9, 2007 (date of inception) to September 30, 2013
	2011	2012	2012	2013	
(in thousands, except share and per share data)					
<b>Statement of Operations Data:</b>					
Total revenue	\$ 2,421	\$ 808	\$ 555	\$ 135	\$ 9,467
Operating expenses:					
General and administrative	3,062	3,123	2,480	2,843	16,854
Research and development	15,109	13,295	10,547	12,240	66,252
Total operating expenses	18,171	16,418	13,027	15,083	83,106
Loss from operations	(15,750)	(15,610)	(12,472)	(14,948)	(73,639)
Total other income (expense)	(60)	(26)	(50)	(1,398)	(1,676)
Net loss and comprehensive loss	(15,810)	(15,636)	(12,522)	(16,346)	(75,315)
Accretion of redeemable convertible preferred stock	(74)	(316)	(237)	(248)	(736)
Net loss attributable to common stockholders	\$ (15,884)	\$ (15,952)	\$ (12,759)	\$ (16,594)	\$ (76,051)
Net loss per share—basic and diluted	\$ (4.40)	\$ (3.82)	\$ (3.07)	\$ (3.58)	
Pro forma net loss per share of common stock—basic and diluted		\$		\$	
Weighted average shares of common stock outstanding used in computing net loss per share—basic and diluted	3,611,112	4,173,782	4,154,328	4,628,902	
Weighted average shares of common stock outstanding used in computing pro forma net loss per share—basic and diluted					

The following table presents our summary balance sheet data:

- on an actual basis as of September 30, 2013;
- on a pro forma basis to give effect to the net exercise of warrants that will expire upon the closing of this offering to acquire \_\_\_\_\_ shares of our common stock, assuming the conversion of preferred stock into common stock, and assuming an initial public offering price of \$ \_\_\_\_\_ per share, the midpoint of the price range set forth on the cover of this prospectus, the conversion of warrants to purchase our preferred stock into warrants to purchase 125,000 shares of our common stock, and the conversion of all then outstanding shares of our preferred stock, including those issued upon exercise of the warrants, into an aggregate of \_\_\_\_\_ shares of our common stock, which will occur automatically upon the closing of this offering; and
- on a pro forma as adjusted basis to give further effect to our sale of \_\_\_\_\_ shares of common stock in this offering at an assumed initial public offering price of \$ \_\_\_\_\_ per share, which is the midpoint of the price range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.

The pro forma as adjusted information presented in the summary balance sheet data is illustrative only and will change based on the actual initial public offering price and other terms of this offering determined at pricing. Each \$1.00 increase or decrease in the assumed initial public offering price of \$ \_\_\_\_\_ per share, which is the midpoint of the price range set forth on the cover page of this prospectus, would increase or decrease each of cash and cash equivalents, total assets and total stockholders' equity on a pro forma as adjusted basis by approximately \$ \_\_\_\_\_ million, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same. Similarly, each increase or decrease of 1.0 million shares offered by us at the assumed initial public offering price would increase or decrease each of cash and cash equivalents, total assets and total stockholders' equity on a pro forma as adjusted basis by approximately \$ \_\_\_\_\_ million.

	As of September 30, 2013		
	Actual	Pro forma (in thousands)	Pro forma as adjusted
<b>Balance Sheet Data:</b>			
Cash and cash equivalents	\$ 47,984	\$	\$
Total assets	50,449		
Total liabilities	6,377		
Total redeemable convertible preferred stock	119,125		
Total stockholders' (deficit) equity	(75,053)		

## RISK FACTORS

*Investing in our common stock involves a high degree of risk. Before you invest in our common stock, you should carefully consider the following risks, as well as general economic and business risks, and all of the other information contained in this prospectus. Any of the following risks could have a material adverse effect on our business, operating results and financial condition and cause the trading price of our common stock to decline, which would cause you to lose all or part of your investment. When determining whether to invest, you should also refer to the other information contained in this prospectus, including our financial statements and the related notes thereto.*

### Risks Related to Our Financial Position and Capital Needs

**We have incurred significant losses since our inception. We expect to incur losses over the next several years and may never achieve or maintain profitability.**

Since inception, we have incurred significant operating losses. Our net loss was \$15.8 million for the year ended December 31, 2011, \$15.6 million for the year ended December 31, 2012 and \$16.3 million for the nine months ended September 30, 2013. As of September 30, 2013, we had an accumulated deficit of \$75.4 million. To date, we have financed our operations primarily through private placements of our preferred stock and through grant revenue. Virtually all of our revenue to date has been grant revenue. We have devoted substantially all of our financial resources and efforts to research and development, including preclinical studies and clinical trials. We are still in the early stages of development of our product candidates, and we have not completed development of any drugs. We expect to continue to incur significant expenses and operating losses over the next several years. Our net losses may fluctuate significantly from quarter to quarter and year to year. We anticipate that our expenses will increase substantially as we:

- initiate and enroll our Phase 2b clinical trial of TRV027 and initiate and conduct a Phase 2 program for TRV130, our lead product candidates;
- commence clinical trials of TRV734;
- continue research and development activities for our d-opioid receptor program;
- seek to discover and develop additional product candidates;
- conduct late-stage clinical trials and seek regulatory approvals for any product candidates that successfully complete clinical trials;
- ultimately establish a sales, marketing and distribution infrastructure and scale up external manufacturing capabilities to commercialize any products that we choose not to license to a third party and for which we may obtain regulatory approval;
- maintain, expand and protect our intellectual property portfolio;
- hire additional clinical and scientific personnel; and
- add operational, financial and management information systems and personnel, including personnel to support our product development and planned future commercialization efforts.

To become and remain profitable, we must succeed in developing and eventually commercializing products that generate significant revenue. This will require us to be successful in a range of challenging activities, including completing preclinical testing and clinical trials of our product candidates, discovering additional product candidates, potentially entering into collaboration and license agreements, obtaining regulatory approval for product candidates and manufacturing, marketing and selling any products for which we may obtain regulatory approval. We are only in the preliminary stages



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of most of these activities. We may never succeed in these activities and, even if we do, may never achieve profitability.

Because of the numerous risks and uncertainties associated with pharmaceutical product development, we are unable to accurately predict the timing or amount of increased expenses or when, or if, we will be able to achieve profitability. If we are required by the United States Food and Drug Administration, or FDA, or foreign regulatory authorities, to perform studies in addition to those currently expected, or if there are any delays in completing our clinical trials or the development of any of our product candidates, our expenses could increase.

Even if we do achieve profitability, we may not be able to sustain or increase profitability on a quarterly or annual basis. Our failure to become and remain profitable would depress the value of our company and could impair our ability to raise capital, expand our business, maintain our research and development efforts, diversify our product offerings or even continue our operations. A decline in the value of our company could also cause you to lose all or part of your investment.

**We will need substantial additional funding, which may not be available to us on acceptable terms, or at all. If we are unable to raise capital when needed, we could be forced to delay, reduce or eliminate our product development programs or commercialization efforts.**

We expect our expenses to increase in connection with our ongoing activities, particularly as we initiate and enroll the Phase 2b clinical trial for TRV027, initiate and conduct the Phase 2 clinical program for TRV130, commence clinical development of TRV734, and continue research and development and initiate additional clinical trials of, and seek regulatory approval for, these and other product candidates. In addition, if we obtain regulatory approval for any of our product candidates, we expect to incur significant commercialization expenses related to product manufacturing, marketing, sales and distribution. Furthermore, upon the closing of this offering, we expect to incur additional costs associated with operating as a public company. Accordingly, we will need to obtain substantial additional funding in connection with our continuing operations. If we are unable to raise capital when needed or on attractive terms, we could be forced to:

- delay, reduce or eliminate our research and development programs or any future commercialization efforts;
- relinquish or license on unfavorable terms our rights to technologies or product candidates that we otherwise would seek to develop or commercialize ourselves;
- seek collaborators for one or more of our product candidates at an earlier stage than otherwise would be desirable or on terms that are less favorable than might otherwise be available; or
- cease operations altogether.

We believe that the net proceeds from this offering, together with our existing cash and cash equivalents as of September 30, 2013, will enable us to fund our operating expenses and capital expenditure requirements through 2015, without giving effect to a potential option payment and, if the option is exercised, potential milestone payments we may receive under our option and license agreements with Forest Laboratories Holdings Limited, or Forest. We have based this estimate on assumptions that may prove to be wrong, and we could use up our capital resources sooner than we currently expect. We do not expect our existing capital resources, including the net proceeds from this offering, to enable us to either complete Phase 3 development of TRV027 if Forest chooses not to license the product candidate or complete Phase 3 development of TRV130 for postoperative pain and continue development of TRV734 past Phase 1 trials without a collaborator. Accordingly, we expect

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that we will need to raise substantial additional funds in the future. Our future capital requirements will depend on many factors, including:

- the progress and results of the Phase 2 clinical program for TRV130;
- whether Forest exercises its option to license TRV027;
- the scope, progress, results and costs of preclinical development, laboratory testing and clinical trials for our other product candidates, including our planned Phase 1 clinical trial of TRV734;
- our ability to enter into collaborative agreements for the development and commercialization of our product candidates, for example TRV734;
- the number and development requirements of other product candidates that we pursue;
- the costs, timing and outcome of regulatory review of our product candidates or any future product candidates, both in the United States and in territories outside the United States;
- the costs and timing of future commercialization activities, including product manufacturing, marketing, sales and distribution, for any of our product candidates for which we receive marketing approval;
- any product liability or other lawsuits related to our products;
- the expenses needed to attract and retain skilled personnel;
- the revenue, if any, received from commercial sales of our product candidates for which we receive marketing approval; and
- the costs involved in preparing, filing and prosecuting patent applications, maintaining and enforcing our intellectual property rights and defending any intellectual property-related claims, both in the United States and in territories outside the United States.

Identifying potential product candidates and conducting preclinical testing and clinical trials is a time-consuming, expensive and uncertain process that takes years to complete, and we may never generate the necessary data or results required to obtain regulatory approval and achieve product sales. In addition, our product candidates, if approved, may not achieve commercial success. Our commercial revenue, if any, will be derived from sales of products that we do not expect to be commercially available for many years, if at all. Accordingly, we will need to continue to rely on additional financing to achieve our business objectives. Adequate additional financing may not be available to us on acceptable terms, or at all. In addition, we may seek additional capital due to favorable market conditions or strategic considerations, even if we believe we have sufficient funds for our current or future operating plans.

**Raising additional capital may cause dilution to our stockholders, including purchasers of common stock in this offering, restrict our operations or require us to relinquish rights to our technologies or product candidates.**

Until such time, if ever, as we can generate substantial product revenue, we expect to finance our cash needs through a combination of equity offerings, debt financings, grants and license and development agreements in connection with any collaborations. We do not have any committed external source of funds other than a possible option payment and, if the option is exercised, possible milestone and royalty payments under our option and license agreements with Forest. To the extent that we raise additional capital through the sale of equity or convertible debt securities, your ownership interest will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect your rights as a common stockholder. Debt financing and preferred equity financing, if available,

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may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends.

If we raise additional funds through collaborations, strategic alliances or marketing, distribution or licensing arrangements with third parties, we may have to relinquish valuable rights to our technologies, future revenue streams, research programs or product candidates or grant licenses on terms that may not be favorable to us. If we are unable to raise additional funds through equity or debt financings when needed, we may be required to delay, limit, reduce or terminate our product development or future commercialization efforts or grant rights to develop and market product candidates that we would otherwise prefer to develop and market ourselves.

**Our limited operating history may make it difficult for you to evaluate the success of our business to date and to assess our future viability.**

We commenced active operations in late 2007, and our operations to date have been limited to organizing and staffing our company, business planning, raising capital, developing our ABLE product platform, identifying potential product candidates, undertaking preclinical studies and conducting clinical trials. All but two of our product candidates are still in preclinical development. We have not yet demonstrated our ability to successfully complete later stage clinical trials, obtain regulatory approvals, manufacture a commercial scale product, or arrange for a third party to do so on our behalf, or conduct sales and marketing activities necessary for successful product commercialization. Consequently, any predictions you make about our future success or viability may not be as accurate as they could be if we had a longer operating history.

In addition, as a young business, we may encounter unforeseen expenses, difficulties, complications, delays and other known and unknown factors. We will need to expand our capabilities to support commercial activities. We may not be successful in adding such capabilities.

We expect our financial condition and operating results to continue to fluctuate significantly from quarter to quarter and year to year due to a variety of factors, many of which are beyond our control. Accordingly, you should not rely upon the results of any past quarterly or annual periods as indications of future operating performance.

**Risks Related to the Discovery and Development of Our Product Candidates**

**Our research and development is focused on discovering and developing novel drugs based on biased ligands, and the approach we are taking to discover and develop drugs is not proven and may never lead to marketable products.**

The discovery and development of drugs based on biased ligands is an emerging field, and the scientific discoveries that form the basis for our efforts to discover and develop product candidates are relatively new. The scientific evidence to support the feasibility of developing differentiated product candidates based on these discoveries is both preliminary and limited. We believe that we are the first company to conduct a clinical trial of a product candidate based on the concept of biased ligands. Therefore, we do not know if our approach will be successful.

**We are very early in our development efforts and have only one product candidate, TRV027 in Phase 2 and one more, TRV130, for which we are planning a Phase 2 clinical trial. All of our other product candidates are still in preclinical development. If we are unable to successfully complete development and commercialization of our product candidates or experience significant delays in doing so, our business will be materially harmed.**

We are very early in our development efforts and have only one product candidate, TRV027, in Phase 2 and one more, TRV130, for which we are planning a Phase 2 clinical trial. All of our other

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product candidates are still in preclinical development. We have invested substantially all of our efforts and financial resources in the identification and development of biased ligands. Our ability to generate product revenue, which we do not expect will occur for many years, if ever, will depend heavily on the successful development and eventual commercialization of our product candidates. The success of our product candidates will depend on several factors, including the following:

- successful completion of preclinical studies and clinical trials;
- receipt of marketing approvals from applicable regulatory authorities;
- obtaining, maintaining and protecting our intellectual property portfolio, including patents and trade secrets, and regulatory exclusivity for our product candidates;
- making arrangements with third-party manufacturers for, or establishing, commercial manufacturing capabilities;
- launching commercial sales of the products, if and when approved, whether alone or in collaboration with others;
- acceptance of our products, if and when approved, by patients, the medical community and third-party payors;
- effectively competing with other therapies;
- obtaining and maintaining healthcare coverage of our products and adequate reimbursement; and
- maintaining a continued acceptable safety profile of our products following approval.

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

### **We may not be successful in our efforts to expand our pipeline of product candidates.**

One element of our strategy is to expand our pipeline of therapeutics based on biased ligands and advance these product candidates through clinical development for the treatment of a variety of indications. Although our research and development efforts to date have resulted in a number of development programs based on biased ligands, we may not be able to develop product candidates that are safe and effective. Even if we are successful in continuing to expand our pipeline, the potential product candidates that we identify may not be suitable for clinical development, including as a result of being shown to have harmful side effects or other characteristics that indicate that they are unlikely to receive marketing approval and achieve market acceptance. If we do not successfully develop and commercialize product candidates based upon our technological approach, we will not be able to obtain product revenue in future periods, which would make it unlikely that we would ever achieve profitability.

### **Preclinical and clinical drug development involves a lengthy and expensive process, with an uncertain outcome. We may incur additional costs or experience delays in completing, or ultimately be unable to complete, the development and commercialization of our product candidates.**

Clinical testing is expensive and can take many years to complete, and the risk of failure is high. It is impossible to predict when or if any of our product candidates will prove effective or safe in humans or will receive regulatory approval. Before obtaining marketing approval from regulatory authorities for the sale of any product candidate, we must complete preclinical studies and then conduct extensive clinical trials to demonstrate the safety and efficacy of our product candidates in humans. A failure of one or more clinical trials can occur at any stage of testing. The outcome of preclinical testing and

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early clinical trials may not be predictive of the success of later clinical trials, and interim results of a clinical trial do not necessarily predict final results. Moreover, preclinical and clinical data are often susceptible to varying interpretations and analyses, and many companies that have believed their product candidates performed satisfactorily in preclinical studies and clinical trials have nonetheless failed to obtain marketing approval of their products. We may experience numerous unforeseen events during, or as a result of, clinical trials that could delay or prevent our ability to receive marketing approval or subsequently to commercialize our product candidates, including:

- regulators or institutional review boards may not authorize us or our investigators to commence a clinical trial or conduct a clinical trial at a prospective trial site;
- we may experience delays in reaching, or fail to reach, agreement on acceptable clinical trial contracts or clinical trial protocols with prospective trial sites;
- clinical trials of our product candidates may produce negative or inconclusive results, and we may decide, or regulators may require us, to conduct additional clinical trials or abandon product development programs;
- the number of patients required for clinical trials of our product candidates may be larger than we anticipate, enrollment in these clinical trials may be slower than we anticipate or participants may drop out of these clinical trials at a higher rate than we anticipate;
- our third-party contractors may fail to comply with regulatory requirements or meet their contractual obligations to us in a timely manner, or at all;
- we may have to suspend or terminate clinical trials of our product candidates for various reasons, including a finding that the participants are being exposed to unacceptable health risks;
- regulators or institutional review boards may require that we or our investigators suspend or terminate clinical research for various reasons, including noncompliance with regulatory requirements or a finding that the participants are being exposed to unacceptable health risks;
- the cost of clinical trials of our product candidates may be greater than we anticipate;
- the supply or quality of our product candidates or other materials necessary to conduct clinical trials of our product candidates may be insufficient or inadequate; and
- our product candidates may have undesirable side effects or other unexpected characteristics, causing us or our investigators, regulators or institutional review boards to suspend or terminate the trials.

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

- be delayed in obtaining marketing approval for our product candidates;
- not obtain marketing approval at all;
- obtain approval for indications or patient populations that are not as broad as intended or desired;
- obtain approval with labeling that includes significant use or distribution restrictions or safety warnings;
- be subject to additional post-marketing testing requirements; or
- have the product removed from the market after obtaining marketing approval.

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Our product development costs will also increase if we experience delays in testing or in receiving marketing approvals. We do not know whether any of our preclinical studies or clinical trials will begin as planned, will need to be restructured or will be completed on schedule, or at all. Significant preclinical study or clinical trial delays also could shorten any periods during which we may have the exclusive right to commercialize our product candidates or allow our competitors to bring products to market before we do and impair our ability to successfully commercialize our product candidates and may harm our business and results of operations.

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

We may not be able to initiate or continue clinical trials for our product candidates if we are unable to locate and enroll a sufficient number of eligible patients to participate in these trials as required by the FDA or similar regulatory authorities outside the United States. Some of our competitors have ongoing clinical trials for product candidates that treat the same indications as our product candidates, and patients who would otherwise be eligible for our clinical trials may instead enroll in clinical trials of our competitors' product candidates. Patient enrollment is affected by other factors including:

- the severity of the disease under investigation;
- the eligibility criteria for the study in question;
- the perceived risks and benefits of the product candidate under study;
- the efforts to facilitate timely enrollment in clinical trials;
- the patient referral practices of physicians;
- the ability to monitor patients adequately during and after treatment; and
- the proximity and availability of clinical trial sites for prospective patients.

Our inability to enroll a sufficient number of patients for our clinical trials would result in significant delays and could require us to abandon one or more clinical trials altogether. For example, TRV027 faces significant competition in recruiting and enrolling heart failure patients due to a number of trials in heart failure currently being conducted by other sponsors. Enrollment delays in our clinical trials may result in increased development costs for our product candidates, which would cause the value of our company to decline and limit our ability to obtain additional financing.

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

If our product candidates are associated with undesirable side effects in clinical trials or have characteristics that are unexpected, we may need to abandon their development or limit development to more narrow uses or subpopulations in which the undesirable side effects or other characteristics are less prevalent, less severe or more acceptable from a risk-benefit perspective. In our industry, many compounds that initially showed promise in early stage testing have later been found to cause side effects that prevented further development of the compound. In the event that our clinical trials reveal a high and unacceptable severity and prevalence of side effects, our trials could be suspended or terminated and the FDA or comparable foreign regulatory authorities could order us to cease further development or deny approval of our product candidates for any or all targeted indications. Drug-related side effects could affect patient recruitment or the ability of enrolled patients to complete the trial and could result in potential product liability claims.

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Additionally if one or more of our product candidates receives marketing approval, and we or others later identify undesirable side effects caused by such products, a number of potentially significant negative consequences could result, including:

- regulatory authorities may withdraw approvals of such product;
- regulatory authorities may require additional warnings on the label;
- we may be required to create a medication guide outlining the risks of such side effects for distribution to patients, if one is not required before approval;
- we could be sued and held liable for harm caused to patients; and
- our reputation may suffer.

Any of these events could prevent us from achieving or maintaining market acceptance of the particular product candidate, if approved.

TRV027 is a biased ligand targeted at the angiotensin II type 1 receptor, or AT1R, and has been shown to drop blood pressure in subjects with chronic heart failure. One subject in the Phase 2a trial in advanced chronic heart failure was withdrawn from therapy after experiencing low blood pressure, or hypotension. If TRV027 drops blood pressure too much or causes prolonged low blood pressure, this could lead to adverse effects that could compromise the development, approval and market potential of TRV027.

TRV130 is predominantly metabolized by two liver enzymes, CYP2D6 and CYP3A4, that are common metabolic pathways for drugs. Because of competitive use of these pathways, we will need to conduct drug interaction studies and TRV130 may be limited in its co-administration with other drugs using these pathways as their safety and effectiveness, as well as TRV130's, may be adversely impacted. This could limit our commercial opportunity due to the common co-administration of drugs in patients with moderate to severe acute pain requiring IV therapy.

TRV130 and TRV734 are both biased ligands targeted at the  $\mu$ -opioid receptor. Common adverse reactions for agonists of the  $\mu$ -opioid receptor include respiratory depression, constipation, nausea, vomiting and addiction. In rare cases,  $\mu$ -opioid receptor agonists can cause respiratory arrest requiring immediate medical intervention. Since TRV130 and TRV734 also modulate the  $\mu$ -opioid receptor, these adverse reactions and risks could apply to the use of TRV130 and TRV734. In addition, one healthy subject in the 0.25 mg dosing cohort of our Phase 1 trial of TRV130 experienced a severe episode of vasovagal syncope during which he fainted and his pulse stopped. These were considered severe adverse events. Although this individual recovered without medical intervention and experienced no known adverse consequences from this, certain potential triggers of vasovagal syncope were removed from the trial protocol, and dose escalation proceeded up to 7 mg/hr (28-fold higher than the 0.25 mg/hr dose at which the syncope occurred) without further incident, it is possible that serious adverse vasovagal events could occur in other patients dosed with TRV130.

Agonists at the  $\delta$ -opioid receptor have been associated with a risk of seizures. Our  $\delta$ -opioid receptor program targets the same receptor as other programs that have been associated with seizures and, accordingly, it is possible that it will be associated with similar side effects.

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

Because we have limited financial and managerial resources, we focus on research programs and product candidates that we identify for specific indications. As a result, we may forego or delay pursuit of opportunities with other product candidates or for other indications that later prove to have greater commercial potential. Our resource allocation decisions may cause us to fail to capitalize on viable

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commercial products or profitable market opportunities. In addition, under our option agreement with Forest, we have agreed to conduct, at our expense, a Phase 2b trial of TRV027 in AHF. Our spending on current and future research and development programs and product candidates for specific indications may not yield any commercially viable products. If we do not accurately evaluate the commercial potential or target market for a particular product candidate, we may relinquish valuable rights to that product candidate through collaboration, licensing or other royalty arrangements in cases in which it would have been more advantageous for us to retain sole development and commercialization rights to such product candidate.

### **Risks Related to the Commercialization of Our Product Candidates**

**Even if any of our product candidates receives marketing approval, it may fail to achieve the degree of market acceptance by physicians, patients, third-party payors and others in the medical community necessary for commercial success.**

If any of our product candidates receives marketing approval, it may nonetheless fail to gain sufficient market acceptance by physicians, patients, third-party payors and others in the medical community. If our product candidates 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 product candidates, if approved for commercial sale, will depend on a number of factors, including:

- the efficacy, safety and potential advantages compared to alternative treatments;
- the timing of market introduction of the product candidate as well as competitive products;
- our ability to offer the product for sale profitably and at competitive prices;
- the convenience and ease of administration compared to alternative treatments;
- the willingness of the target patient population to try new therapies and of physicians to prescribe these therapies;
- the strength of sales, marketing and distribution support;
- the availability of third-party coverage and adequate reimbursement;
- the prevalence and severity of any side effects;
- the clinical indications for which the product is approved; and
- any restrictions on the use of our products together with other medications.

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

We currently do not have a marketing or sales organization for the marketing, sales and distribution of pharmaceutical products and have no experience in this area. In order to commercialize any product candidates that receive marketing approval, we would need to build marketing, sales, distribution, managerial and other non-technical capabilities or make arrangements with third parties to perform these services, and we may not be successful in doing so. In the event of successful development and regulatory approval of TRV130 or another product candidate, we expect to build a targeted specialist sales force to market or co-promote the product in the United States. There are risks involved with establishing our own sales, marketing and distribution capabilities. For example, recruiting and training a sales force is expensive and time consuming and could delay any product launch. If the commercial launch of a product candidate for which we recruit a sales force and establish marketing capabilities is delayed or does not occur for any reason, we would have prematurely or unnecessarily incurred these commercialization expenses. This may be costly, and our investment would be lost if we cannot retain or reposition our sales and marketing personnel.



Factors that may inhibit our efforts to commercialize our products on our own include:

- our inability to recruit, train and retain adequate numbers of effective sales and marketing personnel;
- the inability of sales personnel to obtain access to physicians or persuade adequate numbers of physicians to prescribe any future products;
- the lack of complementary or other products to be offered by sales personnel, which may put us at a competitive disadvantage from the perspective of sales efficiency relative to companies with more extensive product lines; and
- unforeseen costs and expenses associated with creating an independent sales and marketing organization.

As an alternative to establishing our own sales force, we may choose to partner with third parties that have well-established direct sales forces to sell, market and distribute our products. In the case of TRV027, should Forest elect to license TRV027, Forest would thereafter have responsibility for further clinical development, regulatory approval and commercialization. If we are unable to enter into collaborations with third parties for the commercialization of approved products, if any, on acceptable terms or at all, or if any such partner, including Forest if it exercises its option to license TRV027, does not devote sufficient resources to the commercialization of our product or otherwise fails in commercialization efforts, we may not be able to successfully commercialize any of our product candidates that receive regulatory approval.

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

The development and commercialization of new drug products is highly competitive. We face competition with respect to our current product candidates, and will face competition with respect to any product candidates that we may seek to develop or commercialize in the future, from major pharmaceutical companies, specialty pharmaceutical companies and biotechnology companies worldwide. In addition to existing therapeutic treatments for the indications we are targeting with our product candidates, which our goal would be to displace if any of our product candidates achieves regulatory approval, we also face potential competition from other drug candidates in development by other companies. With respect to competition for TRV027, we are aware of three product candidates in mid- to late-stage clinical development for AHF. These are serelaxin, being developed by Novartis, which has completed a single Phase 3 trial, omecamtiv mercarbil, being developed by Cytokinetics and Amgen, which has completed a Phase 2b trial, and ularitide, being developed by Cardiorientis and currently in a Phase 3 trial. With respect to competition for TRV130, the most advanced potentially competitive product candidates are reformulations of existing opioids, such as a fentanyl ionophoresis patch, in development by The Medicines Company, and sufentanil nanotab, in development by AcelRx, or combination products, such as MoxDuo IV, a combination of morphine and oxycodone being developed by QRxPharma, which is in Phase 2 trials. Some of these potential competitive compounds are being developed by large, well-financed and experienced pharmaceutical and biotechnology companies or have been partnered with such companies, which may give them development, regulatory and marketing advantages over us, or Forest, if it exercises its option for TRV027.

Our commercial opportunity could be reduced or eliminated if our competitors develop and commercialize products that are safer, more effective, have fewer or less severe side effects, are more convenient or are less expensive than any products that we may develop. Our competitors also may obtain FDA or other regulatory approval for their products more rapidly than we may obtain approval for ours, which could result in our competitors establishing a strong market position before we are able to enter the market. In addition, our ability to compete may be affected in many cases by insurers or

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other third-party payors seeking to encourage the use of generic products. Generic products are currently on the market for the indications that we are pursuing. If our product candidates achieve marketing approval, we expect that they will be priced at a significant premium over competing generic products.

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

### **Even if we or our collaborators are able to commercialize any of our product candidates, the product candidates may become subject to unfavorable pricing regulations, third-party coverage and reimbursement policies or healthcare reform initiatives.**

Both our and our collaborators' ability to commercialize any of our product candidates successfully will depend, in part, on the extent to which coverage and adequate reimbursement for these products and related treatments will be available from government payor programs at the federal and state level authorities, including Medicare and Medicaid, private health insurers, managed care plans and other organizations. Government authorities and third-party payors, such as private health insurers and health maintenance organizations, decide which medications they will pay for and establish reimbursement levels. A primary trend in the U.S. healthcare industry and elsewhere is cost containment. Government authorities and third-party payors have attempted to control costs by limiting coverage and the amount of reimbursement for particular medications. Increasingly, third-party payors are requiring that drug companies provide them with predetermined discounts from list prices and are challenging the prices charged for medical products. Coverage and reimbursement may not be available for any drug that we or our collaborators commercialize and, even if these are available, the level of reimbursement may not be satisfactory. Inadequate reimbursement levels may adversely affect the demand for, or the price of, any product candidate for which we or our collaborators obtain marketing approval. Obtaining and maintaining adequate reimbursement for our products may be difficult. We may be required to conduct expensive pharmacoeconomic studies to justify coverage and reimbursement or the level of reimbursement relative to other therapies. If coverage and adequate reimbursement are not available or reimbursement is available only to limited levels, we or our collaborators may not be able to successfully commercialize any product candidates for which marketing approval is obtained.

There may be significant delays in obtaining coverage and reimbursement for newly approved drugs, and coverage may be more limited than the indications for which the drug is approved by the FDA or similar regulatory authorities outside the United States. Moreover, eligibility for coverage and reimbursement does not imply that a drug will be paid for in all cases or at a rate that covers our costs, including research, development, manufacture, sale and distribution expenses. Interim reimbursement levels for new drugs, if applicable, may also not be sufficient to cover our costs and may not be made permanent. Reimbursement rates may vary according to the use of the drug and the clinical setting in which it is used, may be based on reimbursement levels already set for lower cost drugs and may be incorporated into existing payments for other services. Net prices for drugs may be reduced by mandatory discounts or rebates required by government healthcare programs or private payors and by any future relaxation of laws that presently restrict imports of drugs from countries where they may be sold at lower prices than in the United States. Third-party payors often rely upon Medicare coverage

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policy and payment limitations in setting their own reimbursement policies. Our or our collaborators' inability to promptly obtain coverage and adequate reimbursement rates from both government-funded and private payors for any approved drugs that we develop could adversely affect our operating results, our ability to raise capital needed to commercialize drugs and our overall financial condition.

The regulations that govern marketing approvals, pricing, coverage and reimbursement for new drugs vary widely from country to country. Current and future legislation may significantly change the approval requirements in ways that could involve additional costs and cause delays in obtaining approvals. Some countries require approval of the sale price of a drug before it can be marketed. In many countries, the pricing review period begins after marketing or licensing approval is granted. In some foreign markets, prescription pharmaceutical pricing remains subject to continuing governmental control even after initial approval is granted. As a result, we or our collaborators might obtain marketing approval for a drug in a particular country, but then be subject to price regulations that delay commercial launch of the drug, possibly for lengthy time periods, and negatively impact our ability to generate revenue from the sale of the drug in that country. Adverse pricing limitations may hinder our ability to recoup our investment in one or more product candidates, even if our product candidates obtain marketing approval.

There can be no assurance that our product candidates, if they are approved for sale in the United States or in other countries, will be considered medically reasonable and necessary for a specific indication, that they will be considered cost-effective by third-party payors, that coverage or an adequate level of reimbursement will be available, or that third-party payors' reimbursement policies will not adversely affect our ability to sell our product candidates profitably if they are approved for sale.

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

We face an inherent risk of product liability exposure related to the testing of our product candidates in human clinical trials and will face an even greater risk if we commercially sell any products that we may develop. For example, we may be sued if any product we develop allegedly causes injury or is found to be otherwise unsuitable during clinical testing, manufacturing, marketing or sale. Any such product liability claims may include allegations of defects in manufacturing, defects in design, a failure to warn of dangers inherent in the product, negligence, strict liability or a breach of warranties. If we cannot successfully defend ourselves against claims that our product candidates or products caused injuries, we will incur substantial liabilities. Regardless of merit or eventual outcome, liability claims may result in:

- decreased demand for any product candidates or products that we may develop;
- injury to our reputation and significant negative media attention;
- withdrawal of clinical trial participants;
- initiation of investigations by regulators;
- significant costs to defend the related litigation;
- product recalls, withdrawals or labeling, marketing or promotional restrictions;
- substantial monetary awards to trial participants or patients;
- loss of revenue;
- reduced resources of our management to pursue our business strategy; and
- the inability to commercialize any products that we may develop.

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We currently hold \$15 million in product liability insurance coverage, which may not be adequate to cover all liabilities that we may incur. We may need to increase our insurance coverage as we expand our clinical trials or if we commence commercialization of our product candidates. Insurance coverage is increasingly expensive. We may not be able to maintain insurance coverage at a reasonable cost or in an amount adequate to satisfy any liability that may arise.

**Risks Related to Our Dependence on Third Parties**

**If Forest exercises its option to license TRV027, that relationship will be important to our business, and any future relationships or collaborations we may elect to pursue may also be important to us. If we are unable to maintain our relationship with Forest or any of these collaborations, or if our relationship with Forest or these collaborators is not successful, our business could be adversely affected.**

We have limited capabilities for product development and do not yet have any capability for sales, marketing or distribution. We have entered into an option agreement and a license agreement with Forest, which provide Forest with an option to license TRV027. If Forest exercises this option, they will be responsible for subsequent development, regulatory approval and commercialization of TRV027 and we will be eligible to receive milestone payments and royalties on product sales. This relationship, any future collaboration with Forest, and any future collaborations we might enter into with another third party, may pose a number of risks, including the following:

- collaborators have significant discretion in determining the efforts and resources that they will apply to these collaborations;
- collaborators may not perform their obligations as expected;
- collaborators may elect not to continue or renew development or commercialization programs or may not pursue commercialization of any product candidates that achieve regulatory approval based on clinical trial results, changes in the collaborators' strategic focus or available funding, or external factors, such as an acquisition, that divert resources or create competing priorities;
- collaborators may delay clinical trials, provide insufficient funding for a clinical trial program, stop a clinical trial or abandon a product candidate, repeat or conduct new clinical trials or require a new formulation of a product candidate for clinical testing;
- collaborators could fail to make timely regulatory submissions for a product candidate;
- collaborators may not comply with all applicable regulatory requirements or may fail to report safety data in accordance with all applicable regulatory requirements;
- collaborators could independently develop, or develop with third parties, products that compete directly or indirectly with our products or product candidates if the collaborators believe that competitive products are more likely to be successfully developed or can be commercialized under terms that are more economically attractive than ours;
- product candidates discovered in collaboration with us may be viewed by our collaborators as competitive with their own product candidates or products, which may cause collaborators to cease to devote resources to the commercialization of our product candidates;
- a collaborator with marketing and distribution rights to one or more of our product candidates that achieve regulatory approval may not commit sufficient resources to the marketing and distribution of such product or products;
- disagreements with collaborators, including disagreements over proprietary rights, contract interpretation or the preferred course of development, might cause delays or termination of the research, development or commercialization of product candidates, might lead to additional

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responsibilities for us with respect to product candidates, or might result in litigation or arbitration, any of which would be time-consuming and expensive;

- collaborators may not properly maintain or defend our intellectual property rights or may use our proprietary information in such a way as to invite litigation that could jeopardize or invalidate our intellectual property or proprietary information or expose us to potential litigation;
- collaborators may infringe the intellectual property rights of third parties, which may expose us to litigation and potential liability; and
- collaborations may be terminated at the convenience of the collaborator and, if terminated, we could be required to raise additional capital to pursue further development or commercialization of the applicable product candidates.

If our potential collaboration with Forest, or any other collaborations we might enter into in the future, do not result in the successful development and commercialization of products or if one of our collaborators terminates its agreement with us, we may not receive any future research funding or milestone or royalty payments under the collaboration. If we do not receive the funding we expect under these agreements, our development of our product platform and product candidates could be delayed and we may need additional resources to develop our product candidates and our product platform. All of the risks relating to our product development, regulatory approval and commercialization described in this prospectus also apply to the activities of our therapeutic program collaborators.

If Forest exercises its option to license TRV027 from us, the license agreement will contain a restriction on our engaging in activities relating to certain product candidates that may compete with TRV027 for a specified period of time. This restriction may have the effect of preventing us from undertaking development and other efforts for TRV027 that we would otherwise prefer to pursue. Additionally, subject to its contractual obligations to us, if Forest or a future collaborator of ours is involved in a business combination, the collaborator might deemphasize or terminate development or commercialization of any product candidate licensed to it by us. If one of our collaborators terminates its agreement with us, we may find it more difficult to attract new collaborators and our reputation in the business and financial communities could be adversely affected.

For our product candidates other than TRV027, we may in the future determine to collaborate with pharmaceutical and biotechnology companies for their development and potential commercialization. We face significant competition in seeking appropriate collaborators. Our ability to reach a definitive agreement for collaboration will depend, among other things, upon our assessment of the collaborator's resources and expertise, the terms and conditions of the proposed collaboration and the proposed collaborator's evaluation of a number of factors. If we are unable to reach agreements with suitable collaborators on a timely basis, on acceptable terms, or at all, we may have to curtail the development of a product candidate, reduce or delay its development program or one or more of our other development programs, delay its potential commercialization or reduce the scope of any sales or marketing activities or increase our expenditures and undertake development or commercialization activities at our own expense. If we elect to fund and undertake development or commercialization activities on our own, we may need to obtain additional expertise and additional capital, which may not be available to us on acceptable terms or at all. If we fail to enter into collaborations and do not have sufficient funds or expertise to undertake the necessary development and commercialization activities, we may not be able to further develop our product candidates or bring them to market or continue to develop our product platform and our business may be materially and adversely affected.

**We rely, and expect to continue to rely, on third parties to conduct our preclinical studies and clinical trials, and those third parties may not perform satisfactorily, including failing to meet deadlines for the completion of such trials or complying with applicable regulatory requirements.**

We rely on third-party contract research organizations and clinical research organizations to conduct some of our preclinical studies and all of our clinical trials for TRV027 and TRV130. We expect to continue to rely on third parties, such as contract research organizations, clinical research organizations, clinical data management organizations, medical institutions and clinical investigators, to conduct some of our preclinical studies and all of our clinical trials. The agreements with these third parties might terminate for a variety of reasons, including a failure to perform by the third parties. If we need to enter into alternative arrangements, that could delay our product development activities.

Our reliance on these third parties for research and development activities will reduce our control over these activities but will not relieve us of our responsibilities. For example, we will remain responsible for ensuring that each of our preclinical studies and clinical trials are conducted in accordance with the general investigational plan and protocols for the trial and for ensuring that our preclinical studies are conducted in accordance with good laboratory practice, or GLP as appropriate. Moreover, the FDA requires us to comply with standards, commonly referred to as good clinical practices, or GCPs, 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 trial participants are protected. Regulatory authorities enforce these requirements through periodic inspections of trial sponsors, clinical investigators and trial sites. If we or any of our clinical research organizations fail to comply with applicable GCPs, the clinical data generated in our clinical trials may be deemed unreliable and the FDA or comparable foreign regulatory authorities may require us to perform additional clinical trials before approving our marketing applications. We cannot assure you that upon inspection by a given regulatory authority, such regulatory authority will determine that any of our clinical trials complies with GCP regulations. In addition, our clinical trials must be conducted with product produced under current good manufacturing practice, or cGMP, regulations. Our failure to comply with these regulations may require us to repeat clinical trials, which would delay the regulatory approval process. We also are required to register ongoing clinical trials and post the results of completed clinical trials on a government-sponsored database, ClinicalTrials.gov, within specified timeframes. Failure to do so can result in fines, adverse publicity and civil and criminal sanctions.

The third parties with whom we have contracted to help perform our preclinical studies or clinical trials may also have relationships with other entities, some of which may be our competitors. If these third parties do not successfully carry out their contractual duties, meet expected deadlines or conduct our preclinical studies or clinical trials in accordance with regulatory requirements or our stated protocols, we will not be able to obtain, or may be delayed in obtaining, marketing approvals for our product candidates and will not be able to, or may be delayed in our efforts to, successfully commercialize our product candidates.

If any of our relationships with these third-party contract research organizations or clinical research organizations terminate, we may not be able to enter into arrangements with alternative contract research organizations or clinical research organizations or to do so on commercially reasonable terms. Switching or adding additional contract research organizations or clinical research organizations involves additional cost and requires management time and focus. In addition, there is a natural transition period when a new contract research organization or clinical research organization commences work. As a result, delays could occur, which could compromise our ability to meet our desired development timelines. Though we carefully manage our relationships with our contract research organizations or clinical research organizations, there can be no assurance that we will not encounter similar challenges or delays in the future.

**We contract with third parties for the manufacture of our product candidates for preclinical and clinical testing and expect to continue to do so for commercialization. This reliance on third parties increases the risk that we will not have sufficient quantities of our product candidates or products or such quantities at an acceptable cost, which could delay, prevent or impair our development or commercialization efforts.**

We do not have any manufacturing facilities or personnel. We rely, and expect to continue to rely, on third parties for the manufacture of our product candidates for preclinical and clinical testing, as well as for commercial manufacture if any of our product candidates receive marketing approval. This reliance on third parties increases the risk that we will not have sufficient quantities of our product candidates or products or such quantities at an acceptable cost or quality, which could delay, prevent or impair our development or commercialization efforts. For example, in March 2011, TRV027 was put on clinical hold by the FDA following an FDA audit at the company then manufacturing the TRV027 drug product. We replaced this drug product with new drug product manufactured by another company and the FDA lifted the clinical hold in June 2011.

We also expect to rely on third-party manufacturers or third-party collaborators for the manufacture of commercial supply of any product candidates for which our collaborators or we obtain marketing approval. We may be unable to establish any agreements with third-party manufacturers or to do so on acceptable terms. Even if we are able to establish agreements with third-party manufacturers, reliance on third-party manufacturers entails additional risks, including:

- reliance on the third party for regulatory compliance and quality assurance;
- the possible breach of the manufacturing agreement by the third party;
- manufacturing delays if our third-party manufacturers give greater priority to the supply of other products over our product candidates or otherwise do not satisfactorily perform according to the terms of the agreement between us;
- the possible misappropriation of our proprietary information, including our trade secrets and know-how; and
- the possible termination or nonrenewal of the agreement by the third party at a time that is costly or inconvenient for us.

The facilities used by our contract manufacturers to manufacture our product candidates must be approved by the FDA pursuant to inspections that will be conducted after we submit an NDA to the FDA. We do not control the manufacturing process of, and are completely dependent on, our contract manufacturers for compliance with cGMP regulations for manufacture of our product candidates. Third-party manufacturers may not be able to comply with the cGMP regulations or similar regulatory requirements outside the United States. Our failure, or the failure of our third-party manufacturers, to comply with applicable regulations could result in sanctions being imposed on us, including clinical holds, fines, injunctions, civil penalties, delays, suspension or withdrawal of approvals, license revocation, seizures or recalls of product candidates or products, operating restrictions and criminal prosecutions, any of which could significantly and adversely affect supplies of our products.

Our product candidates and any products that we may develop may compete with other product candidates and products for access to manufacturing facilities. There are a limited number of manufacturers that operate under cGMP regulations and that might be capable of manufacturing for us. Any performance failure on the part of our existing or future manufacturers could delay clinical development or marketing approval. We do not currently have arrangements in place for redundant supply or a second source for bulk drug substance. If our current contract manufacturers cannot perform as agreed, we may be required to replace such manufacturers. We may incur added costs and delays in identifying and qualifying any replacement manufacturers. The U.S. Drug Enforcement

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Administration, or DEA, restricts the importation of a controlled substance finished drug product when the same substance is commercially available in the United States, which could reduce the number of potential alternative manufacturers for our  $\mu$ -opioid receptor targeted product candidates, including TRV130 and TRV734.

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

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

### **We rely on clinical data and results obtained by third parties that could ultimately prove to be inaccurate or unreliable.**

As part of our strategy to mitigate development risk, we seek to develop product candidates with validated mechanisms of action and we utilize biomarkers to assess potential clinical efficacy early in the development process. This strategy necessarily relies upon clinical data and other results obtained by third parties that may ultimately prove to be inaccurate or unreliable. Further, such clinical data and results may be based on products or product candidates that are significantly different from our product candidates. If the third-party data and results we rely upon prove to be inaccurate, unreliable or not applicable to our product candidates, we could make inaccurate assumptions and conclusions about our product candidates and our research and development efforts could be compromised.

### **Risks Related to Our Intellectual Property**

#### **If we are unable to obtain and maintain patent protection for our technology and products or if the scope of the patent protection obtained is not sufficiently broad, our competitors could develop and commercialize technology and products similar or identical to ours, and our ability to successfully commercialize our technology and products may be impaired.**

Our success depends in large part on our ability to obtain and maintain patent protection in the United States and other countries with respect to our product candidates. We seek to protect our proprietary position by filing patent applications in the United States and abroad related to our product candidates.

The patent prosecution process is expensive and time-consuming, and we may not be able to file and prosecute all necessary or desirable patent applications at a reasonable cost or in a timely manner. It is also possible that we will fail to identify patentable aspects of our research and development output before it is too late to obtain patent protection. If Forest exercises its option to license TRV027, Forest will have the first right to prosecute, maintain and enforce TRV027 patents and these obligations may have an effect on our strategy regarding the preparation, filing and prosecution of patent applications, or maintenance of the patents, covering our product candidates. Moreover, should we enter into other collaborations we may be required to consult with or cede control to collaborators regarding the prosecution, maintenance and enforcement of our patents. Therefore, these patents and applications may not be prosecuted and enforced in a manner consistent with the best interests of our business.

The patent position of biotechnology and pharmaceutical companies generally is highly uncertain, involves complex legal and factual questions and has in recent years been the subject of much litigation. In addition, the laws of foreign countries may not protect our rights to the same extent as the laws of the United States. For example, European patent law restricts the patentability of methods of treatment



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of the human body more than United States law does. Publications of discoveries in the scientific literature often lag behind the actual discoveries, and patent applications in the United States and other jurisdictions are typically not published until 18 months after a first filing, or in some cases at all. Therefore, we cannot know with certainty whether we were the first to make the inventions claimed in our owned or licensed patents or pending patent applications, or that we were the first to file for patent protection of such inventions. As a result, the issuance, scope, validity, enforceability and commercial value of our patent rights are highly uncertain. Our pending and future patent applications may not result in patents being issued which protect our technology or products, in whole or in part, or which effectively prevent others from commercializing competitive technologies and products. Changes in either the patent laws or interpretation of the patent laws in the United States and other countries may diminish the value of our patents or narrow the scope of our patent protection.

Recent patent reform legislation could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents. On September 16, 2011, the Leahy-Smith America Invents Act, or the Leahy-Smith Act, was signed into law. The Leahy-Smith Act includes a number of significant changes to United States patent law. These include provisions that affect the way patent applications are prosecuted and may also affect patent litigation. The United States Patent Office recently developed new regulations and procedures to govern administration of the Leahy-Smith Act, and many of the substantive changes to patent law associated with the Leahy-Smith Act, and in particular, the first to file provisions, only became effective on March 16, 2013. Accordingly, it is not clear what, if any, impact the Leahy-Smith Act will have on the operation of our business. However, the Leahy-Smith Act and its implementation could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents, all of which could have a material adverse effect on our business and financial condition.

Moreover, we may be subject to a third-party preissuance submission of prior art to the U.S. Patent and Trademark Office, or become involved in opposition, derivation, reexamination, *inter partes* review, post-grant review or interference proceedings challenging our patent rights or the patent rights of others. An adverse determination in any such submission, proceeding or litigation could reduce the scope of, render unenforceable, or invalidate, our patent rights, allow third parties to commercialize our technology or products and compete directly with us, without payment to us, or result in our inability to manufacture or commercialize products without infringing third-party patent rights. In addition, if the breadth or strength of protection provided by our patents and patent applications is threatened, it could dissuade companies from collaborating with us to license, develop or commercialize current or future product candidates.

Even if our patent applications issue as patents, they may not issue in a form that will provide us with any meaningful protection, prevent competitors from competing with us or otherwise provide us with any competitive advantage. Our competitors may be able to circumvent our owned or licensed patents by developing similar or alternative technologies or products in a non-infringing manner.

The issuance of a patent does not foreclose challenges to its inventorship, scope, validity or enforceability. Therefore, our owned and licensed patents may be challenged in the courts or patent offices in the United States and abroad. Such challenges may result in loss of exclusivity or freedom to operate or in patent claims being narrowed, invalidated or held unenforceable, in whole or in part, which could limit our ability to stop others from using or commercializing similar or identical technology and products, or limit the duration of the patent protection of our technology and products. Given the amount of time required for the development, testing and regulatory review of new product candidates, patents protecting such product candidates might expire before or shortly after such product candidates are commercialized. As a result, our owned and licensed patent portfolio may not provide us with sufficient rights to exclude others from commercializing products similar or identical to ours.

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

Competitors may infringe our issued patents or other intellectual property. To counter infringement or unauthorized use, we may be required to file infringement claims, which can be expensive and time consuming. Any claims we assert against perceived infringers could provoke these parties to assert counterclaims against us alleging that we infringe their patents. In addition, in a patent infringement proceeding, a court may decide that a patent of ours is invalid or unenforceable, in whole or in part, construe the patent's claims narrowly or refuse to stop the other party from using the technology at issue on the grounds that our patents do not cover the technology in question. An adverse result in any litigation proceeding could put one or more of our patents at risk of being invalidated, rendered unenforceable, or interpreted narrowly.

**We may need to license certain intellectual property from third parties, and such licenses may not be available or may not be available on commercially reasonable terms.**

A third party may hold intellectual property, including patent rights, that are important or necessary to the development of our products. It may be necessary for us to use the patented or proprietary technology of third parties to commercialize our products, in which case we would be required to obtain a license from these third parties on commercially reasonable terms, or our business could be harmed, possibly materially.

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

Our commercial success depends upon our ability, and the ability of our collaborators, to develop, manufacture, market and sell our product candidates and use our proprietary technologies without infringing the proprietary rights of third parties. There is considerable intellectual property litigation in the biotechnology and pharmaceutical industries. We may become party to, or threatened with, future adversarial proceedings or litigation regarding intellectual property rights with respect to our products and technology, including interference or derivation proceedings before the U.S. Patent and Trademark Office. Third parties may assert infringement claims against us based on existing patents or patents that may be granted in the future.

If we are found to infringe a third party's intellectual property rights, we could be required to obtain a license from such third party to continue developing and marketing our products and technology. However, we may not be able to obtain any required license on commercially reasonable terms or at all. Even if we were able to obtain a license, it could be non-exclusive, thereby giving our competitors access to the same technologies licensed to us. We could be forced, including by court order, to cease commercializing the infringing technology or product. In addition, we could be found liable for monetary damages, including treble damages and attorneys' fees if we are found to have willfully infringed a patent. A finding of infringement could prevent us from commercializing our product candidates or force us to cease some of our business operations, which could materially harm our business. Claims that we have misappropriated the confidential information or trade secrets of third parties could have a similar negative impact on our business.

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

We are currently party to license agreements for technologies that we use in conducting our drug discovery activities. In the future, we may become party to licenses that are important for product development and commercialization. If we fail to comply with our obligations under current or future

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license and funding agreements, our counterparties may have the right to terminate these agreements, in which event we might not be able to develop, manufacture or market any product or utilize any technology that is covered by these agreements or may face other penalties under the agreements. Such an occurrence could materially and adversely affect the value of a product candidate being developed under any such agreement or could restrict our drug discovery activities. Termination of these agreements or reduction or elimination of our rights under these agreements may result in our having to negotiate new or reinstated agreements with less favorable terms, or cause us to lose our rights under these agreements, including our rights to important intellectual property or technology.

**We may be subject to claims by third parties asserting that our employees or we have misappropriated their intellectual property, or claiming ownership of what we regard as our own intellectual property.**

Many of our employees were previously employed at universities or other biotechnology or pharmaceutical companies, including our competitors or potential competitors. Although we try to ensure that our employees do not use the proprietary information or know-how of others in their work for us, we may be subject to claims that these employees or we have used or disclosed intellectual property, including trade secrets or other proprietary information, of any such employee's former employer. Litigation may be necessary to defend against these claims.

In addition, while it is our policy to require our employees and contractors who may be involved in the development of intellectual property to execute agreements assigning such intellectual property to us, we may be unsuccessful in executing such an agreement with each party who in fact develops intellectual property that we regard as our own. Our and their assignment agreements may not be self-executing or may be breached, and we may be forced to bring claims against third parties, or defend claims they may bring against us, to determine the ownership of what we regard as our intellectual property.

If we fail in prosecuting or defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel. Even if we are successful in prosecuting or defending against such claims, litigation could result in substantial costs and be a distraction to management.

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

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

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

In addition to seeking patent protection for our product candidates, we also rely on trade secrets, including unpatented know-how, technology and other proprietary information, to maintain our

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

**Risks Related to Regulatory Approval of Our Product Candidates and Other Legal Compliance Matters**

**If we are not able to obtain, or if there are delays in obtaining, required regulatory approvals, we will not be able to timely commercialize, or to commercialize at all, our product candidates, and our ability to generate revenue will be materially impaired.**

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

The process of obtaining marketing approvals, both in the United States and abroad, is expensive, may take many years if approval is obtained at all, and can vary substantially based upon a variety of factors, including the type, complexity and novelty of the product candidates involved. Changes in marketing approval policies during the development period, changes in or the enactment of additional statutes or regulations, or changes in regulatory review for each submitted product application, may cause delays in the approval or rejection of an application. Regulatory authorities have substantial discretion in the approval process and may refuse to accept any application or may decide that our data is insufficient for approval and require additional preclinical studies or clinical trials. In addition, varying interpretations of the data obtained from preclinical and clinical testing could delay, limit or prevent marketing approval of a product candidate. Any marketing approval we ultimately obtain may

be limited or subject to restrictions or post-approval commitments that render the approved product not commercially viable.

If we experience delays in obtaining approval or if we fail to obtain approval of our product candidates, the commercial prospects for our product candidates may be harmed and our ability to generate revenue will be materially impaired.

In addition, even if we were to obtain approval, regulatory authorities may approve any of our product candidates for fewer or more limited indications than we request, may not approve the price we intend to charge for our products, may grant approval contingent on the performance of costly post-marketing clinical trials, or may approve a product candidate with a label that does not include the labeling claims necessary or desirable for the successful commercialization of that product candidate. Any of these scenarios could compromise the commercial prospects for our product candidates.

**We anticipate that our  $\mu$ -opioid receptor targeted product candidates, including TRV130 and TRV734, will require Risk Evaluation and Mitigation Strategies, which could delay the approval of these product candidates and increase the cost, burden and liability associated with the commercialization of these product candidates.**

The FDA Amendments Act of 2007 implemented safety-related changes to product labeling and provided the FDA with expanded authority to require the adoption of a Risk Evaluation and Mitigation Strategy, or REMS, to assure safe use of the product candidates, either as a condition of product candidate approval or on the basis of new safety information. We anticipate that our  $\mu$ -opioid receptor product candidates will require a REMS, and it is possible that our other product candidates may require a REMS. The REMS may include medication guides for patients, special communication plans to health care professionals or elements to assure safe uses such as restricted distribution methods, patient registries and/or other risk minimization tools. We cannot predict the specific REMS to be required as part of the FDA's approval of our product candidates. Any of these limitations on approval or marketing could restrict the commercial promotion, distribution, prescription or dispensing of our product candidates, if approved. Depending on the extent of the REMS requirements, these requirements may significantly increase our costs to commercialize these product candidates. Furthermore, risks of our product candidates that are not adequately addressed through proposed REMS for such product candidates may also prevent or delay their approval for commercialization.

**Our  $\mu$ -opioid receptor targeted product candidates, including TRV130 and TRV734, may be classified as controlled substances, the making, use, sale, importation, exportation and distribution of which are subject to regulation by state, federal and foreign law enforcement and other regulatory agencies.**

Our  $\mu$ -opioid receptor targeted product candidates, including TRV130 and TRV734, may be classified as controlled substances, which are subject to state, federal and foreign laws and regulations regarding their manufacture, use, sale, importation, exportation and distribution. Controlled substances are regulated under the federal Controlled Substances Act of 1970, or CSA, and regulations of the DEA.

The DEA regulates controlled substances as Schedule I, II, III, IV or V substances. Schedule I substances by definition have no established medicinal use and may not be marketed or sold in the United States. A pharmaceutical product may be listed as Schedule II, III, IV or V, with Schedule II substances considered to present the highest risk of abuse and Schedule V substances the lowest relative risk of abuse among such substances. We expect TRV130 and TRV734 to be regulated by the DEA as Schedule II controlled substances.

Various states also independently regulate controlled substances. Though state controlled substances laws often mirror federal law, because the states are separate jurisdictions, they may separately schedule drugs as well. While some states automatically schedule a drug when the DEA does

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so, in other states there must be rulemaking or a legislative action. State scheduling may delay commercial sale of any controlled substance drug product for which we obtain federal regulatory approval and adverse scheduling could impair the commercial attractiveness of such product. We or our collaborators must also obtain separate state registrations in order to be able to obtain, handle and distribute controlled substances for clinical trials or commercial sale, and failure to meet applicable regulatory requirements could lead to enforcement and sanctions from the states in addition to those from the DEA or otherwise arising under federal law.

For any of our product candidates classified as controlled substances, we and our suppliers, manufacturers, contractors, customers and distributors are required to obtain and maintain applicable registrations from state, federal and foreign law enforcement and regulatory agencies and comply with state, federal and foreign laws and regulations regarding the manufacture, use, sale, importation, exportation and distribution of controlled substances. There is a risk that DEA regulations may limit the supply of the compounds used in clinical trials for our product candidates, and, in the future, the ability to produce and distribute our products in the volume needed to meet commercial demand.

Regulations associated with controlled substances govern manufacturing, labeling, packaging, testing, dispensing, production and procurement quotas, recordkeeping, reporting, handling, shipment and disposal. These regulations increase the personnel needs and the expense associated with development and commercialization of product candidates including controlled substances. The DEA, and some states, conduct periodic inspections of registered establishments that handle controlled substances. Failure to obtain and maintain required registrations or comply with any applicable regulations could delay or preclude us from developing and commercializing our product candidates containing controlled substances and subject us to enforcement action. The DEA may seek civil penalties, refuse to renew necessary registrations or initiate proceedings to revoke those registrations. In some circumstances, violations could lead to criminal proceedings. Because of their restrictive nature, these regulations could limit commercialization of any of our product candidates that are classified as controlled substances.

### **Failure to obtain marketing approval in international jurisdictions would prevent our product candidates from being marketed abroad.**

In order to market and sell our products in the European Union and many other jurisdictions, we or our third-party collaborators must obtain separate marketing approvals and comply with numerous and varying regulatory requirements. The approval procedure varies among countries and can involve additional testing. The time required to obtain approval may differ substantially from that required to obtain FDA approval. The regulatory approval process outside the United States generally includes all of the risks associated with obtaining FDA approval. In addition, in many countries outside the United States, it is required that the product be approved for reimbursement before the product can be approved for sale in that country. We or our collaborators may not obtain approvals from regulatory authorities outside the United States on a timely basis, if at all. Approval by the FDA does not ensure approval by regulatory authorities in other countries or jurisdictions, and approval by one regulatory authority outside the United States does not ensure approval by regulatory authorities in other countries or jurisdictions or by the FDA. However, the failure to obtain approval in one jurisdiction may compromise our ability to obtain approval elsewhere. We may not be able to file for marketing approvals and may not receive necessary approvals to commercialize our products in any market.

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

Any product candidate for which we obtain marketing approval, along with the manufacturing processes, post-approval clinical data, labeling, advertising and promotional activities for such product, will be subject to ongoing requirements of and review by the FDA and other regulatory authorities. These requirements include submissions of safety and other post-marketing information and reports, registration and listing requirements, cGMP requirements relating to manufacturing, quality control, quality assurance and corresponding maintenance of records and documents, requirements regarding the distribution of samples to physicians and recordkeeping. Even if marketing approval of a product candidate is granted, the approval may be subject to limitations on the indicated uses for which the product may be marketed or to the conditions of approval, including the requirement to implement a REMS. If any of our product candidates receives marketing approval, the accompanying label may limit the approved use of our drug, which could limit sales of the product.

The FDA may also impose requirements for costly post-marketing studies or clinical trials and surveillance to monitor the safety or efficacy of the product. The FDA closely regulates the post-approval marketing and promotion of drugs to ensure drugs are marketed only for the approved indications and in accordance with the provisions of the approved labeling. The FDA imposes stringent restrictions on manufacturers' communications regarding off-label use and if we do not market our products for only their approved indications, we may be subject to enforcement action for off-label marketing. Violations of the Federal Food, Drug, and Cosmetic Act relating to the promotion of prescription drugs may lead to investigations alleging violations of federal and state health care fraud and abuse laws, as well as state consumer protection laws.

In addition, later discovery of previously unknown adverse events or other problems with our products, manufacturers or manufacturing processes, or failure to comply with regulatory requirements, may yield various results, including:

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

The FDA's policies may change and additional government regulations may be enacted that could prevent, limit or delay regulatory approval of our product candidates. If we are slow or unable to adapt

to changes in existing requirements or the adoption of new requirements or policies, or if we are not able to maintain regulatory compliance, we may lose any marketing approval that we may have obtained.

**Our current and future relationships with customers and third-party payors in the United States and elsewhere may be subject, directly or indirectly, to applicable anti-kickback, fraud and abuse, false claims, transparency, health information privacy and security and other healthcare laws and regulations, which could expose us to criminal sanctions, civil penalties, contractual damages, reputational harm, administrative burdens and diminished profits and future earnings.**

Healthcare providers, physicians and third-party payors in the United States and elsewhere will play a primary role in the recommendation and prescription of any product candidates for which we obtain marketing approval. Our future arrangements with third-party payors and customers may expose us to broadly applicable fraud and abuse and other healthcare laws and regulations, including, without limitation, the federal Anti-Kickback Statute and the federal False Claims Act, which may constrain the business or financial arrangements and relationships through which we sell, market and distribute any drugs for which we obtain marketing approval. In addition, we may be subject to transparency laws and patient privacy regulation by U.S. federal and state governments and by governments in foreign jurisdictions in which we conduct our business. The applicable federal, state and foreign healthcare laws and regulations that may affect our ability to operate include:

- the federal Anti-Kickback Statute, which prohibits, among other things, persons from knowingly and willfully soliciting, offering, receiving or providing remuneration, directly or indirectly, in cash or in kind, to induce or reward, or in return for, either the referral of an individual for, or the purchase, order or recommendation of, any good or service, for which payment may be made under federal and state healthcare programs, such as Medicare and Medicaid;
- federal civil and criminal false claims laws and civil monetary penalty laws, including the federal False Claims Act, which impose criminal and civil penalties, including civil whistleblower or *qui tam* actions, against individuals or entities for knowingly presenting, or causing to be presented, to the federal government, including the Medicare and Medicaid programs, claims for payment that are false or fraudulent or making a false statement to avoid, decrease or conceal an obligation to pay money to the federal government; the federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, which imposes criminal and civil liability for executing a scheme to defraud any healthcare benefit program or making false statements relating to healthcare matters;
- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act of 2009, or HITECH, and their respective implementing regulations, which impose obligations on covered healthcare providers, health plans, and healthcare clearinghouses, as well as their business associates that create, receive, maintain or transmit individually identifiable health information for or on behalf of a covered entity, with respect to safeguarding the privacy, security and transmission of individually identifiable health information;
- the federal Open Payments program, which requires manufacturers of drugs, devices, biologics and medical supplies for which payment is available under Medicare, Medicaid or the Children's Health Insurance Program, with specific exceptions, to report annually to the Centers for Medicare & Medicaid Services, or CMS, information related to "payments or other transfers of value" made to physicians, which is defined to include doctors, dentists, optometrists, podiatrists and chiropractors, and teaching hospitals and applicable manufacturers and applicable group purchasing organizations to report annually to CMS ownership and investment interests held by the physicians and their immediate family members, with data collection beginning on August 1, 2013, requirements for manufacturers to submit reports to CMS by March 31, 2014 and the



90th day of each subsequent calendar year, and disclosure of such information to be made by CMS on a publicly available website beginning in September 2014; and

- analogous state and foreign laws and regulations, such as state anti-kickback and false claims laws, which may apply to sales or marketing arrangements and claims involving healthcare items or services reimbursed by non-governmental third-party payors, including private insurers; state and foreign laws that require pharmaceutical companies to comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government or otherwise restrict payments that may be made to healthcare providers; state and foreign laws that require drug manufacturers to report information related to payments and other transfers of value to physicians and other healthcare providers or marketing expenditures; and state and foreign laws governing the privacy and security of health information in certain circumstances, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts.

Efforts to ensure that our business arrangements with third parties will comply with applicable healthcare laws and regulations may involve substantial costs. It is possible that governmental authorities will conclude that our business practices may not comply with current or future statutes, regulations or case law involving applicable fraud and abuse or other healthcare laws and regulations. If our operations are found to be in violation of any of these laws or any other governmental regulations that may apply to us, we may be subject to significant civil, criminal and administrative penalties, including, without limitation, damages, fines, imprisonment, exclusion from participation in government healthcare programs, such as Medicare and Medicaid, and the curtailment or restructuring of our operations, which could have a material adverse effect on our business. If any of the physicians or other healthcare providers or entities with whom we expect to do business, including our collaborators, is found not to be in compliance with applicable laws, it may be subject to criminal, civil or administrative sanctions, including exclusions from participation in government healthcare programs, which could also materially affect our business.

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

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

Among policy makers and payors in the United States and elsewhere, there is significant interest in promoting changes in healthcare systems with the stated goals of containing healthcare costs, improving quality and expanding access. In the United States, the pharmaceutical industry has been a particular focus of these efforts and has been significantly affected by major legislative initiatives. In March 2010, President Obama signed into law the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Affordability Reconciliation Act, or collectively the PPACA, a sweeping law intended to broaden access to health insurance, reduce or constrain the growth of healthcare spending, enhance remedies against fraud and abuse, add new transparency requirements for the healthcare and health insurance industries, impose new taxes and fees on the health industry and impose additional health policy reforms.

Among the provisions of the PPACA of importance to our potential product candidates are:

- an annual, nondeductible fee on any entity that manufactures or imports specified branded prescription drugs and biologic agents, apportioned among these entities according to their market share in certain government healthcare programs;

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- an increase in the statutory minimum rebates a manufacturer must pay under the Medicaid Drug Rebate Program to 23.1% and 13.0% of the average manufacturer price for branded and generic drugs, respectively;
- expansion of healthcare fraud and abuse laws, including the False Claims Act and the Anti-Kickback Statute, new government investigative powers and enhanced penalties for non-compliance;
- a new Medicare Part D coverage gap discount program, in which manufacturers must agree to offer 50% point-of-sale discounts off negotiated prices of applicable brand drugs to eligible beneficiaries during their coverage gap period, as a condition for a manufacturer's outpatient drugs to be covered under Medicare Part D;
- extension of a manufacturer's Medicaid rebate liability to covered drugs dispensed to individuals who are enrolled in Medicaid managed care organizations;
- expansion of eligibility criteria for Medicaid programs by, among other things, allowing states to offer Medicaid coverage to additional individuals and by adding new mandatory eligibility categories for certain individuals with income at or below 133% of the federal poverty level beginning in 2014, thereby potentially increasing a manufacturer's Medicaid rebate liability;
- expansion of the entities eligible for discounts under the Public Health Service pharmaceutical pricing program;
- the new requirements under the federal Open Payments program and its implementing regulations;
- a new requirement to annually report drug samples that manufacturers and distributors provide to physicians; and
- a new Patient-Centered Outcomes Research Institute to oversee, identify priorities in, and conduct comparative clinical effectiveness research, along with funding for such research.

In addition, other legislative changes have been proposed and adopted since the PPACA was enacted. These changes include aggregate reductions to Medicare payments to providers of up to 2% per fiscal year, starting in 2013. On March 1, 2013, the President signed an executive order implementing the 2% Medicare payment reductions, and on April 1, 2013, these reductions went into effect. In January 2013, President Obama signed into law the American Taxpayer Relief Act of 2012, which, among other things, reduced Medicare payments to several providers and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. These new laws may result in additional reductions in Medicare and other healthcare funding, which could have a material adverse effect on customers for our drugs, if approved, and, accordingly, our financial operations.

We expect that the PPACA, as well as other healthcare reform measures that may be adopted in the future, may result in more rigorous coverage criteria and in additional downward pressure on the price that we receive for any approved drug. Any reduction in reimbursement from Medicare or other government healthcare programs may result in a similar reduction in payments from private payors. The implementation of cost containment measures or other healthcare reforms may prevent us from being able to generate revenue, attain profitability or commercialize our drugs.

Legislative and regulatory proposals have been made to expand post-approval requirements and restrict sales and promotional activities for drugs. We cannot be sure whether additional legislative changes will be enacted, or whether the FDA regulations, guidance or interpretations will be changed, or what the impact of such changes on the marketing approvals of our product candidates, if any, may be. In addition, increased scrutiny by the U.S. Congress of the FDA's approval process may significantly delay or prevent marketing approval, as well as subject us to more stringent product labeling and post-marketing testing and other requirements.

**Governments outside the United States tend to impose strict price controls, which may adversely affect our revenue, if any.**

In some 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 considerable time after the receipt of marketing approval for a product. To obtain coverage and reimbursement or pricing approval in some countries, we may be required to conduct a clinical trial that compares the cost-effectiveness of our product candidate to other available therapies. If reimbursement of our products is unavailable or limited in scope or amount, or if pricing is set at unsatisfactory levels, our business could be harmed, possibly materially.

**If we fail to comply with environmental, health and safety laws and regulations, we could become subject to fines or penalties or incur costs that could harm our business.**

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

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

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

**Risks Related to Employee Matters and Managing Our Growth**

**Our future success depends on our ability to retain key executives and to attract, retain and motivate qualified personnel.**

We are highly dependent on the research, development, clinical, business development and financial expertise of Maxine Gowen, Ph.D., our President, Chief Executive Officer and Director, Michael W. Lark, Ph.D., our Chief Scientific Officer and Senior Vice President, Research, David Soergel, M.D., our Senior Vice President of Clinical Development, and Roberto Cuca, our Senior Vice President and Chief Financial Officer. Although we have entered into employment agreements with our executive officers, each of them may terminate their employment with us at any time. We do not maintain "key person" insurance for any of our executives or other employees.

Recruiting and retaining qualified management, scientific and clinical personnel, and if any of our product candidates achieve regulatory approval, potentially manufacturing and sales and marketing personnel, will also be critical to our success. The loss of the services of our executive officers or other key employees could impede the achievement of our research, development and commercialization objectives and seriously harm our ability to successfully implement our business strategy. Furthermore, replacing executive officers and key employees may be difficult and may take an extended period of

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time because of the limited number of individuals in our industry with the breadth of skills and experience required to successfully develop, gain regulatory approval of and commercialize products. Competition to hire from this limited pool is intense, and we may be unable to hire, train, retain or motivate these key personnel on acceptable terms given the competition among numerous pharmaceutical and biotechnology companies for similar personnel. We also experience competition for the hiring of scientific and clinical personnel from universities and research institutions. In addition, we rely on consultants and advisors, including scientific, clinical and commercial advisors, to assist us in formulating our research and development and commercialization strategy. Our consultants and advisors may be employed by employers other than us and may have commitments under consulting or advisory contracts with other entities that may limit their availability to us. If we are unable to continue to attract and retain high quality personnel, our ability to pursue our growth strategy will be limited.

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

We expect to experience significant growth in the number of our employees and the scope of our operations, particularly in the areas of drug development, regulatory affairs and, if any of our product candidates receives marketing approval, sales, marketing and distribution. To manage our anticipated future growth, we must continue to implement and improve our managerial, operational and financial systems, expand our facilities and continue to recruit and train additional qualified personnel. Due to our limited financial resources and the limited experience of our management team in managing a company with such anticipated growth, we may not be able to effectively manage the expansion of our operations or recruit and train additional qualified personnel. The expansion of our operations may lead to significant costs and may divert our management and business development resources. Any inability to manage growth could delay the execution of our business plans or disrupt our operations.

**Our employees may engage in misconduct or other improper activities, including noncompliance with regulatory standards and requirements, which could expose us to liability and hurt our reputation.**

We are exposed to the risk of employee fraud or other misconduct. Misconduct by employees could include intentional failures to comply with FDA regulations, provide accurate information to the FDA, report financial information or data accurately or disclose unauthorized activities to us. Employee misconduct could also involve the improper use or misrepresentation of information obtained in the course of clinical trials, which could result in regulatory sanctions and serious harm to our reputation. It is not always possible to identify and deter employee misconduct, and the precautions we take to detect and prevent this activity may not be effective in controlling unknown or unmanaged risks or losses or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to be in compliance with such laws or regulations. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a significant impact on our business and financial results, including the imposition of significant fines or other sanctions.

**Other Risks Related to our Business**

**We intend to conduct a substantial portion of the clinical trials for our product candidates outside of the United States and, if approved, we intend to market our product candidates abroad. Accordingly, we will be subject to the risks of doing business outside of the United States.**

We intend to conduct a substantial portion of our clinical trials outside of the United States and, if approved, we intend to market our product candidates outside of the United States. We are thus subject to risks associated with doing business outside of the United States. With respect to our product candidates, we may choose to partner with third parties that have direct sales forces and established

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distribution systems, either to augment our own sales force and distribution systems outside of the United States or in lieu of our own sales force and distribution systems, which would indirectly expose us to these risks. Our business and financial results in the future could be adversely affected due to a variety of factors associated with conducting development and marketing of our product candidates, if approved, outside of the United States, including:

- efforts to develop an international sales, marketing and distribution organization may increase our expenses, divert our management's attention from the development of product candidates or cause us to forgo profitable licensing opportunities in these geographies;
- changes in a specific country's or region's political and cultural climate or economic condition;
- unexpected changes in foreign laws and regulatory requirements;
- difficulty of effective enforcement of contractual provisions in local jurisdictions;
- inadequate intellectual property protection in foreign countries;
- trade-protection measures, import or export licensing requirements such as Export Administration Regulations promulgated by the U.S. Department of Commerce and fines, penalties or suspension or revocation of export privileges;
- regulations under the U.S. Foreign Corrupt Practices Act and similar foreign anti-corruption laws;
- the effects of applicable foreign tax structures and potentially adverse tax consequences; and
- significant adverse changes in foreign currency exchange rates which could make the cost of our clinical trials, to the extent conducted outside of the United States, more expensive.

### **Our business and operations would suffer in the event of system failures.**

Despite our implementation of security measures, our internal computer systems and those of our contractors and consultants are vulnerable to damage from computer viruses, unauthorized access, natural disasters, terrorism, war and telecommunication and electrical failures. If such an event were to occur and cause interruptions in our operations, it could result in a material disruption to our product candidate development programs. For example, the loss of clinical trial data from completed, ongoing or planned clinical trials could result in delays in our regulatory approval efforts and significantly increase our costs to recover or reproduce the data. To the extent that any disruption or security breach were to result in a loss of or damage to our data or applications, or inappropriate disclosure of personal, confidential or proprietary information, we could incur liability and the further development of any of our product candidates could be delayed or abandoned.

### **Risks Related to this Offering, Ownership of Our Common Stock and Our Status as a Public Company**

**An active trading market for our common stock may not develop and you may not be able to resell your shares of our common stock at or above the initial offering price, if at all.**

Prior to this offering, there has been no public market for our common stock. The initial public offering price for our common stock will be determined through negotiations with the underwriters and may not be indicative of the price at which our common stock will trade upon completion of this offering. Although we intend to apply to list our common stock on The NASDAQ Global Market, an active trading market for our shares may never develop or be sustained following this offering. If an active market for our common stock does not develop or is not sustained, it may be difficult for you to sell shares you purchased in this offering at an attractive price or at all.

**The trading price of the shares of our common stock may be volatile, and purchasers of our common stock could incur substantial losses.**

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

- actual or anticipated variations in our operating results;
- changes in financial estimates by us or by any securities analysts who might cover our stock;
- the timing and results of our clinical trials for any of our product candidates;
- failure or discontinuation of any of our development programs;
- conditions or trends in our industry;
- stock market price and volume fluctuations of comparable companies and, in particular, those that operate in the biopharmaceutical industry;
- announcements by us or our competitors of significant acquisitions, strategic partnerships or divestitures;
- developments or disputes concerning patent applications, issued patents or other proprietary rights;
- announcements of investigations or regulatory scrutiny of our operations or lawsuits filed against us;
- capital commitments;
- investors' general perception of our company and our business;
- recruitment or departure of key personnel;
- announcements and expectations of additional financing efforts; and
- sales of our common stock, including sales by our directors and officers or specific stockholders.

In addition, in the past, stockholders have initiated class action lawsuits against pharmaceutical and biotechnology companies following periods of volatility in the market prices of these companies' stock. Such litigation, if instituted against us, could cause us to incur substantial costs and divert management's attention and resources from our business.

**If equity research analysts do not publish research or reports, or publish unfavorable research or reports, about us, our business or our market, our stock price and trading volume could decline.**

The trading market for our common stock will be influenced by the research and reports that equity research analysts publish about us and our business. We do not currently have and may never obtain research coverage by equity research analysts. Equity research analysts may elect not to provide research coverage of our common stock after the completion of this offering, and such lack of research coverage may adversely affect the market price of our common stock. In the event we do have equity research analyst coverage, we will not have any control over the analysts or the content and opinions included in their reports. The price of our stock could decline if one or more equity research analysts downgrade our stock or issue other unfavorable commentary or research. If one or more equity research analysts ceases coverage of our company or fails to publish reports on us regularly, demand for our stock could decrease, which in turn could cause our stock price or trading volume to decline.

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

We expect the initial public offering price of our common stock to be substantially higher than the net tangible book value per share of our common stock. Therefore, if you purchase shares of our common stock in this offering, you will pay a price per share that substantially exceeds our pro forma net tangible book value per share after this offering. Based on an assumed initial public offering price of \$ \_\_\_\_\_ per share, which is the midpoint of the price range set forth on the cover page of this prospectus, you will experience immediate dilution of \$ \_\_\_\_\_ per share, representing the difference between our pro forma as adjusted net tangible book value per share after giving effect to this offering and the assumed initial public offering price.

In addition, as of September 30, 2013, we had outstanding stock options to purchase an aggregate of 17,386,829 shares of common stock at a weighted average exercise price of \$0.36 per share and warrants to purchase an aggregate of 1,790,000 shares of common stock, assuming the conversion of preferred stock into common stock, at a weighted average exercise price of \$0.99 per share. To the extent these outstanding options and warrants are exercised, there will be further dilution to investors in this offering.

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

Sales of a substantial number of shares of our common stock in the public market could occur at any time. If our stockholders sell, or the market perceives that our stockholders intend to sell, substantial amounts of our common stock in the public market following this offering, the market price of our common stock could decline significantly.

Upon completion of this offering, we will have outstanding \_\_\_\_\_ shares of common stock, assuming no exercise of outstanding options or warrants. Of these shares, the \_\_\_\_\_ shares sold in this offering and \_\_\_\_\_ additional shares will be freely tradable, \_\_\_\_\_ additional shares of common stock will be eligible for sale in the public market beginning 90 days after the date of this prospectus, subject to volume, manner of sale and other limitations of Rule 144 and Rule 701, and \_\_\_\_\_ additional shares of common stock will be available for sale in the public market beginning 180 days after the date of this prospectus following the expiration of lock-up agreements between some of our stockholders and the underwriters. The representatives of the underwriters may release these stockholders from their lock-up agreements with the underwriters at any time and without notice, which would allow for earlier sales of shares in the public market.

In addition, promptly following the completion of this offering, we intend to file one or more registration statements on Form S-8 registering the issuance of approximately \_\_\_\_\_ shares of common stock subject to options or other equity awards issued or reserved for future issuance under our equity incentive plans. Shares registered under these registration statements on Form S-8 will be available for sale in the public market subject to vesting arrangements and exercise of options, the lock-up agreements described above and the restrictions of Rule 144 in the case of our affiliates.

Additionally, after this offering, the holders of an aggregate of \_\_\_\_\_ shares of our common stock and \_\_\_\_\_ shares of our common stock issuable upon the exercise of outstanding warrants, or their transferees, will have rights, subject to some conditions, to require us to file one or more registration statements covering their shares or to include their shares in registration statements that we may file for ourselves or other stockholders. If we were to register the resale of these shares, they could be freely sold in the public market. If these additional shares are sold, or if it is perceived that they will be sold, in the public market, the trading price of our common stock could decline.

**Our ability to utilize our net operating loss carryforwards and certain other tax attributes may be limited.**

We have incurred substantial losses during our history. We do not anticipate generating revenue from sales of products for the foreseeable future, if ever, and we may never achieve profitability. To the extent that we continue to generate tax losses, unused losses will carry forward to offset future taxable income, if any, until such unused losses expire. Under Section 382 of the Internal Revenue Code of 1986, as amended, if a corporation undergoes an "ownership change," which is generally defined as a greater than 50% change, by value, in its equity ownership over a three-year period, the corporation's ability to use its pre-change net operating loss carryforwards and other pre-change tax attributes to offset its post-change income may be limited. We have not completed our analysis to determine what, if any, impact any prior ownership change has had on our ability to utilize our net operating loss carryforwards. In addition, we may experience ownership changes in the future as a result of subsequent shifts in our stock ownership, including this offering. As of December 31, 2012, we had federal net operating loss carryforwards of approximately \$7.7 million that could be limited if we have experienced, or if in the future we experience, an ownership change.

**Provisions in our corporate charter documents and under Delaware law may prevent or frustrate attempts by our stockholders to change our management and hinder efforts to acquire a controlling interest in us, and the market price of our common stock may be lower as a result.**

There are provisions in our certificate of incorporation and bylaws as they will be in effect following this offering that may make it difficult for a third party to acquire, or attempt to acquire, control of our company, even if a change in control was considered favorable by you and other stockholders. For example, our board of directors will have the authority to issue up to \_\_\_\_\_ shares of preferred stock. The board of directors can fix the price, rights, preferences, privileges, and restrictions of the preferred stock without any further vote or action by our stockholders. The issuance of shares of preferred stock may delay or prevent a change in control transaction. As a result, the market price of our common stock and the voting and other rights of our stockholders may be adversely affected. An issuance of shares of preferred stock may result in the loss of voting control to other stockholders.

Our charter documents will also contain other provisions that could have an anti-takeover effect, including:

- only one of our three classes of directors will be elected each year;
- stockholders will not be entitled to remove directors other than by a 66<sup>2</sup>/3% vote and only for cause;
- stockholders will not be permitted to take actions by written consent;
- stockholders cannot call a special meeting of stockholders; and
- stockholders must give advance notice to nominate directors or submit proposals for consideration at stockholder meetings.

In addition, we are subject to the anti-takeover provisions of Section 203 of the Delaware General Corporation Law, which regulates corporate acquisitions by prohibiting Delaware corporations from engaging in specified business combinations with particular stockholders of those companies. These provisions could discourage potential acquisition proposals and could delay or prevent a change in control transaction. They could also have the effect of discouraging others from making tender offers for our common stock, including transactions that may be in your best interests. These provisions may also prevent changes in our management or limit the price that investors are willing to pay for our stock.



**Concentration of ownership of our common stock among our existing executive officers, directors and principal stockholders may prevent new investors from influencing significant corporate decisions.**

Upon completion of this offering, our executive officers, directors and current beneficial owners of 5% or more of our common stock and their respective affiliates will, in the aggregate, beneficially own over % of our outstanding common stock. As a result, these persons, acting together, would be able to significantly influence all matters requiring stockholder approval, including the election and removal of directors, the approval of any merger, consolidation, sale of all or substantially all of our assets, or other significant corporate transactions.

Some of these persons or entities may have interests different than yours. For example, because many of these stockholders purchased their shares at prices substantially below the price at which shares are being sold in this offering and have held their shares for a longer period, they may be more interested in selling our company to an acquirer than other investors, or they may want us to pursue strategies that deviate from the interests of other stockholders.

**We are an "emerging growth company" and as a result of the reduced disclosure and governance requirements applicable to emerging growth companies, our common stock may be less attractive to investors.**

We are an "emerging growth company" as defined in the Jumpstart Our Business Startups Act of 2012, or JOBS Act, and we intend to take advantage of some of the exemptions from reporting requirements that are applicable to other public companies that are not emerging growth companies, including not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act of 2002, or Sarbanes-Oxley Act, reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements, and exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved. We cannot predict if investors will find our common stock less attractive because we will rely on these exemptions. If some investors find our common stock less attractive as a result, there may be a less active trading market for our common stock and our stock price may be more volatile. We may take advantage of these reporting exemptions until we are no longer an emerging growth company. We will remain an emerging growth company until the earlier of (1) the last day of the fiscal year (a) following the fifth anniversary of the completion of this offering, (b) in which we have total annual gross revenue of at least \$1.0 billion, or (c) in which we are deemed to be a large accelerated filer, which means the market value of our common stock that is held by non-affiliates exceeds \$700 million as of the prior June 30th, and (2) the date on which we have issued more than \$1.0 billion in non-convertible debt during the prior three-year period.

Under Section 107(b) of the JOBS Act, emerging growth companies can delay adopting new or revised accounting standards until such time as those standards apply to private companies. We have irrevocably elected not to avail ourselves of this exemption from new or revised accounting standards and, therefore, we will be subject to the same new or revised accounting standards as other public companies that are not emerging growth companies.

**If we fail to maintain proper and effective internal controls, our ability to produce accurate financial statements on a timely basis could be impaired.**

After the completion of this offering, we will be subject to the reporting requirements of the Securities Exchange Act of 1934, the Sarbanes-Oxley Act and the rules and regulations of the stock market on which our common stock is listed. The Sarbanes-Oxley Act requires, among other things, that we maintain effective disclosure controls and procedures and internal controls over financial reporting. Commencing with our fiscal year ending December 31, 2014, we must perform system and process evaluation and testing of our internal controls over financial reporting to allow management to

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report on the effectiveness of our internal controls over financial reporting in our Form 10-K filing for that year, as required by Section 404 of the Sarbanes-Oxley Act. This will require that we incur substantial additional professional fees and internal costs to expand our accounting and finance functions and that we expend significant management efforts. Prior to this offering, we have never been required to test our internal controls within a specified period, and, as a result, we may experience difficulty in meeting these reporting requirements in a timely manner.

We may discover weaknesses in our system of internal financial and accounting controls and procedures that could result in a material misstatement of our financial statements. Our internal control over financial reporting will not prevent or detect all error and all fraud. A control system, no matter how well designed and operated, can provide only reasonable, not absolute, assurance that the control system's objectives will be met. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that misstatements due to error or fraud will not occur or that all control issues and instances of fraud will be detected.

If we are not able to comply with the requirements of Section 404 of the Sarbanes-Oxley Act in a timely manner, or if we are unable to maintain proper and effective internal controls, we may not be able to produce timely and accurate financial statements. If that were to happen, the market price of our stock could decline and we could be subject to sanctions or investigations by the stock exchange on which our common stock is listed, the Securities and Exchange Commission, or SEC, or other regulatory authorities.

**We will have broad discretion in the use of proceeds from this offering and may invest or spend the proceeds in ways with which you do not agree and in ways that may not increase the value of your investment.**

We will have broad discretion over the use of proceeds from this offering. You may not agree with our decisions, and our use of the proceeds may not yield any return on your investment. As described elsewhere in this prospectus, we expect to use the net proceeds to us from this offering for working capital and general corporate purposes, including further development of our product candidates. Our failure to apply the net proceeds of this offering effectively could compromise our ability to pursue our growth strategy and we might not be able to yield a significant return, if any, on our investment of these net proceeds. You will not have the opportunity to influence our decisions on how to use our net proceeds from this offering.

**Because we do not anticipate paying any cash dividends on our common stock in the foreseeable future, capital appreciation, if any, will be your sole source of gains and you may never receive a return on your investment.**

You should not rely on an investment in our common stock to provide dividend income. We have not declared or paid cash dividends on our common stock to date and have no plans to pay cash dividends in the foreseeable future. We currently intend to retain our future earnings, if any, to fund the development and growth of our business. In addition, the terms of any existing or future debt agreements may preclude us from paying dividends. As a result, capital appreciation, if any, of our common stock will be your sole source of gain for the foreseeable future. Investors seeking cash dividends should not purchase our common stock.

**We will incur increased costs and demands upon management as a result of being a public company.**

As a public company listed in the United States, we will incur significant additional legal, accounting and other costs. These additional costs could negatively affect our financial results. In addition, changing laws, regulations and standards relating to corporate governance and public disclosure, including regulations implemented by the SEC and stock exchanges, may increase legal and

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financial compliance costs and make some activities more time consuming. These laws, regulations and standards are subject to varying interpretations and, as a result, their application in practice may evolve over time as new guidance is provided by regulatory and governing bodies. We intend to invest resources to comply with evolving laws, regulations and standards, and this investment may result in increased general and administrative expenses and a diversion of management's time and attention from revenue-generating activities to compliance activities. If notwithstanding our efforts to comply with new laws, regulations and standards, we fail to comply, regulatory authorities may initiate legal proceedings against us and our business may be harmed.

Failure to comply with these rules might also make it more difficult for us to obtain some types of insurance, including directors and officers liability insurance, and we might be forced to accept reduced policy limits and coverage or incur substantially higher costs to obtain the same or similar coverage. The impact of these events could also make it more difficult for us to attract and retain qualified persons to serve on our board of directors, on committees of our board of directors or as members of senior management.

## SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus contains forward-looking statements that involve substantial risks and uncertainties. The forward-looking statements are contained principally in the sections entitled "Prospectus Summary," "Risk Factors," "Management's Discussion and Analysis of Financial Condition and Results of Operations" and "Business," but are also contained elsewhere in this prospectus. In some cases, you can identify forward-looking statements by the words "may," "might," "will," "could," "would," "should," "expect," "intend," "plan," "objective," "anticipate," "believe," "estimate," "predict," "project," "potential," "continue" and "ongoing," or the negative of these terms, or other comparable terminology intended to identify statements about the future. These statements involve known and unknown risks, uncertainties and other factors that may cause our actual results, levels of activity, performance or achievements to be materially different from the information expressed or implied by these forward-looking statements. Although we believe that we have a reasonable basis for each forward-looking statement contained in this prospectus, we caution you that these statements are based on a combination of facts and factors currently known by us and our expectations of the future, about which we cannot be certain. Forward-looking statements include statements about:

- our plans to develop and potentially commercialize our product candidates;
- the exercise by Forest of its option to license TRV027 and, if it does, our ability to achieve milestones under the license;
- our planned clinical trials and preclinical studies for our product candidates;
- the timing of and our ability to obtain and maintain regulatory approvals for our product candidates;
- the extent of clinical trials potentially required by the FDA for our product candidates;
- the clinical utility and market acceptance of our product candidates;
- our commercialization, marketing and manufacturing capabilities and strategy;
- our intellectual property position; and
- our ability to identify additional product candidates with significant commercial potential that are consistent with our commercial objectives.

You should refer to the "Risk Factors" section of this prospectus for a discussion of important factors that may cause our actual results to differ materially from those expressed or implied by our forward-looking statements. As a result of these factors, we cannot assure you that the forward-looking statements in this prospectus will prove to be accurate. Furthermore, if our forward-looking statements prove to be inaccurate, the inaccuracy may be material. In light of the significant uncertainties in these forward-looking statements, you should not regard these statements as a representation or warranty by us or any other person that we will achieve our objectives and plans in any specified time frame, or at all. We undertake no obligation to publicly update any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by law.

You should read this prospectus and the documents that we reference in this prospectus and have filed as exhibits to the registration statement, of which this prospectus is a part, completely and with the understanding that our actual future results may be materially different from what we expect. We qualify all of our forward-looking statements by these cautionary statements.

This prospectus includes statistical and other industry and market data that we obtained from industry publications and research, surveys and studies conducted by third parties. Industry publications and third party research, surveys and studies generally indicate that their information has been obtained from sources believed to be reliable, although they do not guarantee the accuracy or completeness of such information.

## USE OF PROCEEDS

We estimate that the net proceeds from our issuance and sale of \_\_\_\_\_ shares of our common stock in this offering will be approximately \$ \_\_\_\_\_ million, or approximately \$ \_\_\_\_\_ million if the underwriters exercise their option to purchase additional shares in full, based upon an assumed initial public offering price of \$ \_\_\_\_\_ per share, which is the midpoint of the price range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.

Each \$1.00 increase or decrease in the assumed initial public offering price of \$ \_\_\_\_\_ per share, which is the midpoint of the price range set forth on the cover page of this prospectus, would increase or decrease the net proceeds to us from this offering by approximately \$ \_\_\_\_\_ million, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. Each increase or decrease of 1.0 million in the number of shares we are offering would increase or decrease the net proceeds to us from this offering, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us, by approximately \$ \_\_\_\_\_ million, assuming the assumed initial public offering price stays the same.

As of September 30, 2013, we had cash and cash equivalents of \$48.0 million. We currently estimate that we will use the net proceeds from this offering, together with our existing cash and cash equivalents, as follows:

- approximately \$27.0 million to fund the costs of a Phase 2b clinical trial for TRV027;
- approximately \$41.0 million to fund TRV130 through Phase 2 clinical development, including completing two Phase 1 studies, a Phase 2 efficacy trial, two Phase 2 safety trials, and additional clinical trials and non-clinical activities to support Phase 3 clinical trials;
- approximately \$7.0 million to fund TRV734 through Phase 1 clinical development;
- approximately \$6.0 million to fund selection of a product candidate from our delta opioid receptor program and IND-enabling studies for such product candidate;
- approximately \$8.0 million to fund research and development to apply our discovery platform to additional GPCRs and to identify biased ligands against those further targets; and
- the remainder for working capital and general corporate purposes.

Although it is difficult to predict future liquidity requirements, we believe that the net proceeds from this offering and our existing cash and cash equivalents, together with interest thereon, will be sufficient to fund our operations through the end of 2015. However, the expected proceeds from this offering will not be sufficient to complete advanced clinical development of any of our product candidates, or if applicable, to prepare for commercializing any product candidate which achieves approval. Accordingly, we will continue to require substantial additional capital beyond the expected proceeds of this offering to continue our clinical development and potential commercialization activities. Because successful development of our product candidates is uncertain, we are unable to estimate the actual funds we will require to complete research and development and commercialize our products under development.

This expected use of net proceeds from this offering represents our intentions based upon our current plans and business conditions, and could change in the future as our plans and business conditions evolve. The amounts and timing of our actual expenditures may vary significantly depending on numerous factors, including the progress of our development, the status of and results from clinical trials, as well as any collaborations that we may enter into with third parties for our product candidates, and any unforeseen cash needs. As a result, our management will have broad discretion in the application of the net proceeds from this offering, and investors will be relying on the judgment of our management regarding the application of the net proceeds of this offering.

## DIVIDEND POLICY

We have never declared or paid any dividends on our common stock. We anticipate that we will retain all of our future earnings, if any, for use in the operation and expansion of our business and do not anticipate paying cash dividends in the foreseeable future.

## CAPITALIZATION

The following table sets forth our cash and cash equivalents and our capitalization as of September 30, 2013:

- on an actual basis;
- on a pro forma basis to give effect to the net exercise of warrants that will expire upon the closing of this offering to acquire \_\_\_\_\_ shares of our common stock, assuming the conversion of preferred stock into common stock, and assuming an initial public offering price of \$ \_\_\_\_\_ per share, the midpoint of the price range set forth on the cover of this prospectus, and the conversion of the outstanding shares of our preferred stock into an aggregate of 96,839,703 shares of our common stock, which will occur automatically upon the closing of this offering; and
- on a pro forma as adjusted basis to give further effect to our sale of \_\_\_\_\_ shares of common stock in this offering at an assumed initial public offering price of \$ \_\_\_\_\_ per share, which is the midpoint of the range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.

The following information is illustrative only of our cash and capitalization following the completion of this offering and will change based on the actual initial public offering price and other terms of this offering determined at pricing. You should read this table together 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.

	As of September 30, 2013		
	Actual	Pro forma	Pro forma as adjusted
	(in thousands, except share and per share data)		
Cash and cash equivalents	\$ 47,984	\$	\$
Redeemable convertible preferred stock:			
Redeemable convertible Series A preferred stock, \$0.001 par value; 25,074,999 shares authorized, issued and outstanding, actual; no shares designated, issued or outstanding, pro forma and pro forma as adjusted	\$ 25,019	\$	\$
Redeemable convertible Series B preferred stock, \$0.001 par value; 35,500,000 shares authorized, 30,800,000 shares issued and outstanding, actual; no shares designated, issued or outstanding, pro forma and pro forma as adjusted	30,777		
Redeemable convertible Series B-1 preferred stock, \$0.001 par value; 6,000,000 shares authorized, 4,200,000 shares issued and outstanding, actual; no shares designated, issued or outstanding, pro forma and pro forma as adjusted	3,399		
Redeemable convertible Series C preferred stock, \$0.001 par value; 37,000,000 shares authorized, 36,764,704 shares issued and outstanding, actual; no shares designated, issued or outstanding, pro forma and pro forma as adjusted	59,930		
Total redeemable convertible preferred stock	119,125		
Stockholders' deficit:			
Common stock, \$0.001 par value; 132,000,000 shares authorized, 5,175,066 shares issued and outstanding, actual; _____ shares authorized, _____ shares issued and outstanding, pro forma; _____ shares authorized, _____ shares issued and outstanding, pro forma as adjusted	5		
Additional paid-in-capital	309		
Accumulated deficit	(75,367)		
Total stockholders' deficit	(75,053)		
Total capitalization	\$ (75,053)	\$	\$

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Each \$1.00 increase or decrease in the assumed initial public offering price of \$      per share, which is the midpoint of the price range set forth on the cover page of this prospectus, would increase or decrease the pro forma as adjusted amount of each of cash and cash equivalents, additional paid-in capital, total stockholders' equity and total capitalization by approximately \$      million, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same. Similarly, each increase or decrease of 1.0 million in the number of shares we are offering would increase or decrease the pro forma as adjusted amount of cash and cash equivalents, additional paid-in capital, total stockholders' equity and total capitalization by approximately \$      million, assuming the assumed initial public offering price stays the same.

The number of shares of common stock outstanding in the table above does not include:

- 17,386,829 shares of our common stock issuable upon the exercise of stock options outstanding under our 2008 Equity Incentive Plan as of September 30, 2013, at a weighted average exercise price of \$0.36 per share;
- 1,790,000 shares of our common stock issuable upon exercise of warrants outstanding as of September 30, 2013, at a weighted average exercise price of \$0.99 per share, of which warrants to purchase 1,650,000 shares will terminate upon the closing of this offering unless exercised prior to the closing of this offering; and
- shares of our common stock reserved for future issuance under our equity incentive plans and our employee stock purchase plan.

**DILUTION**

If you invest in our common stock in this offering, your interest will be diluted to the extent of the difference between the initial public offering price per share and the pro forma as adjusted net tangible book value per share of our common stock immediately after this offering. Net tangible book value (deficit) per share is determined by dividing our total tangible assets less total liabilities and redeemable convertible preferred stock by the number of outstanding shares of our common stock.

As of September 30, 2013, we had a net tangible book value (deficit) of \$(75.1) million, or approximately \$(14.50) per share of common stock. On a pro forma basis, after giving effect to the net exercise of warrants that will expire upon the closing of this offering to acquire \_\_\_\_\_ shares of our common stock, assuming the conversion of preferred stock into common stock, and assuming an initial public offering price of \$ \_\_\_\_\_ per share, the midpoint of the price range set forth on the cover of this prospectus and the conversion of the outstanding shares of our preferred stock into an aggregate of 96,839,703 shares of our common stock, which will occur automatically upon the closing of this offering, our net tangible book value (deficit) would have been approximately \$ \_\_\_\_\_ million, or approximately \$( \_\_\_\_\_ ) per share of common stock.

Investors participating in this offering will incur immediate and substantial dilution. After giving effect to the issuance and sale of \_\_\_\_\_ shares of our common stock in this offering at an assumed initial public offering price of \$ \_\_\_\_\_ per share, which is the midpoint of the price range set forth on the cover page of this prospectus, and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us, our pro forma as adjusted net tangible book value as of September 30, 2013 would have been approximately \$ \_\_\_\_\_ million, or approximately \$ \_\_\_\_\_ per share of common stock. This represents an immediate increase in the pro forma net tangible book value of \$ \_\_\_\_\_ per share to existing stockholders, and an immediate dilution in the pro forma net tangible book value of \$ \_\_\_\_\_ per share to investors purchasing shares of our common stock in this offering. The following table illustrates this per share dilution:

Assumed initial public offering price per share	\$
Actual net tangible book value per share as of September 30, 2013	\$ (14.50)
Increase per share attributable to net exercise of warrants and conversion of redeemable convertible preferred stock	_____
Pro forma net tangible book value per share before this offering	_____
Increase in pro forma net tangible book value per share attributable to new investors participating in this offering	_____
Pro forma as adjusted net tangible book value per share after this offering	_____
Dilution per share to investors participating in this offering	\$ _____

The dilution information discussed above is illustrative only and will change based on the actual initial public offering price and other terms of this offering determined at pricing. Each \$1.00 increase or decrease in the assumed initial public offering price of \$ \_\_\_\_\_ per share would increase or decrease our pro forma as adjusted net tangible book value by approximately \$ \_\_\_\_\_ million, or approximately \$ \_\_\_\_\_ per share, and the dilution per share to investors participating in this offering by approximately \$ \_\_\_\_\_ per share, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same. Each increase or decrease of 1.0 million in the number of shares we are offering would increase or decrease our pro forma as adjusted net tangible book value by approximately \$ \_\_\_\_\_ million, or approximately \$ \_\_\_\_\_ per share, and the dilution per share to investors participating in this offering by approximately \$ \_\_\_\_\_ per share, assuming the assumed initial public offering price stays the same.



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If the underwriters exercise their option in full to purchase additional shares of common stock in this offering, the pro forma as adjusted net tangible book value per share after the offering would be \$ per share, the increase in the pro forma net tangible book value per share to existing stockholders would be \$ per share and the dilution to new investors purchasing common stock in this offering would be \$ per share.

The following table sets forth as of September 30, 2013, on the pro forma basis described above, the differences between the number of shares of common stock purchased from us, the total consideration paid and the weighted average price per share paid by existing stockholders and by investors purchasing shares of our common stock in this offering at an assumed initial public offering price of \$ per share, which is the midpoint of the range set forth on the cover page on this prospectus, before deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us:

	Shares purchased		Total consideration		Weighted average price per share
	Number	Percent	Amount	Percent	
Existing stockholders			% \$		% \$
New investors					
Total		100.0%	\$	100.0%	

Each \$1.00 increase or decrease in the assumed initial public offering price of \$ per share, which is the midpoint of the range set forth on the cover page of this prospectus, would increase or decrease the total consideration paid by new investors by \$ million, and increase or decrease the percent of total consideration paid by new investors by percentage points, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same.

Each increase or decrease of 1.0 million in the number of shares we are offering would increase or decrease the total consideration paid by new investors by \$ million, and increase or decrease the percent of total consideration paid by new investors by percentage points, assuming the assumed initial offering price stays the same.

The table above also excludes:

- 17,386,829 shares of our common stock issuable upon the exercise of stock options outstanding under our 2008 Equity Incentive Plan as of September 30, 2013, at a weighted average exercise price of \$0.36 per share;
- 1,790,000 shares of our common stock issuable upon exercise of warrants outstanding as of September 30, 2013, at a weighted average exercise price of \$0.99 per share, of which warrants to purchase 1,650,000 shares will terminate upon the closing of this offering unless exercised prior to the closing of this offering; and
- shares of our common stock reserved for future issuance under our equity incentive plans and our employee stock purchase plan.

The shares of our common stock reserved for future issuance under our equity benefit plans may be subject to automatic annual increases in accordance with the terms of the plans. To the extent that options or warrants are exercised, new options are issued under our equity incentive plans or we issue additional shares of common stock in the future, there will be further dilution to investors participating in this offering. In addition, we may choose to raise additional capital because of market conditions or strategic considerations, even if we believe that we have sufficient funds for our current or future operating plans. If we raise additional capital through the sale of equity or convertible debt securities, the issuance of these securities could result in further dilution to our stockholders.

**SELECTED FINANCIAL DATA**

The following tables set forth our selected financial data for the periods indicated. The following selected financial data for the years ended December 31, 2011 and 2012 and the selected balance sheet data as of December 31, 2011 and 2012 are derived from our audited financial statements, which have been audited by Ernst & Young LLP, our independent registered public accounting firm, appearing elsewhere in this prospectus. The selected statement of operations data for the nine-month periods ended September 30, 2012 and 2013 and the period from November 9, 2007 (date of inception) to September 30, 2013 are derived from unaudited condensed financial statements appearing elsewhere in this prospectus.

The financial data for the nine months ended September 30, 2012 and 2013 and as of September 30, 2013, in the opinion of management, includes all adjustments, consisting only of normal recurring adjustments, that are necessary for a fair presentation of the financial position and the results of operations for these periods. Our historical results are not necessarily indicative of the results to be expected in the future, and our operating results for the nine months ended September 30, 2013 are not necessarily indicative of the results that may be expected for the entire year ending December 31, 2013.

This selected financial data should be read together with the historical financial statements and related notes to those statements, as well as "Management's Discussion and Analysis of Financial Condition and Results of Operations," which are included elsewhere in this prospectus.

	Year Ended December 31,		Nine Months Ended September 30,		Period From November 9, 2007 (date of inception) to September 30, 2013
	2011	2012	2012	2013	
(in thousands, except share and per share data)					
<b>Statement of Operations Data:</b>					
Total revenue	\$ 2,421	\$ 808	\$ 555	\$ 135	\$ 9,467
Operating expenses:					
General and administrative	3,062	3,123	2,480	2,843	16,854
Research and development	15,109	13,295	10,547	12,240	66,252
Total operating expenses	18,171	16,418	13,027	15,083	83,106
Loss from operations	(15,750)	(15,610)	(12,472)	(14,948)	(73,639)
Total other income (expense)	(60)	(26)	(50)	(1,398)	(1,676)
Net loss and comprehensive loss	(15,810)	(15,636)	(12,522)	(16,346)	(75,315)
Accretion of redeemable convertible preferred stock	(74)	(316)	(237)	(248)	(736)
Net loss attributable to common stockholders	\$ (15,884)	\$ (15,952)	\$ (12,759)	\$ (16,594)	\$ (76,051)
Net loss per share—basic and diluted	\$ (4.40)	\$ (3.82)	\$ (3.07)	\$ (3.58)	
Pro forma net loss per share of common stock—basic and diluted		\$		\$	
Weighted average shares of common stock outstanding used in computing net loss per share—basic and diluted	3,611,112	4,173,782	4,154,328	4,628,902	
Weighted average shares of common stock outstanding used in computing pro forma net loss per share—basic and diluted					

	As of December 31,		As of
	2011	2012	September 30, 2013
		(in thousands)	
<b>Balance Sheet Data:</b>			
Cash and cash equivalents	\$ 17,060	\$ 6,739	\$ 47,984
Total assets	19,407	8,088	50,449
Total liabilities	3,990	8,127	6,377
Total redeemable convertible preferred stock	58,641	58,958	119,125
Total stockholders' deficit	(43,224)	(58,997)	(75,053)

## 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 related notes appearing 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 and related financing, includes forward looking statements that involve risks and uncertainties. As a result of many factors, including those factors set forth in the "Risk Factors" section of this prospectus, our actual results could 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 biopharmaceutical company that discovers, develops and intends to commercialize therapeutics that use a novel approach to target G protein coupled receptors, or GPCRs. Using our proprietary product platform, we have identified and advanced two differentiated product candidates into the clinic. We have completed a Phase 2a clinical trial and plan to initiate a Phase 2b clinical trial of TRV027 for acute heart failure, or AHF. Forest Laboratories Holdings Limited, or Forest, has the exclusive option to license TRV027 from us. Our other lead program, TRV130, has completed a Phase 1b clinical trial to evaluate its potential to treat moderate to severe acute pain intravenously and we plan to complete two additional Phase 1 trials and initiate a Phase 2 trial in the first half of 2014. We have retained all worldwide development and commercialization rights to TRV130. We plan to develop and commercialize our two lead product candidates initially in the acute care hospital markets and to advance additional product candidates, including our two most advanced preclinical programs focused on central nervous system, or CNS, indications.

We were incorporated and commenced operations in the fourth quarter of 2007. Our operations to date have included organizing and staffing our company, business planning, raising capital and developing TRV027, TRV130 and our other product candidates. We have financed our operations primarily through private placements of our preferred stock and debt borrowings. As of September 30, 2013, we had a deficit accumulated during the development stage of \$75.4 million. Our net loss was \$15.8 million and \$15.6 million for the years ended December 31, 2011 and 2012, respectively, and \$16.3 million for the nine months ended September 30, 2013. Our ability to become and remain profitable depends on our ability to generate revenue. We do not expect to generate significant revenue unless and until we or a collaborator obtain marketing approval for and commercialize TRV027, TRV130 or one of our other product candidates.

We have received aggregate proceeds of \$120.1 million through September 30, 2013 from the sale of our preferred stock and related warrants and \$9.4 million pursuant to grant and collaboration agreements. As of December 31, 2012, we had drawn down the entire amount of a \$5.3 million loan facility, which we subsequently repaid in full in May 2013 with a portion of the proceeds we received from the issuance of Series C preferred stock. From inception through September 30, 2013, we had incurred approximately \$66.3 million of total research and development expenses and approximately \$16.9 million of total general and administrative expenses.

We expect to incur significant expenses and operating losses for the foreseeable future as we continue the development and clinical trials of, and seek regulatory approval for, our product candidates. If we obtain regulatory approval for any of our product candidates, we expect to incur significant commercialization expenses. Furthermore, upon the closing of this offering, we expect to incur additional costs associated with operating as a public company. We expect that these costs will include significant legal, accounting, investor relations and other expenses that we did not incur as a private company. We will need to obtain substantial additional funding in connection with our continuing operations. If we are unable to raise capital when needed or on attractive terms, we could be forced to delay, reduce or eliminate our research and development programs or any future

commercialization efforts. We will seek to fund our operations through the sale of equity, debt financings or other sources, including potential additional collaborations. However, we may be unable to raise additional funds or enter into such other agreements when needed on favorable terms, or at all. If we fail to raise capital or enter into such other arrangements as, and when, needed, we may have to significantly delay, scale back or discontinue the development and/or commercialization of one or more of our product candidates.

### **Our Option and License Agreements with Forest**

In May 2013, we entered into an option agreement and a license agreement with Forest, under which we granted to Forest an exclusive option to license TRV027, which may be exercised at any time before we deliver our Phase 2b clinical trial results to Forest and during a specified period of time thereafter. If Forest exercises its option, the license agreement between us and Forest will become effective, and Forest will have an exclusive worldwide license to develop and commercialize TRV027 and specified related compounds. Forest will be responsible for subsequent development, regulatory approval and commercialization of TRV027 at Forest's expense.

Under the option agreement, we will conduct, at our expense, a Phase 2b trial of TRV027 in AHF. The Phase 2b trial will be conducted pursuant to a mutually agreed upon development plan and under the oversight of a joint development committee, which has an equal number of representatives from us and from Forest, with operational authority during the option period retained by us, subject to Forest's right to assume control in certain circumstances if we fail to conduct the development activities adequately.

We expect to deliver the data from the Phase 2b trial to Forest in the second half of 2015. During the option period, we are not permitted to negotiate for or enter into any agreement with a third party for the development and commercialization of TRV027 and its related compounds. Under specified circumstances linked to adverse changes in the market or with respect to TRV027, Forest has the right to renegotiate the terms of the license agreement. If Forest exercises such right, its option will expire and we will be obligated to negotiate in good faith with Forest for a period of time the terms of any new arrangement. If we and Forest are unable to agree on the terms of any new arrangement during such period of time, then the option agreement will terminate and for a specified period of time thereafter we may not offer a license to any third party on terms better than those last proposed by either us or Forest during our negotiations.

If Forest does not exercise the option during the specified period, its option will expire and the license agreement will not become effective. In that event, we would be free to enter into any type of collaboration arrangement with another party for the development and commercialization of TRV027 or to pursue development and commercialization ourselves.

If Forest exercises the option, Forest will have the sole and exclusive right under the license agreement, at its sole cost and expense, to develop and commercialize TRV027 and specified related compounds throughout the world. At our request, Forest will consider in good faith whether to grant us the right to co-promote the licensed products in the United States under terms to be agreed upon by the parties but it has no obligation to provide any co-promote rights to us. Under the license agreement, we may not, and may not license others to, develop or commercialize certain products that compete with the licensed products.

We received no consideration from Forest for the grant of the option to license TRV027. If Forest exercises the option, we could potentially receive up to \$430 million in the aggregate, including an upfront option exercise fee of \$65 million and milestone payments depending upon the achievement of future development and commercial milestones. We could also receive tiered royalties between 10% and 20% on net sales of licensed products worldwide, subject to certain deductions and offsets, with the royalty rates on net sales of licensed products in the United States being somewhat higher than the royalty rates on net sales of licensed products outside the United States.

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If Forest exercises the option and the license agreement becomes effective, both we and Forest would have the right to terminate the license agreement in the event of an uncured material breach or insolvency of the other party. In addition, Forest would be permitted to terminate the license agreement without cause at any time upon prior written notice or immediately for product safety reasons. Following a termination of the license agreement, all licenses granted to Forest would terminate, and Forest would grant us an exclusive royalty, bearing license under specified patents and know-how to develop and commercialize the licensed products that it returns to us. If not terminated, Forest's license agreement would remain in effect until the expiration of the last royalty term for the last licensed product.

If Forest elects to exercise its option, the term of the royalty on sales of TRV027 for a given country would extend until the latest to occur of (i) 10 years from first commercial sale of TRV027 in that country, (ii) the expiration of the last to expire patent claiming TRV027 that is sufficient to block the entrance of a generic version of the product, or (iii) the expiration of any period of exclusivity granted by applicable law or any regulatory authority in such country that confers exclusive marketing rights on the product.

Forest has the right to grant sublicenses under the license agreement to affiliates and third parties. Any sublicensing does not act to relieve Forest of any of its obligations under the license agreement, including Forest's obligation to make milestone payments to us with respect to TRV027 or pay royalties to us on sales of TRV027 by such sublicensee.

### **Components of Operating Results**

#### ***Revenue***

To date, we have derived revenue principally from research grants as well as from one research collaboration arrangement. We have not generated any revenue from commercial product sales. In the future, if any of our product candidates currently under development is approved for commercial sale, we may generate revenue from product sales, or alternatively, we may choose to select a collaborator to commercialize our product candidates in all or selected markets.

We expect revenue to decrease because we have completed our grant programs and our research collaboration. We do not currently anticipate any revenue from new grant programs or research collaborations. We will not generate any commercial revenue until one of our product candidates receives regulatory approval, if ever.

#### ***General and Administrative Expenses***

General and administrative expenses consist principally of salaries and related costs for executive and other personnel, including stock-based compensation and travel expenses. Other general and administrative expenses include facility-related costs, communication expenses and professional fees for legal, patent prosecution and maintenance consulting and accounting services.

We anticipate that our general and administrative expenses will increase in the future with continued research, development and potential commercialization of our product candidates and expanded compliance obligations of operating as a public company. These increases will likely include greater costs for insurance, costs related to the hiring of additional personnel, payments to outside consultants and investor relations providers, and costs for lawyers and accountants, among other expenses. Additionally, if and when we believe a regulatory approval of a product candidate appears likely, we anticipate an increase in payroll and expense as a result of our preparation for commercial operations, especially as it relates to the sales and marketing of our product candidates.

#### ***Research and Development Expenses***

Our research and development expenses consist primarily of costs incurred for the development of our product candidates. These costs include external costs and internal research and development costs.

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External costs include:

- expenses incurred under agreements with contract research organizations and investigative sites that conduct our clinical trials, preclinical studies and regulatory activities; and
- the costs of acquiring, developing and manufacturing clinical trial materials.

Internal costs include:

- personnel-related expenses, including salaries, benefits and stock-based compensation expense of our research and development personnel;
- laboratory supplies;
- allocated facilities, depreciation and other expenses, which include rent and utilities;
- travel and training for research and development employees;
- product liability insurance; and
- laboratory service costs.

We track external costs by discovery program and subsequently by product candidate once a product candidate has been selected for development. TRV130 and TRV734 were both selected from the m-opioid receptor discovery program and so we did not separately allocate costs between TRV734 and TRV130 until the start of 2011 when we selected TRV130 as a product candidate. We have incurred a total of \$66.3 million in research and development expenses from inception through September 30, 2013, with \$24.9 million being spent on external costs for TRV027, TRV130 and TRV734 and the remainder being spent on internal costs, predominantly personnel related costs, and external costs related to the development of our ABLE product platform, grant funded activities and our early stage programs, including the d-opioid receptor program.

Research and development costs are expensed as incurred. We record costs for some development activities, such as clinical trials, based on an evaluation of the progress to completion of specific tasks using data such as patient enrollment, clinical site activations or information provided to us by our vendors.

Research and development activities are central to our business model. Product candidates in later stages of clinical development generally have higher development costs than those in earlier stages of clinical development, primarily due to the increased size and duration of later-stage clinical trials. As we advance our product candidates, we expect the amount of research and development spending allocated to external spending relative to internal spending will continue to grow for the foreseeable future, while our internal spending should grow at a slower and more controlled pace.

It is difficult to determine with certainty the duration and completion costs of our current or future preclinical programs and clinical trials of our product candidates, or if, when or to what extent we will generate revenue from the commercialization and sale of any of our product candidates that obtain regulatory approval. We may never succeed in achieving regulatory approval for any of our product candidates. The duration, costs and timing of clinical trials and development of our product candidates will depend on a variety of factors, including the uncertainties of future clinical and preclinical studies, uncertainties in clinical trial enrollment rate and significant and changing government regulation. In addition, the probability of success for each product candidate will depend on numerous factors, including competition, manufacturing capability and commercial viability. We will determine which programs to pursue and how much to fund each program in response to the scientific and clinical success of each product candidate, as well as an assessment of each product candidate's commercial potential.

### ***Change in Fair Value of Warrant Liability***

We have issued warrants for the purchase of our Series B and Series B-1 preferred stock that we believe are financial instruments that may require a transfer of assets because of the redemption

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features of the underlying preferred stock. Therefore, we have classified these warrants as liabilities that we re-measure to fair value at each balance sheet date and we record the changes in the fair value of the warrant liability in our statement of operations and comprehensive loss as a change in fair value of warrant liability. In the event of an initial public offering, or IPO, or a change in control of our company, 1,650,000 of the 1,775,000 outstanding preferred warrants will terminate, unless exercised, immediately prior to the date such IPO or change in control is closed. We will continue to adjust the liability for changes in fair value until the earlier of the exercise or expiration of the warrants or the conversion of the underlying preferred stock. Upon consummation of this offering, the underlying preferred stock will be converted to common stock, and the fair value of the warrant liability at that time will be reclassified to additional paid-in capital.

### ***Other Income / Expense***

Other income consists principally of interest income earned on cash and cash equivalent balances and miscellaneous income attributable to the sale of research and development tax credits.

Interest expense consists of cash paid and noncash interest expense related to our prior bank facility, which we repaid in November 2011, our prior equipment loan facility with the Commonwealth of Pennsylvania, which we repaid in December 2012, and our loan facility with Comerica Bank, or the Comerica loan facility, which we repaid in May 2013.

### ***Accretion of Preferred Stock***

We account for the redemption of issuance costs on our preferred stock using the effective interest method, accreting such amounts to preferred stock from the date of issuance to the earliest date the holder can demand redemption.

### **Critical Accounting Policies and Significant Judgments and Estimates**

This discussion and analysis of our financial condition and results of operations is based on our financial statements, which have been prepared in accordance with generally accepted accounting principles in the United States of America, or GAAP. The preparation of these financial statements requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities, disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenue and expenses during the reported period. In accordance with GAAP, we base our estimates on historical experience and on various other assumptions that we believe are reasonable under the circumstances. Actual results may differ from these estimates under different assumptions or conditions.

While our significant accounting policies are more fully described in Note 2 to our audited financial statements appearing elsewhere in this prospectus, we believe the following accounting policies are critical to the process of making significant judgments and estimates in the preparation of our financial statements.

### ***Grant Revenue Recognition***

We recognize grant revenue when persuasive evidence of an arrangement exists, delivery has occurred or services have been rendered, the price is fixed and determinable and collectability is reasonably assured. In 2009, we received a research grant from the National Institutes of Health, or NIH, to assist in the funding of specific research activities from September 2009 through August 2011. The amount of the award was approximately \$7.6 million and as of December 31, 2011, we had completed all activities and recognized all revenue related to this grant. In August 2011, we received a second research grant from the NIH to assist in the funding of our d-opioid program. The award contemplated funding up to \$496 thousand during the period from August 15, 2011 through July 31, 2016, subject to availability of funds and successful progression of the program. Through June 6, 2013, we had received \$338 thousand and on June 6, 2013, we were informed that no additional funds would be made available. In November 2011, we received a research grant for approximately \$205 thousand



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from the Michael J. Fox Foundation for the funding of certain research activities from December 2011 through November 2012. As of December 31, 2012, we had completed all activities and recognized all revenue related to this grant. We recognize revenue under all three grants in earnings in the period in which the related expenditures are incurred. In May 2009, we entered into an Opportunity Grant Program with the Commonwealth of Pennsylvania under which we could receive up to \$200 thousand based on the achievement of specified headcount and expenditure milestones. We met our initial headcount goal and were awarded \$100 thousand under this program in 2011. This revenue was recognized as received. We did not meet our second headcount goal and no additional revenue is expected under this program.

### ***Collaboration Revenue Recognition***

We recognize collaboration revenue when persuasive evidence of an arrangement exists, delivery has occurred or services have been rendered, the price is fixed and determinable, and collectability is reasonably assured.

### ***Research and Development Expenses***

Research and development costs are charged to expense as incurred. These costs include, but are not limited to, employee-related expenses, including salaries, benefits and travel; expenses incurred under agreements with contract research organizations and clinical research organizations and investigative sites that conduct clinical trials and preclinical studies; the cost of acquiring, developing and manufacturing clinical trial materials; facilities, depreciation and other expenses, which include direct and allocated expenses for rent and utilities; insurance and other supplies; and costs associated with preclinical activities and regulatory operations.

Costs for certain development activities, such as clinical trials, are recognized based on an evaluation of the progress to completion of specific tasks using data such as patient enrollment, clinical site activations or information provided to us by our vendors with respect to their actual costs incurred. Payments for these activities are based on the terms of the individual arrangements, which may differ from the pattern of costs incurred, and are reflected in the financial statements as prepaid or accrued research and development expense, as the case may be.

### ***Income Taxes***

Income taxes are recorded in accordance with ASC Topic 740, *Income Taxes*, or ASC 740, which provides for deferred taxes using an asset and liability approach. We recognize deferred tax assets and liabilities for the expected future tax consequences of events that have been included in the financial statements or tax returns. Deferred tax assets and liabilities are determined based on the difference between the financial statement and tax bases of assets and liabilities using enacted tax rates in effect for the year in which the differences are expected to reverse. Valuation allowances are provided if based upon the weight of available evidence, it is more likely than not that some or all of the deferred tax assets will not be realized.

We account for uncertain tax positions in accordance with the provisions of ASC 740. When uncertain tax positions exist, we recognize the tax benefit of tax positions to the extent that the benefit will more likely than not be realized. The determination as to whether the tax benefit will more likely than not be realized is based upon the technical merits of the tax position as well as consideration of the available facts and circumstances. As of December 31, 2011 and 2012, and September 30, 2013, we did not have any significant uncertain tax positions.

### ***Preferred Stock Warrants***

Freestanding warrants that are related to the purchase of preferred stock are classified as liabilities and recorded at fair value regardless of the timing of the redemption feature or the redemption price or the likelihood of redemption. The warrants are subject to re-measurement at each balance sheet date and any change in fair value is recognized as a component of change in fair value of warrant

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liability in our statements of operations and comprehensive loss. Pursuant to the terms of these warrants, upon the conversion to common stock of the series of preferred stock underlying the warrant, the warrants automatically become exercisable for shares of common stock based upon the conversion ratio of the underlying preferred stock. Upon such conversion of the underlying series of preferred stock, the warrants will be classified as a component of equity and will no longer be subject to re-measurement. Further, as it relates to 1,650,000 Series B-1 preferred stock warrants, in the event of an initial public offering or a change in control of our company, such preferred stock warrants will terminate unless exercised prior to the closing of such public offering or change in control. We will continue to adjust the liability for changes in fair value until the earlier of the exercise or expiration of the warrants or the conversion of the underlying preferred stock.

**Stock-Based Compensation**

We account for all share-based compensation payments issued to employees, directors and non-employees using an option pricing model for estimating fair value. Accordingly, share-based compensation expense is measured based on the estimated fair value of the awards on the date of grant, net of forfeitures. We recognize compensation expense for the portion of the award that is ultimately expected to vest over the period during which the recipient renders the required services to us using the straight-line single option method. In accordance with authoritative accounting guidance, we re-measure the fair value of non-employee share-based awards as the awards vest, and recognize the resulting value, if any, as expense during the period the related services are rendered.

**Significant Factors, Assumptions and Methodologies Used in Determining Fair Value**

We apply the fair value recognition provisions of Financial Accounting Standards Board Accounting Standards Codification Topic 718, Compensation—Stock Compensation, or ASC 718. Determining the amount of share-based compensation to be recorded requires us to develop estimates of the fair value of stock options as of their grant date. We recognize share-based compensation expense ratably over the requisite service period, which in most cases is the vesting period of the award. Calculating the fair value of share-based awards requires that we make highly subjective assumptions.

We use the Black-Scholes option pricing model to value our stock option awards. Use of this valuation methodology requires that we make assumptions as to the volatility of our common stock, the expected term of our stock options, the risk free interest rate for a period that approximates the expected term of our stock options and our expected dividend yield. Because we are a privately held company with a limited operating history, we utilize data from a representative group of companies to estimate expected stock price volatility. We selected companies from the biopharmaceutical industry with similar characteristics to us, including those in the early stage of product development and with a therapeutic focus.

We use the simplified method as prescribed by the Securities and Exchange Commission Staff Accounting Bulletin No. 107, Share-Based Payment, to calculate the expected term of stock option grants to employees as we do not have sufficient historical exercise data to provide a reasonable basis upon which to estimate the expected term of stock options granted to employees. We utilize a dividend yield of zero based on the fact that we have never paid cash dividends and have no current intention to pay cash dividends. The risk-free interest rate used for each grant is based on the U.S. Treasury yield curve in effect at the time of grant for instruments with a similar expected life. The weighted-average assumptions used to estimate the fair value of stock options using the Black-Scholes option pricing model were as follows for the year ended December 31, 2012 and for the nine months ended September 30, 2013:

	Year Ended December 31, 2012	Nine Months Ended September 30, 2013
Risk-free interest rate	1.92%	1.50%
Expected term of options (in years)	6.1	6.1
Expected volatility	80.0 %	80.5 %
Dividend yield	0.0 %	0.0 %

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We are also required to estimate forfeitures at the time of grant, and revise those estimates in subsequent periods if actual forfeitures differ from our estimates. We use historical data to estimate pre-vesting option forfeitures and record share-based compensation expense only for those awards that are expected to vest. To the extent that actual forfeitures differ from our estimates, the difference is recorded as a cumulative adjustment in the period the estimates were revised. Through September 30, 2013, actual forfeitures have not been material.

Stock-based compensation expense totaled \$176 thousand and \$500 thousand for the year ended December 31, 2012 and for the nine months ended September 30, 2013, respectively. We record stock-based compensation expense as a component of research and development expenses or general and administrative expenses, depending on the function performed by the optionee. For the year ended December 31, 2012 and the nine months ended September 30, 2013, we allocated stock-based compensation as follows:

	Year Ended December 31, 2012	Nine Months Ended September 30, 2013
	(in thousands)	
Research and development	\$ 125	\$ 355
General and administrative	51	145
Total	<u>\$ 176</u>	<u>\$ 500</u>

As of September 30, 2013, we had \$3.9 million of total unrecognized stock-based compensation expense, which we expect to recognize over a weighted-average remaining vesting period of approximately 3.34 years. While our share-based compensation for stock options granted to employees and non-employees to date has not been material to our financial results, in future periods, our share-based compensation expense is expected to increase as a result of recognizing our existing unrecognized share-based compensation for awards that will vest and as we issue additional share-based awards to attract and retain our employees.

**Fair Market Value Estimates**

We are required to estimate the fair market value of the common stock underlying our share-based awards when performing the fair value calculations with the Black-Scholes option pricing model. The fair market value of the common stock underlying our share-based awards was determined on each grant date by our board of directors, with input from management. All options to purchase shares of our common stock are intended to be granted with an exercise price per share no less than the fair market value per share of our common stock underlying those options on the date of grant, based on the information known to us on the date of grant. In the absence of a public trading market for our common stock, on each grant date, we develop an estimate of the fair market value of our common stock in order to determine an exercise price for the option grants. We determined the fair market value of our common stock using methodologies, approaches and assumptions consistent with the American Institute of Certified Public Accountants, or AICPA, *Audit and Accounting Practice Aid Series: Valuation of Privately Held Company Equity Securities Issued as Compensation* or the AICPA Practice Guide. In addition, we considered various objective and subjective factors, along with input from management and contemporaneous valuations, to determine the fair market value of our common stock, including:

- external market conditions affecting the biotechnology industry;
- trends within the biotechnology industry;
- the prices at which we sold shares of preferred stock;

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- the superior rights and preferences of the preferred stock relative to our common stock at the time of each grant;
- our results of operations and financial position;
- the status of our research and development efforts;
- our stage of development and business strategy;
- the lack of an active public market for our capital stock; and
- the likelihood of achieving a liquidity event, such as an IPO or sale of our company in light of prevailing market conditions.

The per share estimated fair market value of our common stock in the table below represents the determination by our board of directors of the fair market value of our common stock as of the date of grant, taking into consideration the various objective and subjective factors described above, including the conclusions, if applicable, of contemporaneous independent third-party valuations of our common stock as discussed below. We computed the per share weighted average estimated fair value for stock option grants based on the Black-Scholes option pricing model. The following table sets forth information about our stock option grants since January 1, 2012:

<u>Date of Issuance</u>	<u>Number of Shares Underlying Options Granted</u>	<u>Exercise Price per Share</u>	<u>Estimated Fair Market Value per Common Share</u>	<u>Estimated Fair Value of Options per Share</u>
February 2, 2012	395,000	\$ 0.11	\$ 0.11	\$ 0.09
April 19, 2012	780,000	0.11	0.11	0.09
October 17, 2012	200,000	0.11	0.11	0.09
June 17, 2013	6,555,013	0.36	0.36	0.25
June 19, 2013	165,266	0.36	0.36	0.25
August 6, 2013	244,838	0.36	0.36	0.25
August 12, 2013	612,094	0.36	0.36	0.25
August 27, 2013	429,579	1.20	1.20	0.84
September 3, 2013	1,224,188	1.20	1.20	0.85
September 26, 2013	760,000	1.20	1.20	0.84

In determining the exercise prices of the options set forth in the table above granted since January 1, 2012, our board of directors considered the most recent available independent third-party valuations of our common stock, which were prepared as of July 8, 2010, April 30, 2013 and August 15, 2013, and based its determination in part on such valuations, with the analyses summarized below.

The intrinsic value of all outstanding vested and unvested options of \$ million is based on a per share price of \$ , the midpoint of the price range set forth on the cover page of this prospectus, shares of common stock issuable upon the exercise of options outstanding as of September 30, 2013 and a weighted average exercise price of \$ per share.

### *Stock option grants from January 1, 2012 to October 17, 2012*

Our board of directors granted stock options from January 1, 2012 through October 17, 2012, with each having an exercise price of \$0.11 per share. The exercise price per share was supported by an independent third-party valuation of \$0.11 per common share as of July 8, 2010 in connection with our initial Series B and Series B-1 preferred stock issuances. In conducting this valuation, we estimated the value of our common stock using the option pricing method. The option pricing method treats common stock as options on the enterprise's value, with exercise prices based on liquidation preferences set forth in the terms of the preferred stockholders agreements. The enterprise value was determined

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based upon the Series B preferred stock pre-money valuation and this value was employed in the option pricing method for valuing the common stock. We completed the Series B and Series B-1 preferred stock issuances, at \$1.00 per share, for up to \$39.3 million in July 2010. The common stock is treated as a call option that gives its owner the right to buy the underlying net assets at a predetermined or "strike" price at a liquidity event, such as an IPO, merger or sale. The option pricing method considers the various terms of the preferred stock, including the level of seniority among the securities, dividend policy, conversion ratios, and cash allocations upon liquidation of the enterprise. In addition, the option pricing method implicitly considers the effect of the liquidation preference as of the appropriate date in the future, not as of the valuation date. Under the option pricing method, value is allocated to the common stock only if the net assets of the enterprise exceed the liquidation preference at the time of the liquidity event. The option pricing method commonly uses the Black-Scholes formula to price the common stock as a call option. The Black-Scholes assumptions used in the July 8, 2010 valuation were determined as follows:

- The current value per share of common stock was management's estimate of fair value based on the pre-money Series B financing value.
- The exercise price was calculated based on the aggregate liquidation preferences of the outstanding Series A and B preferred stock.
- The time until expiration was based on the estimated time horizon for common stock value. A four-year time horizon was used based on our early stage of development and strategic plans. It was assumed that if our research and development plans progress as planned, that a liquidation event would occur within four years; if the development plans fail or have limited success, it was assumed that we would liquidate for less than the preferred stock preference or that we would recapitalize, in either case leaving the common stock virtually worthless.
- The volatility factor of 100% was based on comparable companies in the U.S. biotechnology market with market capitalizations less than \$100 million.

A discount for lack of marketability of 50% was then applied to the resulting Black-Scholes value. A discount for lack of marketability was applied to reach the final valuation of the common stock because, as we are a private company, there are impediments to liquidity, including lack of publicly available information and the lack of a trading market. Our determination of the discount included factors such as our proximity to an IPO, reduced funding risk and our progress made on our clinical development program. The discount for marketability decreases as we move closer to marketability of common shares through an event, such as an IPO, and as the risk declines for our company as milestones are achieved.

We concluded that the value of our company remained relatively unchanged from July 8, 2010 through October 17, 2012. This was primarily attributable to the absence of a significant product inflection point, insofar as TRV027, our lead asset, was in a Phase 2a clinical trial from the end of 2010 into the first half of 2012, and our continued efforts to obtain financing to support our liquidity needs and funding of operating expenses. The specific facts and circumstances considered by our board of directors included the following:

- We had principally financed our operations through private placements of preferred stock and debt. In 2010 and 2011, we successfully closed and received \$17.5 million in each year. The original issuance per share price of \$1.00 for the preferred stock remained unchanged in 2010 and 2011.
- There were no preferred stock issuances in 2012 despite fund raising efforts and our cash and cash equivalents at the end of 2012 were \$6.7 million. At December 31, 2011, we had cash and cash equivalents of \$17.1 million.

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- In anticipation of completing a financing in 2012, we had a valuation conducted in October 2012 that indicated that the value of our common stock was less than \$0.01, and as a result, we ceased making additional option grants until after completion of a financing.
- We had no completed clinical trial data for any of our programs from the end of 2010 through the end of 2011.

### *Stock options granted on June 17, 2013 and July 29, 2013*

Our board of directors granted stock options on June 17, 2013 and July 29, 2013, with each having an exercise price of \$0.36 per share. Three of these grants became effective upon later dates (June 19, 2013, August 6, 2013 and August 12, 2013) when the respective recipient initially became an employee of the company. The exercise price per share was supported by the most recent independent third-party valuation of \$0.36 per common share as of April 30, 2013. In conducting this valuation, we utilized the option pricing model backsolve method to calculate our enterprise value utilizing the May 2013 Series C financing at \$1.632 per share. Additionally, we estimated the value of our common stock using the option pricing method, consistent with the methodology noted above in the July 8, 2010 valuation. Changes in assumptions since the July 8, 2010 valuation included, adjusting the enterprise value based upon the Series C financing raise at \$1.632 per share, changing the expected term to 2.5 years based on updated management estimates, utilizing volatility of 80.5% based on the median of comparable companies and reducing the discount for lack of marketability to 30%. The comparable companies we used were publicly traded companies selected primarily on the basis of the lead indications they have under development. These companies consisted of Pain Therapeutics, Acura Pharmaceuticals, Horizon Pharma, Zogenix and Neurocrine Biosciences, each of which have lead indications focused on pain/neurological disorders, and Aastrom Biosciences, Pozen and Cytokinetics, each of which specializes in cardiovascular indications. All of the selected companies have market capitalizations of less than a billion dollars and low or no product revenue which we believe make them representative of our size and stage of development.

### *Stock options granted on August 27, 2013 and September 26, 2013*

Our board of directors granted stock options on August 27, 2013 and September 26, 2013 with an exercise price of \$1.20 per share. One of these grants became effective upon a later date (September 3, 2013) when the recipient initially became an employee of our company. The exercise price per share was supported by the most recent third-party valuation of \$1.20 per common share as of August 15, 2013. In conducting this valuation, we applied the weighted average of the market adjusted option pricing method and the probability weighted expected return method, or PWERM, approach to determine our enterprise value and then to allocate the appropriate portion of that enterprise value to our shares of common stock. We used both the market adjusted option pricing method and the PWERM to take into account the decision by our board of directors in August 2013 to proceed with preparations for an IPO. We applied a weighting of 50% to the option pricing method, which assumed that we continue to operate as a private company, and a weighting of 50% to the PWERM approach, which assumed that we achieve an IPO exit in the near-term. This 50% probability of an IPO exit in the near term was selected based on the changing dynamics of market receptivity for biotech IPOs and the early stage of our preparations.

To calculate our enterprise value under the market adjusted option pricing method, we started with the enterprise value calculated in the April 30, 2013 valuation described above and increased that value by 9.7% based upon the change from April 30, 2013 through August 15, 2013, in enterprise value of relevant market indices such as the NASDAQ Biotechnology Index, iShares NASDAQ Biotechnology Index and SPDR S&P Biotech. We then further adjusted this increased value by 13.3% based upon the estimated value created with the cash we utilized between April 30, 2013 and August 15, 2013 using a venture capital required rate of return of 20%. From this enterprise value we then estimated the value

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of our common stock using the option pricing method, consistent with the methodology noted above in the July 8, 2010 and April 30, 2013 valuations.

Our PWERM approach employed three IPO scenarios and weighted those as described below. We estimated our enterprise value using the guideline public company method under the market approach. Under the guideline public company method, we considered an average of pre-money values for IPOs completed by biotechnology companies from the beginning of 2012 through the middle of 2013. In addition, we considered a medium multiple of invested capital as indicated by the IPOs. For the complete set of biotechnology companies that went public between the beginning of 2011 through the middle of 2013, the median step-up factor was 1.1x. However, for biotechnology companies with lead programs, partnerships with pharmaceutical companies and robust pipelines, the range of this multiple has been 1.2x-1.4x. Given the general positive investor sentiment in the public markets for biotech IPOs, we used a factor of 1.3x as the upper end of the enterprise value range for our company, which is at a slight premium to the historical median.

For each of the various scenarios, an equity value was estimated and the rights and preferences for each shareholder class were considered to allocate the enterprise value to common shares. The common share value was then multiplied by a discount factor reflecting the calculated discount rate and the timing of the event. Lastly, the common share value was multiplied by an estimated probability for each scenario. The probability and timing of each scenario were based on discussions between our board of directors and our management team.

We used the following three possible scenarios under the PWERM, weighing them as indicated:

- an IPO at an assumed valuation in the fourth quarter of 2013, weighted at 60%;
- an IPO at a lower assumed valuation in the fourth quarter of 2013, weighted at 25%; and
- an IPO at the higher assumed valuation in the first quarter of 2014, weighted at 15%.

A discount for lack of marketability of 10% was then applied to the resulting PWERM value. This discount was significantly less than the 30% applied to the April 30, 2013 option pricing model to reflect that the PWERM assumed that we have moved closer to marketability of shares of common stock in anticipation of a successful IPO.

The primary drivers for the increased value per share of common stock between April 30, 2013 and August 15, 2013 were:

- We received strong preliminary data from 10 subjects in our Phase 1b trial for TRV130, suggesting to us that TRV130 was potentially superior to morphine. This data increased our confidence that data from 30 subjects would be sufficient to show statistically significant differences. The final data for all 30 subjects was not available until early October.
- The in-life period for TRV734's IND-enabling studies was completed, which increased the probability of successful transition into Phase 1 testing.
- The likelihood of a successful IPO increased as a result of the positive early data from our Phase 1b trial for TRV130, the advancement of TRV734 and the decision by our board of directors in August 2013 to initiate the process for an initial public offering.

### *Determination of estimated IPO offering price*

In 2013, we determined the estimated initial public offering price per share of this offering, as set forth on the cover page of this prospectus, to be between \$ and \$ per share. We note that, as is typical in IPOs, the preliminary range was not derived using a formal determination of fair value, but was determined based upon discussions between us and the underwriters. Among the factors considered in setting the preliminary range were our prospects and the

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history of and prospects for our industry, the general condition of the securities markets and the recent market prices of, and the demand for, publicly traded common stock of generally comparable companies. In addition to this difference in purpose and methodology, we believe that the difference in value between the midpoint of the preliminary price range and management's determination of the fair value of our common stock of \$1.20 per share as of August 15, 2013, the date of our last valuation, was primarily the result of the following factors:

- We received promising final data from the 30 subjects in our Phase 1b clinical trial for TRV130 in early October, which were not factored into the August 15, 2013 valuation.
- Subsequent to August 15, 2013, we completed several critical events necessary to proceed toward an IPO, including the confidential submission of a registration statement for an IPO in September, the public filing of the registration statement in October and testing-the-waters meetings with potential IPO investors in October that led us to believe an IPO was potentially feasible.
- Our convertible preferred stock currently has substantial economic rights and preferences over our common stock. An IPO would result in the conversion of our preferred stock upon the completion of this offering and the corresponding elimination of these preferences, which would result in an increased common stock valuation as compared to the valuation as of August 15, 2013.
- The proceeds of a successful IPO would substantially strengthen our balance sheet by increasing our liquidity. Additionally, the completion of an IPO would provide us with access to the public company debt and equity markets. These improvements in our financial position would increase the valuation of our common stock as compared to the valuation as of August 15, 2013.
- The fact that the estimated initial public offering price range necessarily assumes that the IPO has occurred, that a public market for our common stock has been created and that our preferred stock has been converted into common stock in connection with the IPO, and therefore excludes any discount for lack of marketability of our common stock, any discount to reflect the time value of money for the period from the assumed IPO dates back to the valuation date, any preferences of our preferred stock and any assumption of less than 100% probability of an IPO, which were factored into the August 15, 2013 valuation.

### **Recent Accounting Pronouncements**

In June 2011, FASB issued ASU No. 2011-05, *Comprehensive Income (ASC Topic 220): Presentation of Comprehensive Income*, or ASU 2011-05. This accounting update eliminates the option to present the components of other comprehensive income as part of the statement of stockholders' equity. Instead, comprehensive income must be presented in either a single continuous statement of comprehensive income, which contains two sections, net income and other comprehensive income, or in two separate but consecutive statements. ASU 2011-05 was effective for fiscal periods beginning after December 15, 2011 with early adoption permitted. Our retrospective adoption of ASU 2011-05 did not have a significant impact on our financial position, results of operations or cash flows.

In February 2013, FASB issued ASU No. 2013-02, *Comprehensive Income (Topic 220): Reporting of Amounts Reclassified Out of Accumulated Other Comprehensive Income*, or ASU 2013-02. ASU 2013-02 requires companies to present either in a single note or parenthetically on the face of the financial statements; the effect of significant amounts reclassified from each component of accumulated other comprehensive income based on its source and the income statement line items affected by the reclassification. This guidance is effective for annual reporting periods beginning after December 15, 2012. We believe the adoption of this standard will not have a significant impact on our financial position, results of operations or cash flows.



**JOBS Act**

The JOBS Act contains provisions that, among other things, reduce reporting requirements for an "emerging growth company." As an emerging growth company, we have elected to not take advantage of the extended transition period afforded by the JOBS Act for the implementation of new or revised accounting standards and, as a result, will comply with new or revised accounting standards on the relevant dates on which adoption of such standards is required for non-emerging growth companies.

**Results of Operations***Comparison of the Nine Months Ended September 30, 2012 and 2013*

	Nine Months Ended September 30,		Change
	2012	2013 (in thousands)	
<b>Revenue:</b>			
Grant revenue	\$ 355	\$ 85	\$ (270)
Collaboration revenue	200	50	(150)
Total revenue	<u>555</u>	<u>135</u>	<u>(420)</u>
<b>Operating expenses:</b>			
General and administrative	2,480	2,843	363
Research and development	10,547	12,240	1,693
Total operating expenses	<u>13,027</u>	<u>15,083</u>	<u>2,056</u>
Loss from operations	<u>(12,472)</u>	<u>(14,948)</u>	<u>(2,476)</u>
<b>Other income (expense):</b>			
Change in fair value of warrant liability	34	(1,250)	(1,284)
Miscellaneous income	38	1	(37)
Interest expense	(122)	(149)	(27)
Total other income (expense)	<u>(50)</u>	<u>(1,398)</u>	<u>(1,348)</u>
Net loss and comprehensive loss	<u>(12,522)</u>	<u>(16,346)</u>	<u>(3,824)</u>
Accretion of preferred stock	(237)	(248)	(11)
Net loss attributable to common stockholders	<u>\$ (12,759)</u>	<u>\$ (16,594)</u>	<u>\$ (3,835)</u>

*Revenue*

Revenue decreased by \$420 thousand, or 76%, from \$555 thousand for the nine months ended September 30, 2012 to \$135 thousand for the nine months ended September 30, 2013. The change was attributable to a decrease of \$187 thousand in grant revenue due to the conclusion of the Michael J. Fox Foundation research grant in November 2012, a decrease of \$83 thousand in grant revenue due to the discontinuation of funding in June 2013 for a research grant from the National Institutes of Health and a decrease of \$150 thousand in collaboration revenue related to the completion of the research activities in 2012 under a research collaboration agreement with Merck Sharp & Dohme Corporation.

*General and administrative*

General and administrative expenses increased by \$363 thousand for the nine months ended September 30, 2013 compared to the same period in 2012 primarily as a result of an increase in professional fees for legal services and for financial consulting services in connection with business development activities.

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*Research and development*

Research and development expenses increased by \$1.7 million, or 16.1%, from \$10.5 million for the nine months ended September 30, 2012 to \$12.2 million for the nine months ended September 30, 2013. This increase was primarily driven by \$1.2 million related to TRV734's IND-enabling studies and a \$930 thousand increase for additional TRV130 Phase 1 clinical trials, offset by a \$518 thousand decrease in other research and development expenses.

The following table summarizes our research and development expenses for the nine months ended September 30, 2012 and 2013:

	Nine Months Ended September 30,	
	2012	2013
	(in thousands)	
TRV027	\$ 2,507	\$ 2,242
TRV130	1,547	2,477
TRV734	362	1,559
Stock-based compensation	55	355
Other personnel related costs	3,627	3,676
Other research and development	2,449	1,931
	<u>\$ 10,547</u>	<u>\$ 12,240</u>

*Change in fair value of warrant liability*

The fair value of the warrant liability decreased by \$34 thousand during the nine months ended September 30, 2012 compared to an increase of \$1.3 million during the nine months ended September 30, 2013, which resulted in a commensurate increase in other income and other expense, respectively. The change in the fair value of the warrant liability for each of the nine months ended September 30, 2012 and 2013 was due to the revaluation of the warrants outstanding.

*Interest expense*

Interest expense increased from \$122 thousand during the nine months ended September 30, 2012 to \$149 thousand for the nine months ended September 30, 2013, primarily due to the expensing of remaining deferred financing costs associated with the Comerica loan facility that was repaid in full on May 3, 2013 partially offset by a decrease in interest expense recognized on the loan.

*Comparison of Years Ended December 31, 2011 and 2012*

	Year Ended December 31,		Change
	2011	2012	
	(in thousands)		
<b>Revenue:</b>			
Grant revenue	\$ 2,421	\$ 408	\$ (2,013)
Collaboration revenue	—	400	400
Total revenue	<u>2,421</u>	<u>808</u>	<u>(1,613)</u>
<b>Operating expenses:</b>			
General and administrative	3,062	3,123	61
Research and development	15,109	13,295	(1,814)
Total operating expenses	<u>18,171</u>	<u>16,418</u>	<u>(1,753)</u>
Loss from operations	<u>(15,750)</u>	<u>(15,610)</u>	<u>140</u>
<b>Other income (expense):</b>			
Change in fair value of warrant liability	11	45	34
Miscellaneous income	—	123	123
Interest income	3	—	(3)
Interest expense	(74)	(194)	(120)
Total other income (expense)	<u>(60)</u>	<u>(26)</u>	<u>34</u>
Net loss and comprehensive loss	<u>(15,810)</u>	<u>(15,636)</u>	<u>174</u>
Accretion of preferred stock	(74)	(316)	(242)
Net loss attributable to common stockholders	<u>\$ (15,884)</u>	<u>\$ (15,952)</u>	<u>\$ (68)</u>

*Revenue*

Revenue decreased by \$1.6 million, or 66.6%, from \$2.4 million in 2011 to \$0.8 million in 2012. The decrease was primarily attributable to a net decrease of \$2.0 million in grant revenue, offset by \$400 thousand from the initiation and completion of the research activities under the Merck research collaboration in 2012.

*General and administrative expense*

General and administrative expenses increased by \$61 thousand for 2012 when compared to 2011, primarily as a result of additional legal and public relations expenses associated with fundraising activities ahead of the Series C financing.

*Research and development expense*

Research and development expenses decreased by \$1.8 million, or 12.0%, from \$15.1 million for 2011 to \$13.3 million for 2012. This decrease was primarily driven by the conclusion of the Phase 2a trial for TRV027 in early 2012, the conclusion of IND-enabling studies for TRV130 at the end of 2011 and reduced spend on grant-related activities in 2012.

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The following table summarizes our research and development expenses for the years ended December 31, 2011 and 2012:

	Year Ended December 31,	
	2011	2012
	(in thousands)	
TRV027	\$ 3,439	\$ 3,114
TRV130	2,873	1,849
TRV734	351	494
Stock-based compensation	110	125
Other personnel related costs	4,191	4,744
Other research and development	4,145	2,969
	<u>\$ 15,109</u>	<u>\$ 13,295</u>

*Change in fair value of warrant liability*

The fair value of the warrant liability decreased by \$11 thousand during the year ended December 31, 2011 compared to a decrease of \$45 thousand during the year ended December 31, 2012, which in both cases resulted in a commensurate increase in other income. The decrease in the fair value of the warrant liability for each of the years ended December 31, 2011 and 2012 was due to the revaluation of the warrants outstanding.

*Miscellaneous income*

Miscellaneous income increased by \$123 thousand for 2012 compared to 2011 as a result of the sale of research and development tax credits awarded by the Commonwealth of Pennsylvania.

*Interest expense*

Interest expense increased by \$120 thousand during 2012 compared to 2011, due primarily to a \$5.3 million increase in borrowings under the Comerica loan facility.

*Accretion of preferred stock*

Accretion of preferred stock increased by \$242 thousand during 2012 compared to 2011, due primarily to the issuance of warrants to purchase 1,650,000 shares of our preferred stock in the second half of 2011 with an estimated fair value of \$1.3 million. This \$1.3 million is being accreted until the redemption date in July 2016 and this incremental accretion is the driver of the increase during 2012 compared to 2011.

**Liquidity and Capital Resources**

Since our inception, we have incurred net losses and negative cash flows from our operations. We incurred net losses of \$15.8 million and \$15.6 million for the years ended December 31, 2011 and 2012, respectively, and \$12.5 million and \$16.3 million for the nine months ended September 30, 2012 and 2013, respectively. Net cash used in operating activities was \$11.5 million and \$13.7 million during the nine months ended September 30, 2012 and 2013, respectively. At September 30, 2013, we had an accumulated deficit of \$75.4 million, working capital of \$46.4 million and cash and cash equivalents of \$48.0 million. Historically, we have financed our operations principally through private placements of preferred stock. Through September 30, 2013, we have received gross proceeds of \$120.1 million from the issuance of preferred stock.

**Cash Flows**

The following table summarizes our cash flows for the years ended December 31, 2011 and 2012 and the nine months ended September 30, 2012 and 2013:

	Year Ended December 31,	
	2011	2012
	(in thousands)	
Net cash (used in) provided by:		
Operating activities	\$ (13,282)	\$ (14,805)
Investing activities	(98)	(21)
Financing activities	16,584	4,505
Net increase (decrease) in cash and cash equivalents	<u>\$ 3,204</u>	<u>\$ (10,321)</u>

	Nine Months Ended September 30,	
	2012	2013
	(in thousands)	
Net cash (used in) provided by:		
Operating activities	\$ (11,478)	\$ (13,687)
Investing activities	(196)	(78)
Financing activities	5,158	55,010
Net (decrease) increase in cash and cash equivalents	<u>\$ (6,516)</u>	<u>\$ 41,245</u>

*Net cash (used in) provided by operating activities*

Net cash used in operating activities was \$14.8 million for the year ended December 31, 2012 and consisted primarily of a net loss of \$15.6 million and a \$138 thousand decrease in operating assets and liabilities that were offset by \$1.0 million of noncash increases. The significant factors that contributed to a change in operating assets and liabilities included a decrease in prepaid expenses and other current assets of \$114 thousand, offset by decreases in accrued expenses of \$344 thousand. The decrease in prepaid expenses, accounts payable and accrued expenses was primarily due to the conclusion of clinical trials for TRV027 and TRV130 in mid-2012. The noncash increases were primarily attributable to increases in depreciation and amortization related to leasehold improvements and laboratory equipment.

Net cash used in operating activities was \$13.3 million for the year ended December 31, 2011 and consisted primarily of a net loss of \$15.8 million offset by noncash increases of \$1.0 million and a \$1.5 million increase related to the change in operating assets and liabilities. The noncash increases were primarily attributable to depreciation and amortization related to leasehold improvements and laboratory equipment. The significant factors that contributed to the change in operating assets and liabilities included a decrease in prepaid expenses and other assets of \$0.9 million, offset by increases in accrued expenses of \$0.6 million. The decrease in prepaid expenses was primarily due to a \$250 thousand pre-payment to a provider of contract chemistry services and start-up payments in 2010 associated with the Phase 2a clinical trial for TRV027. The increase in accounts payable and accrued expenses was primarily due to the timing of our payment of clinical trial costs related to the ongoing trials and development of our product candidates, in particular the Phase 2a trial for TRV027.

Net cash used in operating activities was \$13.7 million for the nine months ended September 30, 2013 and consisted primarily of a net loss of \$16.3 million offset by noncash increases of \$2.4 million and a \$241 thousand increase related to the change in operating assets and liabilities. The noncash

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increases were primarily attributable to depreciation and amortization related to leasehold improvements and laboratory equipment, the increase in the fair value of stock options and the revaluation of the preferred stock warrant liability. The significant factors that contributed to the change in operating assets and liabilities included an increase in prepaid expenses and other assets of \$1.7 million, offset by increases in accrued expenses of \$1.9 million. The increase in prepaid expenses and other assets was primarily due to start-up costs that were prepaid in association with the Phase 1b trial for TRV130 and the Phase 2b trial for TRV027. The increase in accounts payable and accrued expense was primarily due to the timing of our payment of costs related to ongoing development of our product candidates.

Net cash used in operating activities was \$11.5 million for the nine months ended September 30, 2012 and consisted primarily of a net loss of \$12.5 million, partially offset by noncash increases of \$900 thousand. The noncash increases were primarily attributable to depreciation and amortization related to leasehold improvements and laboratory equipment.

### *Net cash used in investing activities*

Net cash used in investing activities for the years ended December 31, 2012 and 2011 was \$21 thousand and \$98 thousand, respectively. Cash used in investing activities primarily consisted of purchases of fixed assets.

Net cash used in investing activities for the nine months ended September 30, 2013 and 2012 was \$78 thousand and \$196 thousand, respectively. Cash used in investing activities consisted of purchases of fixed assets.

### *Net cash provided by financing activities*

Net cash provided by financing activities was \$4.5 million for the year ended December 31, 2012, which was primarily due to net borrowings under the Comerica loan facility.

Net cash provided by financing activities was \$16.6 million for the year ended December 31, 2011, which was primarily due to \$17.5 million in proceeds from the issuance of preferred stock offset by \$0.9 million in repayments under loan facilities.

Net cash provided by financing activities was \$55.0 million for the nine months ended September 30, 2013, which was primarily due to \$59.9 million in net proceeds from the issuance of preferred stock offset by \$4.9 million in repayments under the Comerica loan facility.

Net cash provided by financing activities was \$5.2 million for the nine months ended September 30, 2012, resulting primarily from the net proceeds under the Comerica loan facility.

## **Operating and Capital Expenditure Requirements**

We have not achieved profitability since our inception and we expect to continue to incur net losses for the foreseeable future. We expect our cash expenditures to increase in the near term as we fund our Phase 2 clinical trials of TRV027 and TRV130 and our Phase 3 clinical trials of TRV130, as well as our clinical trials of our other preclinical product candidates and continuing preclinical activities. Following this offering, we will be a publicly traded company and will incur significant legal, accounting and other expenses that we were not required to incur as a private company. In addition, the Sarbanes-Oxley Act, as well as rules adopted by the SEC and the NASDAQ Stock Market, require public companies to implement specified corporate governance practices that are currently inapplicable to us as a private company. We expect these rules and regulations will increase our legal and financial compliance costs and will make some activities more time-consuming and costly.

We believe that our existing capital resources, together with the net proceeds from this offering, will be sufficient to fund our operations through the end of 2015. However, we anticipate that we will need to raise substantial additional financing in the future to fund our operations. In order to meet

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these additional cash requirements, we may seek to sell additional equity or convertible securities that may result in dilution to our stockholders. If we raise additional funds through the issuance of convertible securities, these securities could have rights senior to those of our common stock and could contain covenants that restrict our operations. There can be no assurance that we will be able to obtain additional equity or debt financing on terms acceptable to us, if at all. Our future capital requirements will depend on many factors, including:

- the progress and results of the Phase 2 clinical program for TRV130;
- whether Forest exercises its option to license TRV027;
- our ability to enter into collaborative agreements for the development and commercialization of our product candidates, for example TRV734;
- the number and development requirements of any other product candidates that we pursue;
- the scope, progress, results and costs of researching and developing our product candidates or any future product candidates, both in the United States and in territories outside the United States;
- the costs, timing and outcome of regulatory review of our product candidates or any future product candidates, both in the United States and in territories outside the United States;
- the costs and timing of future commercialization activities, including product manufacturing, marketing, sales and distribution, for any of our product candidates for which we receive marketing approval;
- any product liability or other lawsuits related to our products;
- the expenses needed to attract and retain skilled personnel;
- the revenue, if any, received from commercial sales of our product candidates for which we receive marketing approval; and
- the costs involved in preparing, filing and prosecuting patent applications, maintaining and enforcing our intellectual property rights and defending our intellectual property-related claims, both in the United States and in territories outside the United States.

Please see "Risk Factors" for additional risks associated with our substantial capital requirements.

### **Contractual Obligations and Commitments**

The following is a summary of our long-term contractual cash obligations as of December 31, 2012:

	<u>Total</u>	<u>Less than One Year</u>	<u>1 - 3 Years</u>	<u>3 - 5 Years</u>	<u>More than 5 Years</u>
			(in thousands)		
Operating lease obligations <sup>1</sup>	\$ 391	\$ 344	\$ 47	\$ —	\$ —
Total contractual obligations	\$ 391	\$ 344	\$ 47	\$ —	\$ —

<sup>1</sup> Operating lease obligations reflect our obligation to make payments in connection with the lease for our office space.

### **Purchase Commitments**

We have no material non-cancelable purchase commitments with contract manufacturers or service providers as we have generally contracted on a cancelable basis.

### **Option and License Agreements and Other Commitments**

In May 2013, we entered into an option agreement and a license agreement with Forest, under which we granted to Forest an exclusive option to license TRV027, which may be exercised at any time

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before we deliver our Phase 2b clinical trial results to Forest and during a specified period of time thereafter. If Forest exercises its option, the license agreement between us and Forest will become effective, and Forest will have an exclusive worldwide license to develop and commercialize TRV027 and specified related compounds. Forest will be responsible for subsequent development, regulatory approval and commercialization of TRV027 at Forest's expense.

If Forest exercises the option, we could potentially receive up to \$430 million in the aggregate, including an upfront option exercise fee of \$65 million and milestone payments depending upon the achievement of future development and commercial milestones. We could also receive tiered royalties between 10% and 20% on net sales of licensed products worldwide, subject to certain deductions and offsets, with the royalty rates on net sales of licensed products in the United States being somewhat higher than the royalty rates on net sales of licensed products outside the United States.

If Forest elects to exercise its option, the term of the royalty on sales of TRV027 for a given country would extend until the latest to occur of (i) 10 years from first commercial sale of TRV027 in that country, (ii) the expiration of the last to expire patent claiming TRV027 that is sufficient to block the entrance of a generic version of the product, or (iii) the expiration of any period of exclusivity granted by applicable law or any regulatory authority in such country that confers exclusive marketing rights on the product.

Forest has the right to grant sublicenses under the license agreement to affiliates and third parties. Any sublicensing does not act to relieve Forest of any of its obligations under the license agreement, including Forest's obligation to make milestone payments to us with respect to TRV027 or pay royalties to us on sales of TRV027 by such sublicensee.

In addition, in the course of normal business operations, we have agreements with contract service providers to assist in the performance of our research and development and manufacturing activities. We can elect to discontinue the work under these agreements at any time. We could also enter into additional collaborative research, contract research, manufacturing and supplier agreements in the future, which may require upfront payments and even long-term commitments of cash.

### **Off-Balance Sheet Arrangements**

We do not have any off-balance sheet arrangements, as defined by applicable SEC regulations.

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

We are exposed to market risks in the ordinary course of our business. These market risks are principally limited to interest rate fluctuations. We had cash and cash equivalents of \$6.7 million as of December 31, 2012 and \$48.0 million as of September 30, 2013, consisting of cash and money market mutual funds that invest substantially all of their assets in U.S. government securities. The primary objective of our investment activities is to preserve principal and liquidity while maximizing income without significantly increasing risk. We do not enter into investments for trading or speculative purposes. Due to the short-term nature of our investment portfolio, we do not believe an immediate 10% increase in interest rates would have a material effect on the fair market value of our portfolio, and accordingly we do not expect our operating results or cash flows to be materially affected by a sudden change in market interest rates.

We contract with contract research organizations, clinical research organizations and contract manufacturers globally. We may be subject to fluctuations in foreign currency rates in connection with some of these agreements. To date, we have not incurred material effects from foreign currency changes on these contracts. Transactions denominated in currencies other than the U.S. dollar are recorded based on exchange rates at the time such transactions arise.



## BUSINESS

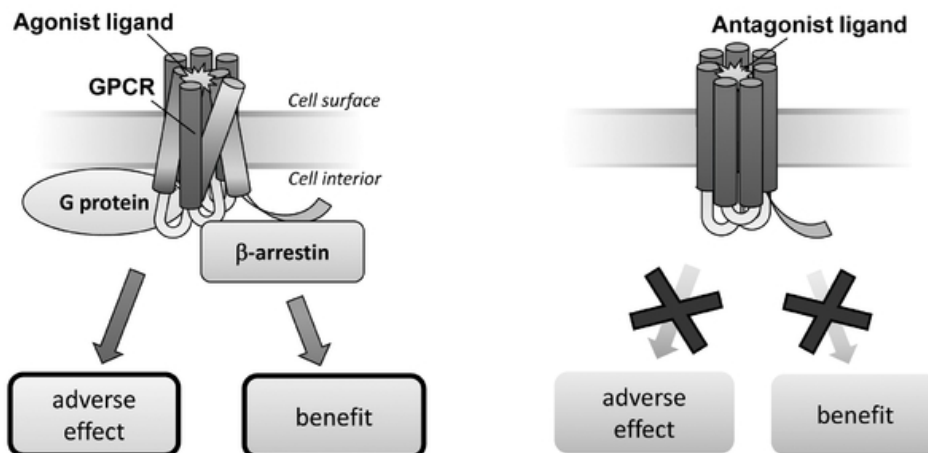
### Overview

Trevena is a clinical stage biopharmaceutical company that discovers, develops and intends to commercialize therapeutics that use a novel approach to target G protein coupled receptors, or GPCRs. Using our proprietary product platform, we have identified and advanced two differentiated product candidates into the clinic. We have completed a Phase 2a clinical trial and plan to initiate a Phase 2b clinical trial of TRV027 for acute heart failure, or AHF. Forest Laboratories Holdings Limited, or Forest, has the exclusive option to license TRV027 from us. Our other lead program, TRV130, has completed a Phase 1b clinical trial to evaluate its potential to treat moderate to severe acute pain intravenously and we plan to complete two additional Phase 1 clinical trials and initiate a Phase 2 trial in the first half of 2014. We expect to have top-line Phase 2 data for both TRV027 and TRV130 by the end of 2015. We have retained all worldwide development and commercialization rights to TRV130. We plan to develop and commercialize our two lead product candidates initially in the acute care hospital market and to advance additional product candidates, including our two most advanced preclinical programs focused on central nervous system, or CNS, indications.

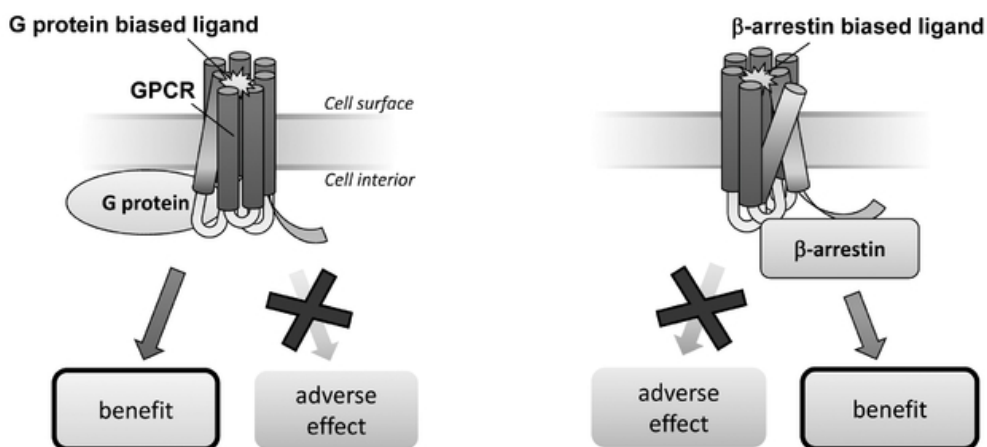
GPCRs are a large family of cell surface receptors that trigger two signaling pathways, G protein and  $\beta$ -arrestin, and are implicated in cellular function and disease processes. More than 30% of all therapeutics currently marketed target GPCRs. Currently available therapeutics that target GPCRs, or GPCR ligands, are typically not signal specific, and therefore either inhibit both the G protein and  $\beta$ -arrestin pathways (an antagonist ligand) or activate both pathways (an agonist ligand). This lack of signal specificity often results in a suboptimal therapeutic profile for these drugs because in many cases one of the pathways is associated with a beneficial therapeutic effect and the other is associated with an undesirable side effect (see Figure 1). We use our proprietary Advanced Biased Ligand Explorer, or ABLE, product platform to identify "biased" ligands, which are compounds that activate one of the two signaling pathways of the GPCR and inhibit the other (see Figure 2). This signaling specificity is the basis for our drug discovery and development approach, which is to identify and develop therapeutics targeting established GPCRs while offering a differentiated and superior therapeutic profile compared to currently available GPCR-targeted drugs.

We were founded in late 2007 to discover and develop product candidates based on biased ligands, a concept discovered by our scientific founder, Dr. Robert Lefkowitz, who was awarded the 2012 Nobel Prize in Chemistry in part for his elucidation of the multiple pathways that a GPCR engages. We believe that we are the first company to progress a GPCR biased ligand into clinical trials. The members of our executive management team have held senior positions at leading pharmaceutical and biotechnology companies and possess substantial experience across the spectrum of drug discovery, development and commercialization.

**Figure 1: Mechanism of current GPCR-targeted drugs**



**Figure 2: Mechanism of our biased ligands—the next generation of GPCR-targeted drugs**



***Our Clinical Stage Programs***

*TRV027 for the treatment of AHF*

We are developing TRV027 as a first-line, intravenous, or IV, treatment in combination with standard diuretic therapy for AHF patients. There are over 20 million people living with heart failure in the United States and Europe, according to the American Heart Association, or AHA, and the European Society of Cardiology, or ESC. AHF is heart failure requiring hospitalization. The National Hospital Discharge Survey, or NHDS, reported over 5 million hospital discharges in the United States in 2010 where heart failure was listed as a component of the diagnosis, over 1 million of which listed heart failure as the primary diagnosis. In 2009, the AHA estimated the cost of heart failure

hospitalization in the United States to be \$20.1 billion. AHF represents a serious unmet need for patients, physicians and healthcare systems.

TRV027 is a peptide b-arrestin biased ligand that targets the angiotensin II type 1 receptor, or AT1R, which is a GPCR expressed on cells within the cardiovascular system. The native ligand that activates the AT1R is angiotensin II, which is a key mediator of the renin angiotensin system, or RAS. In many individuals with heart failure, RAS is activated and angiotensin II levels are elevated. Angiotensin II stimulates cardiac contractility, which is the ability of the heart to produce force during contraction, through b-arrestin signaling, but also increases blood pressure and causes fluid retention through G protein signaling. Increased blood pressure and fluid retention strain the heart and damage the kidneys, resulting in multi-organ pathophysiology. Current AT1R-targeted therapies for chronic heart failure antagonize the receptor and are called angiotensin receptor blockers, or ARBs. These unbiased drugs fully block the effects of angiotensin II, decreasing blood pressure and preserving kidney function, but preventing the stimulation of cardiac contractility. We believe that the resulting risk of acutely impairing cardiac function has limited the development of ARBs for the treatment of AHF. In contrast, TRV027 selectively blocks G protein signaling at the AT1R, reducing blood pressure and preserving kidney performance, while activating b-arrestin signaling, and thereby has the potential to promote contractility, preserve cardiac performance and increase cardio-protective signaling.

In our preclinical studies and our Phase 1b and Phase 2a clinical trials, TRV027 demonstrated beneficial effects on the kidneys, heart and blood vessels. We believe that there are no therapies currently approved for AHF that benefit all three of these key organ systems. In the first quarter of 2014, we plan to commence enrollment in a Phase 2b dose-ranging clinical trial of TRV027 in AHF patients with the primary endpoint consisting of a composite of clinically important outcomes. If Forest exercises its option to license TRV027, they will be responsible for all the costs associated with any further development and commercialization of TRV027 and will have exclusive commercialization rights worldwide, subject to the obligation to consider in good faith whether to grant us the right to co-promote TRV027 in the United States on terms to be agreed.

#### *TRV130 for the treatment of moderate to severe acute pain*

We are developing TRV130 as a first-line treatment for patients experiencing moderate to severe acute pain where IV administration is preferred. According to data from IMS Health, a healthcare information firm, there were approximately 30 million reimbursement claims made for IV opioids by hospitals in the United States in 2010, of which 14 million were inpatient and 16 million were outpatient claims. We anticipate that the initial market opportunity for TRV130 will be in this acute care hospital setting, with a focus on postoperative pain. The IMS Health reimbursement data also show that 75% of inpatient claims and 50% of outpatient claims for IV opioids were surgery-related in 2010. Opioid analgesics such as morphine and fentanyl, which are unbiased  $\mu$ -opioid agonists, are currently the most effective IV analgesics for moderate to severe acute postoperative pain, but their use is limited by well-known side effects such as respiratory depression, nausea and vomiting, constipation and postoperative ileus. Based on our analysis of a series of published clinical and health economic studies, we believe that the side effects of currently available intravenously administered  $\mu$ -opioid agonists in the postoperative care setting result in additional annual costs of approximately \$5 billion in the United States alone, predominantly due to the need for lengthier hospital stays.

TRV130 is a small molecule G protein biased ligand that targets the  $\mu$ -opioid receptor, which is a GPCR expressed on cells within the central nervous and intestinal systems. TRV130 activates the m-opioid G protein pathway, which has been associated with analgesia, or pain relief, while inhibiting the b-arrestin pathway, which in preclinical studies has been associated with constipation and respiratory depression. If further testing confirms that TRV130 avoids the side effects typically associated with the activation of the  $\mu$ -opioid receptor, we believe that TRV130, if approved, could be a more effective treatment for postoperative pain than currently available  $\mu$ -opioid therapies and could thereby expedite postoperative recovery and hospital discharge.

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In a Phase 1b trial in healthy subjects using an evoked-pain model, TRV130 showed superior analgesia compared to a high dose of morphine, while causing less respiratory depression, nausea and vomiting. These data are consistent with our preclinical and Phase 1 data, and are the basis for our belief that TRV130 may have an improved therapeutic profile with respect to respiratory depression, nausea and vomiting compared to currently approved unbiased opioids. In preclinical studies, TRV130 also demonstrated less constipation as compared to morphine.

We expect to initiate a Phase 2 clinical trial of TRV130 in the first half of 2014 with the goal of demonstrating analgesic efficacy in postoperative patients. In the second half of 2014, we expect to initiate two Phase 2 clinical trials to evaluate TRV130's safety and tolerability profile compared to unbiased m-opioid agonists. We have retained all development and commercialization rights to TRV130 worldwide. We intend to retain full commercialization rights in the United States for TRV130. After the availability of Phase 2 clinical data for TRV130, we may seek collaborators for commercializing TRV130 outside of the United States to offset risk and preserve capital.

### **Our Additional Programs**

#### *TRV734, oral agent for the treatment of moderate to severe acute and chronic pain*

TRV734 is a small molecule G protein biased ligand targeting them-opioid receptor. We are developing TRV734 as a first-line, orally administered treatment of moderate to severe acute and chronic pain. Data from IMS Health shows that opioid drug sales across the United States, Europe and Japan were almost \$11 billion in 2012. Despite widespread use, there are significant limitations to existing therapies with respect to constipation, nausea and vomiting and respiratory depression. The objective of TRV734 is to deliver the benefits we believe are characteristic of TRV130 in an orally bioavailable therapeutic. TRV734 exhibited similar effects as TRV130 in preclinical *in vitro* and *in vivo* studies, and has shown oral bioavailability in primates. We are currently preparing an IND submission and plan to initiate a Phase 1 clinical trial of TRV734 in the first quarter of 2014 to evaluate safety, tolerability and oral bioavailability in humans. We intend to seek a collaborator with experience in developing and commercializing controlled-substance therapeutics in chronic care pain markets to assist in the development of TRV734, while retaining rights to commercialize TRV734 in hospital and specialist markets in the United States.

#### *d-opioid receptor G protein biased ligand therapeutics*

We are also focused on the discovery of a novel, orally bioavailable, small molecule d-opioid receptor G protein biased ligand with potential for the treatment of CNS disorders, of which we intend to initially focus on Parkinson's disease, pain or depression. We have identified potent, biased modulators of the d-opioid receptor that show positive efficacy in animal models of each of these indications without the seizure risk characteristic of d-opioid receptor agonists previously developed by others.

### **Our Strategy**

Our goal is to build a leading biopharmaceutical company leveraging our expertise in biased ligands to develop and commercialize innovative, best-in-class drugs targeting established GPCRs. Key elements of our business strategy to achieve this goal are to:

- **Rapidly advance clinical development of our two lead product candidates to commercialization.**

We plan to complete the Phase 2b trial for TRV027 for the treatment of AHF by the end of 2015. If this trial is successful and Forest exercises its option, Forest will be responsible for all costs associated with further development and commercialization of TRV027. If the option is exercised, we will be entitled to an upfront option exercise fee and certain contingent milestone payments and

royalties, which we intend to use to further develop and potentially commercialize our proprietary portfolio.

We plan to develop and commercialize TRV130 for the treatment of moderate to severe acute postoperative pain and other indications where IV therapy is preferred, such as end-of-life care. The efficacy of drugs targeting the  $\mu$ -opioid receptor is well-established. We intend to conduct two Phase 2 safety trials, a respiratory safety trial and gastrointestinal, or GI, tolerability trial, in parallel with our Phase 2 efficacy clinical trial to evaluate the analgesic benefits and side effect profile of TRV130. These Phase 2 trials are expected to be complete by the end of 2015. We believe this parallel-track development plan will allow us to accelerate the transition into a Phase 3 program and, if approved, commercialization.

- **Establish commercialization and marketing capabilities in the United States, initially in acute care markets, for any of our product candidates that are approved or that we anticipate may be approved.**

If any of our products beyond TRV027 receive or are anticipated to receive regulatory approval, we intend to build a focused sales force and establish marketing capabilities to commercialize those products to specialists in the United States, initially in the acute care setting.

We intend to retain full commercialization rights in the United States for TRV130. After the availability of Phase 2 clinical data for TRV130, we may seek collaborators for commercializing TRV130 outside the United States to offset risk and preserve capital.

If Forest exercises its option to license TRV027, Forest will be responsible for commercialization of TRV027 worldwide. We have the option to negotiate with Forest for co-promotion rights in the United States, although Forest has no obligation to grant us any co-promotion rights. We expect that TRV027, if approved, would be used primarily in the acute care setting, thereby providing an opportunity to leverage the commercial infrastructure we plan to implement to market TRV130 if it is approved.

- **Expand our CNS product portfolio through the development of preclinical programs.**

We plan to build a robust product portfolio in the CNS area, where we have identified potential for biased ligands, including TRV734 and a product candidate from our opioid receptor ligand program.

We plan to develop TRV734 for oral use in moderate to severe acute and chronic pain. We intend to seek a collaborator with experience in developing and commercializing controlled-substance therapeutics in chronic care pain markets while retaining rights to commercialize TRV734 in hospital and specialist markets in the United States.

Our goal is to deliver the first opioid receptor-targeted therapeutic for the treatment of CNS disorders, such as Parkinson's disease, pain and depression. We are currently optimizing our lead biased ligand product candidate. We intend to maintain flexibility on whether to develop and commercialize this product candidate in collaboration with a pharmaceutical company licensee depending on the clinical indications we ultimately decide to pursue, but we intend to retain meaningful commercial rights in any event.

- **Leverage our ABLE product platform to continue to discover and develop a pipeline of innovative biased ligand therapeutics and expand our product platform's impact through external collaborations.**

We have used our ABLE product platform to identify three potential therapeutics targeting GPCRs. We are in lead optimization with a fourth product candidate discovery program, and have also identified additional high-value GPCR targets. As part of our longer term strategy, we plan to initiate internal drug discovery efforts in CNS indications and other areas of significant unmet

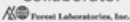
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medical need, and to continue to mitigate development risk by focusing on product candidates targeting GPCRs with well-established mechanisms of action. We also intend to selectively collaborate on discovery and development programs to leverage the potential of our ABLE product platform.

**Our ABLE Product Platform**

Our ABLE product platform is a collection of proprietary biological information, *in vitro* assays, know-how and expertise that we use to identify unique GPCR-targeted biased ligands with attractive pharmaceutical properties. These *in vitro* assays use cells that have the receptor of interest on the cell surface, where G protein and b-arrestin signaling from that receptor can be measured to determine if a particular ligand is biased, and if so whether it is a G protein or b-arrestin biased ligand. Our assays can also measure different cellular responses resulting from signaling through b-arrestin and can thereby help us to associate pharmacological responses with molecular signaling. Most components of our ABLE product platform are maintained as trade secrets, but the output of the product platform is reflected in the product candidates that we have advanced into clinical testing and the research we have published in numerous peer-reviewed journals. We believe the set of competencies reflected in our ABLE product platform provides us with an important competitive advantage in identifying further opportunities for efficient and high-impact biased ligand drug discovery, development and commercialization.

**Our Pipeline**

	Target	Indication	Lead Op.	Preclinical	Phase 1	Phase 2	Phase 3	Ownership
<b>Cardiovascular Program</b>								
TRV027	Angiotensin II type 1 receptor	AHF	intravenous					Collaborator 
<b>CNS Portfolio</b>								
TRV130	μ-opioid receptor	Post-operative pain	intravenous					Wholly owned
TRV734	μ-opioid receptor	Acute/chronic pain	oral					Wholly owned
Delta opioid biased ligand	δ-opioid receptor	Parkinson's disease, depression, pain	oral					Wholly owned

**TRV027**

TRV027 is a peptide b-arrestin biased ligand that targets the AT1R, inhibiting G protein signaling and activating b-arrestin signaling. We are developing TRV027 for the treatment of AHF in combination with standard diuretic therapy. In our Phase 2a clinical trial, TRV027 rapidly reduced blood pressure and preserved renal, or kidney, function, while preserving cardiac performance. In the first quarter of 2014, we plan to commence enrollment of patients in a Phase 2b clinical trial to evaluate the safety and efficacy of TRV027 in AHF. If subsequent Phase 3 development is successful and TRV027 is approved by regulatory authorities, we believe TRV027 would be used as a first-line in-hospital AHF treatment. We also believe TRV027 could improve AHF symptoms and shorten length of hospital stay in the short term, and potentially lower readmission rates and mortality rates in the longer term.

*Disease*

Heart failure is the inability of the heart to supply adequate blood flow, and therefore oxygen, to peripheral tissues and organs. When the heart is failing, mechanisms are triggered by the body to maintain blood pressure and tissue perfusion. One such mechanism is the activation of RAS, of which angiotensin II is a key mediator. Through angiotensin II, RAS increases blood pressure and stimulates the kidneys to retain both sodium and water. These mechanisms maintain cardiac performance in the short term, but in the longer term, the heart must pump against higher pressure, referred to as afterload, and is overstretched when filled, referred to as preload. These effects make the failing heart pump less efficiently and lead to progressive damage to the muscular tissue of the heart.

There are over 20 million people living with heart failure in the United States and Europe, according to the AHA and ESC. AHF, also sometimes referred to as acute decompensated heart failure, is heart failure requiring hospitalization. AHF patients present with fluid overload and severe dyspnea, a serious shortness of breath sometimes described as "air hunger," leading to an inability to perform simple functions such as standing and walking short distances. AHF can also lead to organ dysfunction, such as in the kidneys and heart. Most patients experiencing an AHF event have a worsening of existing chronic heart failure, although an estimated 25% of AHF hospitalizations represent new diagnoses of heart failure.

According to NHDS data, in the United States there were over 5 million hospital discharges in 2010 where heart failure was listed as a component of the diagnosis, over 1 million of which listed heart failure as the primary diagnosis. Based on national hospital discharge statistics from 25 countries in Europe, we estimate that there were a total of 1.6 million hospitalizations with a primary heart failure diagnosis in 2010 in those countries. Despite long hospital stays, up to approximately 50% of AHF patients remain symptomatic on discharge according to data from ADHERE, a national U.S. registry of over 100,000 patients admitted to the hospital with AHF between 2000 and 2005. In addition, the risk of readmission is 25% after 30 days and the one-year mortality rate is approximately 30%. Combined, these poor outcomes result in a substantial burden to the healthcare system. In 2009, the AHA estimated the cost of heart failure hospitalization in the United States to be \$20.1 billion. We believe there is a significant unmet medical need for improved treatments for AHF.

*Current treatment options for AHF*

None of the currently available therapeutic options, which are listed below, target all three of the key organ systems affected by AHF:

- Loop diuretics, such as furosemide, target the kidneys and remove excess fluid, but can worsen renal function in the process.
- Vasodilators, like nitrates or nesiritide, target the blood vessels and reduce blood pressure, reducing load on the heart, but each of these agents has undesirable side effects that limit its use.
- Inotropes, such as dobutamine, target the heart and directly stimulate cardiac contractility. However, current inotropes increase mortality through an increased risk of arrhythmia.

The mainstay of therapy for AHF is loop diuretics, such as furosemide. In AHF patients, fluid removal is important to relieve symptoms and to improve tissue oxygenation. Furosemide facilitates excretion of excess fluid, but aggressive diuresis can lead to renal dysfunction. Worsening renal function in AHF patients is associated with higher mortality and increased risk of hospital readmission. Diuretic therapy has also been shown to precipitate activation of RAS, further exacerbating the vicious cycle of heart failure.

After diuretics, IV vasodilators, such as nitroglycerin, nitroprusside and nesiritide, are the most common medications used for the treatment of AHF. These vasodilators effectively reduce blood

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pressure, but each is associated with undesirable side effects and other limitations. Hypotension, or low blood pressure, is the most common serious side effect of vasodilating agents. Nitroglycerin is also often hampered by rapid development of tolerance, such that the medication becomes less effective the longer that it is used. Nitroprusside is associated with possible cyanide toxicity and cannot be used without intensive monitoring, so its use is limited. Nesiritide was launched in 2001 and initially saw rapid adoption, reaching a peak in use of 16.6% of AHF hospital admissions in March 2005. Shortly thereafter, two independent publications reported associations between nesiritide and worsening renal function and an increase in mortality, after which sales of the drug declined significantly. In response, the drug's sponsor conducted a safety study of 7,000 patients, known as ASCEND. This study, while not confirming the safety risk for nesiritide, failed to demonstrate a benefit over background therapy, and subsequent use of the drug has continued to decline. Nesiritide lowers blood pressure, but if the blood pressure is lowered too far, the effect is difficult to reverse. This prolonged hypotension may produce end-organ dysfunction.

In severe cases, and those characterized by very low cardiac output, physicians sometimes resort to the use of inotropes, which work by increasing cardiac contractility by mobilizing calcium but at the expense of increased oxygen consumption and risk of arrhythmia. These agents can improve symptoms in the short term but have been shown to increase mortality.

There is an unmet need for better therapeutic approaches to treat AHF that can improve blood circulation through vasodilation, facilitate fluid excretion by the kidneys and enhance cardiac function through a novel mechanism not requiring calcium mobilization. Based on our preclinical studies and our clinical trials, we believe TRV027 has the potential to meet each of these critical criteria, and may prove to be more effective than currently available treatment options, reducing hospital readmission rates, mortality rates and length of hospital stay, while improving symptoms more rapidly and more completely.

### *Key differentiating attributes of TRV027*

We believe that TRV027 has the following potential advantages over currently available treatment options:

- **Efficacy**
  - **Benefits the three key organ systems.** Unlike current therapies, in our preclinical studies and Phase 1b and 2a clinical trials, TRV027 has shown beneficial effects on the blood vessels, heart and kidneys. TRV027 rapidly and reversibly lowered blood pressure and pulmonary capillary wedge pressure, or PCWP, which is a measure of pressure buildup in the lungs. A drop in PCWP is correlated with an improvement in dyspnea. These beneficial effects on blood pressure and PCWP allow the heart to pump more effectively thereby preserving cardiac performance. TRV027 also preserved kidney function, which in the context of lowered blood pressure is an important characteristic of a vasodilator for AHF. In combination, we believe these effects may translate into improvements in symptoms and outcomes such as hospital readmission rates, length of hospital stay and mortality rates if TRV027 successfully completes Phase 3 development and is approved by regulatory authorities.
  - **Enhances furosemide's effects on PCWP.** Furosemide or other loop diuretics are used as the first-line treatment in approximately 90% of AHF patients in all major pharmaceutical markets. Loop diuretics, like furosemide, facilitate excretion of excess fluid, but also activate RAS, which may compromise their ability to fully resolve symptoms. Renal safety concerns limit dose escalation of furosemide. Approximately 50% of AHF patients remain symptomatic at hospital discharge. We believe that administering TRV027 in combination with furosemide may improve dyspnea directly by decreasing pressure on the heart and in



the lungs and indirectly by allowing furosemide to work more effectively without the negative consequences of RAS activation. In a dog model of heart failure, TRV027 showed an additional decrease in PCWP when combined with furosemide compared to furosemide alone. TRV027's additive effect with furosemide is expected to more rapidly resolve dyspnea, reducing the length of hospital stay, and more fully resolve symptoms, reducing readmission.

- **Targets RAS, a mechanism that is central to the disease.** None of the therapies currently approved for AHF improve long-term outcomes. RAS blockade has been shown to have morbidity and mortality benefits in chronic heart failure. We believe that TRV027, if approved, could be the first therapy to bring modulation of RAS to the acute hospital setting, allowing the physician to improve blood circulation while protecting the heart and kidneys.

- **Drug safety and tolerability**

- **Favorable drug safety profile.** We believe that TRV027's tolerability profile sets it apart from current therapies. In healthy subjects in our Phase 1 clinical trial, there were no significant adverse effects even at doses 20 times higher than the expected therapeutic dose. In addition, there were no TRV027-related serious adverse events in a Phase 2a trial in medically fragile, severe chronic heart failure patients and no clinically significant adverse events in subjects with heart failure and concomitant renal impairment. Finally, in preclinical toxicology studies, TRV027 had a favorable profile at doses up to 500 times the expected therapeutic dose.
- **Self-limiting blood pressure effect.** In our Phase 2a clinical trial, there was a dose-dependent decrease in blood pressure up to doses of 1 µg/kg/min. No further reduction in blood pressure was seen at doses up to 3 µg/kg/min. We believe that this characteristic would offer a safety advantage over current vasodilators, which can cause dangerous hypotension.
- **Rapidly reversible effects on blood pressure.** In our clinical trials, TRV027 had a very short half-life and its effects were rapidly reversible. In the acute care setting, this should allow the physician to alter the dose and avoid prolonged hypotension.
- **Action specific to target pathophysiology.** In our clinical trials, TRV027 lowered blood pressure only in subjects with elevated measures of RAS activity, the target pathophysiology. This is important for any drug that is used in emergency rooms when the initial diagnosis may be uncertain.

*Clinical experience*

We have had an active investigational new drug application, or IND, for TRV027 for AHF with the U.S. Food and Drug Administration, or FDA, since February 2010. Since then, we have completed three clinical trials of TRV027:

- A Phase 2a trial in medically fragile subjects with advanced stable heart failure, low ejection fraction and a clinical indication for right-heart catheterization. Ejection fraction is a measure of the volume of blood pumped by the heart. Right-heart catheterization is a procedure that allows measurement of intracardiac and intravascular pressures on the side of the heart leading to the lungs. This procedure is not commonly used for the treatment of AHF patients, so this trial enabled us to profile the hemodynamic effects of TRV027 in a comparatively stable chronic heart failure population which could be considered an AHF forerunner population.

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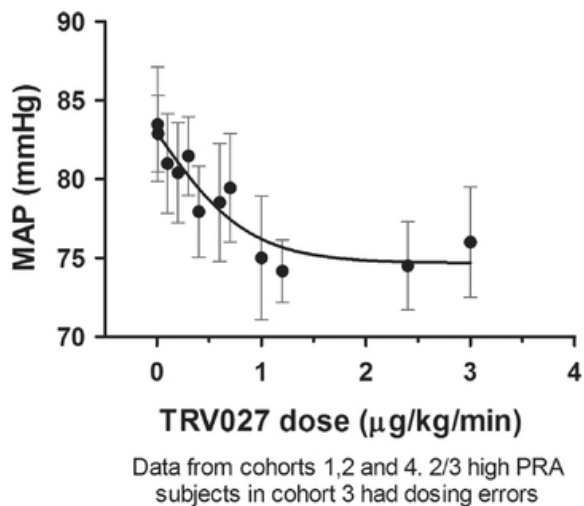
- A Phase 1b trial in subjects with moderate heart failure and concomitant renal dysfunction. Selecting a stable population allowed us to directly measure renal plasma flow, or RPF, and glomerular filtration rate, or GFR, two common measures used to evaluate renal safety.
- A Phase 1 clinical trial in healthy subjects to evaluate pharmacokinetics and tolerability prior to moving into chronic stable heart failure subjects.

### *Phase 2a hemodynamics trial in advanced stable heart failure subjects*

The primary objectives of this trial were to characterize the safety and tolerability of TRV027 in subjects with advanced stable heart failure and to measure its effects on blood circulation, also known as hemodynamics. Due to the wide dose-range available following the Phase 1 clinical trial, we elected to employ a step-wise dose titration over five hours with the dose increased to a target dose 10-fold higher than the starting dose. This highest dose was continued for nine hours as a steady state infusion, for a total infusion time of 14 hours, to evaluate the stability of TRV027's hemodynamic effects. Reversibility of TRV027's effects was then studied for four hours after the infusion was discontinued. Three dosing regimens were evaluated in 24 subjects: 0.1 µg/kg/min titrated up to 1 µg/kg/min; 0.3 µg/kg/min titrated up to 3 µg/kg/min; and 1 µg/kg/min titrated up to 10 µg/kg/min. In total, 14 different doses were studied across the three different dosing regimens. Nine additional subjects received placebo in a double blind manner. Based on the preclinical and Phase 1 data, we were expecting the hemodynamic effects of TRV027 to depend on elevation of RAS activity. The data were therefore analyzed based on plasma renin activity, or PRA, elevation, with high PRA subjects defined as those with PRA levels greater than 5.82 ng/ml/hr, which is the upper limit of lab normal range. PRA is an enzyme in the RAS cascade and measures RAS activity. Eleven of the 24 treated subjects had high PRA.

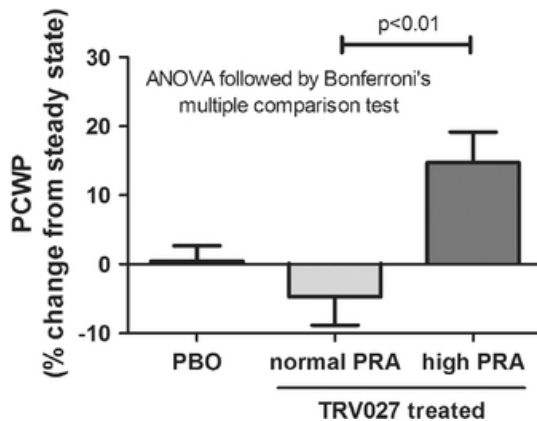
In this trial, TRV027 produced a dose-related decrease in mean arterial pressure, or MAP, in subjects with elevated PRA, as shown in Figure 3, which was sustained during the steady state infusion. This decrease in MAP was reversed during the washout period following the end of the infusion. This reversal of effect was statistically significant compared to both placebo and normal PRA subjects with p-values of less than 0.01 and 0.001, respectively. P-value is a conventional statistical method for measuring the statistical significance of clinical results. A p-value of 0.05 or less represents statistical significance, meaning that there is less than a 1-in-20 likelihood that the observed results occurred by chance. The decrease in MAP in the high PRA subjects compared to subjects receiving placebo in the maintenance phase was also statistically significant, with a p-value of less than 0.05.

**Figure 3: Effect of TRV027 on mean arterial pressure in advanced stable heart failure subjects with elevated PRA**



We also observed evidence of pharmacologic effects on PCWP in the subjects with elevated PRA. PCWP dropped in subjects with high PRA during the titration phase and this was sustained during the maintenance phase and reversed during the wash-out phase. The interpretation of the results in the titration and maintenance phases was complicated by a baseline drift in PCWP in the placebo group, however, the increase in PCWP when the TRV027 infusion was stopped was clear and statistically significant in high PRA compared to normal PRA subjects, with a p-value of less than 0.01.

**Figure 4: Reversal of effect of TRV027 on pulmonary capillary wedge pressure in advanced stable heart failure subjects**



In this trial, there was no apparent change in cardiac index observed in subjects with normal or high PRA following administration of TRV027. Cardiac index is a well accepted measurement of how well the heart is functioning as a pump by directly correlating the volume of blood pumped by the heart with an individual's body surface area. This contrasts with the response of heart failure subjects to acute administration of the ARB, losartan, which has been shown to decrease cardiac index in some studies.

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TRV027 was well tolerated in this medically fragile population. Despite the substantial reduction in MAP in TRV027-treated high-PRA subjects, there was no apparent increase in heart rate or in levels of cystatin-C or creatinine, which are biomarkers of renal function. This suggests that the blood pressure reduction was accompanied by preservation of kidney function. This result was consistent with our observations in preclinical studies. One subject in the lowest-dose cohort in this trial experienced hypotension necessitating dose reduction and then discontinuation of the TRV027 infusion. No other TRV027-related clinically significant adverse events were reported. In addition, while subjects receiving placebo and normal PRA subjects treated with TRV027 showed an increase in levels of brain natriuretic peptide, or BNP, which is a marker of cardiac stress, high-PRA subjects treated with TRV027 showed less of an increase in BNP, suggesting that TRV027's hemodynamic effects in high-PRA subjects may be protecting the heart from cardiac stress.

This trial was conducted in subjects who were taking standard medication for chronic heart failure. The subjects with high PRA tended to have higher BNP levels and a lower ejection fraction, suggesting that they represent a sicker, more relevant population for AHF. We anticipate that most patients with AHF will have high PRA levels and, accordingly, based on our clinical trial results, we believe that many of them will be responsive to TRV027 if it is approved. Based on these data from the Phase 2a clinical trial, we also believe that TRV027 may show positive effects in patients who are currently taking ACE inhibitors, or ACEis, which are a commonly prescribed therapeutic for patients with high blood pressure and heart failure. In our trial, 21 of 24 treated subjects were taking ACEis. Medications were withheld on the day of dosing, but this is insufficient to wash-out background ACEi levels, which means that TRV027 was effectively studied in combination with background ACEis.

Approximately 12% of congestive heart failure patients are prescribed ARBs. Subjects taking ARBs were excluded from the Phase 2a trial because TRV027 may need to be administered at a different dose to these patients, due to competition for the same receptor. We expect to study the effects of TRV027 on ARB patients in later stage development.

### *Phase 1b renal safety trial in stable chronic heart failure subjects*

The primary objective of this trial was to explore the pharmacokinetics and renal safety of TRV027, co-administered with furosemide, in 17 subjects with a history of heart failure and concomitant renal dysfunction. Two cohorts of six subjects and one cohort of five subjects were enrolled in this two-period crossover trial. All of the subjects had moderate heart failure and concomitant renal dysfunction.

TRV027 was administered using a standard dosing paradigm, with doses of 1.25 mg/hr, 6.25 mg/hr and 31.25 mg/hr (equivalent to 0.35 µg/kg/min, 1.74 µg/kg/min and 8.68 µg/kg/min, respectively, for a 60 kg person), without weight correction. The plasma concentrations obtained were similar to those obtained when TRV027 was administered on a per-kg basis to subjects with normal kidney function, suggesting that a standard dosing approach with no adjustment for weight or renal impairment is appropriate, which would facilitate use in the emergency room where patients are not routinely weighed.

TRV027 was well tolerated in these renally impaired subjects. There were no TRV027-related clinically significant or serious adverse events reported. Previously published research has shown that oral furosemide administration produces a reduction in GFR that can be inhibited by blocking the effects of elevated angiotensin II. In our trial, however, there was no effect of the single dose of furosemide on GFR or RPF; therefore, it was not possible to show a renal protective effect of TRV027. The trial did, however, show that TRV027 itself preserved GFR and RPF, before and after furosemide administration. In this trial, co-administration of TRV027 did not impair furosemide's effect on diuresis or urinary sodium excretion.

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Taken together, we believe the Phase 2a and Phase 1b trials in stable chronic heart failure subjects provide evidence for TRV027's beneficial effects on the heart, the blood vessels and kidney function, consistent with the data we had obtained in preclinical studies.

### Phase 1 clinical trial

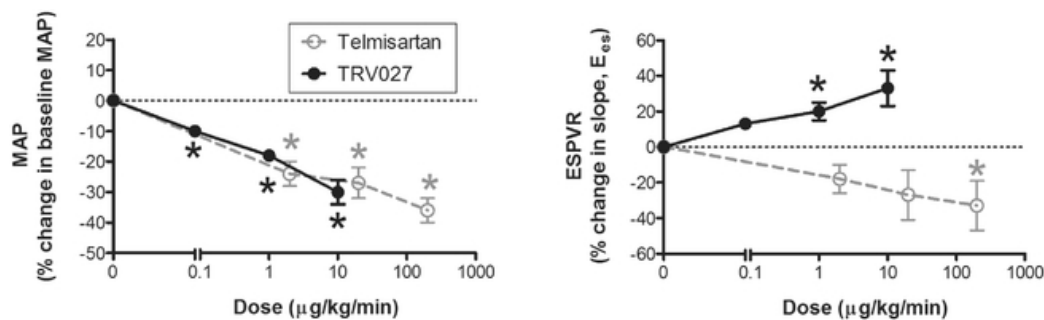
The Phase 1 clinical trial was a single center, crossover trial evaluating four-hour infusions of TRV027 in 20 healthy subjects at doses ranging from 0.01 to 20  $\mu\text{g}/\text{kg}/\text{min}$ . The primary objective of the trial was to evaluate the tolerability and pharmacokinetics of TRV027. TRV027 was well tolerated with no serious adverse events or clinically significant adverse events reported even at doses up to 20 times higher than the expected therapeutic dose. There was a linear increase in exposure with dose and TRV027 was rapidly cleared when the infusion was stopped, suggesting that it will potentially be easy to reverse any unexpected hypotensive effects. There was no urinary excretion of TRV027 so we do not expect any dose adjustments to be required for renal insufficiency. We believe this characteristic may make TRV027 easy to use in the emergency room. We also employed a brief sodium restriction paradigm to attempt to physiologically activate RAS and thereby elicit the pharmacodynamic effects of TRV027. Based on this compressed sodium restriction paradigm, four of the 20 subjects experienced a measurable elevation in RAS, with elevated RAS defined as PRA greater than or equal to 3  $\text{ng}/\text{hr}/\text{mL}$ . Modest decreases in MAP were evident in three of the four subjects with elevated RAS. No change in MAP was seen in subjects with normal PRA. These results are consistent with our belief that TRV027 reduces load on the heart but only in patients with elevated RAS, the target pathophysiology.

### Preclinical studies

In a paced dog animal model of heart failure, TRV027 decreased MAP and PCWP. TRV027 also increased renal blood flow and moderately increased cardiac output. TRV027 was also studied in combination with furosemide in another paced dog model study and showed additive effects on reducing PCWP, which would be consistent with beneficial effects on dyspnea in the clinic. In addition, combining the data in normal dogs, paced dogs and paced dogs treated with furosemide, we observed meaningful blood pressure decreases only in animals with elevated RAS, which is consistent with the data seen in the clinical trials and we believe provides further evidence supporting the premise that TRV027 only works in patients with the target pathophysiology. Furthermore, the dose response observed in paced dogs was consistent with that observed in subjects in the Phase 2a trial.

To examine the direct effects of TRV027 on cardiac contractility, we studied the hemodynamic effects of TRV027 compared to the ARB telmisartan in normal rats using a micromanometer conductance catheter. TRV027 treatment increased cardiac contractility independent of its effects on blood pressure, as measured by end systolic pressure volume relationship, or ESPVR, a common measure of cardiac output independent of blood pressure, and it also decreased MAP. This compared to telmisartan, which similarly decreased MAP but also decreased ESPVR (see Figure 5). Telmisartan is an ARB that inhibits both the G protein and b-arrestin AT1R pathways.

Figure 5: Effect of TRV027 on MAP and cardiac contractility in normal rats



The mechanism by which TRV027 increased cardiac contractility in *in vivo* studies does not appear to involve calcium mobilization seen in currently marketed inotropes. Calcium mobilization is linked to pro-arrhythmic effects. In a study we conducted in rats, a  $\beta$ -arrestin biased AT1R ligand closely related to TRV027 increased contractility through a myofilament calcium sensitization mechanism, a novel mechanism of cardiac contractility that does not involve calcium mobilization.

*Development strategy*

We plan to commence enrollment of a Phase 2b trial in the first quarter of 2014 to evaluate the safety and efficacy of TRV027 in AHF. This will be a randomized double-blind, placebo controlled trial comparing TRV027 plus standard of care to standard of care alone. The primary objective of this trial is to evaluate the effects of three doses of TRV027, 1.0 mg/hr, 5.0 mg/hr and 25 mg/hr, on a composite of clinically important outcomes. These outcomes are mortality, worsening heart failure, hospital readmission rate, dyspnea and length of hospital stay. Our trial design contemplates that at least 500 patients will be enrolled and randomized. We are targeting early administration of TRV027, ideally within six hours of arrival at the hospital. TRV027 will then continue to be administered for a minimum of 48 hours and up to 96 hours. We believe administration of TRV027 soon after hospital admission will improve in-hospital mortality rates and shorten length of hospital stay. We plan to enroll patients with both low ejection fraction and preserved ejection fraction since RAS elevation is a key component of both conditions. We plan to conduct an interim analysis after 300 patients have been enrolled and, depending on the outcome of that analysis, enrollment into one or more of the active dose groups may be discontinued. We expect data from this trial to be available in the second half of 2015.

We believe that an endpoint measuring dyspnea in Phase 3 trials could form the basis for FDA approval of TRV027. However, we believe the FDA may be open to other well-defined benefit parameters, such as a hospitalization benefit or a patient and caregiver quality of life benefit. The composite endpoint tested in Phase 2b will facilitate our evaluation of potential alternative proposals to be discussed with the FDA at an end-of-Phase 2 meeting.

In May 2013, we entered into an option agreement and a license agreement with Forest, under which we granted to Forest an exclusive option to license TRV027. If Forest exercises this option, the license agreement between us and Forest will become effective, and Forest will have an exclusive worldwide license to develop and commercialize TRV027 and specified related compounds. Forest will be responsible for subsequent development, regulatory approval and commercialization of TRV027 at Forest's expense. Forest may exercise its option at any time before we deliver our Phase 2b clinical trial results to Forest and during a specified period of time thereafter. If Forest exercises the option, we could potentially receive up to \$430 million in the aggregate, including an upfront option exercise fee of \$65 million and milestone payments depending upon the achievement of future development and commercial milestones. We could also receive tiered royalties between 10% and 20% on net sales of licensed products worldwide, with the royalty rates on net sales of licensed products in the United States being somewhat higher than the royalty rates on net sales of licensed products outside the United States.

If Forest elects to exercise its option, the term of the royalty on sales of TRV027 for a given country would extend until the latest to occur of (i) 10 years from first commercial sale of TRV027 in that country, (ii) the expiration of the last to expire patent claiming TRV027 that is sufficient to block the entrance of a generic version of the product, or (iii) the expiration of any period of exclusivity granted by applicable law or any regulatory authority in such country that confers exclusive marketing rights on the product.

Forest has the right to grant sublicenses under the license agreement to affiliates and third parties. Any sublicensing does not act to relieve Forest of any of its obligations under the license agreement, including Forest's obligation to make milestone payments to us with respect to TRV027 or pay royalties to us on sales of TRV027 by such sublicensee.

## **TRV130**

TRV130 is a small molecule G protein biased ligand at the  $\mu$ -opioid receptor, which we are developing as a first-line treatment for patients experiencing moderate to severe acute pain where IV administration is preferred. TRV130 activates the  $\mu$ -opioid G protein pathway, associated with analgesia, and inhibits the b-arrestin pathway, which, in preclinical studies, was associated with constipation and respiratory depression. We believe that the management of acute postoperative pain represents the largest opportunity for a  $\mu$ -opioid therapy. Accordingly, the focus of our clinical trials will involve surgical patients. We believe avoiding the side effects typically associated with the activation of the  $\mu$ -opioid receptor will position TRV130, if approved, to more effectively treat moderate to severe acute pain than currently available  $\mu$ -opioid therapies and expedite postoperative recovery.

### *Disease*

According to IMS Health, there were approximately 30 million reimbursement claims made for IV opioids by hospitals in the United States in 2010, of which 14 million were inpatient claims and 16 million were outpatient claims. We anticipate that the initial market opportunity for TRV130 will be in this acute care, hospital setting, with a focus on postoperative pain. The IMS Health reimbursement data also show that 75% of inpatient and 50% of outpatient claims for IV opioids were surgery-related in 2010.

In terms of the total potential market opportunity, the World Health Organization estimates that over 230 million major surgical procedures are performed each year worldwide. The NHDS recorded over 30 million hospital inpatient surgical procedures in the United States in 2010. A similar number of hospital inpatient surgeries were performed in France, Germany, the United Kingdom, Italy and Spain, collectively. Data from the U.S. Centers for Disease Control and Prevention in 2006 estimated an additional 20 million outpatient surgical procedures in U.S. hospitals and an additional 14 million procedures in ambulatory surgical centers. Accordingly, we believe that there is a large potential commercial opportunity for TRV130, if approved.

Despite the development and adoption of guidelines for the management of postoperative pain and the extensive use of current treatments, significant unmet need remains. In a survey of 250 surgical patients in the United States, over 70% of the patients undergoing in-hospital procedures reported pain in the postoperative period before hospital discharge, of which almost 50% experienced severe or extreme pain. The dosing of the most effective class of analgesics currently available,  $\mu$ -opioid agonists, is limited by severe side effects such as respiratory depression, nausea and vomiting, constipation, and postoperative ileus.

### *Treatment options for moderate to severe, acute postoperative pain*

The typical treatment paradigm in developed markets for management of moderate to severe, acute postoperative pain is to initiate injectable or IV medication in the preoperative or immediate postoperative period to provide rapid and effective pain relief. As soon as it is safe and practical, a transition is typically made to oral pain medication, allowing patients to take medication home with them.

Opioid analgesics like morphine, fentanyl and hydromorphone are mainstays of pain treatment in the immediate postoperative period. Non-opioid analgesics are also often added for supplemental analgesia, and to keep opioid doses low to mitigate opioid-related adverse effects. A recent survey we conducted in a sample of 72 U.S. surgeons and anesthesiologists suggests that the most important feature of existing IV opioids requiring improvement is analgesic efficacy. In the same survey, respondents stated that injectable non-opioid analgesics are currently used to supplement IV opioids for post-surgical pain management in about 60% of hospital inpatient cases. These drugs, such as IV non-steroidal anti-inflammatory drugs, or NSAIDs, IV acetaminophen or local anesthetics such as bupivacaine, have their own potential side effects in the cardiovascular and GI systems as well as the

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liver. We estimate that these drugs add \$42 to \$285 per patient per day to the cost of managing patients with moderate to severe postoperative pain in the United States. Anti-emetics, laxatives and peripherally restricted opioid antagonists are also employed to combat opioid-induced GI side effects in postoperative patients.

Morphine, fentanyl and hydromorphone are all associated with reduced respiratory rate and reduced tidal volume, which is the amount of air inhaled or exhaled in a single breath. Although serious complications or deaths from opioid-induced respiratory depression are rare, fear of respiratory depression represents a major barrier to the effective use of opioids in the management of postoperative pain because physicians are cautious about increasing dose. We estimate that about 80 thousand cases of opioid-induced respiratory depression occur each year in hospitalized patients in the United States. Risk is higher in some patient groups, such as the obese, patients with chronic obstructive pulmonary disease and patients who suffer sleep apnea. In our survey of U.S. surgeons and anesthesiologists, respiratory failure was cited as the most important opioid analgesic side effect they would like to see addressed.

In several published surveys, patients faced with surgery list the avoidance of postoperative nausea and vomiting, or PONV, as a leading concern. PONV occurs in approximately one third of surgical patients following treatment with IV opioids. We believe that there are over 5 million cases of opioid-induced PONV annually in U.S. hospitals for inpatients alone. We estimate that PONV results in \$1.3 billion annually in additional costs for hospital inpatient management of postoperative pain in the United States. The major cost driver is increased length of hospital stay.

The constipating effects of opioid drugs are also problematic and costly for surgical patients, who are typically not considered ready for discharge until they have had a meal or a bowel movement. Postoperative ileus, or POI, is a condition in which the bowel enters spasm and stops passing food and waste, which most commonly occurs after surgery involving interruption of movement of the intestines. POI is exacerbated by anesthetics and opioid analgesics, and occurs in at least 10% of patients following invasive abdominal procedures. We believe that opioid-induced constipation adds more than \$2 billion to the cost of hospital inpatient post-surgical recovery in the United States annually and that POI adds another \$1.5 billion.

### *Key differentiating attributes of TRV130*

We believe that TRV130 has the following potential advantages over existing opioid treatments for postoperative pain:

- **Efficacy**
  - **Improved analgesia.** In a Phase 1b trial in healthy subjects using an evoked-pain model, TRV130 showed superior analgesia compared to a high dose of morphine and produced less respiratory depression, less nausea and less vomiting compared to morphine. If TRV130 continues in clinical testing to demonstrate an improved therapeutic index with respect to key safety and tolerability concerns, we believe that TRV130, if approved, may have an improved profile compared to unbiased  $\mu$ -opioid agonists, which are the current standard of care in terms of efficacy, safety and tolerability.
  - **Less time to peak effect.** In preclinical studies, TRV130 delivered maximal efficacy at only five minutes after dosing, compared to morphine, which takes about 30 minutes to reach its maximum effect. In our Phase 1 trial, we also observed full pharmacodynamic response in the form of pupil constriction in humans at 10 minutes after dosing. Pupil constriction is a well-established surrogate for the analgesic efficacy of opioid drugs. We also observed full analgesic effect in the Phase 1b evoked-pain model at the first practical data collection point of 10 minutes after dosing. If our clinical trials continue to bear out this rapid time to peak effect, we



believe TRV130, if approved, could provide benefit in the peri-operative pain market where fentanyl is commonly used today, thus allowing TRV130 to broaden its market potential.

- **Targets an established mechanism for the management of moderate to severe acute pain but in a novel way (ligand bias).** TRV130 is a G protein biased ligand at the  $\mu$ -opioid receptor and has shown equivalent or superior analgesic efficacy to morphine in multiple preclinical pain models and in an evoked-pain model in our clinical testing. Unbiased  $\mu$ -opioid analgesics like morphine, fentanyl and hydromorphone are the mainstays of therapy in the postoperative period due to their strong analgesic efficacy. Different mechanisms of action are under evaluation by other companies for the management of postoperative pain, such as peripherally restricted modulation of the  $k$ -opioid receptor, but we are not aware that any of these mechanisms has yet approached the level of analgesia achievable through a  $\mu$ -opioid-targeted analgesic.
- **Drug safety and tolerability**
  - **Reduced respiratory depression risk.** In a Phase 1b trial in healthy subjects using an evoked-pain model, TRV130 showed less respiratory depression compared to a high dose of morphine at doses delivering superior analgesia. In a preclinical proof of concept study, TRV130 showed less respiratory depression at equivalent analgesic doses compared to morphine. If we can continue to demonstrate this safety advantage in clinical trials and TRV130 is ultimately approved, we believe it may be used as a first-line treatment of postoperative pain, particularly in patients with increased risk of respiratory depression.
  - **Reduced PONV.** In our Phase 1b trial in healthy subjects using an evoked-pain model, subjects treated with TRV130 showed less nausea and vomiting at a dose eliciting greater analgesia compared to a high dose of morphine. This was consistent with our Phase 1 data in which TRV130 showed no nausea or vomiting at doses eliciting equivalent or greater pupil constriction compared to high doses of morphine or fentanyl that would be expected to result in a 20% to 30% incidence of nausea and vomiting. A reduction in PONV, if supported by future clinical trials, would be a meaningful advantage for physicians, patients and payors.
  - **Reduced POI and constipation.** If we are able to demonstrate its safety and efficacy in clinical trials, in the absence of negative GI effects, we believe TRV130, if approved, would be an attractive treatment option for patients. In preclinical studies, TRV130 caused significantly less constipation compared to morphine at doses delivering equivalent analgesia. If these potential benefits translate to the clinical setting, and TRV130 is approved, we believe that TRV130 could offer the possibility of meaningful cost savings to the hospital.

#### *Clinical experience*

We have had an active IND for TRV130 for moderate to severe acute pain with the FDA since January 2012. Since then, we have completed three clinical trials of TRV130 in 110 healthy subjects.

- A Phase 1b proof of concept exploratory trial in healthy subjects using an evoked-pain model to evaluate analgesic efficacy of TRV130 compared to a high dose of morphine. We also evaluated nausea and vomiting using a visual analogue scale and respiratory depression using an established experimental model as compared to a high dose of morphine.
- A three part, Phase 1 trial in healthy subjects to evaluate the pharmacokinetics and tolerability of TRV130. Part A evaluated TRV130 administered as a continuous one hour infusion, Part B replicated Part A but in individuals who are genetically predisposed to be poor metabolizers of TRV130, and Part C evaluated TRV130 administered as an intravenous injection over infusion times ranging from 1 to 30 minutes. In all three parts, we generated pharmacodynamic data by measuring pupil diameter.

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- A Phase 1 IV bolus trial in healthy subjects to expand the dataset generated in Part C of the prior trial with respect to TRV130's pharmacokinetics and tolerability administered as an IV bolus. This trial also evaluated pupil constriction.

### *Phase 1b proof of concept exploratory trial in healthy subjects using an evoked-pain model*

The aims of this trial were to characterize the analgesic efficacy and safety and tolerability of TRV130 as compared to a 10 mg dose of morphine, which is a high dose of morphine. We employed a double-blind, five-period crossover design with 30 healthy male subjects each randomized to receive a 2-minute infusion of three dose levels of TRV130 (1.5 mg, 3.0 mg and 4.5 mg), 10 mg morphine, and placebo in random order. We used an evoked-pain model, the cold pain test, to evaluate the analgesic effects of TRV130. The cold pain test is an established model to evaluate opioid effectiveness. We measured time to hand removal, or latency, from a temperature-controlled cold water bath. We used visual analog scale measurements of nausea and measured respiratory depression through ventilatory response to hypercapnia, another well-known experimental model.

At both the 3.0 mg and 4.5 mg doses, TRV130 showed superior efficacy as compared to a 10 mg morphine dose that was statistically significant with a p-value of less than 0.05 at the 10 and 30 minute time points after dosing. The durability of the analgesic effect was similar to morphine as shown in Figure 6. In addition, the time to peak effect was more rapid than morphine and there were a higher number of responders at the 3.0 mg and 4.5 mg dose levels compared to morphine as shown in Figure 7. A responder was defined as a subject who experienced a doubling of latency as compared to pre-dose baseline.

Overall, TRV130 was well tolerated. Subjects receiving TRV130 showed less nausea and less vomiting at the 1.5 mg and 3.0 mg doses as compared to a 10 mg dose of morphine. TRV130 also showed less respiratory depression compared to morphine, measured as minute volume, or MV, area under the curve over 4 hours as shown in Figure 8. MV is a product of respiratory rate and tidal volume, or the amount of air exhaled in a single breath, and thereby captures the body's ability to expel carbon dioxide. The reduction in respiratory depression was statistically significant as compared to a 10 mg morphine dose with a p-value of less than 0.05 at all TRV130 doses. The 3.0 mg dose of TRV130 therefore demonstrated superior efficacy, less nausea, less vomiting and less respiratory depression in this trial as compared to 10 mg morphine, suggesting that TRV130, if approved, may be a better analgesic and have improved safety and tolerability as compared to existing unbiased  $\mu$ -opioid agonists.

Figure 6: Analgesic effect of TRV130 as compared to morphine in an evoked-pain model

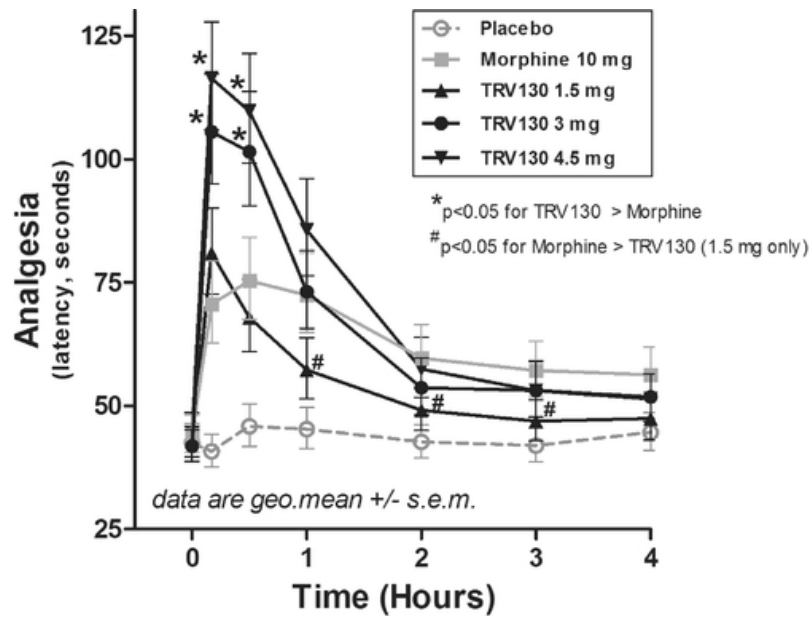
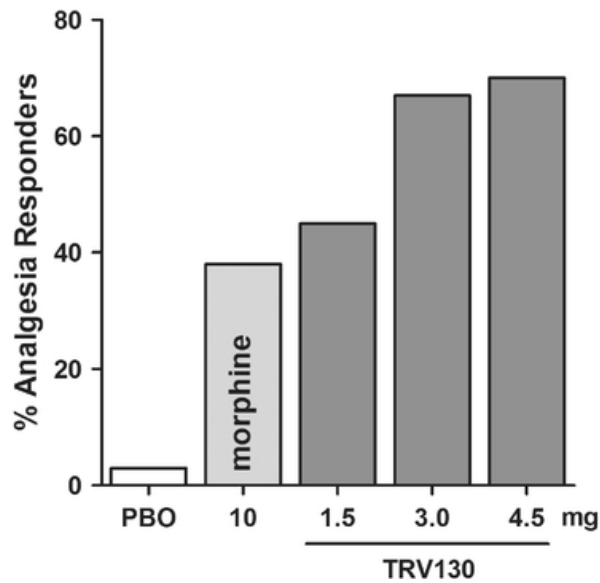
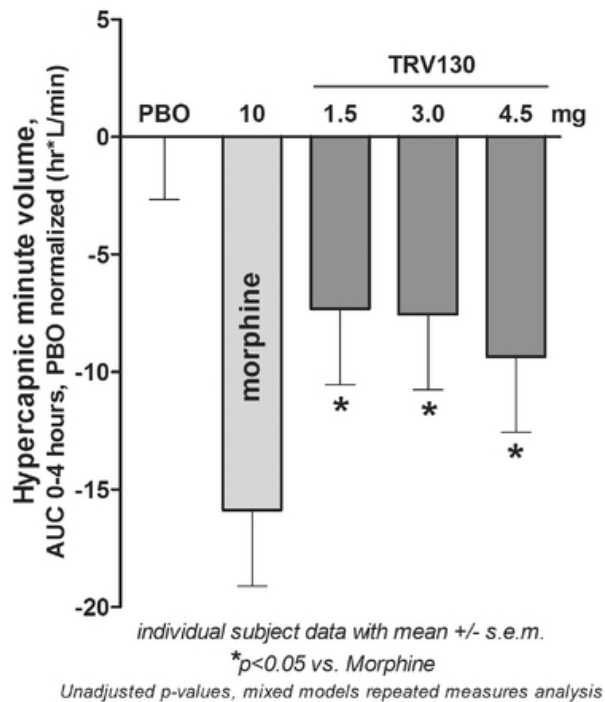


Figure 7: Higher proportion of responders to TRV130 as compared to morphine in an evoked-pain model



**Figure 8: Less respiratory depression with TRV130 as compared to morphine**



*Three part phase 1 trial in healthy subjects*

The primary objectives of this trial were to evaluate the pharmacokinetics and tolerability of TRV130. We also obtained pharmacodynamic data by measuring pupil constriction. At historically efficacious doses, morphine and fentanyl cause approximately 1 to 2 mm of pupil constriction.

Based on the pharmacokinetics data from these trials, we expect TRV130, if approved, could be administered by IV bolus, or continuous infusion, including by way of patient-controlled analgesic device, making it potentially convenient and easy to use for postoperative pain. Specific pharmacokinetic data obtained from these trials is highlighted below:

- TRV130 showed a dose-dependent increase in exposure.
- TRV130 is predominantly metabolized by two liver enzymes CYP2D6 and CYP3A4. Approximately 2% to 21% of the population has low levels of CYP2D6 activity. In Part B of the trial, we evaluated TRV130 in a group of these poor metabolizers in order to understand whether dose adjustments will be required in this group. The maximum TRV130 plasma concentration in this group was in the upper range of that observed in non-poor metabolizers, suggesting that the poor metabolizers should exhibit similar tolerability to non-poor metabolizers. There was a reduction in clearance by approximately 50% in the poor metabolizers suggesting that a lower frequency of dosing may be required to offer effective pain relief.
- Reducing infusion time when administering TRV130 as a bolus in Part C of the trial did not significantly alter the exposure, suggesting that TRV130 could be administered as an intermittent bolus infusion without compromising drug exposure.

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Overall, TRV130 was well tolerated. In Part A of the Phase 1 trial, when TRV130 was administered as a one-hour infusion, there was no nausea or vomiting reported at doses up to 4 mg/hr that produced a reduction in pupil diameter. When the dose was increased to 7 mg/hr, four subjects receiving TRV130 experienced nausea and four experienced vomiting, thus establishing the non-tolerated dose.

TRV130 administered over one hour produced robust pupil constriction at doses starting at 1.2 mg/hr. Mean pupil diameter decreased as much as 3.5 mm at a 7 mg/hr dose. At the well-tolerated 4mg/hr dose, TRV130 produced a mean reduction in pupil diameter of approximately 2.5 mm, higher than that reported for highly effective doses of morphine or fentanyl in previously published work. At these effective doses of both morphine and fentanyl, approximately 25% of people experience nausea and vomiting. In contrast, there was no nausea or vomiting in the subjects dosed with 4mg/hr of TRV130. These data suggest that the 4 mg/hr dose may be at least as effective as morphine and fentanyl without the associated opioid-induced PONV.

In Part A of this Phase 1 trial in healthy subjects, one subject who received 0.25 mg/hr TRV130 experienced a severe episode of vasovagal syncope during which he fainted and his pulse stopped, which were classified as serious adverse events. He recovered without medical intervention and experienced no known adverse consequences from this event. Certain potential triggers of vasovagal syncope were removed from the trial protocol, and dose escalation proceeded up to 7 mg/hr (28-fold higher than the 0.25 mg/hr dose at which the syncope occurred). No additional vasovagal syncope events were reported in the study.

In Part C of the trial, TRV130 was administered to six subjects with each subject receiving on successive days a 1.5 mg dose with an infusion time of 30 minutes, 15 minutes, five minutes and one minute. TRV130 was well tolerated with pupil constriction of approximately 1 mm. We used these data to design a further intravenous bolus trial as described below to evaluate higher bolus doses.

### *Phase 1 IV bolus trial*

In a follow-up trial with bolus doses of 2.0, 3.0 or 3.5 mg administered over two minutes, TRV130 was well tolerated up to 3.5 mg (the highest dose in the trial). One subject experienced mild nausea when 3.5 mg TRV130 was given. No nausea was reported at the lower doses. When 3.5 mg of TRV130 was administered, pupil diameter decreased by approximately 2 mm from baseline, in line with high-dose morphine or fentanyl.

### *Preclinical studies*

Morphine, hydromorphone and fentanyl all work by binding and activating the  $\mu$ -opioid receptor. All three of these drugs activate both the G protein as well as  $\beta$ -arrestin pathways, and all three drugs offer significant analgesia but with significant risk of respiratory depression and constipation. To determine if the efficacy seen with morphine could be separated from the respiratory and GI effects of the drug,  $\beta$ -arrestin knock-out mice were treated with morphine, and the analgesic, respiratory and GI effects were measured. In the  $\beta$ -arrestin knock-out mice, morphine showed higher analgesia and, at the same time, less respiratory depression and constipation compared to morphine administered to wild-type mice. We believe this result supports our hypothesis that a G protein biased ligand at the  $\mu$ -opioid receptor could have an improved therapeutic index.

In preclinical models, TRV130's G protein biased signaling profile showed analgesic efficacy comparable to morphine but reached peak effect more quickly than morphine. Time to peak effect occurred within five minutes for TRV130 compared to 30 minutes for morphine. TRV130 had a significantly improved therapeutic index, compared to morphine, of analgesia to respiratory depression, measured as blood carbon dioxide, or pCO<sub>2</sub>, and analgesia to constipation, measured using two GI motility assays.

*Development strategy*

We believe that the early clinical and preclinical data generated suggest that TRV130 may have superior analgesia with fewer safety and tolerability disadvantages compared to existing opioid analgesics. If confirmed in further trials, we believe that this profile will justify TRV130, if approved, as a preferred opioid analgesic for the intravenous treatment of moderate to severe acute pain.

In addition to the recently completed Phase 1b clinical trial using an evoked-pain model, we are conducting two additional Phase 1 trials in healthy subjects to add to our clinical understanding of TRV130's pharmacokinetics, pharmacodynamics and safety and tolerability in support of a Phase 2 trial. These two additional Phase 1 trials are:

- A multiple ascending dose trial to evaluate the safety and tolerability of multiple doses of TRV130 and to characterize the multiple dose pharmacokinetics.
- A drug-drug interaction trial to evaluate the pharmacokinetics of TRV130 when co-administered with a CYP3A4 inhibitor. We believe that CYP3A4 plays a significant role in the metabolism of TRV130, in addition to CYP2D6.

We expect to initiate a Phase 2 program of TRV130 in the first half of 2014 with the goal of demonstrating analgesic efficacy and confirming TRV130's safety and tolerability profile compared to existing opioid pain medications. We expect that the efficacy trial will be completed by the end of the first half of 2015 and that the two safety trials, a respiratory safety trial and a GI tolerability trial, will be completed by the end of 2015. In addition, we plan to complete other clinical trials that would support Phase 3 trials.

We plan to initially target TRV130 for the treatment of moderate to severe, acute postoperative pain where IV administration is preferred. If our trials for this indication are successful, we believe there will be opportunities to expand the target indications in subsequent trials. Other potential patient populations for the eventual use of TRV130 include perioperative use, non-surgical hospitalized patients such as burn victims, end-of-life palliative care for terminally ill patients, emergency service trauma care and military applications. We may also explore other dosage forms, such as oral or transdermal administration, in additional separate trials.

We plan to develop and commercialize TRV130 for IV administration ourselves, if approved. We intend to build acute care commercial capabilities, initially in the United States, and to retain full U.S. rights. We may seek collaborators for commercializing TRV130 outside the United States after the availability of Phase 2 data to offset risk and preserve capital.

**TRV734**

TRV734 is a small molecule G protein biased ligand at the  $\mu$ -opioid receptor, which we are developing as a first-line, orally administered compound for the treatment of moderate to severe acute and chronic pain. Like TRV130, TRV734 takes advantage of a well-established mechanism of pain relief by targeting the  $\mu$ -opioid receptor, but does so with enhanced selectivity for the signaling pathway that, based on preclinical studies and our TRV130 clinical trials, we believe is linked to analgesia as opposed to the b-arrestin signaling pathway associated with side effects. Subject to successful preclinical and clinical development and regulatory approval, we believe TRV734 may have an improved efficacy and side effect profile as compared to current commonly prescribed oral analgesics, such as oxycodone. We have filed patent applications covering TRV734 and methods of using TRV734.

Data from IMS Health show that opioid drug sales across the United States, Europe and Japan were almost \$11 billion in 2012. However, these drugs are limited in their safety and tolerability by constipation, nausea and vomiting, and respiratory depression. The constipating effects in particular are common with chronic opioid use and can be dose-limiting, resulting in inadequate pain control. Numerous approaches have been attempted to mitigate constipation. Laxatives, peripherally restricted

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opioid antagonists, such as methylnaltrexone and alvimopan, and multimodal analgesia, such as the opioid/SNRI tapentadol, are only partially effective and can raise problematic new side effects in an attempt to mitigate the adverse effects of opioid analgesics. Based on the very large market and substantial limitations confronting current analgesics, we believe a new opioid with a more precisely targeted mechanism of action could provide a significant product opportunity in the acute and chronic pain markets.

### *Preclinical data*

TRV734 has a similar profile to TRV130 *in vitro* and *in vivo*. It is highly selective for the  $\mu$ -opioid receptor, where, like the most powerful opioid analgesics, it is a strong agonist of G protein coupling. TRV734 is distinct from those analgesics in its very weak recruitment of  $\beta$ -arrestins to the  $\mu$ -opioid receptor. In our preclinical studies, TRV734 showed analgesic effects in preclinical pain models similar to oxycodone and morphine. In the same studies, TRV734 caused less constipation compared to equivalently analgesic doses of oxycodone and morphine. Based on these data, we believe that TRV734 may have improved GI tolerability in humans at analgesic doses that offer comparable analgesic effectiveness to current opioid therapies.

TRV734 is active after oral administration in mice and rats, and has high oral bioavailability and is well tolerated in non-human primates. We have conducted toxicology, safety pharmacology and genotoxicity studies and are currently preparing for an IND submission to the FDA.

### *Development strategy*

If the IND becomes effective, we expect to initiate Phase 1 trials of TRV734 in the first half of 2014 that would include assessments of safety, tolerability and pharmacokinetics. These trials would also include measures of pupil constriction. The pupil data for TRV130 were predictive of the level of analgesic efficacy that is achieved and time to peak effect, so we expect that these data for TRV734 may provide an early estimate of the analgesic dose range. We expect to complete these trials by the end of 2014.

We intend to seek a collaborator with experience in developing and commercializing controlled-substance therapeutics in chronic care pain markets thereby leveraging their expertise while still retaining rights to commercialize TRV734 in hospital and specialist markets in the United States.

### ***d-opioid Receptor Program***

We are pursuing a research program to identify an orally bioavailable, small molecule G protein biased ligand of the  $\delta$ -opioid receptor for the treatment of CNS disorders, of which we intend to initially focus on Parkinson's disease, pain or depression.

Parkinson's disease is a progressive chronic neurodegenerative illness affecting seven to 10 million people worldwide, according to The Parkinson's Foundation. According to Datamonitor Healthcare, a healthcare information firm, the 2010 sales of drugs to treat Parkinson's disease were \$2.25 billion in the seven major pharmaceutical markets, which are the United States, Germany, France, the United Kingdom, Italy, Spain and Japan. Symptoms of the disease include loss of motor control, speech disorders and mental decline. Levodopa is commonly prescribed to treat Parkinson's disease. While patients typically experience satisfactory response to the drug for a limited time, chronic use of levodopa can result in dyskinesia, a disorder involving the lack of control over voluntary and involuntary movements. We are not aware of any currently available neuroprotective or neuroregenerative treatments for Parkinson's disease.

$\delta$ -opioid ligands have the potential to treat neuropathic, mechanical and inflammatory pain. Neuropathic pain is particularly interesting because this population is underserved using the currently approved therapeutics for this indication. Neuropathic pain is a type of chronic pain caused by injury to

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the nervous system. It can often be the consequence of another illness, such as diabetes, herpes zoster infection, HIV or cancer. Datamonitor Healthcare estimates that neuropathic pain-specific drug sales in 2010 were \$2.4 billion in the seven major pharmaceutical markets. We believe that the market for neuropathic pain treatment was approximately \$1.8 billion in the United States in 2010.

The World Health Organization estimates that depression affects more than 350 million people worldwide. Selective serotonin re-uptake inhibitors, or SSRIs, are considered the safest available therapies for depression, although they are only effective in 50% of patients, take about two to four weeks to alleviate symptoms, cause significant sexual side effects and weight gain and can be sedative. According to IMS Health data, the antidepressant market was approximately \$20.4 billion worldwide in 2011, with approximately \$11.0 billion of those sales in the United States.

### *Preclinical data*

Preclinical data support targeting the d-opioid receptor for the treatment of CNS disorders, such as Parkinson's disease, pain and depression. Prior approaches to modulate this receptor have been limited by a significant risk of seizure associated with this target. By contrast, we have identified potent d-opioid receptor ligands that display strong efficacy in animal models of depression, Parkinson's disease and pain without seizure liability through selectively activating G protein coupling without engaging b-arrestin. We are currently conducting lead-optimization and we expect to select a d-opioid product candidate for further development in the first half of 2014.

### *Development strategy*

We expect to complete IND-enabling preclinical studies of a product candidate targeting the d-opioid receptor for the treatment of CNS disorders in 2015. Phase 1 clinical trials will determine the human pharmacokinetics and the initial safety and tolerability of the compound. Due to the known on-target seizure liability of d-opioid agonists, electroencephalogram studies will be performed to specifically assess this liability in humans. The combination of preclinical and Phase 1 data and market considerations will dictate the lead indication for Phase 2 development.

We intend to maintain flexibility on whether to develop and commercialize this product candidate in collaboration with a pharmaceutical company licensee depending on the clinical indications we ultimately decide to pursue, but we intend to retain meaningful commercial rights in any event.

### **Our Option and License Agreements with Forest**

In May 2013, we entered into an option agreement and a license agreement with Forest, under which we granted to Forest an exclusive option to license TRV027, which may be exercised at any time before we deliver our Phase 2b clinical trial results to Forest and during a specified period of time thereafter. If Forest exercises its option, the license agreement between us and Forest will become effective and Forest will have an exclusive worldwide license to develop and commercialize TRV027 and specified related compounds. Forest will be responsible for subsequent development, regulatory approval and commercialization of TRV027 at Forest's expense.

Under the option agreement, we will conduct, at our expense, a Phase 2b trial of TRV027 in AHF. The Phase 2b trial will be conducted pursuant to a mutually agreed upon development plan and under the oversight of a joint development committee, which has an equal number of representatives from us and from Forest, with operational authority during the option period retained by us, subject to Forest's right to assume control in certain circumstances if we fail to conduct the development activities adequately.

During the option period, we are not permitted to negotiate for or enter into any agreement with a third party for the development and commercialization of TRV027 and its related compounds. Under specified circumstances linked to adverse changes in the market or with respect to TRV027, Forest has



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the right to renegotiate the terms of the license agreement. If Forest exercises such right, its option will expire and we will be obligated to negotiate in good faith with Forest for a period of time the terms of any new arrangement. If we and Forest are unable to agree on the terms of any new arrangement during such period of time, then the option agreement will terminate and for a specified period of time thereafter we may not offer a license to any third party on terms better than those last proposed by either us or Forest during our negotiations.

If Forest does not exercise the option during the specified period, its option will expire and the license agreement will not become effective. In that event, we would be free to enter into a collaboration arrangement with another party for the development and commercialization of TRV027 or to pursue development and commercialization ourselves.

If Forest exercises the option, Forest will have the sole and exclusive right under the license agreement, at its sole cost and expense, to develop and commercialize TRV027 and specified related compounds throughout the world. At our request, Forest will consider in good faith whether to grant us the right to co-promote the licensed products in the United States under terms to be agreed upon by the parties. Under the license agreement, we may not, and may not license others to, develop or commercialize certain products that compete with the licensed products.

We received no consideration for the grant of the option to license TRV027. If Forest exercises the option, we could potentially receive up to \$430 million in the aggregate, including an upfront option exercise fee of \$65 million and milestone payments depending upon the achievement of future development and commercial milestones. We could also receive tiered royalties between 10% and 20% on net sales of licensed products worldwide, subject to certain deductions and offsets, with the royalty rates on net sales of licensed products in the United States being somewhat higher than the royalty rates on net sales of licensed products outside the United States.

If Forest exercises the option and the license agreement becomes effective, both we and Forest would have the right to terminate the license agreement in the event of an uncured material breach or insolvency of the other party. In addition, Forest would be permitted to terminate the license agreement without cause at any time upon prior written notice or immediately for product safety reasons. Following a termination of the license agreement, all licenses granted to Forest would terminate, and Forest would grant us an exclusive royalty bearing license under specified patents and know-how to develop and commercialize licensed products it returns to us. If not terminated, the license agreement would remain in effect until the expiration of the last royalty term for the last licensed product.

If Forest elects to exercise its option, the term of the royalty on sales of TRV027 for a given country would extend until the latest to occur of (i) 10 years from first commercial sale of TRV027 in that country, (ii) the expiration of the last to expire patent claiming TRV027 that is sufficient to block the entrance of a generic version of the product, or (iii) the expiration of any period of exclusivity granted by applicable law or any regulatory authority in such country that confers exclusive marketing rights on the product.

Forest has the right to grant sublicenses under the license agreement to affiliates and third parties. Any sublicensing does not act to relieve Forest of any of its obligations under the license agreement, including Forest's obligation to make milestone payments to us with respect to TRV027 or pay royalties to us on sales of TRV027 by such sublicensee.

## **Intellectual Property**

We strive to protect the proprietary technologies that we believe are important to our business, including seeking and maintaining patent protection intended to cover the composition of matter of our product candidates, their methods of use, related technology and other inventions that are important to our business. As more fully described below, patent applications have been filed covering compositions

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of matter for and methods of using TRV027, TRV130 and TRV734. A U.S. patent directed to TRV027 has issued and is expected to expire no earlier than 2031. We also rely on trade secrets and careful monitoring of our proprietary information to protect aspects of our business that are not amenable to, or that we do not consider appropriate for, patent protection.

Our success will depend significantly on our ability to obtain and maintain patent and other proprietary protection for commercially important technology, inventions and know-how related to our business, defend and enforce our patents, maintain our licenses to use intellectual property owned by third parties, preserve the confidentiality of our trade secrets and operate without infringing valid and enforceable patents and other proprietary rights of third parties. We also rely on know-how, and continuing technological innovation to develop, strengthen and maintain our proprietary position in the field of modulating G protein coupled receptors with biased ligands.

One or more third parties may hold intellectual property, including patent rights, that are important or necessary to the development of our products. It may be necessary for us to use the patented or proprietary technology of third parties to commercialize our products, in which case we would be required to obtain a license from these third parties on commercially reasonable terms, or our business could be harmed, possibly materially. If we were not able to obtain a license, or were not able to obtain a license on commercially reasonable terms, our business could be harmed, possibly materially.

We plan to continue to expand our intellectual property estate by filing patent applications directed to dosage forms, methods of treatment and additional biased modulators of G protein coupled receptors. We anticipate seeking patent protection in the United States and internationally for compositions of matter covering the compounds, the chemistries and processes for manufacturing these compounds and the use of these compounds in a variety of therapies.

The patent positions of biopharmaceutical companies like us are generally uncertain and involve complex legal, scientific and factual questions. In addition, the coverage claimed in a patent application can be significantly reduced before the patent is issued, and the patent's scope can be modified after issuance. Consequently, we do not know whether any of our product candidates will be protectable or remain protected by enforceable patents. We cannot predict whether the patent applications we are currently pursuing will issue as patents in any particular jurisdiction or whether the claims of any issued patents will provide sufficient proprietary protection from competitors. Any patents that we hold may be challenged, circumvented or invalidated by third parties.

Because many patent applications in the United States and certain other jurisdictions are maintained in secrecy for 18 months, and since publication of discoveries in the scientific or patent literature often lags behind actual discoveries, we cannot be certain that we will be able to obtain patent protection for the inventions disclosed and/or claimed in our pending patent applications. Moreover, we may have to participate in interference proceedings declared by the United States Patent and Trademark Office or a foreign patent office to determine priority of invention or in post-grant challenge proceedings, such as oppositions, inter-partes review, post grant review or a derivation proceeding, that challenge our entitlement to an invention or the patentability of one or more claims in our patent applications or issued patents. Such proceedings could result in substantial cost, even if the eventual outcome is favorable to us.

Outside of the United States, we have filed patent applications in Australia, Canada, China, the European Patent Office, Hong Kong, India, Japan and New Zealand that are directed to TRV027. The patents from these applications, if issued, are predicted to expire in 2029, subject to any disclaimers or extensions. In addition, we have patent applications pending in South Korea, the European Patent Office, the Eurasian Patent Office, Australia, Brazil, Canada, Israel, India, Japan and New Zealand that are directed to TRV130 and TRV734. Applications directed to TRV130 and TRV734 is scheduled to be filed in China no later than November 23, 2013. The patents from the applications directed to

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TRV130 and TRV734, if issued, are predicted to expire in 2032, subject to any disclaimers or extensions.

The patent portfolios for our most advanced programs are summarized below.

**TRV027**

Our TRV027 patent portfolio is wholly owned by us. The portfolio includes one issued U.S. patent, U.S. Patent No. 8,486,885, which claims, among other things, TRV027 and compositions comprising TRV027. U.S. Patent No. 8,486,885 is expected to expire no earlier than 2031, subject to any disclaimers or extensions available under the Hatch-Waxman Act. The TRV027 patent portfolio also includes two pending U.S. patent applications, which claim a genus of compounds that would cover TRV027 and methods of using TRV027. If the two pending U.S. patent applications were to issue, they would be expected to expire no earlier than 2029, subject to any disclaimers or extensions. Related patent applications have been filed in several other countries and are pending. Any patents resulting from these patent applications, if issued, are also expected to expire no earlier than 2029, subject to any disclaimers or extensions. The TRV027 patent portfolio is subject to an option by Forest for an exclusive license.

**TRV130**

Our TRV130 patent portfolio, which is wholly owned by us, includes two pending U.S. patent applications claiming TRV130, other compounds and/or methods of making or using the same. If issued, the pending U.S. applications are predicted to expire no earlier than 2032, subject to any disclaimers or extensions. A related PCT application was filed and national patent applications have been filed in a number of other countries. Any patents resulting from these national patent applications, if issued, are expected to expire no earlier than 2032, subject to any disclaimers or extensions.

**TRV734**

Our TRV734 patent portfolio, which is wholly owned by us, includes two pending U.S. patent applications claiming TRV734, other compounds and/or methods of making or using the same. If issued, the pending U.S. applications are predicted to expire no earlier than 2032, subject to any disclaimers or extensions. A related PCT application was filed and national patent applications have been filed in a number of other countries. Any patents resulting from these national patent applications, if issued, are predicted to expire no earlier than 2032, subject to any disclaimers or extensions.

**Other**

In addition, we have patent portfolios that are directed to a number of different compounds other than TRV027, TRV130 and TRV734. We have patent applications directed to compounds that modulate various opioid receptors, including the  $\mu$ -opioid receptor, and other GPCRs. We also have an additional application directed to peptides and peptide mimetics targeting the AT1R, besides TRV027, that are  $\beta$ -arrestin effectors. We expect to maintain some of these applications in the United States and file in foreign countries. With the exception of two patent applications, all of the patent applications that we have filed are wholly owned by us and include 33 U.S. provisional patent applications, U.S. non-provisional patent applications, foreign applications and PCT applications, covering compositions and methods of making and using compounds that target G protein coupled receptors. We continue to file foreign applications directed to TRV130 and TRV734, which we expect to be completed by the end of November 2013. One of the patent applications that we have filed is co-owned by Albany Molecular Research, Inc., but we have rights to exclusive ownership to any patents that issue to the compounds and methods of using the compounds disclosed therein. Another application is co-owned by Ligand

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Pharmaceuticals Incorporated, or LPI. We have an exclusive worldwide, paid up, royalty-free license to any compound or method of use in the field of pharmaceuticals disclosed in the LPI co-owned application. These applications are eligible for worldwide filing and may be used to establish non-provisional applications that, if issued, are predicted to expire between 2032 and 2034.

The term of individual patents depends upon the legal term of the patents in the countries in which they are obtained. In most countries in which we file, the patent term is 20 years from the earliest date of filing a PCT application or a non-provisional patent application, subject to any disclaimers or extensions. The term of a patent in the United States can be adjusted and extended due to the failure of the United States Patent and Trademark Office following certain statutory and regulation deadlines for issuing a patent.

In the United States, the patent term of a patent that covers an FDA-approved drug may also be eligible for patent term extension, which permits patent term restoration as compensation for a portion of the patent term lost during the FDA regulatory review process. The Hatch-Waxman Act permits a patent term extension of up to five years beyond the expiration of the patent. The length of the patent term extension is related to the length of time the drug is under regulatory review. Patent extension cannot extend the remaining term of a patent beyond a total of 14 years from the date of product approval and only one patent applicable to an approved drug may be extended. Similar provisions are available in Europe and other non-United States jurisdictions to extend the term of a patent that covers an approved drug. In the future, if and when our pharmaceutical products receive FDA approval, we expect to apply for patent term extensions on patents covering those products. Although, we intend to seek patent term extensions to any of our issued patents in any jurisdiction where these are available there is no guarantee that the applicable authorities, including the FDA in the United States, will agree with our assessment of whether such extensions should be granted, and even if granted, the length of such extensions.

We also rely on trade secret protection for our confidential and proprietary information. Although we take steps to protect our proprietary information and trade secrets, including through contractual means with our employees and consultants, third parties may independently develop substantially equivalent proprietary information and techniques or otherwise gain access to our trade secrets or disclose our technology. Thus, we may not be able to meaningfully protect our trade secrets. It is our policy to require our employees, consultants, outside scientific collaborators, sponsored researchers and other advisors to execute confidentiality agreements upon the commencement of employment or consulting relationships with us. These agreements provide that all confidential information concerning our business or financial affairs developed or made known to the individual during the course of the individual's relationship with us is to be kept confidential and not disclosed to third parties except in specific circumstances. In the case of employees, the agreements provide that all inventions conceived by the individual, and which are related to our current or planned business or research and development or made during normal working hours, on our premises or using our equipment or proprietary information, are our exclusive property.

## **Manufacturing**

We do not have any manufacturing facilities. We currently rely, and expect to continue to rely, on third parties for the manufacture of our product candidates for preclinical and clinical testing, as well as for commercial manufacture if our product candidates receive marketing approval. At this time, none of our contract manufacturing agreements limit where, or with whom we can contract for commercial manufacture or distribution. It is our intention that by the time of any regulatory approvals for commercialization, we will have negotiated long-term commitments with at least one primary and one secondary supplier for each manufacturing and distribution function.

## **Commercialization**

We have not yet established a sales, marketing or product distribution infrastructure because our lead candidates are still in preclinical or early clinical development. If Forest exercises its option to license TRV027, Forest will have the exclusive rights to commercialize TRV027 and will be responsible for all commercialization activities at Forest's expense. At our request, Forest will consider in good faith whether to grant us the right to co-promote TRV027 in the United States under terms to be agreed upon by the parties, but it has no obligation to provide co-promotion rights to us. If Forest does not exercise its option to license TRV027 and we are successful in obtaining necessary regulatory approval, we might pursue commercialization on our own or seek to collaborate with a third party for commercialization, particularly outside the United States.

Subject to successfully completing product development and receiving marketing approvals, we expect to commence commercialization activities for our products other than TRV027 by building a focused sales and marketing organization in the United States, initially in the acute care area. We believe that such an organization will be able to address the community of physicians who are the key specialists in treating the patient populations for which our product candidates are being developed. We further believe that this sales organization could be adapted and expanded to provide support for TRV027 in the acute care setting if Forest does not exercise its option to license TRV027. Outside the United States, we expect to enter into distribution and other marketing arrangements with third parties for any of our product candidates that obtain marketing approval. We also intend to license out commercial rights for products that require a substantial primary care presence.

We also plan to build a marketing and sales management organization to create and implement marketing strategies for any products that we market through our own sales organization and to oversee and support our sales force. In parallel with building this organization, we plan to develop educational initiatives with respect to approved products and relationships with thought leaders in relevant fields of medicine.

## **Competition**

The biotechnology and pharmaceutical industries are characterized by rapidly advancing technologies, intense competition and a strong emphasis on proprietary products. While we believe that our technology, knowledge, experience and scientific resources provide us with competitive advantages, we face potential competition from many different sources, including major pharmaceutical, specialty pharmaceutical and biotechnology companies, academic institutions and governmental agencies and public and private research institutions. Any product candidates that we successfully develop and commercialize will compete with existing therapies and new therapies that may become available in the future. Products in development by other companies may provide efficacy, safety, convenience and other benefits that are not provided by currently marketed therapies. As a result, they may provide significant competition for any of our product candidates for which we obtain marketing approval.

If TRV027 is approved for the indication of AHF, it will compete with the currently marketed drugs that are widely used for that indication, including diuretics, vasodilators and inotropes.

In addition to these widely used drugs, we are also aware of three product candidates in mid- to late-stage clinical development for AHF. These are serelexin, being developed by Novartis and currently in Phase 3 clinical trials in patients with acute heart failure, omecamtiv mecarbil, being developed by Amgen in collaboration with Cytokinetics Incorporated and currently in Phase 2b clinical trials for acute and chronic heart failure, and ularitide, being developed by Cardiorentis and currently in Phase 3 clinical trials for acute heart failure.

If TRV130 is approved for IV treatment of moderate to severe acute pain, it will compete with widely used, currently marketed opioid analgesics, such as morphine, hydromorphone and fentanyl. The

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use of these agents is limited by well-known adverse effects, such as respiratory depression, nausea and vomiting, constipation and postoperative ileus.

We are aware of only a few products in development that are aimed at improving the treatment of moderate to severe, acute postoperative pain while reducing undesirable side effects. The most advanced product candidates are reformulations of existing opioids, such as a fentanyl iontophoresis patch, in development by The Medicines Company, and sufentanil nanotab, in development by AcelRx, or combination products, such as MoxDuo IV, a combination of morphine and oxycodone being developed by QRxPharma, which is in Phase 2.

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

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

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

### **Government Regulation and Product Approval**

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, packaging, storage, recordkeeping, labeling, advertising, promotion, distribution, marketing, import and export of pharmaceutical products such as those we are developing. The processes for obtaining regulatory approvals in the United States and in foreign countries, along with subsequent compliance with applicable statutes and regulations, require the expenditure of substantial time and financial resources.

#### ***FDA Regulation***

In the United States, the FDA regulates drugs under the Federal Food, Drug, and Cosmetic Act, or FDCA, and its implemented regulations. The process of obtaining regulatory approvals and the subsequent compliance with applicable federal, state, local and foreign statutes and regulations requires the expenditure of substantial time and financial resources. Failure to comply with the applicable United States requirements at any time during the product development process, approval process or after approval, may subject an applicant to a variety of administrative or judicial sanctions, such as the

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FDA's refusal to approve pending new drug applications, or NDAs, withdrawal of an approval, imposition of a clinical hold, issuance of warning or untitled letters, product recalls, product seizures, total or partial suspension of production or distribution, injunctions, fines, refusals of government contracts, restitution, disgorgement 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 preclinical laboratory tests, animal studies and formulation studies in compliance with the FDA's good laboratory practice, or GLP, regulations;
- submission to the FDA of an IND which must become effective before human clinical trials may begin;
- approval by an independent institutional review board, or IRB, at each clinical site before each trial may be initiated;
- performance of human clinical trials, including adequate and well-controlled clinical trials, in accordance with good clinical practices, or GCP, to establish the safety and efficacy of the proposed drug product for each indication;
- submission to the FDA of an NDA;
- 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, and to assure that the facilities, methods and controls are adequate to preserve the drug's identity, strength, quality and purity, as well as satisfactory completion of an FDA inspection of selected clinical sites to determine GCP compliance;
- FDA review and approval of the NDA; and
- Some of our potential products are anticipated to require DEA review and scheduling activities prior to launch.

### *Preclinical Studies*

Preclinical studies include laboratory evaluation of drug substance chemistry, toxicity and drug product formulation, as well as animal studies to assess potential safety and efficacy. An IND sponsor must submit the results of the preclinical tests, together with manufacturing information, analytical data and any available clinical data or literature, among other things, to the FDA as part of an IND. Manufacture of drug substance, drug product and the labeling and distribution of clinical supplies must all comply with cGMP standards. Some preclinical testing may continue even 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 a clinical hold. In such a case, the IND sponsor and the FDA must resolve any outstanding concerns before the clinical trial can begin. As a result, submission of an IND may not result in the FDA allowing clinical trials to commence.

### *Clinical Trials*

Clinical trials involve the administration of the investigational new drug to human subjects under the supervision of qualified investigators in accordance with GCP requirements, which include the requirement that all research subjects provide their informed consent in writing for their participation in any clinical trial. Clinical trials are conducted under 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

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submitted to the FDA as part of the IND. In addition, an IRB at each institution participating in the clinical trial must review and approve the plan for any clinical trial before it commences at that institution, and the IRB must continue to oversee the clinical trial while it is being conducted. Information about certain clinical trials must be submitted within specific timeframes to the National Institutes of Health, or NIH, for public dissemination on their ClinicalTrials.gov website.

Human clinical trials are typically conducted in three sequential phases, which may overlap or be combined. In 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 initial indication of its effectiveness. In Phase 2, the drug typically 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. In Phase 3, the drug is administered to an expanded patient population, generally at geographically dispersed clinical trial sites, in well-controlled clinical trials to generate enough data to statistically evaluate the efficacy and safety of the product for approval, to establish the overall risk-benefit profile of the product and to provide adequate information for the labeling of the product.

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

### *Marketing Approval*

Assuming successful completion of the required clinical testing, the results of the preclinical and clinical studies, together with detailed information relating to the product's chemistry, manufacture, controls and proposed labeling, among other things, are submitted to the FDA as part of an NDA requesting approval to market the product for one or more indications. In most cases, the submission of an NDA is subject to a substantial application user fee. Under the Prescription Drug User Fee Act, or PDUFA, guidelines that are currently in effect, the FDA has agreed to certain performance goals regarding the timing of its review of an application.

In addition, under the Pediatric Research Equity Act 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.

The FDA also may require submission of a risk evaluation and mitigation strategy, or REMS, to mitigate any identified or suspected serious risks and ensure safe use of the drug. The REMS plan could include medication guides, physician communication plans, assessment plans and elements to assure safe use, such as restricted distribution methods, patient registries or other risk minimization tools. We expect that the  $\mu$ -opioid agonist products will be subject to a REMS, since currently marketed opioid products are subject to this requirement.

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.



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In this event, the application must be resubmitted with the additional information. The resubmitted application is also subject to review before the FDA accepts it for filing. Once the submission is accepted for filing, the FDA begins an in-depth substantive review. The FDA reviews an NDA to determine, among other things, whether the drug is safe and effective and whether the facility in which it is manufactured, processed, packaged or held meets standards designed to assure the product's continued safety, quality and purity.

The FDA typically refers a question regarding a novel drug to an external advisory committee. An advisory committee is a panel of independent experts, including clinicians and other scientific experts, that reviews, evaluates and provides a recommendation as to whether the application should be approved and under what conditions. 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, referred to as a Pre-Approval Inspection, or PAI. 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. Additionally, before approving an NDA, the FDA will typically inspect one or more clinical trial sites to assure compliance with GCP.

The testing and approval process for an NDA requires substantial time, effort and financial resources, and each may take several years to complete. Data obtained from preclinical and clinical testing 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 of an NDA on a timely basis, or at all.

After evaluating the NDA and all related information, including the advisory committee recommendation, if any, and inspection reports regarding the manufacturing facilities and clinical trial sites, the FDA may issue an approval letter, or, in some cases, a complete response letter. A complete response letter generally contains a statement of specific conditions that must be met in order to secure final approval of the NDA and may require additional clinical or preclinical testing in order for the FDA to reconsider the application. Even with submission of this additional information, the FDA ultimately may decide that the application does not satisfy the regulatory criteria for approval. If and when those conditions have been met to the FDA's satisfaction, the FDA will typically issue an approval letter. An approval letter authorizes commercial marketing of the drug with specific prescribing information for specific indications. For some products, an additional step of DEA review and scheduling is required.

Even if the FDA approves a product, it may limit the approved indications for use of the product, require that contraindications, warnings or precautions be included in the product labeling, including a boxed warning, 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 under a REMS 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-marketing 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.

### *Post-Approval Requirements*

Drugs manufactured or distributed 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

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product, such as adding new indications or other labeling claims are subject to prior FDA review and approval. There also are continuing, annual user fee requirements for any marketed products and the establishments at which such products are manufactured, as well as new application fees for supplemental applications with clinical data.

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.

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 the sponsor and any third party manufacturers that the sponsor may decide to use. Accordingly, manufacturers must continue to expend time, money and effort in the area 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 mandatory 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 REMS program. Other potential consequences include, among other things:

- restrictions on the marketing or manufacturing of the product, complete withdrawal of the product from the market or product recalls;
- fines, warning letters or holds on post-approval clinical trials;
- refusal of the FDA to approve pending NDAs or supplements to approved NDAs, or suspension or revocation of product license approvals;
- product seizure or detention, or refusal to permit the import or export of products; or
- 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. Although physicians, in the practice of medicine, may prescribe approved drugs for unapproved indications, pharmaceutical companies generally are required to promote their drug products 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.

In addition, the distribution of prescription pharmaceutical products is subject to the Prescription Drug Marketing Act, or PDMA, which regulates the distribution of drugs and drug samples at the federal level, and sets minimum standards for the registration and regulation of drug distributors by the states. Both the PDMA and state laws limit the distribution of prescription pharmaceutical product samples and impose requirements to ensure accountability in distribution.

***DEA Regulation***

Both TRV130 and TRV734 will be regulated as a "controlled substance" as defined in the Controlled Substances Act of 1970, or CSA, which establishes registration, security, recordkeeping, reporting, storage, distribution and other requirements administered by the DEA. The DEA is concerned with the control of handlers of controlled substances, and with the equipment and raw materials used in their manufacture and packaging, in order to prevent loss and diversion into illicit channels of commerce.

The DEA regulates controlled substances as Schedule I, II, III, IV or V substances. Schedule I substances by definition have no established medicinal use, and may not be marketed or sold in the United States. A pharmaceutical product may be listed as Schedule II, III, IV or V, with Schedule II substances considered to present the highest risk of abuse and Schedule V substances the lowest relative risk of abuse among such substances. TRV130 and TRV734, if approved, are expected to be listed by the DEA as Schedule II controlled substances under the CSA. Consequently, their manufacture, shipment, storage, sale and use will be subject to a high degree of regulation.

Annual registration is required for any facility that manufactures, distributes, dispenses, imports or exports any controlled substance. The registration is specific to the particular location, activity and controlled substance schedule. For example, separate registrations are needed for import and manufacturing, and each registration will specify which schedules of controlled substances are authorized.

The DEA typically inspects a facility to review its security measures prior to issuing a registration. Security requirements vary by controlled substance schedule, with the most stringent requirements applying to Schedule I and Schedule II substances. Required security measures include background checks on employees and physical control of inventory through measures such as cages, surveillance cameras and inventory reconciliations. Records must be maintained for the handling of all controlled substances, and periodic reports made to the DEA, for example distribution reports for Schedule I and II controlled substances, Schedule III substances that are narcotics, and other designated substances. Reports must also be made for thefts or losses of any controlled substance, and to obtain authorization to destroy any controlled substance. In addition, special authorization and notification requirements apply to imports and exports.

In addition, a DEA quota system controls and limits the availability and production of controlled substances in Schedule I or II. Distributions of any Schedule I or II controlled substance must also be accompanied by special order forms, with copies provided to the DEA. The DEA may adjust aggregate production quotas and individual production and procurement quotas from time to time during the year, although the DEA has substantial discretion in whether or not to make such adjustments. Our, or our contract manufacturers', quota of an active ingredient may not be sufficient to meet commercial demand or complete clinical trials. Any delay or refusal by the DEA in establishing our, or our contract manufacturers', quota for controlled substances could delay or stop our clinical trials or product launches.

To meet its responsibilities, the DEA conducts periodic inspections of registered establishments that handle controlled substances. Individual states also regulate controlled substances, and we and our contract manufacturers will be subject to state regulation with respect to the distribution of these products.

***Federal and State Fraud and Abuse and Data Privacy and Security Laws and Regulations***

In addition to FDA restrictions on marketing of pharmaceutical products, federal and state fraud and abuse laws restrict business practices in the biopharmaceutical industry. These laws include

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anti-kickback and false claims laws and regulations as well as data privacy and security laws and regulations.

The federal 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 item or service reimbursable under Medicare, Medicaid or other federal healthcare programs. The term "remuneration" has been broadly interpreted to include anything of value. The Anti-Kickback Statute has been interpreted to apply to arrangements between pharmaceutical manufacturers on one hand and prescribers, purchasers and formulary managers on the other. Although there are a number of statutory exemptions and regulatory safe harbors protecting some common activities from prosecution, the exemptions and safe harbors are drawn narrowly. Practices that involve remuneration that may be alleged to be intended to induce prescribing, purchases or recommendations may be subject to scrutiny if they do not qualify for an exemption or safe harbor. Several courts have interpreted the statute's intent requirement to mean that if any one purpose of an arrangement involving remuneration is to induce referrals of federal healthcare covered business, the statute has been violated.

The reach of the Anti-Kickback Statute was also broadened by the Patient Protection and Affordable Care Act of 2010, as amended by the Health Care and Education Reconciliation Act of 2010, or collectively PPACA, which, among other things, amended the intent requirement of the federal Anti-Kickback Statute such that a person or entity no longer needs to have actual knowledge of this statute or specific intent to violate it in order to have committed a violation. In addition, PPACA provides that the government may assert that a claim including items or services resulting from a violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the civil False Claims Act or the civil monetary penalties statute, which imposes penalties against any person who is determined to have presented or caused to be presented a claim to a federal health program that the person knows or should know is for an item or service that was not provided as claimed or is false or fraudulent. PPACA also created new federal requirements for reporting, by applicable manufacturers of covered drugs of payments and other transfers of value to physicians and teaching hospitals.

The federal False Claims Act prohibits any person from knowingly presenting, or causing to be presented, a false claim for payment to the federal government or knowingly making, using or causing to be made or used a false record or statement material to a false or fraudulent claim to the federal government. A claim includes "any request or demand" for money or property presented to the U.S. government. Several pharmaceutical and other healthcare companies have been prosecuted under these laws for allegedly providing free product to customers with the expectation that the customers would bill federal programs for the product. Other companies have been prosecuted for causing false claims to be submitted because of the companies' marketing of products for unapproved, and thus non-reimbursable, uses. The federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, created new federal criminal statutes that prohibit knowingly and willfully executing a scheme to defraud any healthcare benefit program, including private third party payors and knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false, fictitious or fraudulent statement in connection with the delivery of or payment for healthcare benefits, items or services. Also, many states have similar fraud and abuse statutes or regulations that apply to items and services reimbursed under Medicaid and other state programs, or, in several states, apply regardless of the payor.

In addition, we may be subject to data privacy and security regulation by both the federal government and the states in which we conduct our business. HIPAA, as amended by the Health Information Technology and Clinical Health Act, or HITECH, and their respective implementing regulations, including the final omnibus rule published on January 25, 2013, imposes specified requirements relating to the privacy, security and transmission of individually identifiable health

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information. Among other things, HITECH makes HIPAA's privacy and security standards directly applicable to "business associates," defined as independent contractors or agents of covered entities that create, receive, maintain or transmit protected health information in connection with providing a service for or on behalf of a covered entity. HITECH also increased the civil and criminal penalties that may be imposed against covered entities, business associates and possibly other persons, and gave state attorneys general new authority to file civil actions for damages or injunctions in federal courts to enforce the federal HIPAA laws and seek attorney's fees and costs associated with pursuing federal civil actions. In addition, state laws govern the privacy and security of health information in certain circumstances, many of which differ from each other in significant ways and may not have the same effect, thus complicating compliance efforts.

Because of the breadth of these laws and the narrowness of available statutory and regulatory exemptions, it is possible that some of our business activities could be subject to challenge under one or more of such laws. If our operations are found to be in violation of any of the federal or state laws described above or any other governmental regulations that apply to us, we may be subject to penalties, including criminal and significant civil monetary penalties, damages, fines, imprisonment, exclusion from participation in government healthcare programs, and the curtailment or restructuring of our operations, any of which could adversely affect our ability to operate our business and our results of operations. To the extent that any of our products are sold in a foreign country, we may be subject to similar foreign laws and regulations, which may include, for instance, applicable post-marketing requirements, including safety surveillance, anti-fraud and abuse laws, and implementation of corporate compliance programs and reporting of payments or transfers of value to healthcare professionals.

### ***Coverage and Reimbursement***

The commercial success of our product candidates and our ability to commercialize any approved product candidates successfully will depend in part on the extent to which governmental payor programs at the federal and state levels, including Medicare and Medicaid, private health insurers and other third-party payors provide coverage for and establish adequate reimbursement levels for our product candidates. Government health administration authorities, private health insurers and other organizations generally decide which drugs they will pay for and establish reimbursement levels for healthcare. In particular, in the United States, private health insurers and other third party payors often provide reimbursement for products and services based on the level at which the government provides reimbursement through the Medicare or Medicaid programs for such treatments. In the United States, the European Union and other potentially significant markets for our product candidates, government authorities and third party payors are increasingly attempting to limit or regulate the price of medical products and services, particularly for new and innovative products and therapies, which often has resulted in average selling prices lower than they would otherwise be. Further, the increased emphasis on managed healthcare in the United States and on country and regional pricing and reimbursement controls in the European Union will put additional pressure on product pricing, reimbursement and usage, which may adversely affect our future product sales and results of operations. These pressures can arise from rules and practices of managed care groups, judicial decisions and governmental laws and regulations related to Medicare, Medicaid and healthcare reform, pharmaceutical coverage and reimbursement policies and pricing in general.

Third party payors are increasingly imposing additional requirements and restrictions on coverage and limiting reimbursement levels for medical products. For example, federal and state governments reimburse covered prescription drugs at varying rates generally below average wholesale price. These restrictions and limitations influence the purchase of healthcare services and products. Third-party payors may limit coverage to specific drug products on an approved list, or formulary, which might not include all of the FDA-approved drug products for a particular indication. Third-party payors are increasingly challenging the price and examining the medical necessity and cost-effectiveness of medical

products and services, in addition to their safety and efficacy. We may need to conduct expensive pharmacoeconomic studies in order to demonstrate the medical necessity and cost-effectiveness of our products, in addition to the costs required to obtain the FDA 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. Adequate third-party reimbursement may not be available to enable us to maintain price levels sufficient to realize an appropriate return on our investment in drug development. Legislative proposals to reform healthcare or reduce costs under government insurance programs may result in lower reimbursement for our products and product candidates or exclusion of our products and product candidates from coverage. The cost containment measures that healthcare payors and providers are instituting and any healthcare reform could significantly reduce our revenue from the sale of any approved product candidates. We cannot provide any assurances that we will be able to obtain and maintain third party coverage or adequate reimbursement for our product candidates in whole or in part.

#### ***Impact of Healthcare Reform on Coverage, Reimbursement and Pricing***

The United States and some foreign jurisdictions are considering enacting or have enacted a number of additional legislative and regulatory proposals to change the healthcare system in ways that could affect our ability to sell our products profitably. Among policy makers and payors in the United States and elsewhere, there is significant interest in promoting changes in healthcare systems with the stated goals of containing healthcare costs, improving quality and expanding access. In the United States, the pharmaceutical industry has been a particular focus of these efforts and has been significantly affected by major legislative initiatives. For example, the Medicare Prescription Drug, Improvement, and Modernization Act of 2003, or the MMA, imposed new requirements for the distribution and pricing of prescription drugs for Medicare beneficiaries. Under Part D, Medicare beneficiaries may enroll in prescription drug plans offered by private entities that provide coverage of outpatient prescription drugs. Part D plans include both standalone prescription drug benefit plans and prescription drug coverage as a supplement to Medicare Advantage plans. Unlike Medicare Part A and B, Part D coverage is not standardized. Part D prescription drug plan sponsors are not required to pay for all covered Part D drugs, and each drug plan can develop its own drug formulary that identifies which drugs it will cover and at what tier or level. However, Part D prescription drug formularies must include drugs within each therapeutic category and class of covered Part D drugs, though not necessarily all the drugs in each category or class. Any formulary used by a Part D prescription drug plan must be developed and reviewed by a pharmacy and therapeutic committee. Government payment for some of the costs of prescription drugs may increase demand for any products for which we receive marketing approval. However, any negotiated prices for our future products covered by a Part D prescription drug plan will likely be lower than the prices we might otherwise obtain. Moreover, while the MMA applies only to drug benefits for Medicare beneficiaries, private payors often follow Medicare coverage policy and payment limitations in setting their own payment rates. Any reduction in payment that results from Medicare Part D may result in a similar reduction in payments from non-governmental payors.

The American Recovery and Reinvestment Act of 2009 provides funding for the federal government to compare the effectiveness of different treatments for the same illness. A plan for the research will be developed by the Department of Health and Human Services, the Agency for Healthcare Research and Quality and the National Institutes of Health, and periodic reports on the status of the research and related expenditures will be made to Congress. Although the results of the comparative effectiveness studies are not intended to mandate coverage policies for public or private payors, it is not clear what effect, if any, the research will have on the sales of any product, if any such product or the condition that it is intended to treat is the subject of a study. It is also possible that comparative effectiveness research demonstrating benefits in a competitor's product could adversely affect the sales of our product candidates. If third party payors do not consider our product candidates

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to be cost-effective compared to other available therapies, they may not cover our product candidates, once approved, 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 on a profitable basis.

PPACA became law in March 2010 and substantially changes the way healthcare is financed by both governmental and private insurers. Among other cost containment measures, the PPACA establishes an annual, nondeductible fee on any entity that manufactures or imports specified branded prescription drugs and biologic agents; a new Medicare Part D coverage gap discount program; and a new formula that increases the rebates a manufacturer must pay under the Medicaid Drug Rebate Program. In the future, there may continue to be additional proposals relating to the reform of the U.S. healthcare system, some of which could further limit the prices we are able to charge for our product candidates, once approved, or the amounts of reimbursement available for our product candidates once they are approved.

In addition, other legislative changes have been proposed and adopted since PPACA was enacted. In August 2011, the President signed into law the Budget Control Act of 2011, as amended, which, among other things, created the Joint Select Committee on Deficit Reduction to propose spending reductions to Congress. The Joint Select Committee on Deficit Reduction did not achieve its targeted deficit reduction of at least \$1.2 trillion for the years 2013 through 2021, triggering the legislation's automatic reductions to several government programs. These reductions include aggregate reductions to Medicare payments to providers of up to 2% per fiscal year, starting in 2013. Under the Budget Control Act of 2011, as amended, federal budget "sequestration" Medicare payment reductions became effective on April 1, 2013 and automatically reduced payments under various government programs, including, for example, certain Medicare provider and supplier reimbursement payments. In January 2013, President Obama signed into law the American Taxpayer Relief Act of 2012, which, among other things, reduced Medicare payments to several providers and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. These and other healthcare reform initiatives may result in additional reductions in Medicare and other healthcare funding.

### ***Exclusivity and Approval of Competing Products***

#### *Hatch-Waxman Patent Exclusivity*

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, or 505(b)(2) NDA. 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. 505(b)(2) NDAs generally are submitted for changes to a previously approved drug product, such as a new dosage form or indication.

The ANDA or 505(b)(2) NDA 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.

Generally, the ANDA or 505(b)(2) NDA cannot be approved until all listed patents have expired, except when the ANDA or 505(b)(2) NDA applicant challenges a listed drug. A certification that the proposed 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 or 505(b)(2) NDA application will not be approved until all the listed patents claiming the referenced product have expired.

If the ANDA or 505(b)(2) NDA 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 application 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 the Paragraph IV certification automatically prevents the FDA from approving the ANDA or 505(b)(2) NDA 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.

#### ***Hatch-Waxman Non-Patent Exclusivity***

Market and data exclusivity provisions under the FDCA also can delay the submission or the approval of certain applications for competing products. The FDCA provides a five-year period of non-patent data exclusivity within the United States to the first applicant to gain approval of an NDA for a new chemical entity. A drug is a new chemical entity if the FDA has not previously approved any other new drug containing the same active moiety, which is the molecule or ion responsible for the activity of the drug substance. During the exclusivity period, the FDA may not accept for review an ANDA or a 505(b)(2) NDA submitted by another company that contains the previously approved active moiety. However, an ANDA or 505(b)(2) NDA may be submitted after four years if it contains a certification of patent invalidity or noninfringement.

The FDCA also provides three years of marketing exclusivity for an NDA, 505(b)(2) NDA, or supplement to an existing NDA or 505(b)(2) NDA if new clinical investigations, other than bioavailability studies, that were conducted or sponsored by the applicant, are deemed by the FDA to be essential to the approval of the application or supplement. Three-year exclusivity may be awarded for changes to a previously approved drug product, such as new indications, dosages, strengths or dosage forms of an existing drug. This three-year exclusivity covers only the conditions of use associated with the new clinical investigations and, as a general matter, does not prohibit the FDA from approving ANDAs or 505(b)(2) NDAs for generic versions of the original, unmodified drug product. Five-year and three-year exclusivity will not delay the submission or approval of a full NDA; however, an applicant submitting a full NDA would be required to conduct or obtain a right of reference to all of the preclinical studies and adequate and well-controlled clinical trials necessary to demonstrate safety and effectiveness.



***Pediatric Exclusivity***

Pediatric exclusivity is another type of non-patent marketing exclusivity in the United States and, if granted, provides for the attachment of an additional six months of marketing protection to the term of any existing regulatory exclusivity, including the non-patent exclusivity periods described above. This six-month exclusivity may be granted if an NDA sponsor submits pediatric data that fairly respond to a written request from the FDA for such data. The data do not need to show the product to be effective in the pediatric population studied; rather, if the clinical trial is deemed to fairly respond to the FDA's request, the additional protection is granted. If reports of requested pediatric studies are submitted to and accepted by FDA within the statutory time limits, whatever statutory or regulatory periods of exclusivity or Orange Book listed patent protection cover the drug are extended by six months. This is not a patent term extension, but it effectively extends the regulatory period during which the FDA cannot approve an ANDA or 505(b)(2) application owing to regulatory exclusivity or listed patents. When any of our products is approved, we anticipate seeking pediatric exclusivity when it is appropriate.

***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. For example, in the European Union, we must obtain authorization of a clinical trial application, or CTA, in each member state in which we intend to conduct a clinical trial. 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.

**Employees**

As of September 30, 2013, we had 31 employees, all of whom are located in the United States. None of our employees are represented by a labor union or covered by a collective bargaining agreement. We consider our relationship with our employees to be good.

**Facilities**

Our principal offices occupy approximately 12,750 square feet of leased office and laboratory space in King of Prussia, Pennsylvania pursuant to a lease agreement that expires in September 2020. In addition, we lease a vivarium space in Exton, Pennsylvania pursuant to a lease agreement that expires in September 2014. We believe that our current facilities are suitable and adequate to meet our current needs. We intend to add new facilities or expand existing facilities as we add employees, and we believe that suitable additional or substitute space at our current location will be available as needed to accommodate any such expansion of our operations.

**Legal Proceedings**

From time to time, we are subject to litigation and claims arising in the ordinary course of business. We are not currently a party to any material legal proceedings and we are not aware of any pending or threatened legal proceeding against us that we believe could have a material adverse effect on our business, operating results or financial condition.

**MANAGEMENT****Directors and Executive Officers**

The following table sets forth information concerning our directors and executive officers, including their ages as of October 28, 2013:

<u>Name</u>	<u>Age</u>	<u>Position</u>
<i>Executive Officers:</i>		
Maxine Gowen, Ph.D.	55	President, Chief Executive Officer and Director
Michael W. Lark, Ph.D.	56	Chief Scientific Officer and Senior Vice President, Research
Roberto Cuca	46	Senior Vice President and Chief Financial Officer
David Soergel, M.D.	46	Senior Vice President, Clinical Development
<i>Non-Management Directors:</i>		
Leon O. Moulder, Jr.	56	Director
Farah Champsi	52	Director
Michael R. Dougherty	55	Director
Terrance G. McGuire	57	Director
Christopher K. Mirabelli, Ph.D.	59	Director
Jake R. Nunn	43	Director
David F. Solomon	47	Director

**Executive Officers*****Maxine Gowen, Ph.D.***

Dr. Gowen has served as our President and Chief Executive Officer and as a member of our board of directors since our founding in November 2007. Prior to joining our company, Dr. Gowen was Senior Vice President for the Center of Excellence for External Drug Discovery at GlaxoSmithKline plc, or GSK, where she held a variety of leadership positions during her tenure of 15 years. Before GSK, Dr. Gowen was Senior Lecturer and Head, Bone Cell Biology Group, Department of Bone and Joint Medicine, of the University of Bath, U.K. From 2008 until 2012, Dr. Gowen served as a director of Human Genome Sciences, Inc., a public biopharmaceutical company. She received her Ph.D. from the University of Sheffield, U.K., an M.B.A. with academic honors from The Wharton School of the University of Pennsylvania, and a B.Sc. with Honors in Biochemistry from the University of Bristol, U.K. Our board of directors believes that Dr. Gowen's detailed knowledge of our company and her over 20 years in the pharmaceutical industry, including her roles at GSK, provide a critical contribution to our board of directors.

***Michael W. Lark, Ph.D.***

Dr. Lark has served in a number of capacities with our company since February 2008, and currently serves as our Chief Scientific Officer and Senior Vice President, Research, a position he has held since March 2011. Prior to joining our company, he was Vice President of Biology at Centocor Inc., a division of Johnson & Johnson, or Centocor, from 2004 until 2008 and the Senior Director of Cardiovascular and Metabolic Diseases at Centocor from 2002 to 2004. Prior to that, Dr. Lark was Director of Musculoskeletal Diseases at GSK, from 1999 until 2002. Dr. Lark received his Ph.D. in Molecular Biology and Microbiology from the Case Western Reserve University Medical School and his B.S. in Microbiology from the Pennsylvania State University.

***Roberto Cuca***

Mr. Cuca joined our company as Senior Vice President and Chief Financial Officer in September 2013. Prior to joining us, he held various leadership positions in the finance organization of Endo Health Solutions Inc., a pharmaceutical company, from March 2010 to August 2013, including, most recently, Treasurer and Senior Vice President, Finance. Prior to that, he was Director, Corporate and Business Development, at moksha8 Pharmaceuticals, Inc., an emerging markets focused pharmaceutical company, from March 2008 until February 2010. From 2005 until 2008, he worked at JPMorgan Chase & Co. as an equity analyst covering U.S. pharmaceutical companies. Mr. Cuca received an M.B.A. from the Wharton School of The University of Pennsylvania, a J.D. from Cornell Law School, an A.B. from Princeton University and he is a CFA charterholder.

***David Soergel, M.D.***

Dr. Soergel has served in multiple positions since joining our company in November 2009 and currently serves as our Senior Vice President, Clinical Development, a position he has held since September 2012. Prior to joining our company, he served as Senior Director, Clinical Development for Concert Pharmaceuticals, Inc., a biotechnology company, from July 2008 to November 2009. Prior to Concert, Dr. Soergel served as Director, Discovery Medicine, in the Cardiovascular Urogenital Center of Excellence in Drug Discovery at GSK, from 2005 until 2008. Dr. Soergel received an M.D. from Cornell University Medical College and a B.A. from The Johns Hopkins University. Dr. Soergel completed his clinical training in pediatric cardiology at Johns Hopkins Hospital and underwent additional training in heart failure and transplant at the Children's Hospital of Philadelphia.

**Non-Management Directors**

***Leon O. Moulder, Jr.***

Mr. Moulder has served as a member of our board of directors since November 2011 and as Chairman of our board of directors since June 2013. Since June 2010, Mr. Moulder has served as Chief Executive Officer and a member of the board of directors of TESARO, Inc., or TESARO, a public biopharmaceutical company. From April 2009 to January 2010, Mr. Moulder served as Vice Chairman, President and Chief Executive Officer of Abraxis BioScience, Inc., or Abraxis, a biotechnology company. Before that, Mr. Moulder served as Vice Chairman of Eisai Corporation, North America, or Eisai, a pharmaceutical company and wholly owned subsidiary of Eisai Co., Ltd., a Japanese pharmaceutical company, from January 2008 until January 2009, after Eisai acquired MGI PHARMA, Inc., a biopharmaceutical company, where he had served as President and Chief Executive Officer since May 2003. Mr. Moulder currently serves on the board of directors of Cubist Pharmaceuticals, Inc. and also serves on the Board of Trustees of Temple University as well as the Board of Visitors of the Temple University School of Pharmacy. Our board of directors believes that Mr. Moulder's significant operational and senior management experience in the pharmaceutical and biotechnology industries, as well as his extensive experience serving on boards of directors of public and private companies in the life sciences industry, allow him to make valuable contributions to the board.

***Farah Champs***

Ms. Champs has served as a member of our board of directors since January 2008. Ms. Champs joined Alta Partners, a venture capital firm, in 2000 and serves as Managing Director where she focuses her efforts on biopharmaceutical companies. Ms. Champs also serves on the boards of directors of Chimerix, Inc., a biopharmaceutical company, and two private companies. Prior to Alta Partners, Ms. Champs served as an investment banker at Robertson Stephens & Company from 1987 to 1999 and was elected as a general partner in 1992 and head of the global life sciences investment banking group in 1995. Ms. Champs earned an M.B.A. from the Stanford University Graduate School of

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Business and a B.A. in Economics from Smith College. Our board of directors believes that Ms. Champs's experience and expertise in investment banking in biopharmaceutical companies, as well as being responsible for building successful life sciences investment banking franchises, allows her to make valuable contributions to the board.

***Michael R. Dougherty***

Mr. Dougherty has served as a member of our board of directors since August 2013. Mr. Dougherty was Chief Executive Officer and a member of the board of directors of Kalidex Pharmaceuticals, Inc., or Kalidex, from May 2012 to October 2012. Mr. Dougherty was the President and Chief Executive Officer of Adolor Corporation, or Adolor, a biopharmaceutical company, and was a member of the board of directors of Adolor from December 2006 until December 2011. Mr. Dougherty joined Adolor as Senior Vice President of Commercial Operations in November 2002, and until his appointment as President and Chief Executive Officer in December 2006, served in a number of capacities, including Chief Operating Officer and Chief Financial Officer. From November 2000 to November 2002, Mr. Dougherty was President and Chief Operating Officer of Genomics Collaborative, Inc. Previously, Mr. Dougherty served in a variety of senior positions at Genaera Corporation, or Genaera, a biotechnology company, including President and Chief Executive Officer, and at Centocor. Mr. Dougherty is currently on the board of directors at Viropharma Incorporated, Biota Pharmaceuticals, Inc., Cempra, Inc., and Celator Pharmaceuticals, Inc. and one private company. Mr. Dougherty received a B.S. from Villanova University. Our board of directors believes that Mr. Dougherty's deep understanding of biotechnology finance, research and development, sales and marketing, strategy and operations allows him to make valuable contributions to the board.

***Terrance G. McGuire***

Mr. McGuire has served as a member of our board of directors since January 2008. Mr. McGuire was a co-founder and is currently a general partner of Polaris Venture Partners. Prior to starting Polaris Venture Partners in 1996, Mr. McGuire spent seven years at Burr, Egan, Deleage & Co., investing in early stage medical and information technology companies. He serves on the board of directors of Ironwood Pharmaceuticals, Inc., Acceleron Pharma, Inc., and several private companies and has served on the boards of Akamai Technologies, Inc., Aspect Medical Systems, Inc., Cubist Pharmaceuticals, Inc., deCODE genetics, Inc. and various private companies. Mr. McGuire is chairman emeritus of the National Venture Capital Association, chairman of the board of the Thayer School of Engineering at Dartmouth College, and a member of the advisory boards of The David H. Koch Institute for Integrative Cancer Research at the Massachusetts Institute of Technology and The Arthur Rock Center for Entrepreneurship at Harvard Business School. Mr. McGuire earned an M.B.A from Harvard Business School, an M.S. in engineering from The Thayer School at Dartmouth College, and a B.S. in physics and economics from Hobart College. The board of directors believes that Mr. McGuire's extensive scientific and investment experience, including his experience in working with entrepreneurial companies, allows him to make valuable contributions to the board.

***Christopher K. Mirabelli, Ph.D.***

Dr. Mirabelli has served as a member of our board of directors since January 2008. Dr. Mirabelli joined HealthCare Ventures as a managing director in 2000, prior to which he served as President of Pharmaceutical Research and Development at Millennium Pharmaceuticals, Inc. While at HealthCare Ventures, Dr. Mirabelli served as an officer and a director of Critical Therapeutics, Inc. and various private companies. Dr. Mirabelli was chairman of the board and chief executive officer of LeukoSite, Inc., a biotechnology company, from 1993 through 1999. He was also a co-founder of Isis Pharmaceuticals, Inc. and was previously with the research and development division of GSK. He is a member of the board of advisors of the Accelerator Fund at Harvard Medical School and serves on the

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Department of Genetics Advisory Board. Dr. Mirabelli is also a member of the National Sciences Advisory Council of SUNY-Fredonia. Dr. Mirabelli received his Ph.D. in molecular pharmacology from Baylor College of Medicine and a B.S. in biology from SUNY-Fredonia. The board of directors believes that Dr. Mirabelli's extensive scientific and managerial experience allows him to make valuable contributions to the board.

### ***Jake R. Nunn***

Mr. Nunn has served as a member of our board of directors since July 2013. Mr. Nunn has been a Partner at New Enterprise Associates, Inc., a venture capital firm, since 2006. From January 2001 to June 2006, Mr. Nunn served as a Partner and an analyst for the MPM BioEquities Fund, a public life sciences fund at MPM Capital, L.P., a private equity firm. Previously, Mr. Nunn was a healthcare research analyst and portfolio manager at Franklin Templeton Investments and an investment banker with Alex, Brown & Sons. Mr. Nunn is currently on the boards of directors at Hyperion Therapeutics, Inc., Transcept Pharmaceuticals, Inc. and three private companies. Mr. Nunn received an M.B.A. from the Stanford University Graduate School of Business and an A.B. in Economics from Dartmouth College. Mr. Nunn holds the Chartered Financial Analyst designation, and is a member of the CFA Society of San Francisco. The board of directors believes that Mr. Nunn's experience in investing in life sciences, later-stage specialty pharmaceuticals, biotechnology and medical device investments, as well as his business and educational background, allows him to make valuable contributions to the board.

### ***David F. Solomon***

Mr. Solomon has served as a member of our board of directors since May 2013. Since December 31, 2010, Mr. Solomon has been the Senior Vice President, Corporate Development & Strategic Planning at Forest Laboratories, Inc., or Forest Laboratories. Mr. Solomon joined Forest Laboratories in 2001 and has served in a variety of roles there, including Vice President—Business Development and Strategic Planning from December 2007 through December 2010 and Vice President—Business Development from June 2006 through December 2007. Mr. Solomon serves on the board of directors of Lincoln Center Theater and the Municipal Art Society and on the Executive Board of the Yale Drama Alumni Association. Mr. Solomon received his J.D. from Yale Law School and graduated summa cum laude with a B.S. in Biology from Yale College. The board of directors believes that Mr. Solomon's extensive scientific and managerial experience allows him to make valuable contributions to the board.

### **Family Relationships**

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

### **Board Composition**

Our board of directors currently consists of eight members. Each director is currently elected to the board for a one-year term, to serve until the election and qualification of successor directors at the annual meeting of stockholders, or until the director's earlier removal, resignation or death.

Our directors were elected to and currently serve on the board pursuant to a voting agreement among us and several of our largest stockholders. This agreement will terminate upon the completion of this offering, after which there will be no further contractual obligations regarding the election of our directors.

In accordance with our amended and restated certificate of incorporation, which will be in effect upon the closing of this offering, our board of directors will be divided into three classes, each of which will consist, as nearly as possible, of one-third of the total number of directors constituting our entire

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board and which will serve staggered three-year terms. At each annual meeting of stockholders, the successors to directors whose terms then expire will be elected to serve from the time of election and qualification until the third annual meeting following election. Our directors will be divided among the three classes as follows:

- Class I, which will consist of Ms. Champsi, Mr. McGuire and Dr. Mirabelli, and their term will expire at our first annual meeting of stockholders to be held after the completion of this offering;
- Class II, which will consist of Dr. Gowen, Mr. Nunn and Mr. Solomon, and their term will expire at our second annual meeting of stockholders to be held after the completion of this offering; and
- Class III, which will consist of Mr. Moulder and Mr. Dougherty, and their term will expire at our third annual meeting of stockholders to be held after the completion of this offering.

Our amended and restated bylaws, which will become effective upon completion of this offering, will provide that the authorized number of directors may be changed only by resolution approved by a majority of our board of directors. Any additional directorships resulting from an increase in the number of directors will be distributed among the three classes so that, as nearly as possible, each class will consist of one-third of the directors.

The division of our board of directors into three classes with staggered three-year terms may delay or prevent a change of our management or a change in control.

### **Director Independence**

Our board of directors has undertaken a review of the independence of the directors and considered whether any director has a material relationship with us that could compromise his ability to exercise independent judgment in carrying out his or her responsibilities. As a result of this review, our board of directors has determined that Dr. Mirabella, Messrs. Dougherty, McGuire, Nunn, Moulder and Solomon and Ms. Champsi, representing seven of our eight directors, are "independent directors" as defined under applicable stock exchange rules.

### **Committees of the Board of Directors**

Our board of directors has established an audit committee, a compensation committee and a nominating and corporate governance committee, each of which has the composition and responsibilities described below. From time to time, the board may establish other committees to facilitate the management of our business.

#### ***Audit Committee***

Our audit committee consists of three directors, Mr. Dougherty, Ms. Champsi and Mr. Nunn, and our board of directors has determined that each of them is independent within the meaning of the applicable stock exchange listing requirements and the independence requirements contemplated by Rule 10A-3 under the Securities Exchange Act of 1934, as amended, or the Exchange Act. Mr. Nunn is a Partner at New Enterprise Associates, Inc. and Ms. Champsi is a Managing Director of Alta Partners, each of which is affiliated with a stockholder that we expect will beneficially own more than 10% of our common stock following this offering. Therefore, we may not be able to rely upon the safe harbor position of Rule 10A-3 under the Exchange Act, which provides that a person will not be deemed to be an affiliate of a company if he or she is not the beneficial owner, directly or indirectly, of more than 10% equity securities of that company. However, our board of directors has made an affirmative determination that Mr. Nunn and Ms. Champsi are not affiliates of our company. Mr. Dougherty is the chairman of the audit committee and our board of directors has determined that Mr. Dougherty is an

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"audit committee financial expert" as defined by SEC rules and regulations. Our board of directors has determined that the composition of our audit committee meets the criteria for independence under, and the functioning of our audit committee complies with, the applicable requirements of the Sarbanes-Oxley Act, applicable stock exchange listing requirements and SEC rules and regulations. We intend to continue to evaluate the requirements applicable to us and we intend to comply with the future requirements to the extent that they become applicable to our audit committee.

Our audit committee reviews our internal accounting procedures and consults with and reviews the services provided by our independent registered public accountants.

The principal duties and responsibilities of our audit committee include:

- appointing and retaining an independent registered public accounting firm to serve as independent auditor to audit our financial statements, overseeing the independent auditor's work and determining the independent auditor's compensation;
- approving in advance all audit services and non-audit services to be provided to us by our independent auditor;
- establishing procedures for the receipt, retention and treatment of complaints received by us regarding accounting, internal accounting controls, auditing or compliance matters, as well as for the confidential, anonymous submission by our employees of concerns regarding questionable accounting or auditing matters;
- reviewing and discussing with management and our independent auditor the results of the annual audit and the independent auditor's review of our quarterly financial statements; and
- conferring with management and our independent auditor about the scope, adequacy and effectiveness of our internal accounting controls, the objectivity of our financial reporting and our accounting policies and practices.

### ***Compensation Committee***

Our compensation committee reviews and determines the compensation of all our executive officers. Our compensation committee consists of three directors, Mr. Moulder, Dr. Mirabelli and Mr. Solomon, each of whom is a non-employee member of our board of directors as defined in Rule 16b-3 under the Exchange Act. Mr. Moulder is the chairman of the compensation committee. Our board of directors has determined that the composition of our compensation committee satisfies the applicable independence requirements under, and the functioning of our compensation committee complies with the applicable requirements of, stock exchange listing rules and SEC rules and regulations. We intend to continue to evaluate and intend to comply with all future requirements applicable to our compensation committee. The principal duties and responsibilities of our compensation committee include:

- establishing and approving, and making recommendations to the board of directors regarding, performance goals and objectives relevant to the compensation of our chief executive officer, evaluating the performance of our chief executive officer in light of those goals and objectives and setting, or recommending to the full board of directors for approval, the chief executive officer's compensation, including incentive-based and equity-based compensation, based on that evaluation;
- setting the compensation of our other executive officers, based in part on recommendations of the chief executive officer;
- exercising administrative authority under our stock plans and employee benefit plans;

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- establishing policies and making recommendations to our board of directors regarding director compensation;
- reviewing and discussing with management the compensation discussion and analysis that we may be required from time to time to include in SEC filings; and
- preparing a compensation committee report on executive compensation as may be required from time to time to be included in our annual proxy statements or annual reports on Form 10-K filed with the SEC.

### ***Nominating and Corporate Governance Committee***

The nominating and corporate governance committee consists of three directors, Mr. McGuire, Ms. Champsi and Mr. Solomon. Mr. McGuire is the chairman of the nominating and corporate governance committee. Our board of directors has determined that the composition of our nominating and corporate governance committee satisfies the applicable independence requirements under, and the functioning of our nominating and corporate governance committee complies with the applicable requirements of, stock exchange listing standards and SEC rules and regulations. We will continue to evaluate and will comply with all future requirements applicable to our nominating and corporate governance committee. The nominating and corporate governance committee's responsibilities include:

- assessing the need for new directors and identifying individuals qualified to become directors;
- recommending to the board of directors the persons to be nominated for election as directors and to each of the board's committees;
- assessing individual director performance, participation and qualifications;
- developing and recommending to the board corporate governance principles;
- monitoring the effectiveness of the board and the quality of the relationship between management and the board; and
- overseeing an annual evaluation of the board's performance.

### **Code of Business Conduct and Ethics for Employees, Executive Officers and Directors**

We have adopted a Code of Business Conduct and Ethics, or the Code of Conduct, applicable to all of our employees, executive officers and directors. Following the completion of this offering, the Code of Conduct will be available on our website at [www.trevenainc.com](http://www.trevenainc.com). The nominating and corporate governance committee of our board of directors will be responsible for overseeing the Code of Conduct and must approve any waivers of the Code of Conduct for employees, executive officers and directors. We expect that any amendments to the Code of Conduct, or any waivers of its requirements, will be disclosed on our website.

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

None of our directors who currently serve as members of our compensation committee is, or has at any time during the past year been, one of our officers or employees. None of our executive officers currently serves, or in the past year has served, as a member of the board of directors or compensation committee of any other entity that has one or more executive officers serving on our board of directors or compensation committee.



## Non-Employee Director Compensation

We have not historically paid cash retainers or other compensation with respect to service on our board of directors, except for reimbursement of direct expenses incurred in connection with attending meetings of the board or committees.

Dr. Gowen, our President and Chief Executive Officer, is also a director but does not receive any additional compensation for her service as a director. Dr. Gowen's compensation as an executive officer is set forth below under "Executive Compensation—Summary Compensation Table." In February 2012, we granted Mr. Moulder, one of our non-employee directors, an option to purchase 75,000 shares of our common stock at an exercise price of \$0.11 per share. This option will vest in quarterly installments through May 2014, subject to Mr. Moulder's continued service through each applicable vesting date. Other than Mr. Moulder, none of our non-employee directors serving as of December 31, 2012 held any options to purchase our common stock.

The following table sets forth in summary form information concerning the compensation that we paid or awarded during the year ended December 31, 2012 to each of our non-employee directors:

Name <sup>1</sup>	Option Awards	
	(\$) <sup>2</sup>	Total (\$)
Leon O. Moulder, Jr.	6,750 <sup>3</sup>	6,750
Farah Champsi	—	—
Michael R. Dougherty	—	—
Terrence G. McGuire	—	—
Christopher K. Mirabelli, Ph.D.	—	—
Jake R. Nunn	—	—
David F. Solomon	—	—

- <sup>1</sup> Dr. Gowen was an employee director during 2012 and her compensation is fully reflected in the "Summary Compensation Table" below.
- <sup>2</sup> This column reflects the full grant date fair value for options granted during the year as measured pursuant to ASC Topic 718 as stock-based compensation in our consolidated financial statements. Unlike the calculations contained in our financial statements, this calculation does not give effect to any estimate of forfeitures related to service-based vesting, but assumes that the non-employee director will perform the requisite service for the award to vest in full. The assumptions we used in valuing options are described in Note 7 to our financial statements included in this prospectus. These amounts do not reflect the actual economic value that will be realized by the non-employee director upon the vesting of the stock options, the exercise of the stock options, or the sale of the common stock underlying such stock options.
- <sup>3</sup> Represents an option to purchase 75,000 shares granted to Mr. Moulder during 2012 for service on our board of directors. The shares subject to this option vest in quarterly installments through May, 2014, subject to Mr. Moulder's continued service with us, provided that, if during such time there is a covered transaction, the option will vest in full. As of December 31, 2012, an aggregate of 75,000 shares were outstanding under all options to purchase our common stock held by Mr. Moulder.

We expect that our board of directors will adopt a director compensation plan for non-employee directors to be effective following the completion of this offering.

**Director Equity Outstanding at 2012 Year End**

The following table provides information about outstanding stock options held by each of our non-employee directors as of December 31, 2012. All of these options and awards were granted under our 2008 Equity Incentive Plan.

<u>Non-Employee Directors</u>	<u>Option Awards</u>
Leon O. Moulder, Jr.	75,000
Farah Champs	—
Michael R. Dougherty	—
Terrance G. McGuire	—
Christopher K. Mirabelli, Ph.D.	—
Jake R. Nunn	—
David F. Solomon	—

**EXECUTIVE COMPENSATION**

Our named executive officers for the year ended December 31, 2012, which consist of our principal executive officer and our two other most highly compensated executive officers during the year, are:

- Maxine Gowen, Ph.D., our President and Chief Executive Officer;
- Michael W. Lark, Ph.D., our Chief Scientific Officer and Senior Vice President, Research; and
- David Soergel, M.D., our Senior Vice President, Clinical Development.

Roberto Cuca joined our company as Chief Financial Officer in September 2013, and, accordingly, is not included among our named executive officers for 2012.

**2012 Summary Compensation Table**

The following table sets forth information regarding compensation earned during the year ended December 31, 2012 by our named executive officers

<u>Name and Principal Position</u>	<u>Salary (\$)</u>	<u>Bonus (\$)<sup>1</sup></u>	<u>Option Awards (\$)<sup>2</sup></u>	<u>All Other Compensation (\$)<sup>3</sup></u>	<u>Total (\$)</u>
Maxine Gowen, Ph.D. <sup>4</sup> President and Chief Executive Officer	368,756	125,377	—	10,605	504,738
Michael W. Lark, Ph.D. Chief Scientific Officer and Senior Vice President, Research	308,993	78,793	—	10,000	397,786
David Soergel, M.D. Senior Vice President, Clinical Development	253,955	64,759	18,000	10,000	346,714

- 1 Amounts shown in this column reflect the discretionary bonus paid for performance during 2012, as discussed further below under "Annual Bonus."
- 2 This column reflects the full grant date fair value for options granted during the year as measured pursuant to ASC Topic 718 as stock-based compensation in our financial statements. Unlike the calculations contained in our financial statements, this calculation does not give effect to any estimate of forfeitures related to service-based vesting, but assumes that the executive will perform the requisite service for the award to vest in full. The assumptions we used in valuing options are described in note 7 to our audited financial statements included in this prospectus. These amounts do not reflect the actual economic value that will be realized by the named executive officer upon the vesting of the stock options, the exercise of the stock options or the sale of the common stock underlying such stock options.
- 3 Consists of company contributions to the officer's 401(k) plan and one club membership for Dr. Gowen.
- 4 Dr. Gowen is also a member of our board of directors but does not receive any additional compensation in her capacity as a director.

**Narrative to Summary Compensation Table**

We review compensation annually for all employees, including our executives. In setting executive base salaries and bonuses and granting equity incentive awards, we consider compensation for comparable positions in the market, the historical compensation levels of our executives, individual performance as compared to our expectations and objectives, our desire to motivate our employees to achieve short- and long-term results that are in the best interests of our stockholders, and a long-term commitment to our company. We do not target a specific competitive position or a specific mix of compensation among base salary, bonus or long-term incentives.

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Our board of directors has historically determined our executives' compensation. Our compensation committee typically reviews and discusses management's proposed compensation with the chief executive officer for all executives other than the chief executive officer. Based on those discussions and its discretion, the compensation committee then recommends the compensation for each executive officer. Our board of directors, without members of management present, discusses the compensation committee's recommendations and ultimately approves the compensation of our executive officers. To date, our compensation committee has not engaged a compensation consultant or adopted a peer group of companies for purposes of determining executive compensation.

**Annual Base Salary**

The following table presents the base salaries for each of our named executive officers for the years 2012 and 2013, and the base salaries that will be in effect as of the effective date of the completion of this offering. The 2012 base salaries became effective on March 1, 2012, and the 2013 base salaries became effective on March 1, 2013.

<u>Name</u>	<u>2012 Base Salary (\$)</u>	<u>2013 Base Salary (\$)</u>	<u>Completion of Offering (\$)</u>
Maxine Gowen, Ph.D.	371,135	382,269	425,000
Michael Lark, Ph.D.	311,227	320,564	325,000
David Soergel, M.D.	265,462	273,426	310,000

**Annual Bonus**

Our discretionary bonus plan motivates and rewards our executives for achievements relative to our goals and expectations for each fiscal year. Each named executive officer has a target bonus opportunity, defined as a percentage of his or her annual salary. Following the end of each year, our board of directors determines the bonuses. Material considerations in determining bonuses include our financial performance relative to our plan and achievement of corporate objectives for the year; the executive's handling of unplanned events and opportunities; and the chief executive officer's input with respect to the performance of the company and of our executives. Based on these factors and in the sole discretion of our board of directors, we approved the following bonuses that were paid in 2013 for our named executive officers for 2012.

<u>Name</u>	<u>Target Bonus (% of salary)</u>	<u>Actual Bonus (\$)</u>	<u>Actual Bonus (% of salary)</u>
Maxine Gowen, Ph.D.	40	125,377	34.0
Michael Lark, Ph.D.	30	78,793	25.5
David Soergel, M.D.	30	64,759	25.5

Specific achievements and performance considered by our board of directors in determining bonuses for 2012 included:

- the completion of a Phase 1b and Phase 2a trial for TRV027;
- the completion of a Phase 1 trial for TRV130;
- identification of TRV734 as a product candidate for the oral treatment of moderate to severe acute and chronic pain; and
- closing a Series C financing round in 2012.

To reinforce the importance of integrated and collaborative leadership, the bonuses for our executives at the senior vice president level and above were restructured in 2012 to be solely based on company performance. We did not include an individual performance component for bonuses earned in 2012.

### Long-Term Incentives

Our 2008 Equity Incentive Plan authorizes us to make grants to eligible recipients of non-qualified stock options, incentive stock options, restricted stock awards, restricted stock units and stock appreciation rights. While we have made restricted stock awards to our executive officers in the past, our equity grants during 2012 to our executive officers were only in the form of stock options.

We typically grant equity incentive awards at the start of employment to each executive and our other employees. Through 2012, we have not maintained a practice of granting additional equity on an annual basis, but we have retained discretion to provide additional targeted grants in certain circumstances and in association with promotions.

We award our equity grants on the date our board of directors approves the grant. We set the option exercise price and grant date fair value based on our per-share valuation on the date of grant. For grants in connection with initial employment, vesting begins on the initial date of employment. Options have a term of 10 years from the grant date. Option grants to our executives typically vest over four years.

In October 2012, we awarded a time-vested stock option to Dr. Soergel in connection with his promotion to Senior Vice President. This was the only option or stock award granted to any of our named executive officers in 2012. In June 2013, we approved stock options to Drs. Gowen, Lark and Soergel following the execution of our Series C financing. The number of shares subject to these stock options was established by our board of directors. The option granted to Dr. Soergel in 2012 and all of the options granted to the executives in 2013 other than Mr. Cuca are subject to a vesting schedule with 1/16 of the shares vesting per quarter over the four year period following the vesting commencement date.

The stock options we granted to our named executive officers, as well as to Mr. Cuca, who became an executive officer in 2013, are summarized in the following table

<u>Name</u>	<u>Date of Grant</u>	<u>Number of Shares</u>	<u>Price per Share</u>
Maxine Gowen, Ph.D.	June 17, 2013	2,368,957	\$ 0.36
	September 26, 2013	650,000	1.20
Michael Lark, Ph.D.	June 17, 2013	765,776	0.36
David Soergel, M.D.	June 17, 2013	611,692	0.36
Roberto Cuca	September 3, 2013	1,224,188	1.20

### Agreements with our Named Executive Officers

Below are summaries of our employment agreements with our named executive officers.

*Agreement with Dr. Gowen.* We entered into an employment agreement with Dr. Gowen in January 2008, which governs the terms of her employment with us. Pursuant to the agreement, Dr. Gowen was entitled to an initial annual base salary of \$325,000 (subject to review and adjustment) and is eligible to receive an annual target bonus of up to 40% of her current base salary, as determined by our board of directors. Dr. Gowen is additionally entitled to severance benefits pursuant to her agreement, the terms of which are described below under "—Potential Payments Upon Termination of Employment or in Connection with Change of Control."

*Agreement with Dr. Lark.* We entered into an employment agreement with Dr. Lark in February 2008, which governs the terms of his employment with us. Pursuant to the agreement, Dr. Lark was entitled to an initial annual base salary of \$260,000 (subject to review and adjustment) and is eligible to receive an annual target bonus of up to 30% of his current base salary, as determined by our board of directors. Dr. Lark is additionally entitled to severance benefits pursuant to his agreement, the terms of which are described below under "—Potential Payments Upon Termination of Employment or in Connection with Change of Control."

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*Offer Letter for Dr. Soergel.* We provided an employment offer letter to Dr. Soergel in November 2009, which governs the terms of his employment with us. Pursuant to the letter, Dr. Soergel was entitled to an initial annual base salary of \$230,000 and was eligible to receive an annual target bonus of up to 25% of his base salary, as determined by our board of directors. Dr. Soergel's annual target bonus was increased to 30% in connection with his promotion to Senior Vice President in 2012. Dr. Soergel is not entitled to severance benefits or change in control payments pursuant to the terms of the letter.

**Outstanding Equity Awards at Fiscal Year-End 2012**

The following table provides information about outstanding stock options held by each of our named executive officers at December 31, 2012. All of these options were granted under our 2008 Equity Incentive Plan. None of our named executive officers held restricted stock or other stock awards at the end of 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>
Maxine Gowen, Ph.D.	843,750	587,250 <sup>1</sup>	0.11	9/10/2020
	14,896	10,367 <sup>1</sup>	0.11	6/23/2021
Michael W. Lark, Ph.D.	253,125	176,175 <sup>1</sup>	0.11	9/10/2020
	4,469	3,110 <sup>1</sup>	0.11	6/23/2021
David Soergel, M.D.	135,000	45,000 <sup>2</sup>	0.01	11/30/2019
	135,000	93,960 <sup>1</sup>	0.11	9/10/2020
	2,086	1,451 <sup>1</sup>	0.11	6/23/2021
	12,500	187,500 <sup>3</sup>	0.11	10/17/2022

<sup>1</sup> The unvested shares under these options are scheduled to vest in approximately equal quarterly installments, through July 8, 2014.

<sup>2</sup> The unvested shares under this option are scheduled to vest in approximately equal quarterly installments, through November 23, 2013.

<sup>3</sup> The unvested shares under this option are scheduled to vest in approximately equal quarterly installments, through September 1, 2016.

**Option Repricings**

We did not engage in any repricings or other modifications or cancellations to any of our named executive officers' outstanding equity awards during the year ended December 31, 2012.

**Perquisites, Health, Welfare and Retirement Benefits**

All of our executives are eligible to participate in our employee benefit plans, including our medical, dental, vision, life insurance, flexible spending account, disability and accidental death and dismemberment insurance plans, in each case on the same basis as all of our other employees. We provide a 401(k) plan to our employees, including our named executive officers, as discussed in the section below entitled "401(k) Plan."

Dr. Gowen is entitled to reimbursement from us for the cost of a club membership. We do not provide any other perquisites or personal benefits to our named executive officers. We do, however, pay the premiums for disability insurance for all of our employees, including our executives. None of our named executive officers participate in or have account balances in qualified or non-qualified defined benefit plans sponsored by us. Our board of directors may elect to adopt qualified or non-qualified benefit plans in the future if it determines that doing so is in our best interests.

#### **401(k) Plan**

We maintain a defined contribution employee retirement plan, or 401(k) plan, for our employees. Our named executive officers are eligible to participate in the 401(k) plan on the same basis as our other employees. The plan provides that each participant may defer eligible compensation subject to the statutory limit, which is \$17,500 for calendar year 2013. Participants that are 50 years or older can also make "catch-up" contributions, which in calendar year 2013 may be up to an additional \$5,500 above the statutory limit. Currently, we match 100% of each eligible employee's contributions up to 3% of salary, and then 50% of each eligible employee's contributions between 3% and 5% of salary. Employees' pre-tax contributions are allocated to each participant's individual account and are then invested in selected investment alternatives according to the participants' directions. Employees are immediately and fully vested in both their contributions and our matching contributions. The 401(k) plan is intended to be qualified under Section 401(a) of the Code with the 401(k) plan's related trust intended to be tax exempt under Section 501(a) of the Code. As a tax-qualified retirement plan, contributions to the 401(k) plan and earnings on those contributions are not taxable to the employees until distributed from the 401(k) plan.

#### **Nonqualified Deferred Compensation**

Our named executive officers did not earn any nonqualified deferred compensation benefits from us during 2012.

#### **Potential Payments upon Termination of Employment or in Connection with Change of Control**

We believe that reasonable severance benefits for our named executive officers are important because it may be difficult for them to find comparable employment within a short period of time. We also believe that it is important to protect our named executive officers in the event of a change of control transaction involving our company, as a result of which such officers might have their employment terminated. In addition, we believe that the interests of management should be aligned with those of our stockholders as much as possible, and we believe that providing protection upon a change of control is an appropriate counter to any disincentive such officers might otherwise perceive in regard to transactions that may be in the best interest of our stockholders.

As a result of these considerations, we have entered into employment agreements with Dr. Gowen and Dr. Lark that provide for specified benefits to be paid if the executives are terminated under specified conditions or in connection with a change in control of our company. Summaries of these benefits are set forth below.

Under the employment agreements between us and Dr. Gowen, and between us and Dr. Lark, if the executive is terminated by us other than for cause or resigns for good reason, in each case as defined in the agreement, he or she will receive (i) continuing payments of severance pay in the amount of twelve months of his or her then-current base salary, and (ii) his or her prior-year bonus compensation, pro-rated for the period between the beginning of the calendar year and the date of termination, to be paid on or before January 30 of the calendar year following termination. If the executive is terminated by us other than for cause or resigns for good reason within twelve months following a change of control (or also, for Dr. Gowen, is terminated by us other than for cause in the 30 days prior to a change of control or during a period between our execution of a letter of intent for a change of control and the consummation of that change of control), in each case as defined in the agreement, he or she will receive similar compensation.

Receipt of the benefits described above upon the officer's termination of employment is contingent upon his or her signing of a release of claims against us.

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Dr. Soergel is not entitled to any severance payments or benefits upon termination of his employment with us, whether or not in connection with a change in control of our company.

**Equity Incentive Plans**

***2013 Equity Incentive Plan***

We expect that our board of directors will adopt, and our stockholders will approve, prior to the completion of this offering, our 2013 Equity Incentive Plan, or our 2013 plan. The 2013 plan is expected to become effective upon the execution and delivery of the underwriting agreement for this offering. Once the 2013 plan is effective, no further grants will be made under the 2008 Equity Incentive Plan, or 2008 plan.

*Stock Awards*

The 2013 plan provides for the grant of incentive stock options, or ISOs, nonstatutory stock options, or NSOs, stock appreciation rights, restricted stock awards, restricted stock unit awards, performance-based stock awards and other forms of equity compensation (collectively, stock awards), all of which may be granted to employees, including officers, non-employee directors and consultants of us and our affiliates. Additionally, the 2013 plan provides for the grant of performance cash awards. ISOs may be granted only to employees. All other awards may be granted to employees, including officers, and to non-employee directors and consultants.

*Share Reserve*

Initially, the aggregate number of shares of our common stock that may be issued pursuant to stock awards under the 2013 plan after the 2013 plan becomes effective is the sum of (i) \_\_\_\_\_ shares, plus (ii) the number of shares reserved for issuance under our 2008 plan at the time our 2013 plan becomes effective, plus (iii) any shares subject to stock options or other stock awards granted under our 2008 plan that would have otherwise returned to our 2008 plan (such as upon the expiration or termination of a stock award prior to vesting). Additionally, the number of shares of our common stock reserved for issuance under our 2013 plan will automatically increase on January 1 of each year, beginning on January 1, 2015 and continuing through and including January 1, 2023, by \_\_\_\_\_ % of the total number of shares of our capital stock outstanding on December 31 of the preceding calendar year, or a lesser number of shares determined by our board of directors. The maximum number of shares that may be issued upon the exercise of ISOs under our 2013 plan is \_\_\_\_\_ shares.

No person may be granted stock awards covering more than \_\_\_\_\_ shares of our common stock under our 2013 plan during any calendar year pursuant to stock options, stock appreciation rights and other stock awards whose value is determined by reference to an increase over an exercise or strike price of at least 100% of the fair market value on the date the stock award is granted. Additionally, no person may be granted in a calendar year a performance stock award covering more than \_\_\_\_\_ shares or a performance cash award having a maximum value in excess of \$ \_\_\_\_\_. Such limitations are designed to help assure that any deductions to which we would otherwise be entitled with respect to such awards will not be subject to the \$1,000,000 limitation on the income tax deductibility of compensation paid to any covered executive officer imposed by Section 162(m) of the Code.

If a stock award granted under the 2013 plan expires or otherwise terminates without being exercised in full, or is settled in cash, the shares of our common stock not acquired pursuant to the stock award again will become available for subsequent issuance under the 2013 plan. In addition, the following types of shares under the 2013 plan may become available for the grant of new stock awards under the 2013 plan: (1) shares that are forfeited to or repurchased by us prior to becoming fully vested; (2) shares withheld to satisfy income or employment withholding taxes; or (3) shares used to pay the exercise or purchase price of a stock award. Shares issued under the 2013 plan may be



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previously unissued shares or reacquired shares bought by us on the open market. As of the date hereof, no awards have been granted and no shares of our common stock have been issued under the 2013 plan.

### *Administration*

Our board of directors, or a duly authorized committee thereof, has the authority to administer the 2013 plan. Our board of directors may also delegate to one or more of our officers the authority to (1) designate employees, other than other executives, to be recipients of certain stock awards, and (2) determine the number of shares of common stock to be subject to such stock awards. Subject to the terms of the 2013 plan, our board of directors or the authorized committee, referred to herein as the plan administrator, determines recipients, dates of grant, the numbers and types of stock awards to be granted and the terms and conditions of the stock awards, including the period of their exercisability and vesting schedule applicable to a stock award. Subject to the limitations set forth below, the plan administrator will also determine the exercise price, strike price or purchase price of awards granted and the types of consideration to be paid for the award.

The plan administrator has the authority to modify outstanding awards under our 2013 plan. Subject to the terms of our 2013 plan, the plan administrator has the authority to reduce the exercise, purchase or strike price of any outstanding stock award, cancel any outstanding stock award in exchange for new stock awards, cash or other consideration, or take any other action that is treated as a repricing under generally accepted accounting principles, with the consent of any adversely affected participant.

### *Stock Options*

Incentive and nonstatutory stock options are granted pursuant to stock option agreements adopted by the plan administrator. The plan administrator determines the exercise price for a stock option, within the terms and conditions of the 2013 plan, provided that the exercise price of a stock option generally cannot be less than 100% of the fair market value of our common stock on the date of grant. Options granted under the 2013 plan vest at the rate specified by the plan administrator.

The plan administrator determines the term of stock options granted under the 2013 plan, up to a maximum of 10 years. Unless the terms of an option holder's stock option agreement provide otherwise, if an option holder's service relationship with us, or any of our affiliates, ceases for any reason other than disability, death or cause, the option holder may generally exercise any vested options for a period of three months following the cessation of service. The option term may be extended in the event that exercise of the option following such a termination of service is prohibited by applicable securities laws or our insider trading policy. If an optionholder's service relationship with us or any of our affiliates ceases due to disability or death, or an optionholder dies within a certain period following cessation of service, the optionholder or a beneficiary may generally exercise any vested options for a period of 12 months in the event of disability and 18 months in the event of death. In the event of a termination for cause, options generally terminate immediately upon the termination of the individual for cause. In no event may an option be exercised beyond the expiration of its term.

Acceptable consideration for the purchase of common stock issued upon the exercise of a stock option will be determined by the plan administrator and may include (1) cash, check, bank draft or money order, (2) a broker-assisted cashless exercise, (3) the tender of shares of our common stock previously owned by the optionholder, (4) a net exercise of the option if it is an NSO, and (5) other legal consideration approved by the plan administrator.

Unless the plan administrator provides otherwise, options generally are not transferable except by will, the laws of descent and distribution, or pursuant to a domestic relations order. An optionholder may designate a beneficiary, however, who may exercise the option following the optionholder's death.

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*Tax Limitations on Incentive Stock Options*

The aggregate fair market value, determined at the time of grant, of our common stock with respect to ISOs that are exercisable for the first time by an optionholder during any calendar year under all of our stock plans may not exceed \$100,000. Options or portions thereof that exceed such limit will generally be treated as NSOs. No ISO may be granted to any person who, at the time of the grant, owns or is deemed to own stock possessing more than 10% of our total combined voting power or that of any of our affiliates unless (1) the option exercise price is at least 110% of the fair market value of the stock subject to the option on the date of grant, and (2) the term of the ISO does not exceed five years from the date of grant.

*Restricted Stock Awards*

Restricted stock awards are granted pursuant to restricted stock award agreements adopted by the plan administrator. Restricted stock awards may be granted in consideration for (1) cash, check, bank draft or money order, (2) services rendered to us or our affiliates, or (3) any other form of legal consideration. Common stock acquired under a restricted stock award may, but need not, be subject to a share repurchase option in our favor in accordance with a vesting schedule to be determined by the plan administrator. Rights to acquire shares under a restricted stock award may be transferred only upon such terms and conditions as set by the plan administrator. Except as otherwise provided in the applicable award agreement, restricted stock unit awards that have not vested will be forfeited upon the participant's cessation of continuous service for any reason.

*Restricted Stock Unit Awards*

Restricted stock unit awards are granted pursuant to restricted stock unit award agreements adopted by the plan administrator. Restricted stock unit awards may be granted in consideration for any form of legal consideration. A restricted stock unit award may be settled by cash, delivery of stock, a combination of cash and stock as deemed appropriate by the plan administrator, or in any other form of consideration set forth in the restricted stock unit award agreement. Additionally, dividend equivalents may be credited in respect of shares covered by a restricted stock unit award. Except as otherwise provided in the applicable award agreement, restricted stock units that have not vested will be forfeited upon the participant's cessation of continuous service for any reason.

*Stock Appreciation Rights*

Stock appreciation rights are granted pursuant to stock appreciation grant agreements adopted by the plan administrator. The plan administrator determines the strike price for a stock appreciation right, which generally cannot be less than 100% of the fair market value of our common stock on the date of grant. Upon the exercise of a stock appreciation right, we will pay the participant an amount equal to the product of (1) the excess of the per share fair market value of our common stock on the date of exercise over the strike price, multiplied by (2) the number of shares of common stock with respect to which the stock appreciation right is exercised. A stock appreciation right granted under the 2013 plan vests at the rate specified in the stock appreciation right agreement as determined by the plan administrator.

The plan administrator determines the term of stock appreciation rights granted under the 2013 plan, up to a maximum of ten years. Unless the terms of a participant's stock appreciation right agreement provides otherwise, if a participant's service relationship with us or any of our affiliates ceases for any reason other than cause, disability or death, the participant may generally exercise any vested stock appreciation right for a period of three months following the cessation of service. The stock appreciation right term may be further extended in the event that exercise of the stock appreciation right following such a termination of service is prohibited by applicable securities laws. If a

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participant's service relationship with us, or any of our affiliates, ceases due to disability or death, or a participant dies within a certain period following cessation of service, the participant or a beneficiary may generally exercise any vested stock appreciation right for a period of 12 months in the event of disability and 18 months in the event of death. In the event of a termination for cause, stock appreciation rights generally terminate immediately upon the occurrence of the event giving rise to the termination of the individual for cause. In no event may a stock appreciation right be exercised beyond the expiration of its term.

### *Performance Awards*

The 2013 plan permits the grant of performance-based stock and cash awards that may qualify as performance-based compensation that is not subject to the \$1,000,000 limitation on the income tax deductibility of compensation paid to a covered executive officer imposed by Section 162(m) of the Code. To help assure that the compensation attributable to performance-based awards will so qualify, our compensation committee can structure such awards so that stock or cash will be issued or paid pursuant to such award only after the achievement of certain pre-established performance goals during a designated performance period.

The performance goals that may be selected include one or more of the following: (1) earnings (including earnings per share and net earnings); (2) earnings before interest, taxes and depreciation; (3) earnings before interest, taxes, depreciation and amortization; (4) total stockholder return; (5) return on equity or average stockholder's equity; (6) return on assets, investment, or capital employed; (7) stock price; (8) margin (including gross margin); (9) income (before or after taxes); (10) operating income; (11) operating income after taxes; (12) pre-tax profit; (13) operating cash flow; (14) sales or revenue targets; (15) increases in revenue or product revenue; (16) expenses and cost reduction goals; (17) improvement in or attainment of working capital levels; (18) economic value added (or an equivalent metric); (19) market share; (20) cash flow; (21) cash flow per share; (22) share price performance; (23) debt reduction; (24) implementation or completion of projects or processes; (25) customer satisfaction; (26) stockholders' equity; (27) capital expenditures; (28) debt levels; (29) operating profit or net operating profit; (30) workforce diversity; (31) growth of net income or operating income; (32) billings; and (33) to the extent that an award is not intended to comply with Section 162(m) of the Code, other measures of performance selected by our board of directors.

The performance goals may be based on a company-wide basis, with respect to one or more business units, divisions, affiliates or business segments, and in either absolute terms or relative to the performance of one or more comparable companies or the performance of one or more relevant indices. Unless specified otherwise (i) in the award agreement at the time the award is granted or (ii) in such other document setting forth the performance goals at the time the goals are established, we will appropriately make adjustments in the method of calculating the attainment of performance goals as follows: (1) to exclude restructuring and/or other nonrecurring charges; (2) to exclude exchange rate effects, as applicable, for non-U.S. dollar denominated goals; (3) to exclude the effects of changes to generally accepted accounting principles; (4) to exclude the effects of any statutory adjustments to corporate tax rates; (5) to exclude the effects of any "extraordinary items" as determined under generally accepted accounting principles. In addition, we retain the discretion to reduce or eliminate the compensation or economic benefit due upon attainment of the goals. The performance goals may differ from participant to participant and from award to award.

### *Other Stock Awards*

The plan administrator may grant other awards based in whole or in part by reference to our common stock. The plan administrator will set the number of shares under the stock award and all other terms and conditions of such awards.

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*Changes to Capital Structure*

In the event that there is a specified type of change in our capital structure, such as a stock split or recapitalization, appropriate adjustments will be made to (a) the class and maximum number of shares reserved for issuance under the 2013 plan, (b) the class and maximum number of shares by which the share reserve may increase automatically each year, (c) the class and maximum number of shares that may be issued upon the exercise of ISOs, (d) the class and maximum number of shares subject to stock awards that can be granted in a calendar year (as established under the 2013 plan pursuant to Section 162(m) of the Code) and (e) the class and number of shares and exercise price, strike price, or purchase price, if applicable, of all outstanding stock awards.

*Corporate Transactions*

In the event of certain specified significant corporate transactions, the plan administrator has the discretion to take any of the following actions with respect to stock awards:

- arrange for the assumption, continuation or substitution of a stock award by a surviving or acquiring entity or parent company;
- arrange for the assignment of any reacquisition or repurchase rights held by us to the surviving or acquiring entity or parent company;
- accelerate the vesting of the stock award and provide for its termination prior to the effective time of the corporate transaction;
- arrange for the lapse of any reacquisition or repurchase right held by us;
- cancel or arrange for the cancellation of the stock award in exchange for such cash consideration, if any, as our board of directors may deem appropriate; or
- make a payment equal to the excess of (a) the value of the property the participant would have received upon exercise of the stock award over (b) the exercise price otherwise payable in connection with the stock award.

Our plan administrator is not obligated to treat all stock awards, even those that are of the same type, in the same manner.

Under the 2013 plan, a corporate transaction is generally the consummation of (i) a sale or other disposition of all or substantially all of our consolidated assets, (ii) a sale or other disposition of at least 90% of our outstanding securities, (iii) a merger, consolidation or similar transaction following which we are not the surviving corporation, or (iv) a merger, consolidation or similar transaction following which we are the surviving corporation but the shares of our common stock outstanding immediately prior to such transaction are converted or exchanged into other property by virtue of the transaction.

*Change of Control*

The plan administrator may provide, in an individual award agreement or in any other written agreement between a participant and us that the stock award will be subject to additional acceleration of vesting and exercisability in the event of a change of control. Under the 2013 plan, a change of control is generally (i) the acquisition by a person or entity of more than 50% of our combined voting power other than by merger, consolidation or similar transaction; (ii) a consummated merger, consolidation or similar transaction immediately after which our stockholders cease to own more than 50% of the combined voting power of the surviving entity; or (iii) a consummated sale, lease or exclusive license or other disposition of all or substantially all of our consolidated assets.

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*Amendment and Termination*

Our board of directors has the authority to amend, suspend or terminate our 2013 plan, provided that such action does not materially impair the existing rights of any participant without such participant's written consent. No ISOs may be granted after the tenth anniversary of the date our board of directors adopted our 2013 plan.

**2008 Equity Incentive Plan**

Our board of directors adopted, and our stockholders approved, the 2008 Equity Incentive Plan, or the 2008 plan, in January 2008. Our 2008 plan was most recently amended by our board of directors and our stockholders in June 2013. The 2008 plan provides for the grant of ISO, NSOs, restricted stock awards, restricted stock unit awards and stock appreciation rights (collectively, stock awards), all of which may be granted to employees, including officers, non-employee directors and consultants of us and our affiliates. ISOs may be granted only to employees.

*Authorized Shares*

There are 20,528,141 shares of our common stock reserved for issuance under our 2008 plan. As of September 30, 2013, 1,175,316 shares of our common stock have been issued upon the exercise of options granted under our 2008 plan, options to purchase 17,386,829 shares of our common stock were outstanding at a weighted average exercise price of \$0.36 per share, and 1,104,183 shares remained available for future grant under our 2008 plan. Effective upon the completion of this offering, no further options or stock awards may be granted under our 2008 plan, but all outstanding stock awards will continue to be governed by their existing terms.

*Administration*

Our board of directors, or a committee thereof appointed by our board of directors, administers our 2008 plan and the option and stock awards granted under it. Our board of directors delegated its authority to administer our 2008 plan to our compensation committee.

*Changes to Capital Structure*

In the event that there is a specified type of change in our capital structure, such as a stock split or recapitalization, appropriate adjustments will be made to (a) the class and maximum number of shares reserved for issuance under the 2008 plan, (b) the class and maximum number of shares that may be issued upon the exercise of ISOs, and (c) the class and number of shares and exercise price, strike price or purchase price, if applicable, of all outstanding stock awards.

*Corporate Transactions*

In the event of certain specified significant corporate transactions, outstanding stock awards shall be assumed, continued or substituted for similar stock awards by the surviving or acquiring corporation. If any surviving or acquiring corporation fails to assume, continue or substitute such stock awards, stock awards held by participants whose continuous service has not terminated will accelerate vesting in full prior to the corporate transaction. All stock awards not assumed, continued or substituted for by the acquiring or surviving corporation in a corporate transaction will terminate at or prior to the corporate transaction. In addition, in the event a stock award will terminate if not exercised before a corporate transaction, our board of directors may, in its sole discretion, provide that the holder of the stock award may not exercise the stock award but will receive a payment equal to the excess, if any, of (i) the value of our common stock the holder would have received upon exercise of the stock awards, over (ii) any exercise price payable by the holder in connection with the exercise.

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Under the 2008 plan, a corporate transaction is generally the consummation of (i) a sale or other disposition of all or substantially all of our consolidated assets, (ii) a sale or other disposition of at least 90% of our outstanding securities, (iii) a merger, consolidation or similar transaction following which we are not the surviving corporation, or (iv) a merger, consolidation or similar transaction following which we are the surviving corporation but the shares of our common stock outstanding immediately prior to such transaction are converted or exchanged into other property by virtue of the transaction.

### *Change of Control*

The plan administrator may provide, in an individual award agreement or in any other written agreement between a participant and us that the stock award will be subject to additional acceleration of vesting and exercisability in the event of a change of control. Under the 2008 plan, a change of control is generally (i) the acquisition by a person or entity of more than 50% of our combined voting power other than by merger, consolidation or similar transaction; (ii) a consummated merger, consolidation or similar transaction immediately after which our stockholders cease to own more than 50% of the combined voting power of the surviving entity; or (iii) a consummated sale, lease or exclusive license or other disposition of all or substantially of our consolidated assets.

### **2013 Employee Stock Purchase Plan**

We expect that our board of directors will adopt, and our stockholders will approve, prior to the completion of this offering, our 2013 Employee Stock Purchase Plan, or our 2013 ESPP. We do not expect to grant purchase rights under our 2013 ESPP until after the closing of this offering.

The maximum number of shares of our common stock that may be issued under our 2013 ESPP is \_\_\_\_\_ shares. Shares subject to purchase rights granted under our 2013 ESPP that terminate without having been exercised in full will not reduce the number of shares available for issuance under our 2013 ESPP.

Our board of directors, or a duly authorized committee thereof, will administer our 2013 ESPP. Our board of directors expects to delegate its authority to administer our 2013 ESPP to our compensation committee under the terms of the compensation committee's charter.

Employees, including executive officers, of ours or any of our designated affiliates may have to satisfy one or more of the following service requirements before participating in our 2013 ESPP, as determined by the administrator: (i) customary employment with us or one of our affiliates for more than 20 hours per week and more than five months per calendar year, or (ii) continuous employment with us or one of our affiliates for a minimum period of time, not to exceed two years, prior to the first date of an offering. An employee may not be granted rights to purchase stock under our 2013 ESPP if such employee (i) immediately after the grant would own stock possessing 5% or more of the total combined voting power or value of all classes of our common stock, or (ii) holds rights to purchase stock under our 2013 ESPP that would accrue at a rate that exceeds \$25,000 worth of our stock for each calendar year that the rights remain outstanding.

Our 2013 ESPP is intended to qualify as an employee stock purchase plan under Section 423 of the Code. The administrator may specify offerings with a duration of not more than 27 months, and may specify one or more shorter purchase periods within each offering. Each offering will have one or more purchase dates on which shares of our common stock will be purchased for the employees who are participating in the offering. The administrator, in its discretion, will determine the terms of offerings under our 2013 ESPP.

Our 2013 ESPP permits participants to purchase shares of our common stock through payroll deductions up to 15% of their earnings. Unless otherwise determined by the administrator, the purchase price of the shares will be 85% of the lower of the fair market value of our common stock on

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the first day of an offering or on the date of purchase. Participants may end their participation at any time during an offering and will be paid their accrued contributions that have not yet been used to purchase shares. Participation ends automatically upon termination of employment with us.

A participant may not transfer purchase rights under our 2013 ESPP other than by will, the laws of descent and distribution or as otherwise provided under our 2013 ESPP.

In the event of a specified corporate transaction, such as a merger or change in control of our company, a successor corporation may assume, continue or substitute each outstanding purchase right. If the successor corporation does not assume, continue or substitute for the outstanding purchase rights, the offering in progress will be shortened and a new exercise date will be set. The participants' purchase rights will be exercised on the new exercise date and such purchase rights will terminate immediately thereafter.

Our board of directors has the authority to amend, suspend or terminate our 2013 ESPP, at any time and for any reason. Our 2013 ESPP will remain in effect until terminated by our board of directors in accordance with the terms of the 2013 ESPP.

**Limitations on Liability and Indemnification Matters**

Upon completion of this offering, our amended and restated certificate of incorporation will contain provisions that limit the liability of our current and former directors for monetary damages to the fullest extent permitted by Delaware law. Delaware law provides that directors of a corporation will not be personally liable for monetary damages for any breach of fiduciary duties as directors, except liability for:

- any breach of the director's duty of loyalty to the corporation or its stockholders;
- any act or omission not in good faith or that involves intentional misconduct or a knowing violation of law;
- unlawful payments of dividends or unlawful stock repurchases or redemptions as provided in Section 174 of the Delaware General Corporation Law; or
- any transaction from which the director derived an improper personal benefit.

This limitation of liability does not apply to liabilities arising under federal securities laws and does not affect the availability of equitable remedies such as injunctive relief or rescission.

Our amended and restated certificate of incorporation and our amended and restated bylaws will provide that we are required to indemnify our directors to the fullest extent permitted by Delaware law. Our amended and restated bylaws will also provide that, upon satisfaction of certain conditions, we are required to advance expenses incurred by a director in advance of the final disposition of any action or proceeding, and permit us to secure insurance on behalf of any officer, director, employee or other agent for any liability arising out of his or her actions in that capacity regardless of whether we would otherwise be permitted to indemnify him or her under the provisions of Delaware law. Our amended and restated bylaws will also provide our board of directors with discretion to indemnify our officers and employees when determined appropriate by the board. We have entered and expect to continue to enter into agreements to indemnify our directors as determined by the board of directors. With certain exceptions, these agreements provide for indemnification for related expenses including, among other things, attorneys' fees, judgments, fines and settlement amounts incurred by any of these individuals in any action or proceeding. We believe that these bylaw provisions and indemnification agreements are necessary to attract and retain qualified persons as directors. We also maintain customary directors' and officers' liability insurance.

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The limitation of liability and indemnification provisions in our amended and restated certificate of incorporation and amended and restated bylaws may discourage stockholders from bringing a lawsuit against our directors for breach of their fiduciary duty. They may also reduce the likelihood of derivative litigation against our directors and officers, even though an action, if successful, might benefit us and other stockholders. Further, a stockholder's investment may be adversely affected to the extent that we pay the costs of settlement and damage awards against directors and officers as required by these indemnification provisions. At present, there is no pending litigation or proceeding involving any of our directors, officers or employees for which indemnification is sought and we are not aware of any threatened litigation that may result in claims for indemnification.

**Rule 10b5-1 Sales Plans**

Our directors and executive officers may adopt written plans, known as Rule 10b5-1 plans, in which they will contract with a broker to buy or sell shares of our common stock on a periodic basis. Under a Rule 10b5-1 plan, a broker executes trades pursuant to parameters established by the director or officer when entering into the plan, without further direction from them. The director or officer may amend a Rule 10b5-1 plan in some circumstances and may terminate a plan at any time. Our directors and executive officers also may buy or sell additional shares outside of a Rule 10b5-1 plan when they are not in possession of material nonpublic information subject to compliance with the terms of our insider trading policy. Prior to 180 days after the date of this offering, subject to early termination, the sale of any shares under such plan would be subject to the lock-up agreement that the director or officer has entered into with the underwriters.



## CERTAIN RELATIONSHIPS AND RELATED PARTY TRANSACTIONS

The following includes a summary of transactions since January 1, 2010 to which we have been a participant in which the amount involved exceeded or will exceed \$120,000, and in which any of our directors, executive officers or holders of more than 5% of our capital stock, or any members of their immediate family, had or will have a direct or indirect material interest, other than compensation arrangements which are described under "Management—Executive Compensation" and "Management—Director Compensation." For a description of severance and change of control arrangements that we have entered into with some of our executive officers, see the section of this prospectus entitled "Management—Executive Compensation—Potential Payments upon Termination of Employment and in Connection with Change of Control Arrangements."

### Preferred Stock Financings

#### *Series B Financing*

In July 2010, July 2011 and December 2011, we issued and sold to investors an aggregate of 30,800,000 shares of Series B preferred stock, at a purchase price of \$1.00 per share, for aggregate consideration of \$30.8 million. Each share of Series B preferred stock is convertible into one share of common stock.

The participants in this preferred stock financing included the following holders of more than 5% of our capital stock or entities affiliated with them. The following table presents the number of shares issued to these related parties in this financing:

<u>Participants<sup>1</sup></u>	<u>Shares of Series B Preferred Stock</u>
Alta Partners VIII, L.P.	8,400,000
HealthCare Ventures VIII, L.P.	4,200,000
New Enterprise Associates 12, Limited Partnership	8,400,000
Polaris Venture Partners V, L.P. and its affiliated entities <sup>2</sup>	8,400,000

<sup>1</sup> Additional details regarding these stockholders and their equity holdings is provided in "Principal Stockholders."

<sup>2</sup> Includes 8,105,447 shares of Series B preferred stock issued to Polaris Venture Partners V, L.P., 157,974 shares of Series B preferred stock issued to Polaris Venture Partners Entrepreneurs' Fund V, L.P., 157,974 shares of Series B preferred stock issued to Polaris Venture Partners Founders' Fund V, L.P. and 81,056 shares of Series B preferred stock issued to Polaris Venture Partners Special Founders' Fund V, L.P.

#### *Series B-1 Financing*

In July 2011 and December 2011, we issued and sold to investors an aggregate of 4,200,000 shares of Series B-1 preferred stock, along with warrants to purchase up to 1,650,000 shares of Series B-1 preferred stock, for an aggregate purchase price of \$1.00 per share and related warrant, for aggregate consideration of \$4.2 million. The warrants have an exercise price of \$1.00 per share of Series B-1 preferred stock. Each share of Series B-1 preferred stock is convertible into one share of common stock.

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The participants in this preferred stock and warrant financing included the following holders of more than 5% of our capital stock or entities affiliated with them. The following table presents the number of shares issued to these related parties in this financing:

<u>Participants</u> <sup>1</sup>	<u>Shares of Series B-1 Preferred Stock</u>	<u>Warrants to Purchase Series B-1 Preferred Stock</u>
Alta Partners VIII, L.P.	1,400,000	550,000
New Enterprise Associates 12, Limited Partnership	1,400,000	550,000
Polaris Venture Partners V, L.P. and its affiliated entities <sup>2</sup>	1,400,000	550,000

<sup>1</sup> Additional details regarding these stockholders and their equity holdings is provided in "Principal Stockholders."

<sup>2</sup> Includes 1,350,907 shares of Series B-1 preferred stock and a warrant to purchase 530,713 shares of Series B-1 preferred stock issued to Polaris Venture Partners V, L.P., 26,329 shares of Series B-1 preferred stock and a warrant to purchase 10,343 shares of Series B-1 preferred stock issued to Polaris Venture Partners Entrepreneurs' Fund V, L.P., 9,254 shares of Series B-1 preferred stock and a warrant to purchase 3,636 shares of Series B-1 preferred stock issued to Polaris Venture Partners Founders' Fund V, L.P. and 13,510 shares of Series B-1 preferred stock and a warrant to purchase 5,308 shares of Series B-1 preferred stock issued to Polaris Venture Partners Special Founders' Fund V, L.P.

### Series C Financing

In May 2013, we issued and sold to investors an aggregate of 36,764,704 shares of Series C preferred stock, at a purchase price of \$1.632 per share, for aggregate consideration of \$60.0 million. Each share of Series C preferred stock is convertible into one share of common stock.

The participants in this preferred stock financing included the following holders of more than 5% of our capital stock or entities affiliated with them. The following table presents the number of shares issued to these related parties in this financing:

<u>Participants</u> <sup>1</sup>	<u>Series C Preferred Stock</u>
Alta Partners VIII, L.P.	4,840,686
Forest Laboratories Holdings Limited	18,382,352
HealthCare Ventures VIII, L.P.	3,125,000
New Enterprise Associates 12, Limited Partnership	4,840,686
Polaris Venture Partners V, L.P. and its affiliated entities <sup>2</sup>	4,840,686

<sup>1</sup> Additional details regarding these stockholders and their equity holdings is provided in "Principal Stockholders."

<sup>2</sup> Includes 4,670,943 shares of Series C preferred stock issued to Polaris Venture Partners V, L.P., 91,037 shares of Series C preferred stock issued to Polaris Venture Partners Entrepreneurs' Fund V, L.P., 31,996 shares of Series C preferred stock issued to Polaris Venture Partners Founders' Fund V, L.P. and 46,710 shares of Series C preferred stock issued to Polaris Venture Partners Special Founders' Fund V, L.P.

### **Investor Rights Agreement**

We have entered into an investor rights agreement, as amended, with our preferred stockholders, including entities affiliated with Alta Partners VIII, L.P., Forest Laboratories Holdings Limited, HealthCare Ventures VIII, L.P., New Enterprise Associates 12, Limited Partnership and Polaris Venture Partners V, L.P. The investor rights agreement, among other things:

- grants these stockholders specified registration rights with respect to shares of our common stock, including shares of common stock issued or issuable upon conversion of the shares of preferred stock held by them;
- obligates us to deliver periodic financial statements to some of the stockholders who are parties to the investor rights agreement; and
- grants a right of first refusal with respect to sales of our shares by us, subject to specified exclusions, which exclusions include the sale of the shares pursuant to this prospectus, to the stockholders who are parties to the investor rights agreement.

For more information regarding the registration rights provided in this agreement, please refer to the section entitled "Description of Capital Stock—Registration Rights." The provisions of this agreement other than those relating to registration rights will terminate upon completion of this offering. This summary discusses certain material provisions of the investor rights agreement and is qualified by the full text of the agreement filed as an exhibit to the registration statement of which this prospectus is a part.

### **Voting Agreement**

We have entered into a voting agreement, as amended, with some of our stockholders, including entities affiliated with Alta Partners VIII, L.P., Forest Laboratories Holdings Limited, HealthCare Ventures VIII, L.P., New Enterprise Associates 12, Limited Partnership and Polaris Venture Partners V, L.P. The voting agreement, among other things:

- provides for the voting of shares with respect to the constituency of our board of directors; and
- provides for the voting of shares with respect to specified transactions approved by our board of directors and the requisite supermajority of holders of our outstanding preferred stock.

The voting agreement will terminate upon the completion of this offering.

### **Right of First Refusal and Co-Sale Agreement**

We have entered into a right of first refusal and co-sale agreement, as amended, with some of our stockholders, including entities affiliated with Alta Partners VIII, L.P., Forest Laboratories Holdings Limited, HealthCare Ventures VIII, L.P., New Enterprise Associates 12, Limited Partnership and Polaris Venture Partners V, L.P. The right of first refusal and co-sale agreement, among other things:

- grants our investors rights of first refusal and co-sale with respect to proposed transfers of our securities by specified stockholders; and
- grants us rights of first refusal with respect to proposed transfers of our securities by specified stockholders.

The right of first refusal and co-sale agreement will terminate upon the completion of this offering.

### **Indemnification Agreements**

Our amended and restated certificate of incorporation will contain provisions limiting the liability of directors, and our amended and restated bylaws will provide that we will indemnify each of our

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directors to the fullest extent permitted under Delaware law. Our amended and restated certificate of incorporation and amended and restated bylaws will also provide our board of directors with discretion to indemnify our officers and employees when determined appropriate by the board.

In addition, we intend to enter into an indemnification agreement with each of our directors. For more information regarding these agreements, see "Executive Compensation—Limitations on Liability and Indemnification Matters."

### **Related Person Transaction Policy**

Prior to the completion of this offering, we expect to amend our related person transaction policy that sets forth our procedures for the identification, review, consideration and approval or ratification of related person transactions. The policy will become effective immediately upon the execution of the underwriting agreement for this offering. For purposes of our policy only, a related person transaction is a transaction, arrangement or relationship, or any series of similar transactions, arrangements or relationships, in which we and any related person are, were or will be participants in which the amount involved exceeds \$120,000. Transactions involving compensation for services provided to us as an employee or director are not covered by this policy. A related person is any executive officer, director or beneficial owner of more than 5% of any class of our voting securities, including any of their immediate family members and any entity owned or controlled by such persons.

Under the policy, if a transaction has been identified as a related person transaction, including any transaction that was not a related person transaction when originally consummated or any transaction that was not initially identified as a related person transaction prior to consummation, our management must present information regarding the related person transaction to our audit committee, or, if audit committee approval would be inappropriate, to another independent body of our board of directors, for review, consideration and approval or ratification. The presentation must include a description of, among other things, the material facts, the interests, direct and indirect, of the related persons, the benefits to us of the transaction and whether the transaction is on terms that are comparable to the terms available to or from, as the case may be, an unrelated third party or to or from employees generally. Under the policy, we will collect information that we deem reasonably necessary from each director, executive officer and, to the extent feasible, significant stockholder to enable us to identify any existing or potential related-person transactions and to effectuate the terms of the policy. In addition, under our Code of Business Conduct and Ethics, our employees and directors have an affirmative responsibility to disclose any transaction or relationship that reasonably could be expected to give rise to a conflict of interest. In considering related person transactions, our audit committee, or other independent body of our board of directors, will take into account the relevant available facts and circumstances including, but not limited to:

- the risks, costs and benefits to us;
- the impact on a director's independence in the event that the related person is a director, immediate family member of a director or an entity with which a director is affiliated;
- the availability of other sources for comparable services or products; and
- the terms available to or from, as the case may be, unrelated third parties or to or from employees generally.

The policy requires that, in determining whether to approve, ratify or reject a related person transaction, our audit committee, or other independent body of our board of directors, must consider, in light of known circumstances, whether the transaction is in, or is not inconsistent with, our best interests and those of our stockholders, as our audit committee, or other independent body of our board of directors, determines in the good faith exercise of its discretion.

## PRINCIPAL STOCKHOLDERS

The following table sets forth the beneficial ownership of our common stock as of September 30, 2013:

- each person, or group of affiliated persons, who is known by us to beneficially own more than 5% of our common stock;
- each of our named executive officers;
- each of our directors; and
- all of our current executive officers and directors as a group.

The percentage ownership information shown in the table is based upon 102,014,769 shares of common stock outstanding as of September 30, 2013, after giving effect to the conversion of all of our preferred stock into 96,839,703 shares of common stock, which will occur automatically immediately prior to the closing of this offering.

We have determined beneficial ownership in accordance with the rules of the SEC. These rules generally attribute beneficial ownership of securities to persons who possess sole or shared voting power or investment power with respect to those securities. In addition, the rules include shares of common stock issuable pursuant to the exercise of stock options or warrants that are either immediately exercisable or exercisable on or before November 29, 2013, which is 60 days after September 30, 2013. These shares are deemed to be outstanding and beneficially owned by the person holding those options or warrants for the purpose of computing the percentage ownership of that person, but they are not treated as outstanding for the purpose of computing the percentage ownership of any other person. Unless otherwise indicated, the persons or entities identified in this table have sole voting and investment power with respect to all shares shown as beneficially owned by them, subject to applicable community property laws.

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Except as otherwise noted below, the address for persons listed in the table is c/o Trevena, Inc., 1018 West 8th Avenue, Suite A, King of Prussia, PA 19406.

Name of Beneficial Owner	Number of Shares Beneficially Owned	Percentage of Shares Beneficially Owned	
		Before Offering	After Offering
<i>Principal Stockholders:</i>			
Alta Partners VIII, L.P. <sup>1</sup>	21,190,686	20.8%	%
New Enterprise Associates 12, Limited Partnership <sup>2</sup>	21,190,686	20.8	
Polaris Venture Partners V, L.P. and its affiliated entities <sup>3</sup>	21,190,686	20.8	
Forest Laboratories Holdings Limited <sup>4</sup>	18,382,352	18.0	
HealthCare Ventures VIII, L.P. <sup>5</sup>	13,325,000	13.1	
<i>Named Executive Officers and Directors:</i>			
Maxine Gowen, Ph.D. <sup>6</sup>	2,736,384	2.7	
Michael W. Lark, Ph.D. <sup>7</sup>	917,801	*	
David Soergel, M.D. <sup>8</sup>	504,472	*	
Leon O. Moulder, Jr. <sup>9</sup>	60,000	*	
Farah Champsi <sup>10</sup>	21,190,686	20.8	
Michael R. Dougherty <sup>11</sup>	9,166	*	
Terrance G. McGuire <sup>12</sup>	21,190,686	20.8	
Christopher K. Mirabelli, Ph.D. <sup>13</sup>	13,325,000	13.1	
Jake R. Nunn <sup>14</sup>	21,190,686	20.8	
David F. Solomon <sup>15</sup>	18,382,352	18.0	
All current directors and executive officers as a group (11 persons) <sup>16</sup>	99,938,923	98.0%	%

\* Less than 1%.

<sup>1</sup> Consists of 6,000,000 shares of common stock issuable upon conversion of Series A preferred stock held of record by Alta Partners VIII, L.P., 8,400,000 shares of common stock issuable upon conversion of Series B preferred stock held of record by Alta Partners VIII, L.P., 1,400,000 shares of common stock issuable upon conversion of Series B-1 preferred stock held of record by Alta, 4,840,686 shares of common stock issuable upon conversion of Series C preferred stock held of record by Alta Partners VIII, L.P. and 550,000 shares of common stock issuable upon conversion of warrants exercisable into Series B-1 preferred stock held of record by Alta Partners VIII, L.P. Alta Partners Management VIII, LLC is the general partner of Alta Partners VIII, L.P. Guy Nohra, Daniel Janney and Farah Champsi, a member of our board of directors, are managing directors of Alta Partners Management VIII, LLC and exercise shared voting and investment powers with respect to the shares owned by Alta Partners VIII, L.P. Each of the reporting persons disclaims beneficial ownership of such shares, except to the extent of their proportionate pecuniary interest therein, if any. The principal business address of the beneficial owner is One Embarcadero Center, 37th Floor San Francisco, CA 94111.

<sup>2</sup> Consists of 6,000,000 shares of common stock issuable upon conversion of Series A preferred stock held of record by New Enterprise Associates 12, Limited Partnership, or NEA 12, 8,400,000 shares of common stock issuable upon conversion of Series B preferred stock held of record by NEA 12, 1,400,000 shares of common stock issuable upon conversion of Series B-1 preferred stock held of record by NEA 12, 4,840,686 shares of common stock issuable upon conversion of Series C preferred stock held of record by NEA 12 and 550,000 shares of common stock issuable upon conversion of warrants exercisable into Series B-1 preferred stock held of record by NEA 12. NEA Partners 12, Limited Partnership, or NEA Partners 12, is the general partner of NEA 12.

NEA 12 GP, LLC, or NEA 12 LLC, is the general partner of NEA Partners 12. The individual Managers, or the Managers, of NEA 12 LLC are M. James Barrett, Peter J. Barris, Forest Baskett, Ryan D. Drant, Patrick J. Kerins, Krishna Kolluri and Scott D. Sandell. The Managers share voting and dispositive power with regard to the shares held directly by NEA 12. The principal business address of the beneficial owner is 1954 Greenspring Drive, Suite 600, Timonium, MD 21093.

- 3 Consists of (i) 5,789,605 shares of common stock issuable upon conversion of Series A preferred stock held of record by Polaris Venture Partners V, L.P., or Polaris V, (ii) 8,105,447 shares of common stock issuable upon conversion of Series B preferred stock held of record by Polaris V, (iii) 1,350,907 shares of common stock issuable upon conversion of Series B-1 preferred stock held of record by Polaris V, (iv) 4,670,943 shares of common stock issuable upon conversion of Series C preferred stock held of record by Polaris V, (v) 530,713 shares of common stock issuable upon conversion of warrants exercisable into Series B-1 preferred stock held of record by Polaris V, (vi) 112,839 shares of common stock issuable upon conversion of Series A preferred stock held of record by Polaris Venture Partners Entrepreneurs' Fund V, L.P., or Polaris EFund V, (vii) 157,974 shares of common stock issuable upon conversion of Series B preferred stock held of record by Polaris EFund V, (viii) 26,329 shares of common stock issuable upon conversion of Series B-1 preferred stock held of record by Polaris EFund V, (ix) 91,037 shares of common stock issuable upon conversion of Series C preferred stock held of record by Polaris EFund V, (x) 10,343 shares of common stock issuable upon conversion of warrants exercisable into Series B-1 preferred stock held of record by Polaris EFund V, (xi) 39,659 shares of common stock issuable upon conversion of Series A preferred stock held of record by Polaris Venture Partners Founders' Fund V, L.P., or Polaris FFund V, (xii) 55,523 shares of common stock issuable upon conversion of Series B preferred stock held of record by Polaris FFund V, (xiii) 9,254 shares of common stock issuable upon conversion of Series B-1 preferred stock held of record by Polaris FFund V, (xiv) 31,996 shares of common stock issuable upon conversion of Series C preferred stock held of record by Polaris FFund V, (xv) 3,636 shares of common stock issuable upon conversion of warrants exercisable into Series B-1 preferred stock held of record by Polaris FFund V, (xvi) 57,897 shares of common stock issuable upon conversion of Series A preferred stock held of record by Polaris Venture Partners Special Founders' Fund V, L.P., or Polaris SFFund V and, together with Polaris V, Polaris EFund V and Polaris FFund V, the Polaris Funds, (xvii) 81,056 shares of common stock issuable upon conversion of Series B preferred stock held of record by Polaris SFFund V, (xviii) 13,510 shares of common stock issuable upon conversion of Series B-1 preferred stock held of record by Polaris SFFund V, (xix) 46,710 shares of common stock issuable upon conversion of Series C preferred stock held of record by Polaris SFFund V, and (xx) 5,308 shares of common stock issuable upon conversion of warrants exercisable into Series B-1 preferred stock held of record by Polaris SFFund V. Each of the Polaris Funds has the sole voting and investment power with respect to the shares directly held by it. The general partner of each of the Polaris Funds is Polaris Venture Management Co. V, LLC, or Polaris Management. Polaris Management may be deemed to have sole voting and investment power with respect to the shares held by the Polaris Funds, and disclaims beneficial ownership of all the shares held by the Polaris Funds except to the extent of its proportionate pecuniary interest therein. The members of North Star Venture Management 2000, LLC are Terrence McGuire, a member of our board of directors, and Jonathan Flint, who we refer to collectively as the Management Members, are also members of Polaris Management, and as members of the general partner, they may be deemed to share voting and investment power over the shares held by the Polaris Funds. The Management Members disclaim beneficial ownership of such shares, except to the extent of their proportionate pecuniary interest therein. The principal business address of the beneficial owner is 1000 Winter St., Waltham, MA 02451.

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- 4 Consists of 18,382,352 shares of common stock issuable upon conversion of Series C preferred stock held of record by Forest Laboratories Holdings Limited. Forest Laboratories Holdings Limited is a wholly-owned subsidiary of FL Holding CV, a Netherlands partnership. The sole limited partner of FL Holding CV is Forest Laboratories, Inc. and the sole general partner of FL Holding CV is FLI International LLC. FLI International LLC is a wholly-owned subsidiary of Forest Laboratories, Inc. The voting and dispositive decisions with respect to the shares held by Forest Laboratories Holdings Limited are made by each of the following directors of Forest Laboratories Holdings Limited: Ralph Kleinman, William Meury, Francis I. Perier, Jr., Charles Ryan, David F. Solomon, Howard Solomon and Herschel Weinstein, each of whom disclaims beneficial ownership of such shares, except to the extent of his or her actual pecuniary interest therein. Each of FL Holding CV, FLI International LLC and Forest Laboratories, Inc. disclaims beneficial ownership of such shares except to the extent of its actual pecuniary interest therein. The principal business address of the beneficial owner is Cumberland House, 9<sup>th</sup> Floor, 1 Victoria Street, Hamilton HM11, Bermuda.
- 5 Consists of 6,000,000 shares of common stock issuable upon conversion of Series A preferred stock held of record by HealthCare Ventures VIII, L.P., 4,200,000 shares of common stock issuable upon conversion of Series B preferred stock held of record by HealthCare Ventures VIII, L.P. and 3,125,000 shares of common stock issuable upon conversion of Series C preferred stock held of record by HealthCare Ventures VIII, L.P. Dr. Mirabelli, a member of our board of directors, is a managing director of HealthCare Partners VIII LLC which is the general partner of HealthCare Partners VIII, L.P. which is the general partner of HealthCare Ventures VIII, L.P. Dr. Mirabelli shares voting and investment authority over the shares held by HealthCare Ventures VIII, L.P. with Eric Aguiar, James Cavanaugh, Augustine Lawlor, John Littlechild and Harold Werner. Dr. Mirabelli disclaims beneficial ownership of these shares except to the extent of his proportionate pecuniary interest in these securities. The principal business address of the beneficial owner is 44 Nassau Street, Princeton, NJ 08542.
- 6 Consists of 1,200,000 shares of common stock and 1,536,384 shares of common stock issuable upon the exercise of options exercisable within 60 days after September 30, 2013.
- 7 Consists of 450,000 shares of common stock and 467,801 shares of common stock issuable upon the exercise of options exercisable within 60 days after September 30, 2013.
- 8 Consists of shares of common stock issuable upon the exercise of options exercisable within 60 days after September 30, 2013.
- 9 Consists of shares of common stock issuable upon the exercise of options exercisable within 60 days after September 30, 2013.
- 10 Consists of the shares described in note (1) above. Ms. Champsi is a Managing Director of Alta Partners VIII, L.P. and as such Ms. Champsi may be deemed to share voting and dispositive power with respect to all shares held by this entity. Ms. Champsi disclaims beneficial ownership of such shares except to the extent of any pecuniary interest therein. Ms. Champsi's business address is One Embarcadero Center, 37th Floor, San Francisco, CA 94111.
- 11 Consists of shares of common stock issuable upon the exercise of options exercisable within 60 days after September 30, 2013.
- 12 Consists of the shares described in note (3) above. Mr. McGuire is a general partner of Polaris Venture Partners V, L.P. and as such Mr. McGuire may be deemed to share voting and dispositive power with respect to all shares held by Polaris Venture Partners V, L.P. and its affiliated entities. Mr. McGuire disclaims beneficial ownership of such shares except to the extent of any pecuniary interest therein. Mr. McGuire's business address is 1000 Winter St., Waltham, MA, 02451.



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- 13 Consists of the shares described in note (5) above. Dr. Mirabelli is a managing director of HealthCare Ventures VIII, L.P. and as such Dr. Mirabelli may be deemed to share voting and dispositive power with respect to all shares held by this entity. Dr. Mirabelli disclaims beneficial ownership of such shares except to the extent of any pecuniary interest therein. Dr. Mirabelli's business address is 47 Thorndike St., Ste. B1-1, Cambridge, MA 02141.
- 14 Consists of the shares described in note (2) above. Mr. Nunn is a Partner of New Enterprise Associates, Inc. Mr. Nunn does not have voting or dispositive power with regard to any of the shares directly held by NEA 12 referenced in note (2) above. Mr. Nunn's business address is 2855 Sand Hill Road, Menlo Park, CA 94025.
- 15 Consists of the shares described in note (4) above. Mr. Solomon is a director of Forest Laboratories Holdings Limited and as such Mr. Solomon may be deemed to share voting and dispositive power with respect to all shares held by this entity. Mr. Solomon disclaims beneficial ownership of such shares except to the extent of any pecuniary interest therein. Mr. Solomon's business address is 909 Third Ave., New York, NY 10022.
- 16 Consists of (i) 1,800,000 shares of common stock, (ii) 24,000,000 shares of common stock issuable upon conversion of Series A preferred stock, (iii) 29,400,000 shares of common stock issuable upon conversion of Series B preferred stock, (iv) 4,200,000 shares of common stock issuable upon conversion of Series B-1 preferred stock, (v) 36,029,410 shares of common stock issuable upon conversion of Series C preferred stock, (vi) 1,650,000 shares of common stock issuable upon conversion of warrants exercisable into Series B-1 preferred stock and (vii) 2,833,263 shares of common stock issuable upon the exercise of options exercisable within 60 days after September 30, 2013.

## DESCRIPTION OF CAPITAL STOCK

*The following description of our capital stock and provisions of our amended and restated certificate of incorporation and amended and restated bylaws are summaries. You should also refer to the amended and restated certificate of incorporation and the amended and restated bylaws, which are filed as exhibits to the registration statement of which this prospectus is part.*

### General

Upon the completion of this offering, our amended and restated certificate of incorporation will authorize us to issue up to 100,000,000 shares of common stock, \$0.001 par value per share, and 5,000,000 shares of preferred stock, \$0.001 par value per share, all of which shares of preferred stock will be undesignated. Our board of directors may establish the rights and preferences of the preferred stock from time to time. As of September 30, 2013, after giving effect to the conversion of all outstanding preferred stock into shares of common stock, there would have been \_\_\_\_\_ shares of common stock issued and outstanding, held of record by \_\_\_\_\_ stockholders.

### Common Stock

#### *Voting Rights*

Each holder of our common stock is entitled to one vote for each share on all matters submitted to a vote of the stockholders, including the election of directors. Under our amended and restated certificate of incorporation and amended and restated bylaws, our stockholders will not have cumulative voting rights. Because of this, the holders of a majority of the shares of common stock entitled to vote in any election of directors can elect all of the directors standing for election, if they should so choose. In addition, the affirmative vote of the holders of at least 66<sup>2</sup>/<sub>3</sub>% of the voting power of all of the then outstanding voting stock will be required to take certain actions, including amending certain provisions of our amended and restated certificate of incorporation, such as the provisions relating to the classified board and director liability, amending our bylaws, removing directors without cause or changing the Court of Chancery of the State of Delaware from being the sole and exclusive forum for certain actions brought by our stockholders against us or our directors, officers or employees.

#### *Dividends*

Subject to preferences that may be applicable to any then-outstanding preferred stock, holders of common stock are entitled to receive ratably those dividends, if any, as may be declared from time to time by the board of directors out of legally available funds.

#### *Liquidation*

In the event of our liquidation, dissolution or winding up, holders of common stock will be entitled to share ratably in the net assets legally available for distribution to stockholders after the payment of all of our debts and other liabilities and the satisfaction of any liquidation preference granted to the holders of any then-outstanding shares of preferred stock.

#### *Rights and Preferences*

Holders of common stock have no preemptive, conversion or subscription rights and there are no redemption or sinking fund provisions applicable to the common stock. The rights, preferences and privileges of the holders of common stock are subject to, and may be adversely affected by, the rights of the holders of shares of any series of preferred stock that we may designate in the future.

### Preferred Stock

All currently outstanding shares of preferred stock will be converted automatically to common stock immediately prior to the completion of this offering.

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Following the completion of this offering, our board of directors will have the authority, without further action by our stockholders, to issue up to 5,000,000 shares of preferred stock in one or more series, to establish from time to time the number of shares to be included in each such series, to fix the rights, preferences and privileges of the shares of each wholly unissued series and any qualifications, limitations or restrictions thereon, and to increase or decrease the number of shares of any such series, but not below the number of shares of such series then outstanding.

Our board of directors may authorize the issuance of preferred stock with voting or conversion rights that could adversely affect the voting power or other rights of the holders of our common stock. The purpose of authorizing our board of directors to issue preferred stock and determine its rights and preferences is to eliminate delays associated with a stockholder vote on specific issuances. The issuance of preferred stock, while providing flexibility in connection with possible acquisitions and other corporate purposes, could, among other things, have the effect of delaying, deferring or preventing a change in control of us and may adversely affect the market price of our common stock and the voting and other rights of the holders of our common stock. It is not possible to state the actual effect of the issuance of any shares of preferred stock on the rights of holders of common stock until the board of directors determines the specific rights attached to that preferred stock.

We have no present plans to issue any shares of preferred stock.

### **Options**

As of September 30, 2013, under our 2008 Equity Incentive Plan, options to purchase an aggregate of 1,175,316 shares of common stock were outstanding. There are no option to purchase shares of common stock outstanding under the 2013 Equity Incentive Plan. For additional information regarding the terms of this plan, see "Executive Compensation—Equity Incentive Plans."

### **Warrants**

We have outstanding an immediately exercisable warrant to purchase an aggregate of 125,000 shares of our Series B preferred stock at an exercise price of \$1.00 per share, which warrant expires in December 2021 and following this offering will be exercisable for \_\_\_\_\_ shares of our common stock at an exercise price of \$ \_\_\_\_\_ per share. We refer to this warrant as the preferred warrant.

We also have outstanding an immediately exercisable warrant to purchase an aggregate of 15,000 shares of our common stock at an exercise price of \$0.01 per share, which warrant expires in June 2018. We refer to this warrant as the common warrant.

The common warrant has a net exercise provision under which the holder may, in lieu of payment of the exercise price in cash, surrender the warrant and receive a net amount of shares based on the fair market value of our stock at the time of exercise of the warrant after deduction of the aggregate exercise price. Each of the preferred warrant and the common warrant also contain provisions for the adjustment of the exercise price and the number of shares issuable upon the exercise of the warrant in the event of certain stock dividends, stock splits, reorganizations, reclassifications and consolidations.

We have also granted registration rights to the warrant holders, as more fully described below under "—Registration Rights."

### **Registration Rights**

We and the holders of our existing preferred stock have entered into an investor rights agreement. The registration rights provisions of this agreement provide those holders with demand and piggyback registration rights with respect to the shares of common stock currently held by them and issuable to them upon conversion of our preferred stock in connection with our initial public offering.

Pursuant to the terms of the preferred warrant and the common warrant, the holders of such warrants have piggyback registration rights, and, in some cases, demand registration rights with respect

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to the shares of Series B preferred stock or common stock, as applicable, issuable upon exercise of such warrants on the same terms as are set forth in the investor rights agreement.

***Demand Registration Rights***

At any time beginning 180 days following this offering, the holders of at least 1,125,000 shares issuable upon conversion of our preferred stock in the aggregate have the right to demand that we file up to a total of two registration statements, as long as the anticipated aggregate offering price, net of underwriting discounts and commissions, would exceed \$5,000,000. These registration rights are subject to specified conditions and limitations, including the right of the underwriters, if any, to limit the number of shares included in any such registration under specified circumstances. Upon such a request, we are required to effect the registration as expeditiously as reasonably possible. An aggregate of \_\_\_\_\_ shares of common stock will be entitled to these demand registration rights.

***Piggyback Registration Rights***

At any time after the completion of this offering, if we propose to register any of our securities under the Securities Act either for our own account or for the account of other stockholders, the holders of shares of common stock that are issued upon conversion of our preferred stock and the holders of our currently outstanding warrants will each be entitled to notice of the registration and will be entitled to include their shares of common stock in the registration statement. These piggyback registration rights are subject to specified conditions and limitations, including the right of the underwriters to limit the number of shares included in any such registration under specified circumstances. An aggregate of \_\_\_\_\_ shares of common stock will be entitled to these piggyback registration rights.

***Registration on Form S-3***

At any time after we become eligible to file a registration statement on Form S-3, holders of shares of our common stock that are issued upon conversion of our preferred stock and the holders of our currently outstanding warrants will be entitled, upon their written request, to have such shares registered by us on a Form S-3 registration statement at our expense, provided that such requested registration has an anticipated aggregate offering size to the public of at least \$1,000,000 and subject to other specified conditions and limitations. Registrations effected on Form S-3 will not reduce the number of demand registrations allowed, as described under "Demand Registration Rights" above. An aggregate of \_\_\_\_\_ shares of common stock will be entitled to these Form S-3 registration rights.

***Expenses of Registration***

We will pay all expenses relating to any demand, piggyback or Form S-3 registration, other than underwriting discounts and commissions, subject to specified conditions and limitations.

***Termination of Registration Rights***

The registration rights granted under the investor rights agreement will terminate upon the third anniversary of the closing of this offering or, if earlier, with respect to a particular holder, at such time as that holder holds less than 1% of our common stock and such holder and its affiliates may sell all of their shares of common stock pursuant to Rule 144 under the Securities Act of 1933, as amended, without any restriction during any 90-day period.

***Anti-Takeover Provisions***

***Section 203 of the Delaware General Corporation Law***

We are subject to Section 203 of the Delaware General Corporation Law, which prohibits a Delaware corporation from engaging in any business combination with any interested stockholder for a

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period of three years after the date that such stockholder became an interested stockholder, with the following exceptions:

- before such date, the board of directors of the corporation approved either the business combination or the transaction that resulted in the stockholder becoming an interested stockholder;
- upon completion of the transaction that resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction began, excluding for purposes of determining the voting stock outstanding, but not the outstanding voting stock owned by the interested stockholder, those shares owned (i) by persons who are directors and also officers and (ii) employee stock plans in which employee participants do not have the right to determine confidentially whether shares held subject to the plan will be tendered in a tender or exchange offer; or
- on or after such date, the business combination is approved by the board of directors and authorized at an annual or special meeting of the stockholders, and not by written consent, by the affirmative vote of at least 66<sup>2</sup>/3% of the outstanding voting stock that is not owned by the interested stockholder.

In general, Section 203 defines a "business combination" to include the following:

- any merger or consolidation involving the corporation and the interested stockholder;
- any sale, transfer, pledge or other disposition of 10% or more of the assets of the corporation involving the interested stockholder;
- subject to certain exceptions, any transaction that results in the issuance or transfer by the corporation of any stock of the corporation to the interested stockholder;
- any transaction involving the corporation that has the effect of increasing the proportionate share of the stock or any class or series of the corporation beneficially owned by the interested stockholder; or
- the receipt by the interested stockholder of the benefit of any loans, advances, guarantees, pledges or other financial benefits by or through the corporation.

In general, Section 203 defines an "interested stockholder" as an entity or person who, together with the person's affiliates and associates, beneficially owns, or within three years prior to the time of determination of interested stockholder status did own, 15% or more of the outstanding voting stock of the corporation.

***Certificate of Incorporation and Bylaws to be in Effect Upon the Completion of this Offering***

Our amended and restated certificate of incorporation to be in effect upon the completion of this offering, or our restated certificate, will provide for our board of directors to be divided into three classes with staggered three-year terms. Only one class of directors will be elected at each annual meeting of our stockholders, with the other classes continuing for the remainder of their respective three-year terms. Because our stockholders do not have cumulative voting rights, stockholders holding a majority of the shares of common stock outstanding will be able to elect all of our directors. Our restated certificate and our amended and restated bylaws to be effective upon the completion of this offering, or our restated bylaws, will also provide that directors may be removed by the stockholders only for cause upon the vote of 66<sup>2</sup>/3% or more of our outstanding common stock. Furthermore, the authorized number of directors may be changed only by resolution of the board of directors, and vacancies and newly created directorships on the board of directors may, except as otherwise required by law or determined by the board, only be filled by a majority vote of the directors then serving on the board, even though less than a quorum.

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Our restated certificate and restated bylaws will also provide that all stockholder actions must be effected at a duly called meeting of stockholders and will eliminate the right of stockholders to act by written consent without a meeting. Our restated bylaws will also provide that only our chairman of the board, chief executive officer or the board of directors pursuant to a resolution adopted by a majority of the total number of authorized directors may call a special meeting of stockholders.

Our restated bylaws will also provide that stockholders seeking to present proposals before a meeting of stockholders to nominate candidates for election as directors at a meeting of stockholders must provide timely advance notice in writing, and will specify requirements as to the form and content of a stockholder's notice.

Our restated certificate and restated bylaws will provide that the stockholders cannot amend many of the provisions described above except by a vote of 66<sup>2</sup>/<sub>3</sub>% or more of our outstanding common stock.

The combination of these provisions will make it more difficult for our existing stockholders to replace our board of directors as well as for another party to obtain control of us by replacing our board of directors. Since our board of directors has the power to retain and discharge our officers, these provisions could also make it more difficult for existing stockholders or another party to effect a change in management. In addition, the authorization of undesignated preferred stock makes it possible for our board of directors to issue preferred stock with voting or other rights or preferences that could impede the success of any attempt to effect a change of control of our Company.

These provisions are intended to enhance the likelihood of continued stability in the composition of our board of directors and its policies and to discourage coercive takeover practices and inadequate takeover bids. These provisions are also designed to reduce our vulnerability to hostile takeovers and to discourage certain tactics that may be used in proxy fights. However, such provisions could have the effect of discouraging others from making tender offers for our shares and may have the effect of delaying changes in our control or management. As a consequence, these provisions may also inhibit fluctuations in the market price of our stock that could result from actual or rumored takeover attempts. We believe that the benefits of these provisions, including increased protection of our potential ability to negotiate with the proponent of an unfriendly or unsolicited proposal to acquire or restructure our company, outweigh the disadvantages of discouraging takeover proposals, because negotiation of takeover proposals could result in an improvement of their terms.

### **Choice of Forum**

Our amended and restated certificate of incorporation will provide that the Court of Chancery of the state of Delaware will be the exclusive forum for: any derivative action or proceeding brought on our behalf; any action asserting a breach of fiduciary duty; any action asserting a claim against us arising pursuant to the Delaware General Corporation Law, our amended and restated certificate of incorporation, or our amended and restated bylaws; or any action asserting a claim against us that is governed by the internal affairs doctrine. The enforceability of similar choice of forum provisions in certain other companies' certificates of incorporation has been challenged in legal proceedings, and it is possible that, in connection with any action, a court could find the choice of forum provisions contained in our amended and restated certificate of incorporation to be inapplicable or unenforceable in such action.

### **Transfer Agent and Registrar**

The transfer agent and registrar for our common stock is . The transfer agent's address is .

### **Stock Exchange Listing**

We have applied for listing of our common stock on The NASDAQ Global Market under the trading symbol "TRVN."

## SHARES ELIGIBLE FOR FUTURE SALE

Prior to this offering, no public market existed for our common stock. Future sales of shares of our common stock in the public market after this offering, or the perception that these sales could occur, could adversely affect prevailing market prices for our common stock and could impair our future ability to raise equity capital.

Based on the number of shares outstanding on \_\_\_\_\_, upon completion of this offering and assuming no exercise of the underwriters' option to purchase additional shares, \_\_\_\_\_ shares of common stock will be outstanding, assuming no outstanding options or warrants are exercised. All of the shares of common stock sold in this offering will be freely tradable without restrictions or further registration under the Securities Act, except for any shares sold to our "affiliates," as that term is defined under Rule 144 under the Securities Act. The remaining \_\_\_\_\_ shares of common stock held by existing stockholders are "restricted securities," as that term is defined in Rule 144 under the Securities Act. Restricted securities may be sold in the public market only if registered or if their resale qualifies for exemption from registration described below under Rule 144 promulgated under the Securities Act.

As a result of contractual restrictions described below and the provisions of Rules 144 and 701, the shares sold in this offering and the restricted securities will be available for sale in the public market as follows:

- the \_\_\_\_\_ shares sold in this offering and \_\_\_\_\_ of the existing restricted shares will be eligible for immediate sale upon the completion of this offering;
- approximately \_\_\_\_\_ restricted shares will be eligible for sale in the public market 90 days after the date of this prospectus, subject to the volume, manner of sale and other limitations under Rule 144 and Rule 701; and
- approximately \_\_\_\_\_ restricted shares will be eligible for sale in the public market upon expiration of lock-up agreements 180 days after the date of this prospectus, which date may be extended in specified circumstances, subject in certain circumstances to the volume, manner of sale and other limitations under Rule 144 and Rule 701.

### Rule 144

In general, persons who have beneficially owned restricted shares of our common stock for at least six months, and any affiliate of the company who owns either restricted or unrestricted shares of our common stock, are entitled to sell their securities without registration with the SEC under an exemption from registration provided by Rule 144 under the Securities Act.

#### *Non-Affiliates*

Any person who is not deemed to have been one of our affiliates at the time of, or at any time during the three months preceding, a sale may sell an unlimited number of restricted securities under Rule 144 if:

- the restricted securities have been held for at least six months, including the holding period of any prior owner other than one of our affiliates;
- we have been subject to the Exchange Act periodic reporting requirements for at least 90 days before the sale; and
- we are current in our Exchange Act reporting at the time of sale.

Any person who is not deemed to have been an affiliate of ours at the time of, or at any time during the three months preceding, a sale and has held the restricted securities for at least one year,

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including the holding period of any prior owner other than one of our affiliates, will be entitled to sell an unlimited number of restricted securities without regard to the length of time we have been subject to Exchange Act periodic reporting or whether we are current in our Exchange Act reporting.

*Affiliates*

Persons seeking to sell restricted securities who are our affiliates at the time of, or any time during the three months preceding, a sale, would be subject to the restrictions described above. They are also subject to additional restrictions, by which such person would be required to comply with the manner of sale and notice provisions of Rule 144 and would be entitled to sell within any three-month period only that number of securities that does not exceed the greater of either of the following:

- 1% of the number of shares of our common stock then outstanding, which will equal approximately \_\_\_\_\_ shares immediately after the completion of this offering based on the number of shares outstanding as of September 30, 2013; or
- the average weekly trading volume of our common stock on The NASDAQ Global Market during the four calendar weeks preceding the filing of a notice on Form 144 with respect to the sale.

Additionally, persons who are our affiliates at the time of, or any time during the three months preceding, a sale may sell unrestricted securities under the requirements of Rule 144 described above, without regard to the six month holding period of Rule 144, which does not apply to sales of unrestricted securities.

**Rule 701**

Rule 701 under the Securities Act, as in effect on the date of this prospectus, permits resales of shares in reliance upon Rule 144 but without compliance with certain restrictions of Rule 144, including the holding period requirement. Most of our employees, executive officers or directors who purchased shares under a written compensatory plan or contract may be entitled to rely on the resale provisions of Rule 701, but all holders of Rule 701 shares are required to wait until 90 days after the date of this prospectus before selling their shares. However, substantially all Rule 701 shares are subject to lock-up agreements as described below and in the section of this prospectus titled "Underwriting" and will become eligible for sale upon the expiration of the restrictions set forth in those agreements.

**Form S-8 Registration Statements**

As soon as practicable after the completion of this offering, we intend to file with the SEC one or more registration statements on Form S-8 under the Securities Act to register the shares of our common stock that are issuable pursuant to our 2008 Equity Incentive Plan and 2013 Equity Incentive Plan. These registration statements will become effective immediately upon filing. Shares covered by these registration statements will then be eligible for sale in the public markets, subject to vesting restrictions, any applicable lock-up agreements described below and Rule 144 limitations applicable to affiliates.

**Lock-Up Agreements**

We and the holders of substantially all of our common stock outstanding on the date of this prospectus, including each of our executive officers and directors, have entered into lock-up agreements with the underwriters or otherwise agreed, subject to certain exceptions, that we and they will not, directly or indirectly, offer, sell, contract to sell, pledge, grant any option to purchase, make any short sale or otherwise dispose of or hedge any of our shares of common stock, any options or warrants to purchase shares of our common stock, or any securities convertible into, or exchangeable for or that



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represent the right to receive shares of our common stock, without the prior written consent of the representatives of the underwriters for a period of 180 days from the date of this prospectus.

**Registration Rights**

On the date beginning 180 days after the date of this prospectus, the holders of \_\_\_\_\_ shares of our common stock issuable upon the conversion of our preferred stock and \_\_\_\_\_ shares of our common stock issuable upon the exercise of outstanding warrants, or their transferees, as well as holders of additional shares that may be acquired after the completion of this offering, will be entitled to specified rights with respect to the registration of their shares under the Securities Act. Registration of these shares under the Securities Act would result in the shares becoming freely tradable without restriction under the Securities Act immediately upon the effectiveness of the registration. See "Description of Capital Stock—Registration Rights" for additional information.

## MATERIAL U.S. FEDERAL INCOME TAX CONSEQUENCES TO NON-U.S. HOLDERS

The following is a general discussion of the material U.S. federal income and estate tax considerations applicable to non-U.S. holders with respect to their ownership and disposition of shares of our common stock issued pursuant to this offering. All prospective non-U.S. holders of our common stock should consult their own tax advisors with respect to the U.S. federal, state, local and non-U.S. tax consequences of the purchase, ownership and disposition of our common stock. In general, a non-U.S. holder means a beneficial owner of our common stock (other than a partnership or an entity or arrangement treated as a partnership for U.S. federal income tax purposes) 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 an entity treated as a corporation for U.S. federal income tax purposes, created or organized in the United States or under the laws of the United States or of any state thereof or the District of Columbia;
- an estate, the income of which is subject to U.S. federal income tax regardless of its source; or
- a trust if (1) a U.S. court can exercise primary supervision over the trust's administration and one or more U.S. persons have the authority to control all of the trust's substantial decisions or (2) the trust has a valid election in effect under applicable U.S. Treasury Regulations to be treated as a U.S. person.

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 U.S. Treasury Regulations promulgated thereunder, published administrative rulings and judicial decisions, all as in effect as of the date of this prospectus. These laws are subject to change and to differing interpretation, possibly with retroactive effect. Any change or differing interpretation could alter the tax consequences to non-U.S. holders described in this prospectus.

We assume in this discussion that a non-U.S. holder holds shares of our common stock as a capital asset within the meaning of Section 1221 of the Code (generally, 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 holders that own, or are deemed to own, more than 5% of our capital stock (except to the extent specifically set forth below), corporations that accumulate earnings to avoid U.S. federal income tax, tax-exempt organizations, banks, financial institutions, insurance companies, brokers, dealers or traders in securities, commodities or currencies, tax-qualified retirement plans, holders subject to the alternative minimum tax or Medicare contribution tax, holders who hold or receive our common stock pursuant to the exercise of employee stock options or otherwise as compensation, holders holding our common stock as part of a hedge, straddle or other risk reduction strategy, conversion transaction or other integrated investment, holders deemed to sell our common stock under the constructive sale provisions of the Code, controlled foreign corporations, passive foreign investment companies, entities that are treated as disregarded entities for U.S. federal income tax purposes (regardless of their places of organization or formation) and certain former U.S. citizens or long-term residents.

In addition, this discussion does not address the tax treatment of partnerships (or entities or arrangements that are treated as partnerships for U.S. federal income tax purposes) or persons that hold their common stock through such partnerships. If a partnership, including any entity or arrangement treated as a partnership for U.S. federal income tax purposes, holds shares of our common stock, the U.S. federal income tax treatment of a partner in such partnership will generally

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depend upon the status of the partner and the activities of the partnership. Such partners and partnerships should consult their own tax advisors regarding the tax consequences of the purchase, ownership and disposition of our common stock.

There can be no assurance that the Internal Revenue Service, which we refer to as the IRS, will not challenge one or more of the tax consequences described herein, and we have not obtained, nor do we intend to obtain, a ruling with respect to the U.S. federal income or estate tax consequences to a non-U.S. holder of the purchase, ownership or disposition of our common stock.

**Distributions on Our Common Stock**

Distributions, if any, on our common stock 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 adjusted tax basis in the common stock. Any remaining excess will be treated as capital gain from the sale or exchange of such common stock, subject to the tax treatment described below in "Gain on Sale, Exchange or Other Disposition of Our Common Stock."

Subject to the discussion below regarding backup withholding and foreign accounts, dividends paid to a non-U.S. holder will generally 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.

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 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 for refund with the IRS.

**Gain on Sale, Exchange or Other Disposition of Our Common Stock**

Subject to the discussion below regarding backup withholding and foreign accounts, in general, a non-U.S. holder will not be subject to any U.S. federal income tax on any gain realized upon such holder's sale, exchange or other disposition of shares of our common stock unless:

- the gain is effectively connected with a U.S. trade or business of the non-U.S. holder and, if an applicable income tax treaty so provides, is attributable to a permanent establishment or a fixed base maintained in the United States by such non-U.S. holder, in which case the non-U.S. holder generally will be taxed at the graduated U.S. federal income tax rates applicable to

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U.S. persons (as defined in the Code) and, if the non-U.S. holder is a foreign corporation, the branch profits tax described above in "Distributions on Our Common Stock" also may apply;

- the non-U.S. holder is a nonresident alien individual who is present in the United States for 183 days or more in the taxable year of the disposition and certain other conditions 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 (even though the individual is not considered a resident of the United States); or
- our common stock constitutes a U.S. real property interest because 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." Even if we are or become a U.S. real property holding corporation, provided that our common stock is regularly traded on an established securities market, our common stock will be treated as a U.S. real property interest only with respect to a non-U.S. holder that holds more than 5% of our outstanding common stock, directly or indirectly, actually or constructively, 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. In such case, such non-U.S. holder generally will be taxed on its net gain derived from the disposition at the graduated U.S. federal income tax rates applicable to U.S. persons (as defined in the Code). Generally, a corporation is a U.S. real property holding corporation only 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 do not believe that we are, or have been, a U.S. real property holding corporation, or that we are likely to become one in the future. No assurance can be provided that our common stock will be regularly traded on an established securities market for purposes of the rules described above.

### **U.S. Federal Estate Tax**

Shares of our common stock that are owned or treated as owned at the time of death by an individual who is not a citizen or resident of the United States, as specifically defined for U.S. federal estate tax purposes, are considered U.S. situs assets and will be included in the individual's gross estate for U.S. federal estate tax purposes. Such shares, therefore, may be subject to U.S. federal estate tax, unless an applicable estate tax or other treaty provides otherwise.

### **Backup Withholding and Information Reporting**

We must report annually to the IRS and to each non-U.S. holder the gross amount of the dividends on our common stock paid to such holder and the tax withheld, if any, with respect to such dividends. Non-U.S. holders will 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 with respect to dividends on our common stock. Dividends paid to non-U.S. holders subject to the U.S. withholding tax, as described above in "Distributions on Our Common Stock," generally will be exempt from U.S. backup withholding.

Information reporting and backup withholding will generally 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

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substantial U.S. ownership or operations generally will be treated in a manner similar to dispositions effected through a U.S. office of a broker. Non-U.S. holders should consult their own tax advisors regarding the application of the information reporting and backup withholding rules to them.

Copies of information returns may be made available to the tax authorities of the country in which the non-U.S. holder resides or is incorporated under the provisions of a specific treaty or agreement.

Backup withholding is not an additional tax. Any amounts withheld under the backup withholding rules from a payment to a non-U.S. holder may be allowed as a credit against the non-U.S. holder's U.S. federal income tax liability, if any, and may entitle such holder to a refund, provided that the required information is timely furnished to the IRS.

**Foreign Accounts**

The Code generally imposes a U.S. federal withholding tax of 30% on dividends and the gross proceeds of a disposition of our common stock paid to a "foreign financial institution" (as specifically defined for this purpose), unless such institution enters into an agreement with the U.S. government to, among other things, withhold on certain payments and to collect and provide to the U.S. tax authorities substantial information regarding U.S. account holders of such institution (which includes certain equity and debt holders of such institution, as well as certain account holders that are foreign entities with U.S. owners). Foreign financial institutions located in jurisdictions that have an intergovernmental agreement with the United States governing their withholding and reporting requirements may be subject to different rules. A U.S. federal withholding tax of 30% also applies to dividends and the gross proceeds of a disposition of our common stock paid to a non-financial foreign entity, unless such entity provides the withholding agent with either a certification that it does not have any substantial direct or indirect U.S. owners or provides information regarding substantial direct and indirect U.S. owners of the entity. The withholding tax described above will not apply if the foreign financial institution or non-financial foreign entity otherwise qualifies for an exception from the rules. The withholding provisions described above will generally apply to dividends on our common stock paid on or after July 1, 2014 and with respect to gross proceeds of a sale or other disposition of our common stock on or after January 1, 2017. Under certain circumstances, a non-U.S. holder might be eligible for refunds or credits of such taxes.

EACH PROSPECTIVE INVESTOR SHOULD CONSULT ITS OWN TAX ADVISOR REGARDING THE TAX CONSEQUENCES OF PURCHASING, HOLDING OR DISPOSING OF OUR COMMON STOCK, INCLUDING THE CONSEQUENCES OF ANY PROPOSED CHANGE IN APPLICABLE LAW, AS WELL AS TAX CONSEQUENCES ARISING UNDER ANY STATE, LOCAL, NON-U.S. OR U.S. FEDERAL NON-INCOME TAX LAWS.

## UNDERWRITING

Barclays Capital Inc. and Jefferies LLC are acting as the representatives of the underwriters and joint book-running managers of this offering. Under the terms of an underwriting agreement, which will be filed as an exhibit to the registration statement, each of the underwriters named below has severally agreed to purchase from us the respective number of common stock shown opposite its name below:

<u>Underwriters</u>	<u>Number of Shares</u>
Barclays Capital Inc.	
Jefferies LLC	
Canaccord Genuity Inc.	
JMP Securities LLC	
Needham & Company, LLC	
Total	

The underwriting agreement provides that the underwriters' obligation to purchase shares of common stock depends on the satisfaction of the conditions contained in the underwriting agreement including:

- the obligation to purchase all of the shares of common stock offered hereby (other than those shares of common stock covered by their option to purchase additional shares as described below), if any of the shares are purchased;
- the representations and warranties made by us to the underwriters are true;
- there is no material change in our business or the financial markets; and
- we deliver customary closing documents to the underwriters.

### Commissions and Expenses

The following table summarizes the underwriting discounts and commissions we will pay to the underwriters. These amounts are shown assuming both no exercise and full exercise of the underwriters' option to purchase additional shares. The underwriting fee is the difference between the initial price to the public and the amount the underwriters pay to us for the shares.

	<u>No Exercise</u>	<u>Full Exercise</u>
Per Share	\$	\$
Total	\$	\$

The representatives have advised us that the underwriters propose to offer the shares of common stock directly to the public at the public offering price on the cover of this prospectus and to selected dealers, which may include the underwriters, at such offering price less a selling concession not in excess of \$ per share. After the offering, the representatives may change the offering price and other selling terms.

The expenses of the offering that are payable by us are estimated to be approximately \$ (excluding underwriting discounts and commissions). We have also agreed to reimburse the underwriters for certain of their expenses in an amount up to \$ as set forth in the underwriting agreement.

### **Option to Purchase Additional Shares**

We have granted the underwriters an option exercisable for 30 days after the date of this prospectus, to purchase, from time to time, in whole or in part, up to an aggregate of \_\_\_\_\_ shares from us at the public offering price less underwriting discounts and commissions. This option may be exercised to the extent the underwriters sell more than \_\_\_\_\_ shares in connection with this offering. To the extent that this option is exercised, each underwriter will be obligated, subject to certain conditions, to purchase its pro rata portion of these additional shares based on the underwriter's percentage underwriting commitment in the offering as indicated in the table at the beginning of this "Underwriting" section.

### **Lock-Up Agreements**

We, all of our directors and executive officers and holders of substantially all of our outstanding stock have agreed that, subject to certain limited exceptions, without the prior written consent of each of Barclays Capital Inc. and Jefferies LLC, we and they will not directly or indirectly, (1) offer for sale, sell, pledge or otherwise dispose of (or enter into any transaction or device that is designed to, or could be expected to, result in the disposition by any person at any time in the future of) any shares of common stock (including, without limitation, shares of common stock that may be deemed to be beneficially owned by us or them in accordance with the rules and regulations of the SEC and shares of common stock that may be issued upon exercise of any options or warrants) or securities convertible into or exercisable or exchangeable for common stock, (2) enter into any swap or other derivatives transaction that transfers to another, in whole or in part, any of the economic benefits or risks of ownership of shares of common stock, whether any such transaction described in clause (1) or (2) above is to be settled by delivery of common stock or other securities, in cash or otherwise, (3) make any demand for or exercise any right or file or cause to be filed a registration statement, including any amendments thereto, with respect to the registration of any shares of common stock or securities convertible, exercisable or exchangeable into common stock or any of our other securities, or (4) publicly disclose the intention to do any of the foregoing for a period of 180 days after the date of this prospectus.

Barclays Capital Inc. and Jefferies LLC, in their sole discretion, may release the common stock and other securities subject to the lock-up agreements described above in whole or in part at any time with or without notice. When determining whether or not to release common stock and other securities from lock-up agreements, Barclays Capital Inc. and Jefferies LLC will consider, among other factors, the holder's reasons for requesting the release, the number of shares of common stock and other securities for which the release is being requested and market conditions at the time.

### **Offering Price Determination**

Prior to this offering, there has been no public market for our common stock. The initial public offering price will be negotiated between the representatives and us. In determining the initial public offering price of our common stock, the representatives will consider:

- the history and prospects for the industry in which we compete;
  - our financial information;
  - the ability of our management and our business potential and earning prospects;
  - the prevailing securities markets at the time of this offering; and
- the recent market prices of, and the demand for, publicly traded shares of generally comparable companies.

## **Indemnification**

We have agreed to indemnify the underwriters against certain liabilities, including liabilities under the Securities Act, and to contribute to payments that the underwriters may be required to make for these liabilities.

## **Stabilization, Short Positions and Penalty Bids**

The representatives may engage in stabilizing transactions, short sales and purchases to cover positions created by short sales, and penalty bids or purchases for the purpose of pegging, fixing or maintaining the price of the common stock, in accordance with Regulation M under the Exchange Act:

- Stabilizing transactions permit bids to purchase the underlying security so long as the stabilizing bids do not exceed a specified maximum.
- A short position involves a sale by the underwriters of shares in excess of the number of shares the underwriters are obligated to purchase in the offering, which creates the syndicate short position. This short position may be either a covered short position or a naked short position. In a covered short position, the number of shares involved in the sales made by the underwriters in excess of the number of shares they are obligated to purchase is not greater than the number of shares that they may purchase by exercising their option to purchase additional shares. In a naked short position, the number of shares involved is greater than the number of shares in their option to purchase additional shares. The underwriters may close out any short position by either exercising their option to purchase additional shares and/or purchasing shares in the open market. In determining the source of shares to close out the short position, the underwriters will consider, among other things, the price of shares available for purchase in the open market as compared to the price at which they may purchase shares through their option to purchase additional shares. A naked short position is more likely to be created if the underwriters are concerned that there could be downward pressure on the price of the shares in the open market after pricing that could adversely affect investors who purchase in the offering.
- Syndicate covering transactions involve purchases of the common stock in the open market after the distribution has been completed in order to cover syndicate short positions.
- Penalty bids permit the representatives to reclaim a selling concession from a syndicate member when the common stock originally sold by the syndicate member is purchased in a stabilizing or syndicate covering transaction to cover syndicate short positions.

These stabilizing transactions, syndicate covering transactions and penalty bids may have the effect of raising or maintaining the market price of our common stock or preventing or retarding a decline in the market price of the common stock. As a result, the price of the common stock may be higher than the price that might otherwise exist in the open market. These transactions may be effected on The NASDAQ Global Market or otherwise and, if commenced, may be discontinued at any time.

Neither we nor any of the underwriters make any representation or prediction as to the direction or magnitude of any effect that the transactions described above may have on the price of the common stock. In addition, neither we nor any of the underwriters make representation that the representatives will engage in these stabilizing transactions or that any transaction, once commenced, will not be discontinued without notice.

## **Electronic Distribution**

A prospectus in electronic format may be made available on the Internet sites or through other online services maintained by one or more of the underwriters and/or selling group members participating in this offering, or by their affiliates. In those cases, prospective investors may view



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offering terms online and, depending upon the particular underwriter or selling group member, prospective investors may be allowed to place orders online. The underwriters may agree with us to allocate a specific number of shares for sale to online brokerage account holders. Any such allocation for online distributions will be made by the representatives on the same basis as other allocations.

Other than the prospectus in electronic format, the information on any underwriter's or selling group member's web site and any information contained in any other web site maintained by an underwriter or selling group member is not part of the prospectus or the registration statement of which this prospectus forms a part, has not been approved and/or endorsed by us or any underwriter or selling group member in its capacity as underwriter or selling group member and should not be relied upon by investors.

**The NASDAQ Global Market**

We have applied for listing of our common stock on The NASDAQ Global Market under the symbol "TRVN."

**Discretionary Sales**

The underwriters have informed us that they do not intend to confirm sales to discretionary accounts without the prior specific written approval of the customer.

**Stamp Taxes**

If you purchase shares of common stock offered in this prospectus, you may be required to pay stamp taxes and other charges under the laws and practices of the country of purchase, in addition to the offering price listed on the cover page of this prospectus.

**Relationships**

Certain of the underwriters and their related entities have engaged and may engage in commercial and investment banking transactions with us in the ordinary course of their business. They have received customary compensation and expenses for these commercial and investment banking transactions.

In the ordinary course of their various business activities, the underwriters and certain of their affiliates may make or hold a broad array of investments and actively trade debt and equity securities (or related derivative securities) and financial instruments (including bank loans) for their own account and for the accounts of their customers, and such investment and securities activities may involve securities and/or instruments of the issuer or its affiliates. If the underwriters or their affiliates have a lending relationship with us, they routinely hedge their credit exposure to us consistent with their customary risk management policies. The underwriters and their affiliates may hedge such exposure by entering into transactions which consist of either the purchase of credit default swaps or the creation of short positions in our securities or the securities of our affiliates, including potentially the common stock offered hereby. Any such short positions could adversely affect future trading prices of the common stock offered hereby. The underwriters and certain of their affiliates may also communicate independent investment recommendations, market color or trading ideas and/or publish or express independent research views in respect of such securities or instruments and may at any time hold, or recommend to clients that they acquire, long and/or short positions in such securities and instruments.

## **Selling Restrictions**

### **European Economic Area**

In relation to each Member State of the European Economic Area which has implemented the Prospectus Directive (each, a "Relevant Member State") an offer to the public of any common stock which are the subject of the offering contemplated herein may not be made in that Relevant Member State, except that an offer to the public in that Relevant Member State of any common stock may be made at any time under the following exemptions under the Prospectus Directive, if they have been implemented in that Relevant Member State:

- to legal entities which are qualified investors as defined under the Prospectus Directive;
- by the underwriters to fewer than 100, or, if the Relevant Member State has implemented the relevant provisions of the 2010 PD Amending Directive, 150, natural or legal persons (other than qualified investors as defined in the Prospectus Directive), as permitted under the Prospectus Directive, subject to obtaining the prior consent of the representatives of the underwriters for any such offer; or
- in any other circumstances falling within Article 3(2) of the Prospectus Directive,

provided that no such offer of common stock shall result in a requirement for us or any underwriter to publish a prospectus pursuant to Article 3 of the Prospectus Directive or supplement a prospectus pursuant to Article 16 of the Prospectus Directive.

Each person in a Relevant Member State who receives any communication in respect of, or who acquires any common stock under, the offers contemplated here in this prospectus will be deemed to have represented, warranted and agreed to and with each underwriter and us that:

- it is a qualified investor as defined under the Prospectus Directive; and
- in the case of any common stock acquired by it as a financial intermediary, as that term is used in Article 3(2) of the Prospectus Directive, (i) the common stock acquired by it in the offering have not been acquired on behalf of, nor have they been acquired with a view to their offer or resale to, persons in any Relevant Member State other than qualified investors, as that term is defined in the Prospectus Directive, or in the circumstances in which the prior consent of the representatives of the underwriters has been given to the offer or resale or (ii) where common stock have been acquired by it on behalf of persons in any Relevant Member State other than qualified investors, the offer of such common stock to it is not treated under the Prospectus Directive as having been made to such persons.

For the purposes of this representation and the provision above, the expression an "offer of common stock to the public" in relation to any common stock in any Relevant Member State means the communication in any form and by any means of sufficient information on the terms of the offer and any common stock to be offered so as to enable an investor to decide to purchase or subscribe for the common stock, as the same may be varied in that Relevant Member State by any measure implementing the Prospectus Directive in that Relevant Member State, the expression "Prospectus Directive" means Directive 2003/71/EC (and amendments thereto, including the 2010 PD Amending Directive, to the extent implemented in the Relevant Member State), and includes any relevant implementing measure in each Relevant Member State and the expression "2010 PD Amending Directive" means Directive 2010/73/EU.

### **United Kingdom**

This prospectus has only been communicated or caused to have been communicated and will only be communicated or caused to be communicated as an invitation or inducement to engage in investment activity (within the meaning of Section 21 of the Financial Services and Markets Act of 2000 (as amended), or FSMA) as received in connection with the issue or sale of the shares in circumstances in which Section 21(1) of the FSMA does not apply to the Issuer. All applicable provisions of the FSMA will be complied with in respect to anything done in relation to the shares in, from or otherwise involving the United Kingdom.

## LEGAL MATTERS

The validity of the shares of common stock being offered by this prospectus will be passed upon for us by Cooley LLP, New York, New York. Certain legal matters in connection with this offering will be passed upon for the underwriters by Latham & Watkins LLP, Boston, Massachusetts.

## EXPERTS

The financial statements of Trevena, Inc. at December 31, 2011 and 2012, for each of the two years in the period ended December 31, 2012, and for the period from November 9, 2007 (date of inception) to 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 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 ADDITIONAL INFORMATION

We have filed with the SEC a registration statement on Form S-1 under the Securities Act, with respect to the shares of common stock being offered by this prospectus. This prospectus does not contain all of the information in the registration statement and its exhibits. For further information with respect to our company and the common stock offered by this prospectus, we refer you to the registration statement and its exhibits. Statements contained in this prospectus as to the contents of any contract or any other document referred to are not necessarily complete, and in each instance, we refer you to the copy of the contract or other document filed as an exhibit to the registration statement. Each of these statements is qualified in all respects by this reference.

You can read our SEC filings, including the registration statement, over the internet at the SEC's website at [www.sec.gov](http://www.sec.gov). You may also read and copy any document we file with the SEC at its public reference facilities at 100 F Street, N.E., Washington, D.C. 20549. You may also obtain copies of these documents at prescribed rates by writing to the Public Reference Section of the SEC at 100 F Street, N.E., Washington, D.C. 20549. Please call the SEC at 1-800-SEC-0330 for further information on the operation of the public reference facilities.

Upon completion of this offering, we will be subject to the information reporting requirements of the Exchange Act, and we will file reports, proxy statements and other information with the SEC. These reports, proxy statements and other information will be available for inspection and copying at the public reference room and web site of the SEC referred to above. We also maintain a website at [www.trevenainc.com](http://www.trevenainc.com), at which you may access these materials free of charge as soon as reasonably practicable after they are electronically filed with, or furnished to, the SEC. The information contained in, or that can be accessed through, our website is not part of, and is not incorporated into, this prospectus.

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**Report of Independent Registered Public Accounting Firm**

The Board of Directors and Stockholders of  
Trevena, Inc.

We have audited the accompanying balance sheets of Trevena, Inc. (a Development-Stage Company) (the Company) as of December 31, 2011 and 2012, and the related statements of operations and comprehensive loss, redeemable convertible preferred stock and stockholders' deficit, and cash flows for the years then ended and for the period from November 9, 2007 (date of inception) to 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 Trevena, Inc. as of December 31, 2011 and 2012, and the results of its operations and its cash flows for the years then ended and for the period from November 9, 2007 (date of inception) to December 31, 2012, in conformity with U.S. generally accepted accounting principles.

/s/ Ernst & Young LLP

Philadelphia, Pennsylvania  
September 6, 2013

**TREVENA, INC.**  
**(A Development-Stage Company)**

**Balance Sheets**

	<b>December 31,</b>	
	<b>2011</b>	<b>2012</b>
<b>Assets</b>		
Current assets:		
Cash and cash equivalents	\$ 17,060,109	\$ 6,738,659
Grants receivable	22,994	11,875
Prepaid expenses and other current assets	259,997	155,679
Restricted cash	92,000	102,000
Total current assets	17,435,100	7,008,213
Property and equipment, net	1,675,979	909,801
Restricted cash	214,000	112,000
Other assets	82,138	57,672
Total assets	\$ 19,407,217	\$ 8,087,686
<b>Liabilities, redeemable convertible preferred stock and stockholders' deficit</b>		
Current liabilities:		
Accounts payable	\$ 623,324	\$ 459,035
Accrued expenses and other current liabilities	1,362,031	1,281,660
Loans payable	193,874	2,085,129
Deferred rent	99,401	105,776
Total current liabilities	2,278,630	3,931,600
Loans payable, net of current portion	250,656	2,783,078
Deferred rent, net of current portion	124,291	18,515
Preferred stock warrant liability	1,336,543	1,393,674
Total liabilities	3,990,120	8,126,867
Commitments and contingencies (Note 8)		
Redeemable convertible preferred stock:		
Series A—\$0.001 par value; 25,074,999 shares authorized, issued and outstanding at December 31, 2011 and 2012 (liquidation preference of \$25,074,999 at December 31, 2012)	24,983,873	25,004,123
Series B—\$0.001 par value; 35,500,000 shares authorized, 30,800,000 shares issued and outstanding at December 31, 2011 and 2012 (liquidation preference of \$30,800,000 at December 31, 2012)	30,761,688	30,770,194
Series B-1—\$0.001 par value; 6,000,000 shares authorized, 4,200,000 shares issued and outstanding at December 31, 2011 and 2012 (liquidation preference of \$4,200,000 at December 31, 2012)	2,895,631	3,183,517
Total redeemable convertible preferred stock	58,641,192	58,957,834
Stockholders' deficit:		
Common stock—\$0.001 par value; 85,000,000 shares authorized, 4,055,062 and 4,231,510 shares issued and outstanding at December 31, 2011 and 2012	4,055	4,232
Additional paid-in capital	157,118	19,679
Deficit accumulated during the development stage	(43,385,268)	(59,020,926)
Total stockholders' deficit	(43,224,095)	(58,997,015)
Total liabilities, redeemable convertible preferred stock and stockholders' deficit	\$ 19,407,217	\$ 8,087,686

See accompanying notes to financial statements.

**TREVENA, INC.**  
**(A Development-Stage Company)**  
**Statements of Operations and Comprehensive Loss**

	<u>Year Ended December 31,</u>		<u>Period From</u>
	<u>2011</u>	<u>2012</u>	<u>November 9, 2007</u> <u>(date of inception) to</u> <u>December 31, 2012</u>
<b>Revenue:</b>			
Grant revenue	\$ 2,421,381	\$ 407,595	\$ 8,931,754
Collaboration revenue	—	400,000	400,000
Total revenue	<u>2,421,381</u>	<u>807,595</u>	<u>9,331,754</u>
<b>Operating expenses:</b>			
General and administrative	3,062,547	3,122,718	14,009,929
Research and development	15,109,048	13,294,917	54,012,425
Total operating expenses	<u>18,171,595</u>	<u>16,417,635</u>	<u>68,022,354</u>
Loss from operations	<u>(15,750,214)</u>	<u>(15,610,040)</u>	<u>(58,690,600)</u>
<b>Other income (expense):</b>			
Change in fair value of warrant liability	10,885	44,576	55,461
Miscellaneous income	—	122,792	122,792
Interest income	3,542	754	69,646
Interest expense	(74,217)	(193,740)	(526,012)
Total other income (expense)	<u>(59,790)</u>	<u>(25,618)</u>	<u>(278,113)</u>
Net loss and comprehensive loss	<u>(15,810,004)</u>	<u>(15,635,658)</u>	<u>(58,968,713)</u>
Accretion of redeemable convertible preferred stock	<u>(73,569)</u>	<u>(316,642)</u>	<u>(488,299)</u>
Net loss attributable to common stockholders	<u>\$ (15,883,573)</u>	<u>\$ (15,952,300)</u>	<u>\$ (59,457,012)</u>
<b>Per share information:</b>			
Net loss per share of common stock, basic and diluted	<u>\$ (4.40)</u>	<u>\$ (3.82)</u>	
Weighted average shares outstanding, basic and diluted	<u>3,611,112</u>	<u>4,173,782</u>	
Pro forma net loss per share of common stock, basic and diluted (unaudited)		<u>\$</u>	
Pro forma basic and diluted pro forma weighted average shares outstanding (unaudited)			

See accompanying notes to financial statements.

## TREVENA, INC.

(A Development-Stage Company)

## Statements of Redeemable Convertible Preferred Stock and Stockholders' Deficit

For the Period From November 9, 2007 (date of inception) to December 31, 2012

	Redeemable Convertible Preferred Stock						Stockholders' Deficit						
	Series A		Series B		Series B-1		Common Stock			Deficit		Total Stockholders' Deficit	
	Number of Shares	Amount	Number of Shares	Amount	Number of Shares	Amount	Total	Number of Shares	\$0.001 Par Value	Additional Paid-in Capital	Accumulated Deficit During the Development Stage		
Balance, November 9, 2007 (date of inception)	—	\$ —	—	\$ —	—	\$ —	\$ —	—	\$ —	\$ —	\$ —	\$ —	—
Issuance of restricted stock to founders—December 2007	—	—	—	—	—	—	—	2,316,000	2,316	—	—	(2,316)	—
Net loss	—	—	—	—	—	—	—	—	—	—	—	(170,106)	(170,106)
Balance, December 31, 2007	—	—	—	—	—	—	—	2,316,000	2,316	—	—	(172,422)	(170,106)
Issuance of Series A convertible preferred stock, net of issuance costs of \$202,291—January and September 2008	13,040,624	12,838,333	—	—	—	—	12,838,333	—	—	—	—	—	—
Issuance of restricted stock—March 2008	—	—	—	—	—	—	—	1,590,000	1,590	(1,590)	—	—	—
Vesting of restricted stock	—	—	—	—	—	—	—	—	—	6,582	—	—	6,582
Common stock issued for a license agreement—February and October 2008	—	—	—	—	—	—	—	83,333	83	750	—	—	833
Stock-based compensation expense	—	—	—	—	—	—	—	—	—	1,439	—	—	1,439
Issuance of warrants to a bank in connection with an equipment loan—September 2008	—	—	—	—	—	—	—	—	—	125	—	—	125
Accretion of preferred stock offering costs	—	33,459	—	—	—	—	33,459	—	—	(7,306)	—	(26,153)	(33,459)
Net loss	—	—	—	—	—	—	—	—	—	—	—	(4,850,246)	(4,850,246)
Balance, December 31, 2008	13,040,624	12,871,792	—	—	—	—	12,871,792	3,989,333	3,989	—	—	(5,048,821)	(5,044,832)
Issuance of Series A convertible preferred stock, net of issuance costs of \$3,959—June and November 2009	12,034,375	12,030,416	—	—	—	—	12,030,416	—	—	—	—	—	—
Issuance of restricted stock—August 2009	—	—	—	—	—	—	—	100,000	100	900	—	—	1,000
Vesting of restricted stock	—	—	—	—	—	—	—	—	—	5,646	—	—	5,646
Common stock issued for a license agreement—June 2009	—	—	—	—	—	—	—	41,667	42	375	—	—	417
Stock-based compensation expense	—	—	—	—	—	—	—	—	—	2,769	—	—	2,769
Exercise of stock options	—	—	—	—	—	—	—	55,312	55	498	—	—	553



Accretion of preferred stock offering costs	—	33,932	—	—	—	—	33,932	—	—	(10,188)	(23,744)	(33,932)
Net loss	—	—	—	—	—	—	—	—	—	—	(11,370,959)	(11,370,959)
Balance, December 31, 2009	25,074,999	24,936,140	—	—	—	—	24,936,140	4,186,312	4,186	—	(16,443,524)	(16,439,338)

TREVENA, INC.

(A Development-Stage Company)

Statements of Redeemable Convertible Preferred Stock and Stockholders' Deficit (Continued)

For the Period From November 9, 2007 (date of inception) to December 31, 2012

	Redeemable Convertible Preferred Stock							Stockholders' Deficit				
	Series A		Series B		Series B-1		Total	Common Stock			Deficit Accumulated During the Development Stage	Total Stockholders' Deficit
	Number of Shares	Amount	Number of Shares	Amount	Number of Shares	Amount		Number of Shares	\$0.001 Par Value	Additional Paid-in Capital		
Balance, December 31, 2009 (from previous page)	25,074,999	\$ 24,936,140	—	\$ —	—	\$ —	\$ 24,936,140	4,186,312	\$ 4,186	\$ —	\$ (16,443,524)	\$ (16,439,338)
Issuance of Series B convertible preferred stock, net of issuance costs of \$38,568—July 2010	—	—	17,500,000	17,461,432	—	—	17,461,432	—	—	—	—	—
Repurchase of restricted stock—May 2010	—	—	—	—	—	—	—	(131,250)	(131)	131	—	—
Vesting of restricted stock	—	—	—	—	—	—	—	—	—	2,549	—	2,549
Stock-based compensation expense	—	—	—	—	—	—	—	—	—	76,154	—	76,154
Accretion of preferred stock offering costs	—	27,483	—	3,214	—	—	30,697	—	—	(30,697)	—	(30,697)
Net loss	—	—	—	—	—	—	—	—	—	—	(11,131,740)	(11,131,740)
Balance, December 31, 2010	25,074,999	24,963,623	17,500,000	17,464,646	—	—	42,428,269	4,055,062	4,055	48,137	(27,575,264)	(27,523,072)
Issuance of Series B convertible preferred stock, net of issuance costs of \$10,046—July and December 2011	—	—	13,300,000	13,289,954	—	—	13,289,954	—	—	—	—	—
Issuance of Series B-1 convertible preferred stock, net of issuance costs of \$3,172 and preferred stock warrants of \$1,347,428—July and December 2011	—	—	—	—	4,200,000	2,849,400	2,849,400	—	—	—	—	—
Vesting of restricted stock	—	—	—	—	—	—	—	—	—	1,966	—	1,966
Stock-based compensation expense	—	—	—	—	—	—	—	—	—	180,584	—	180,584
Accretion of preferred stock to its redemption value	—	20,250	—	7,088	—	46,231	73,569	—	—	(73,569)	—	(73,569)
Net loss	—	—	—	—	—	—	—	—	—	—	(15,810,004)	(15,810,004)
Balance, December 31, 2011	25,074,999	24,983,873	30,800,000	30,761,688	4,200,000	2,895,631	58,641,192	4,055,062	4,055	157,118	(43,385,268)	(43,224,095)
Vesting of restricted stock	—	—	—	—	—	—	—	—	—	162	—	162
Stock-based compensation expense	—	—	—	—	—	—	—	—	—	176,308	—	176,308
Exercise of stock options	—	—	—	—	—	—	—	176,448	177	2,733	—	2,910
Accretion of preferred stock to its redemption value	—	20,250	—	8,506	—	287,886	316,642	—	—	(316,642)	—	(316,642)

Net loss	—	—	—	—	—	—	—	—	—	—	(15,635,658)	(15,635,658)
Balance, December 31, 2012	<u>25,074,999</u>	<u>\$ 25,004,123</u>	<u>30,800,000</u>	<u>\$ 30,770,194</u>	<u>4,200,000</u>	<u>\$ 3,183,517</u>	<u>\$ 58,957,834</u>	<u>4,231,510</u>	<u>\$ 4,232</u>	<u>\$ 19,679</u>	<u>\$ (59,020,926)</u>	<u>\$ (58,997,015)</u>

See accompanying notes to financial statements.

**TREVENA, INC.**  
**(A Development-Stage Company)**

**Statements of Cash Flows**

	<u>Year Ended December 31,</u>		<u>Period From</u>
	<u>2011</u>	<u>2012</u>	<u>November 9, 2007</u> <u>(date of inception) to</u> <u>December 31, 2012</u>
<b>Operating activities:</b>			
Net loss	\$ (15,810,004)	\$ (15,635,658)	\$ (58,968,713)
Adjustments to reconcile net loss to net cash used in operating activities:			
Depreciation and amortization	801,580	787,522	3,259,371
Stock-based compensation	180,584	176,308	437,254
Issuance of restricted stock for consulting services	—	—	7,380
Issuance of common stock for a license agreement	—	—	1,250
Noncash interest expense on loans	10,680	48,848	69,278
Loss on disposal of assets	5,062	—	5,062
Revaluation of preferred stock warrant liability	(10,885)	(44,576)	(55,461)
Changes in operating assets and liabilities:			
Prepaid expenses and other assets	885,666	114,302	(271,132)
Restricted cash	44,000	92,000	(214,000)
Accounts payable and accrued expenses	611,727	(343,899)	1,864,987
Net cash used in operating activities	<u>(13,281,590)</u>	<u>(14,805,153)</u>	<u>(53,864,724)</u>
<b>Investing activities:</b>			
Purchase of property and equipment	(97,783)	(21,344)	(4,162,997)
Net cash used in investing activities	<u>(97,783)</u>	<u>(21,344)</u>	<u>(4,162,997)</u>
<b>Financing activities:</b>			
Proceeds from issuance of redeemable convertible preferred stock and warrants, net	17,486,782	—	59,816,963
Proceeds from sale of restricted common stock	—	—	11,836
Proceeds from exercise of common stock options	—	2,910	3,463
Repurchase of restricted stock	—	—	(1,312)
Proceeds from loans payable	—	5,300,000	7,615,278
Repayment of loans payable	(902,436)	(797,863)	(2,668,611)
Capital lease payments	(631)	—	(11,237)
Net cash provided by financing activities	<u>16,583,715</u>	<u>4,505,047</u>	<u>64,766,380</u>
Net increase (decrease) in cash and cash equivalents	3,204,342	(10,321,450)	6,738,659
Cash and cash equivalents—beginning of period	13,855,767	17,060,109	—
Cash and cash equivalents—end of period	<u>\$ 17,060,109</u>	<u>\$ 6,738,659</u>	<u>\$ 6,738,659</u>
<b>Supplemental disclosure of cash flow information:</b>			
Capital lease obligations incurred for the acquisition of office equipment	\$ —	\$ —	\$ 11,237
Cash paid for interest	<u>\$ 96,585</u>	<u>\$ 148,351</u>	<u>\$ 479,584</u>
Fair value of preferred stock warrants issued	<u>\$ 1,347,428</u>	<u>\$ 101,707</u>	<u>\$ 1,449,135</u>

See accompanying notes to financial statements.

**TREVENA, INC.**

**(A Development-Stage Company)**

**Notes to Financial Statements**

**December 31, 2012**

**1. Organization and Description of the Business**

Trevena, Inc. (the Company) is a development-stage biopharmaceutical company that was incorporated in Delaware as Parallax Therapeutics, Inc. on November 9, 2007. The Company began operations in December 2007, and its name was changed to Trevena, Inc. on January 3, 2008. The Company is a drug discovery company focused on discovering and developing pharmaceutical products targeting G protein coupled receptors. The Company operates in one segment and has its principal office in King of Prussia, Pennsylvania. The Company's revenue is derived from research grants and a research collaboration with a pharmaceutical company.

**Liquidity**

The Company has incurred recurring operating losses since inception. As of December 31, 2012, the Company had an accumulated deficit of \$59,020,926 and will require substantial additional capital to fund its research and development. The Company anticipates operating losses to continue for the foreseeable future due to, among other things, costs related to research funding, development of its product candidates and its preclinical programs, and the development of its administrative organization. The Company believes that its cash resources of \$6,738,659 at December 31, 2012 in addition to the \$59,999,997 raised in May 2013 through the sale and issuance of Series C Preferred Stock will be sufficient to allow the Company to fund its current operating plan through the end of 2015; however, the Company will be required to raise additional capital to fund operations beyond this time. As the Company continues to incur losses, a transition to profitability is dependent upon the successful development, approval and commercialization of its product candidates and the achievement of a level of revenue adequate to support the Company's cost structure. The Company may never achieve profitability, and unless and until it does, the Company will continue to need to raise additional capital. Management intends to fund future operations through the sale of equity, debt financings or other sources, including potential additional collaborations. There can be no assurances, however, that additional funding will be available on terms acceptable to the Company, or at all.

**2. Summary of Significant Accounting Policies**

**Basis of Presentation**

The accompanying financial statements have been prepared in conformity with accounting principles generally accepted in the United States of America (GAAP). Any reference in these notes to applicable guidance is meant to refer to the authoritative United States generally accepted accounting principles as found in the Accounting Standards Codification (ASC) and Accounting Standards Update (ASU) of the Financial Accounting Standards Board (FASB). The Company considers the U.S. dollar to be its functional currency.

**Unaudited Pro Forma Information**

In September 2013, the Company's board of directors (the Board) authorized management of the Company to pursue the filing of a registration statement with the Securities and Exchange Commission (SEC) for the Company to sell shares of its common stock to the public in an initial public offering (IPO). The unaudited pro forma net loss per share is computed using the weighted-average number of

**TREVENA, INC.**

**(A Development-Stage Company)**

**Notes to Financial Statements (Continued)**

**December 31, 2012**

**2. Summary of Significant Accounting Policies (Continued)**

common shares outstanding and gives effect to the automatic conversion of all outstanding shares of the Company's preferred stock and certain exercised warrants, into an aggregate of \_\_\_\_\_ shares of the Company's common stock, which assumes a 1:1 conversion ratio, as if they had occurred at January 1, 2012, or the date of original issuance, if later. Upon conversion of the redeemable convertible preferred stock into shares of the Company's common stock in the event of an IPO, the holders of the redeemable convertible preferred stock are not entitled to receive undeclared dividends. Accordingly, the impact of the redemption value and issuance costs has been excluded from the determination of net loss per share.

**Use of Estimates**

Management considers many factors in selecting appropriate financial accounting policies and controls, and in developing the estimates and assumptions that are used in the preparation of these financial statements. Management must apply significant judgment in this process. In addition, other factors may affect estimates, including expected business and operational changes, sensitivity and volatility associated with the assumptions used in developing estimates, and whether historical trends are expected to be representative of future trends. The estimation process often may yield a range of potentially reasonable estimates of the ultimate future outcomes and management must select an amount that falls within that range of reasonable estimates. This process may result in actual results differing materially from those estimated amounts used in the preparation of the financial statements if these results differ from historical experience, or other assumptions do not turn out to be substantially accurate, even if such assumptions are reasonable when made. In preparing these financial statements, management used significant estimates in the following areas, among others: stock-based compensation expense, the determination of the fair value of stock-based awards, the fair value of liability-classified preferred stock warrants, the accounting for research and development costs, accrued expenses and the recoverability of the Company's net deferred tax assets and related valuation allowance.

The Company utilizes significant estimates and assumptions in determining the fair value of its common stock. The Board determined the estimated fair value of the Company's common stock based on a number of objective and subjective factors, including external market conditions affecting the biotechnology industry and the prices at which the Company sold shares of redeemable convertible preferred stock, the superior rights and preferences of securities senior to the Company's common stock at the time, and the likelihood of achieving a liquidity event, such as an IPO or sale of the Company.

**Cash and Cash Equivalents**

The Company considers all highly liquid investments that have maturities of three months or less when acquired to be cash equivalents. Cash and cash equivalents subject the Company to concentrations of credit risk. However, the Company has invested in money market mutual funds that invest substantially all of their assets in U.S. government securities. Cash equivalents are valued at cost, which approximates their fair market value.

**TREVENA, INC.**

**(A Development-Stage Company)**

**Notes to Financial Statements (Continued)**

**December 31, 2012**

**2. Summary of Significant Accounting Policies (Continued)**

**Restricted Cash**

At December 31, 2011 and 2012, the Company maintained letters of credit totaling \$306,000 and \$214,000 as collateral for the Company's facility and laboratory equipment lease obligations in Pennsylvania.

**Concentration of Credit Risk and Off-Balance Sheet Risk**

Financial instruments that potentially subject the Company to concentrations of credit risk are primarily cash, cash equivalents, restricted cash and grants receivable. The Company maintains its cash and cash equivalent balances in the form of money market mutual funds that invest substantially all of their assets in U.S. government securities with financial institutions that management believes are creditworthy. The Company's investment policy includes guidelines on the quality of the institutions and financial instruments and defines allowable investments that the Company believes minimizes the exposure to concentration of credit risk.

The Company routinely assesses the creditworthiness of its collaborators. The Company has not experienced any material losses related to receivables from collaborators. The Company does not require collateral from its collaborators.

The Company has not recognized any losses from credit risks on such accounts since inception. The Company believes it is not exposed to significant credit risk on cash.

**Property and Equipment**

Property and equipment consists of computer and laboratory equipment, software, office equipment, furniture and leasehold improvements and is recorded at cost. Maintenance and repairs that do not improve or extend the lives of the respective assets are expensed to operations as incurred. Upon disposal, retirement or sale the related cost and accumulated depreciation is removed from the accounts and any resulting gain or loss is included in the results of operations. Property and equipment are depreciated on a straight-line basis over their estimated useful lives. The Company uses a life of three years for computer equipment, and five years for laboratory equipment, office equipment, furniture and software. Leasehold improvements are amortized over the shorter of the lease term or the estimated useful life of the asset.

The Company reviews long-lived assets when events or changes in circumstances indicate the carrying value of the assets may not be recoverable. Recoverability is measured by comparison of the book values of the assets to future net undiscounted cash flows that the assets are expected to generate. If such assets are considered to be impaired, the impairment to be recognized is measured by the amount by which the book value of the assets exceed their fair value, which is measured based on the projected discounted future net cash flows arising from the assets. No impairment losses have been recorded since inception.

**TREVENA, INC.**

**(A Development-Stage Company)**

**Notes to Financial Statements (Continued)**

**December 31, 2012**

**2. Summary of Significant Accounting Policies (Continued)**

**Grant Revenue Recognition**

The Company recognizes grant revenue when persuasive evidence of an arrangement exists, delivery has occurred or services have been rendered, the price is fixed and determinable, and collectibility is reasonably assured. In 2009, the Company received a research grant from the National Institutes of Health (NIH) to assist in the funding of certain research activities from September 2009 through August 2011. The amount of the award was approximately \$7.6 million and as of December 31, 2011, the Company had completed all activities and recognized all revenue related to this grant. In August 2011, the Company received a second research grant from the NIH to assist in the funding of its delta opioid program. The award contemplated funding up to \$496,000 during the period from August 15, 2011 through July 31, 2016, subject to availability of funds and successful progression of the program. Through June 6, 2013, the Company had received \$338,162 and on June 6, 2013, the Company was informed that no additional funds would be made available. In November 2011, the Company received a research grant for approximately \$205,000 from the Michael J. Fox Foundation for the funding of certain research activities from December 2011 through November 2012. As of December 31, 2012, the Company had completed all activities and recognized all revenue related to this grant. The Company recognizes revenue under all three grants in earnings in the period in which the related expenditures are incurred. During the years ended December 31, 2011 and 2012 and the period from November 9, 2007 (date of inception) to December 31, 2012, the Company recognized revenue related to these grants of \$2,321,381, \$407,595 and \$8,098,317, respectively.

In November 2010, the Company received a Federal grant from the U.S. Internal Revenue Service for \$733,437 under the Qualifying Therapeutic Discovery Project Program. The Qualifying Therapeutic Discovery Project tax credit or grant is provided under section 48D of the Internal Revenue Code, enacted as part of the Patient Protection and Affordable Care Act of 2010. The funds were awarded for expenses previously incurred for three of the Company's research programs and were recognized as grant revenue when received.

In May 2009, the Company entered into an Opportunity Grant Program with the Commonwealth of Pennsylvania under which it could receive up to \$200,000 based on the achievement of specified headcount and expenditure milestones. The Company met its initial headcount goal and was awarded \$100,000 under this program in 2011. This revenue was recognized as received. The Company did not meet its second headcount goal and no additional revenue is expected under this program.

**Collaboration Revenue Recognition**

The Company recognizes collaboration revenue when persuasive evidence of an arrangement exists, delivery has occurred or services have been rendered, the price is fixed and determinable, and collectibility is reasonably assured. In May 2012, the Company entered into a research collaboration with Merck Sharp & Dohme Corporation (Merck), requiring the Company to conduct certain research activities. The Company was paid \$400,000 for this work and this revenue was recognized in 2012 when all of the recognition criteria were achieved. The research collaboration agreement was amended in April 2013 for an additional \$50,000 of research activities to be conducted in 2013.



**TREVENA, INC.**

**(A Development-Stage Company)**

**Notes to Financial Statements (Continued)**

**December 31, 2012**

**2. Summary of Significant Accounting Policies (Continued)**

**Research and Development**

Research and development costs are charged to expense as incurred. These costs include, but are not limited to, employee-related expenses, including salaries, benefits and travel and stock based compensation of our research and development personnel; expenses incurred under agreements with contract research organizations and investigative sites that conduct clinical trials and preclinical studies; the cost of acquiring, developing and manufacturing clinical trial materials; facilities; other supplies; allocated facilities, depreciation and other expenses, which include rent and utilities; insurance; and costs associated with preclinical activities and regulatory operations.

Costs for certain development activities, such as clinical trials, are recognized based on an evaluation of the progress to completion of specific tasks using data such as subject enrollment, clinical site activations or information provided to the Company by its vendors with respect to their actual costs incurred. Payments for these activities are based on the terms of the individual arrangements, which may differ from the pattern of costs incurred, and are reflected in the financial statements as prepaid or accrued research and development expense, as the case may be.

**Comprehensive Loss**

Comprehensive loss is defined as the change in equity of a business enterprise during a period from transactions and other events and circumstances from non-owner sources. Comprehensive loss was equal to net loss for all periods presented.

**Income Taxes**

Income taxes are recorded in accordance with ASC Topic 740, *Income Taxes* (ASC 740), which provides for deferred taxes using an asset and liability approach. The Company recognizes deferred tax assets and liabilities for the expected future tax consequences of events that have been included in the financial statements or tax returns. Deferred tax assets and liabilities are determined based on the difference between the financial statement and tax bases of assets and liabilities using enacted tax rates in effect for the year in which the differences are expected to reverse. Valuation allowances are provided, if based upon the weight of available evidence, it is more likely than not that some or all of the deferred tax assets will not be realized.

The Company accounts for uncertain tax positions in accordance with the provisions of ASC 740. When uncertain tax positions exist, the Company recognizes the tax benefit of tax positions to the extent that the benefit will more likely than not be realized. The determination as to whether the tax benefit will more likely than not be realized is based upon the technical merits of the tax position as well as consideration of the available facts and circumstances. As of December 31, 2011 and 2012, the Company does not have any significant uncertain tax positions.

**Preferred Stock Warrants**

Freestanding warrants that are related to the purchase of preferred stock are classified as liabilities and recorded at fair value regardless of the timing of the redemption feature or the redemption price

TREVENA, INC.

(A Development-Stage Company)

Notes to Financial Statements (Continued)

December 31, 2012

**2. Summary of Significant Accounting Policies (Continued)**

or the likelihood of redemption. The warrants are subject to re-measurement at each balance sheet date and any change in fair value is recognized as a component of change in fair value of warrant liability in the Statements of Operations and Comprehensive Loss. Pursuant to the terms of these warrants, upon the conversion to common stock of the series of preferred stock underlying the warrant, the warrants automatically become exercisable for shares of common stock based upon the conversion ratio of the underlying preferred stock. Upon such conversion of the underlying series of preferred stock, the warrants will be classified as a component of equity and will no longer be subject to re-measurement. Further, in the event of an initial public offering or a change in control of the Company, 1,650,000 of the 1,775,000 outstanding warrants shall terminate unless exercised, immediately prior to the date such public offering or change in control is closed. The Company will continue to adjust the liability for changes in fair value until the earlier of the exercise or expiration of the warrants or the conversion of the underlying preferred stock. The preferred stock warrants are classified as Level 3 liabilities (see Fair Value Measurements).

**Fair Value of Financial Instruments**

The carrying amount of the Company's financial instruments, which include cash and cash equivalents, grants receivable, restricted cash, accounts payable and accrued expenses approximate their fair values, given their short-term nature. The carrying amount of the Company's loans payable approximates fair value because the interest rate is reflective of the rate the Company could obtain on debt with similar terms and conditions. The preferred stock warrants are carried at fair value as disclosed above. The Company has evaluated the estimated fair value of financial instruments using available market information and management's estimates. The use of different market assumptions and/or estimation methodologies could have a significant effect on the estimated fair value amounts.

**Fair Value Measurements**

ASC Topic 820, *Fair Value Measurement* (ASC 820), establishes a fair value hierarchy for instruments measured at fair value that distinguishes between assumptions based on market data (observable inputs) and the Company's own assumptions (unobservable inputs). Observable inputs are inputs that market participants would use in pricing the asset or liability based on market data obtained from sources independent of the Company. Unobservable inputs are inputs that reflect the Company's assumptions about the inputs that market participants would use in pricing the asset or liability, and are developed based on the best information available in the circumstances.

ASC 820 identifies fair value as the exchange price, or exit price, representing the amount that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants. As a basis for considering market participant assumptions in fair value measurements, ASC Topic 820 establishes a three-tier fair value hierarchy that distinguishes among the following:

- Level 1—Valuations based on unadjusted quoted prices in active markets for identical assets or liabilities that the Company has the ability to access.

TREVENA, INC.

(A Development-Stage Company)

Notes to Financial Statements (Continued)

December 31, 2012

2. Summary of Significant Accounting Policies (Continued)

- Level 2—Valuations based on quoted prices for similar assets or liabilities in active markets, quoted prices for identical or similar assets or liabilities in markets that are not active and models for which all significant inputs are observable, either directly or indirectly.
- Level 3—Valuations based on inputs that are unobservable and significant to the overall fair value measurement.

To the extent that the valuation is based on models or inputs that are less observable or unobservable in the market, the determination of fair value requires more judgment. Accordingly, the degree of judgment exercised by the Company in determining fair value is greatest for instruments categorized in Level 3. A financial instrument's level within the fair value hierarchy is based on the lowest level of any input that is significant to the fair value measurement.

Items measured at fair value on a recurring basis include money market mutual funds, restricted cash and warrants to purchase redeemable convertible preferred stock. During the periods presented, the Company has not changed the manner in which it values assets and liabilities that are measured at fair value using Level 3 inputs. The following fair value hierarchy table presents information about each major category of the Company's financial assets and liabilities measured at fair value on a recurring basis:

	Quoted Prices in Active Markets for Identical Items (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Total
<b>December 31, 2011</b>				
<b>Assets</b>				
Money market mutual funds	\$ 13,777,249	\$ —	\$ —	\$ 13,777,249
Restricted cash	306,000	—	—	306,000
<b>Total assets</b>	<b>\$ 14,083,249</b>	<b>\$ —</b>	<b>\$ —</b>	<b>\$ 14,083,249</b>
<b>Liabilities</b>				
Warrants to purchase redeemable preferred stock	\$ —	\$ —	\$ 1,336,543	\$ 1,336,543
<b>Total liabilities</b>	<b>\$ —</b>	<b>\$ —</b>	<b>\$ 1,336,543</b>	<b>\$ 1,336,543</b>
<b>December 31, 2012</b>				
<b>Assets</b>				
Money market mutual funds	\$ 3,050,003	\$ —	\$ —	\$ 3,050,003
Restricted cash	214,000	—	—	214,000
<b>Total assets</b>	<b>\$ 3,264,003</b>	<b>\$ —</b>	<b>\$ —</b>	<b>\$ 3,264,003</b>
<b>Liabilities</b>				
Warrants to purchase redeemable preferred stock	\$ —	\$ —	\$ 1,393,674	\$ 1,393,674
<b>Total liabilities</b>	<b>\$ —</b>	<b>\$ —</b>	<b>\$ 1,393,674</b>	<b>\$ 1,393,674</b>

**TREVENA, INC.****(A Development-Stage Company)****Notes to Financial Statements (Continued)****December 31, 2012****2. Summary of Significant Accounting Policies (Continued)**

The following table sets forth a summary of changes in the fair value of the Company's preferred warrant liability, which represents a recurring measurement that is classified within Level 3 of the fair value hierarchy, wherein fair value is estimated using significant unobservable inputs:

	<b>Redeemable Convertible Preferred Stock Warrant Liability</b>
Balance as of December 31, 2010	\$ —
Amounts acquired or issued	1,347,428
Changes in estimated fair value	(10,885)
Balance as of December 31, 2011	1,336,543
Amounts acquired or issued	101,707
Changes in estimated fair value	(44,576)
Balance as of December 31, 2012	<u>\$ 1,393,674</u>

The money market mutual funds noted above are included in cash and cash equivalents in the accompanying balance sheets. The Company recognizes transfers between levels of the fair value hierarchy as of the end of the reporting period. There were no transfers within the hierarchy during the years ended December 31, 2011 or 2012.

The fair value of the warrants on the date of issuance and on each re-measurement date of those warrants classified as liabilities is estimated using the Black-Scholes option pricing model using the following assumptions: contractual life according to the remaining terms of the warrants, no dividend yield, weighted average risk-free interest rate of 3.00% and 1.92% at December 31, 2011 and 2012, respectively, fair value of underlying instrument of \$1.00, and weighted average volatility of 80.0%. For this liability, the Company developed its own assumptions that do not have observable inputs or available market data to support the fair value. This method of valuation involves using inputs such as the fair value of the Company's various classes of preferred stock, stock price volatility, the contractual term of the warrants, risk free interest rates and dividend yields. Due to the nature of these inputs, the valuation of the warrants is considered a Level 3 measurement. The Company accounts for its redeemable convertible preferred stock warrants as liabilities in accordance with the guidance for accounting for certain financial instruments with characteristics of both liabilities and equity as the warrants entitle the holder to purchase preferred stock that is considered contingently redeemable. The warrant liability is recorded on its own line item on the Company's Balance Sheets. The warrant liability is marked-to-market each reporting period with the change in fair value recorded on its own line in the Statement of Operations and Comprehensive Loss until the warrants are exercised, expire or other facts and circumstances lead the warrant liability to be reclassified as an equity instrument.

**Stock-Based Compensation**

At December 31, 2012, the Company had one stock-based compensation plan, which is more fully described in Note 7. The Company accounts for stock-based compensation in accordance with the

TREVENA, INC.

(A Development-Stage Company)

Notes to Financial Statements (Continued)

December 31, 2012

**2. Summary of Significant Accounting Policies (Continued)**

provisions of ASC Topic 718, *Compensation—Stock Compensation* (ASC 718), which requires the recognition of expense related to the fair value of stock-based compensation awards in the Statements of Operations and Comprehensive Loss.

For stock options issued to employees and members of the Board for their services on the Board, the Company estimates the grant date fair value of each option using the Black-Scholes option pricing model. The use of the Black-Scholes option pricing model requires management to make assumptions with respect to the expected term of the option, the expected volatility of the common stock consistent with the expected life of the option, risk-free interest rates, the value of the common stock and expected dividend yields of the common stock. For awards subject to service-based vesting conditions, the Company recognizes stock-based compensation expense, net of estimated forfeitures, equal to the grant date fair value of stock options on a straight-line basis over the requisite service period, which is generally the vesting term. For awards subject to both performance and service-based vesting conditions, the Company recognizes stock-based compensation expense using the straight-line recognition method when it is probable that the performance condition will be achieved. Forfeitures are required to be estimated at the time of grant and revised, if necessary, in subsequent periods if actual forfeitures differ from those estimates.

Share-based payments issued to non-employees are recorded at their fair values, and are periodically revalued as the equity instruments vest and are recognized as expense over the related service period in accordance with the provisions of ASC 718 and ASC Topic 505, *Equity*. See Note 7 for a discussion of the assumptions used by the Company in determining the grant date fair value of options granted under the Black-Scholes option pricing model, as well as a summary of the stock option activity under the Company's stock-based compensation plan for the years ended December 31, 2011 and 2012.

**Clinical Trial Expense Accruals**

As part of the process of preparing its financial statements, the Company is required to estimate its expenses resulting from its obligations under contracts with vendors, clinical research organizations and consultants and under clinical site agreements in connection with conducting clinical trials. The financial terms of these contracts are subject to negotiations, which vary from contract to contract and may result in payment flows that do not match the periods over which materials or services are provided under such contracts. The Company's objective is to reflect the appropriate trial expenses in its financial statements by matching those expenses with the period in which services are performed and efforts are expended. The Company accounts for these expenses according to the progress of the trial as measured by subject progression and the timing of various aspects of the trial. The Company determines accrual estimates through financial models taking into account discussion with applicable personnel and outside service providers as to the progress or state of consummation of trials, or the services completed. During the course of a clinical trial, the Company adjusts its clinical expense recognition if actual results differ from its estimates. The Company makes estimates of its accrued expenses as of each balance sheet date based on the facts and circumstances known to it at that time. The Company's clinical trial accruals are dependent upon the timely and accurate reporting of contract research organizations and other third-party vendors. Although the Company does not expect its

**TREVENA, INC.**

**(A Development-Stage Company)**

**Notes to Financial Statements (Continued)**

**December 31, 2012**

**2. Summary of Significant Accounting Policies (Continued)**

estimates to be materially different from amounts actually incurred, its understanding of the status and timing of services performed relative to the actual status and timing of services performed may vary and may result in it reporting amounts that are too high or too low for any particular period. For the years ended December 31, 2011 and 2012, there were no material adjustments to the Company's prior period estimates of accrued expenses for clinical trials.

**Segment Information**

Operating segments are identified as components of an enterprise about which separate discrete financial information is available for evaluation by the chief operating decision maker, or decision-making group, in making decisions on how to allocate resources and assess performance. The Company's chief operating decision maker is the chief executive officer. The Company and the chief executive officer view the Company's operations and manage its business as one operating segment. All long-lived assets of the Company reside in the United States.

**Basic and Diluted Net Loss Per Share of Common Stock**

Basic net loss per share of common stock is computed by dividing net loss attributable to common stockholders by the weighted-average number of shares of common stock outstanding during the period, excluding the dilutive effects of preferred stock, warrants to purchase preferred stock and stock options. Diluted net loss per share of common stock is computed by dividing the net loss attributable to common stockholders by the sum of the weighted-average number of shares of common stock outstanding during the period plus the potential dilutive effects of preferred stock and warrants to purchase preferred stock, and stock options outstanding during the period calculated in accordance with the treasury stock method, although these shares, options and warrants are excluded if their effect is anti-dilutive. Because the impact of these items is anti-dilutive during periods of net loss, there was no difference between basic and diluted net loss per share of Common Stock for the years ended December 31, 2011 and 2012.

**Recent Accounting Pronouncements**

On April 5, 2012, the Jump-Start Our Business Startups Act (the JOBS Act) was signed into law. The JOBS Act contains provisions that, among other things, reduce certain reporting requirements for an "emerging growth company." The Company is considered an emerging growth company, but has elected to not take advantage of the extended transition period afforded by the JOBS Act for the implementation of new or revised accounting standards. As a result, the Company will comply with new or revised accounting standards on the relevant dates on which adoption of such standards is required for non-emerging growth companies.

In June 2011, FASB issued ASU No. 2011-05, "Comprehensive Income (ASC Topic 220): Presentation of Comprehensive Income" (ASU 2011-05). This accounting update eliminates the option to present the components of other comprehensive income as part of the statement of stockholders' equity. Instead, comprehensive income must be presented in either a single continuous statement of comprehensive income, which contains two sections, net income and other comprehensive income, or in

**TREVENA, INC.****(A Development-Stage Company)****Notes to Financial Statements (Continued)****December 31, 2012****2. Summary of Significant Accounting Policies (Continued)**

two separate but consecutive statements. ASU 2011-05 was effective for fiscal periods beginning after December 15, 2011 with early adoption permitted. The Company's retrospective adoption of ASU 2011-05 did not have a significant impact on its financial position, results of operations or cash flows.

In February 2013, FASB issued ASU No. 2013-02, "Comprehensive Income (Topic 220): Reporting of Amounts Reclassified Out of Accumulated Other Comprehensive Income" ("ASU 2013-02"). ASU 2013-02 requires companies to present either in a single note or parenthetically on the face of the financial statements, the effect of significant amounts reclassified from each component of accumulated other comprehensive income based on its source and the income statement line items affected by the reclassification. This guidance is effective for annual reporting periods beginning after December 15, 2012. The Company believes the adoption of this standard will not have a significant impact on its financial position, results of operations or cash flows.

**3. Net Loss Per Common Share**

The following table sets forth the computation of basic and diluted net loss per share for the periods indicated:

	Year Ended December 31,	
	2011	2012
Basic and diluted net loss per common share calculation:		
Net loss	\$ (15,810,004)	\$ (15,635,658)
Accretion of redeemable convertible preferred stock	(73,569)	(316,642)
Net loss attributable to common stockholders	<u>\$ (15,883,573)</u>	<u>\$ (15,952,300)</u>
Weighted average common shares outstanding	<u>3,611,112</u>	<u>4,173,782</u>
Net loss per share of common stock—basic and diluted	<u>\$ (4.40)</u>	<u>\$ (3.82)</u>

The following outstanding securities at December, 31, 2011 and 2012 have been excluded from the computation of diluted weighted shares outstanding, as they would have been anti-dilutive:

	December 31,	
	2011	2012
Redeemable convertible preferred stock	60,074,999	60,074,999
Unvested restricted stock	129,375	—
Options outstanding	9,696,154	9,443,590
Warrants	1,790,000	1,790,000
Total	<u>71,690,528</u>	<u>71,308,589</u>

## TREVENA, INC.

(A Development-Stage Company)

## Notes to Financial Statements (Continued)

December 31, 2012

**4. Property and Equipment**

Property and equipment consisted of the following:

	December 31,	
	2011	2012
Laboratory equipment	\$ 1,845,905	\$ 1,853,685
Computers and software	404,674	416,606
Office equipment and furniture	183,412	185,044
Leasehold improvements	1,680,125	1,680,125
Total property and equipment	4,114,116	4,135,460
Less accumulated depreciation and amortization	(2,438,137)	(3,225,659)
Property and equipment, net	<u>\$ 1,675,979</u>	<u>\$ 909,801</u>

Depreciation and amortization expense was \$801,580 and \$787,522 for the years ended December 31, 2011 and 2012, respectively, and \$3,259,371 for the period from November 9, 2007 (date of inception) to December 31, 2012.

**5. Accrued Expenses and Other Current Liabilities**

Accrued expenses and other current liabilities consisted of the following:

	December 31,	
	2011	2012
Compensation and benefits	\$ 684,428	\$ 745,820
Clinical trial fees	426,217	269,367
Research and development expenses	149,986	164,777
Professional services	77,157	60,855
Other accrued expenses and other current liabilities	24,243	40,841
Total accrued expenses and other current liabilities	<u>\$ 1,362,031</u>	<u>\$ 1,281,660</u>

**6. Loans Payable**

In September 2008, the Company entered into an equipment loan facility with a bank (the Bank Facility) that provided for borrowings up to \$1,500,000, subject to certain conditions, through February 2009. Borrowings under the Bank Facility were used to finance laboratory equipment, office equipment, furnishings and, up to specified maximum percentages, software and leasehold improvements. Borrowings were secured by the related assets. In November 2011, the Company repaid the outstanding balance of the loan, plus a final payment equal to 2% of the amount borrowed. Interest expense related to the Bank Facility was \$47,929 in 2011 and \$259,993 for the period from November 9, 2007 (date of inception) to December 31, 2012. In connection with the Bank Facility, the Company incurred financing costs of \$13,768, which were included in other assets and amortized to interest expense over the term of the Bank Facility. Amortization expense of these deferred financing costs was \$5,985 in 2011 and \$13,768 for the period from November 9, 2007 (date of inception) to December 31, 2012. In



**TREVENA, INC.****(A Development-Stage Company)****Notes to Financial Statements (Continued)****December 31, 2012****6. Loans Payable (Continued)**

connection with the borrowings under the Bank Facility, the Company issued a ten-year warrant to purchase 15,000 shares of common stock at \$0.01 per share, exercisable through June 2018.

In November 2009, the Company entered into an equipment loan facility with the Commonwealth of Pennsylvania (the PA Facility) that provided for borrowings of up to \$815,278 subject to certain conditions. Borrowings under the PA Facility were used to finance laboratory equipment and computer equipment. Borrowings were secured by the related assets. As of December 31, 2011, \$444,530 of borrowings was outstanding under the PA Facility and in December 2012, the Company repaid the outstanding balance of the loan. Interest expense related to the PA Facility was \$15,937 and \$9,970 in 2011 and 2012, respectively, and \$50,333 for the period from November 9, 2007 (date of inception) to December 31, 2012. In connection with the PA Facility, the Company incurred financing costs of \$13,745, which were included in other assets and amortized to interest expense over the term of the PA Facility. Amortization expense of these deferred financing costs was \$3,172 and \$7,137 in 2011 and 2012, respectively, and \$13,745 for the period from November 9, 2007 (date of inception) to December 31, 2012.

In December 2011, the Company entered into a loan facility with Comerica Bank (the Comerica Facility) that provided for borrowings of up to \$5,300,000 subject to certain conditions. Borrowings under the Comerica Facility are used to fund working capital for general business requirements and are secured by the assets of the Company, excluding intellectual property. The facility bears interest at the prime rate plus a 1% margin (4.25% as of December 31, 2012). The Company drew down the entire amount available under the Comerica Facility during 2012. The borrowings are to be repaid in 30 equal monthly installments, plus interest, beginning November 1, 2012. As of December 31, 2012, \$4,946,667 of borrowings were outstanding under the Comerica Facility. Interest expense related to the Comerica Facility was \$150,751 in 2012. In connection with the Comerica Facility, the Company incurred financing costs of \$62,034, which are included in other assets and are being amortized to interest expense over the term of the Comerica Facility. Amortization expense of these deferred financing costs was \$1,523 and \$18,464 in 2011 and 2012, respectively, and \$19,987 for the period from November 9, 2007 (date of inception) to December 31, 2012. In connection with the borrowings under the Comerica Facility, the Company issued a ten-year warrant to purchase 125,000 shares of Series B preferred stock at \$1.00 per share, exercisable through December 2021. The Company recorded a total of \$101,707 as debt discount related to the estimated fair value of the preferred stock warrants issued, with a corresponding credit to the preferred stock warrant liability. The debt discount is being amortized to interest expense over the term of the Comerica Facility. Interest expense recognized in 2012 related to the amortization of the debt discount was \$23,247.

Total borrowings outstanding as of December 31, 2012 were \$4,946,667, which are due as follows:

2013	\$ 2,120,000
2014	2,120,000
2015	706,667
	<u>\$ 4,946,667</u>

**TREVENA, INC.**

**(A Development-Stage Company)**

**Notes to Financial Statements (Continued)**

**December 31, 2012**

**7. Redeemable Convertible Preferred Stock and Stockholder's Equity**

**Redeemable Convertible Preferred Stock**

On January 4, 2008, the Company authorized the sale and issuance of up to 25,000,000 shares of Series A Convertible Preferred Stock (the Series A). On January 7, 2008, the Company completed the first closing of its sale of the Series A and issued 501,562 shares at \$1.00 per share generating gross proceeds of \$501,562. On January 31, 2008, the Company completed a second closing of its sale of the Series A and issued an additional 4,514,062 shares at \$1.00 per share generating gross proceeds of \$4,514,062. Costs associated with these offerings were \$200,137. In September 2008, the Company completed a third closing of its sale of the Series A and issued an additional 8,025,000 shares at \$1.00 per share generating gross proceeds of \$8,025,000. Costs associated with this offering were \$2,154. On June 30, 2009, the Company completed a fourth closing of its sale of the Series A and issued 11,034,375 shares at \$1.00 per share generating gross proceeds of \$11,034,375. Costs associated with this offering were \$561. On November 16, 2009, the Company amended the stock purchase agreement associated with the Series A financing and issued an additional 1,000,000 shares at \$1.00 per share generating gross proceeds of \$1,000,000. Costs associated with this offering were \$3,398. All offering costs associated with the Series A are being accreted into the carrying value of the Series A until its redemption date, adjusted on July 8, 2010 from January 2014 to July 2016.

On July 8, 2010, the Company authorized the sale and issuance of up to 35,000,000 shares of Series B Preferred Stock (the Series B) and up to 4,300,000 of Series B-1 Preferred Stock (the Series B-1). In connection with the authorization of the Series B and the Series B-1, the Company also authorized the sale and issuance of warrants to purchase up to 1,700,000 shares of the Series B-1 (the Series B-1 Warrants). On July 8, 2010, the Company completed the first closing of its sale of the Series B and issued 17,500,000 shares at \$1.00 per share generating gross proceeds of \$17,500,000. Costs associated with this offering were \$38,568. On July 8, 2011, the Company completed its second closing, issuing 5,700,000 shares of its Series B at \$1.00 per share and 1,800,000 shares of its Series B-1 at \$1.00 per share. Costs associated with this offering were \$8,229. On December 15, 2011, the Company completed its third closing issuing 7,600,000 shares of its Series B at \$1.00 per share and 2,400,000 shares of its Series B-1 at \$1.00 per share. Costs associated with this offering were \$4,989. All offering costs associated with the Series B and Series B-1 are being accreted into the carrying value of the preferred stock until its redemption date in July 2016.

In connection with the issuance of the Series B-1 shares in the second and third closings, the Series B-1 shareholders received ten-year warrants to purchase a total of 1,650,000 shares of the Company's Series B-1 Preferred Stock at an exercise price of \$1.00 per share. The estimated fair value of the preferred stock warrants on the dates of issuance of \$1,347,428 was recorded as a reduction to the carrying value of the Series B-1 Preferred Stock and is being accreted into the carrying value of the Series B-1 until its redemption date in July 2016. The preferred stock warrants were recorded as a liability pursuant to the guidance for accounting for certain financial instruments with characteristics of both liabilities and equity and are revalued at each reporting period to reflect any changes in fair value.

Each share of the Series A, the Series B and the Series B-1 preferred stock is convertible into one share of common stock at any time at the option of the holder. The preferred stock is automatically convertible in the event of (i) an initial public offering at a price of at least \$4.00 per share of common

**TREVENA, INC.**

**(A Development-Stage Company)**

**Notes to Financial Statements (Continued)**

**December 31, 2012**

**7. Redeemable Convertible Preferred Stock and Stockholder's Equity (Continued)**

stock (subject to adjustment to reflect stock splits, stock dividends, stock combinations, recapitalizations and like occurrences) and net proceeds to the Company of at least \$40 million; or (ii) the affirmative vote or written consent of the holders of the majority of shares of the preferred stock then outstanding.

Holders of the preferred stock are entitled to receive non-cumulative dividends at the rate of 8% of the applicable purchase price per share per annum if and when declared by the board of directors. No dividends have been declared through December 31, 2012.

Holders of the preferred stock, voting as a class, are entitled to elect four members of the board of directors.

Holders of the preferred stock are entitled to a liquidation preference in an amount equal to \$1.00 per share plus all declared and unpaid dividends in the event of a liquidation, dissolution, or winding-up of the Company, or in the event the Company merges with or is acquired by another entity.

At any time on or after July 8, 2016, the holders of at least a majority of the outstanding shares of the preferred stock may require the Company to redeem, in three annual installments beginning on the date of the initial redemption, all of the outstanding shares of the preferred stock for an amount equal to the original issue price per share plus any declared and unpaid dividends.

**Common Stock**

The Company was authorized to issue 85,000,000 shares of common stock as of December 31, 2011 and 2012. The Company is required, at all times, to reserve and keep available out of its authorized but unissued shares of common stock sufficient shares to effect the conversion of the shares of the preferred stock and all stock options and warrants.

Holders of the common stock, voting as a class, are entitled to elect one member of the board of directors.

**Restricted Stock Agreements**

In connection with the formation of the Company, 2,316,000 shares of restricted common stock were sold to the Company's initial shareholders at a price of \$0.001 per share. The restricted stock agreements imposed transfer restrictions on the unvested shares of common stock and provided the Company with certain repurchase rights. The restricted shares vested ratably over four years from the time of grant.

In March 2008, the Company sold 1,590,000 shares of restricted common stock to four individuals in consideration for the performance of certain services. The Company received proceeds of \$9,420 and recorded expense of \$6,480 in 2008 related to the issuance of these shares. The restricted stock agreements imposed transfer restrictions on the unvested shares of common stock and provided the Company with certain repurchase rights. The restricted shares vested over periods ranging from two to four years from time of grant. Of these shares, 870,000 were sold under the 2008 Equity Incentive Plan discussed below.

In August 2009, the Company sold 504,000 shares of restricted common stock to one individual, which were subsequently adjusted in November 2009 to 100,000 shares of fully vested common stock in consideration for the performance of certain services. The Company received proceeds of \$100 and recorded expense of \$900 in 2009 related to the issuance of these shares.

**TREVENA, INC.**

**(A Development-Stage Company)**

**Notes to Financial Statements (Continued)**

**December 31, 2012**

**7. Redeemable Convertible Preferred Stock and Stockholder's Equity (Continued)**

In May 2010, the Company repurchased 131,250 shares of restricted common stock in association with the voluntary termination of one individual for a price of \$1,312.

There were no unvested shares of common stock that remain subject to repurchase rights as of December 31, 2012.

**2008 Equity Incentive Plan**

In January 2008, the Company adopted the 2008 Equity Incentive Plan (the Plan), amended on February 29, 2008, January 7, 2010, July 8, 2010, December 10, 2010 and June 23, 2011, that authorizes the Company to grant up to 11,479,259 shares of common stock to eligible employees, directors and consultants to the Company, in the form of restricted stock and stock options. The amount, terms of grant and exercisability provisions are determined by the board of directors. The term of the options may be up to 10 years, and options are exercisable in cash or as otherwise determined by the board of directors. Vesting generally occurs over a period of not greater than four years.

The estimated grant-date fair value of the Company's share-based awards is amortized ratably over the awards' service periods. Share-based compensation expense recognized was as follows:

	Year Ended December 31,		Period from November 9, 2007 (date of inception) to December 31, 2012
	2011	2012	
Research and development	\$ 109,695	\$ 124,879	\$ 285,512
General and administrative	70,889	51,429	151,742
Total stock-based compensation	<u>\$ 180,584</u>	<u>\$ 176,308</u>	<u>\$ 437,254</u>

	Shares Available for Grant	Number of Shares	Options Outstanding	
			Weighted-Average Exercise Price	Weighted Average Remaining Contractual Term (in years)
Balance, December 31, 2010	1,221,196	9,464,000	\$ 0.09	9.27
Granted	(565,460)	565,460	0.11	
Forfeitures	333,306	(333,306)	0.11	
Balance, December 31, 2011	989,042	9,696,154	0.09	8.55
Granted	(1,375,000)	1,375,000	0.11	
Exercised	—	(176,448)	0.02	
Forfeitures	1,451,116	(1,451,116)	0.11	
Balance, December 31, 2012	<u>1,065,158</u>	<u>9,443,590</u>	0.09	7.89
Vested or expected to vest at December 31, 2012		9,443,590	0.09	7.89
Exercisable at December 31, 2012		5,407,703	0.08	7.75

**TREVENA, INC.****(A Development-Stage Company)****Notes to Financial Statements (Continued)****December 31, 2012****7. Redeemable Convertible Preferred Stock and Stockholder's Equity (Continued)**

The Company uses the Black-Scholes option pricing model to estimate the fair value of stock options at the grant date. The Black-Scholes model requires the Company to make certain estimates and assumptions, including estimating the fair value of the Company's common stock, assumptions related to the expected price volatility of the Company's stock, the period during which the options will be outstanding, the rate of return on risk-free investments and the expected dividend yield for the Company's stock.

The per-share weighted-average grant date fair value of the options granted to employees during 2011 and 2012 was estimated at \$0.09 per share on the date of grant using the Black-Scholes option-pricing model with the following weighted-average assumptions:

	Year Ended December 31,	
	2011	2012
Risk-free interest rate	3.00%	1.92%
Expected term of options (in years)	6.1	6.1
Expected volatility	80.0%	80.0%
Dividend yield	0.00%	0.00%

The weighted-average valuation assumptions were determined as follows:

- Risk-free interest rate: The Company based the risk-free interest rate on the interest rate payable on U.S. Treasury securities in effect at the time of grant for a period that is commensurate with the assumed expected option term.
- Expected term of options: The Company estimated the expected life of its employee stock options using the "simplified" method, as prescribed in Staff Accounting Bulletin (SAB) No. 107, whereby the expected life equals the arithmetic average of the vesting term and the original contractual term of the option due to its lack of sufficient historical data.
- Expected stock price volatility: The Company estimated the expected volatility based on actual historical volatility of the stock price of similar companies with publicly-traded equity securities. The Company calculated the historical volatility of the selected companies by using daily closing prices over a period of the expected term of the associated award. The companies were selected based on their enterprise value, risk profiles, position within the industry and with historical share price information sufficient to meet the expected term of the associated award. A decrease in the selected volatility would have decreased the fair value of the underlying instrument.
- Expected annual dividend yield: The Company estimated the expected dividend yield based on consideration of its historical dividend experience and future dividend expectations. The Company has not historically declared or paid dividends to stockholders. Moreover, it does not intend to pay dividends in the future, but instead expects to retain any earnings to invest in the continued growth of the business. Accordingly, the Company assumed and expected dividend yield of 0.0%.
- Estimated forfeiture rate: The Company's estimated annual forfeiture rate on 2012 stock option grants was 5%, based on the historical forfeiture experience.

**TREVENA, INC.****(A Development-Stage Company)****Notes to Financial Statements (Continued)****December 31, 2012****7. Redeemable Convertible Preferred Stock and Stockholder's Equity (Continued)**

The fair value of the Company's common stock was determined by its board of directors with assistance of its management. The board of directors and management considered numerous objective and subjective factors in the assessment of fair value, including the price for the Company's preferred stock that was sold to investors and the rights, preferences and privileges of the preferred stock and common stock, the Company's financial condition and results of operations during the relevant periods and the status of strategic initiatives. These estimates involve a significant level of judgment.

As of December 31, 2012, there was \$319,338 of total unrecognized compensation expense, related to unvested options granted under the Plan, which will be recognized over the weighted average remaining period of 2.13 years.

**Shares Reserved for Future Issuance**

At December 31, 2012, the Company has reserved the following shares of common stock for issuance:

Common stock options and warrants outstanding	9,458,590
Common stock options and restricted stock available for future grant	1,065,158
Series A Preferred Stock	25,074,999
Series B Preferred Stock	30,800,000
Series B-1 Preferred Stock	4,200,000
Preferred Stock warrants outstanding	1,775,000
	<u>72,373,747</u>

**8. Commitments and Contingencies****Operating Leases**

The Company leases approximately 12,750 square feet of office and laboratory space in Pennsylvania. In addition, the Company leases vivarium space in Pennsylvania. The vivarium lease can be terminated at any time upon 90 days' written notice by the Company. The Company's leases contain escalating rent clauses, which require higher rent payments in future years. The Company expenses rent on a straight-line basis over the term of the lease, including any rent-free periods.

Rent expense under operating leases was \$422,456 and \$438,173 in 2011 and 2012, respectively, and \$1,687,628 for the period from November 9, 2007 (date of inception) to December 31, 2012.

Future minimum lease payments under noncancelable lease agreements as of December 31, 2012, are as follows:

	<u>Operating Lease</u>
2013	\$ 344,374
2014	46,750
Total minimum lease payments	<u>\$ 391,124</u>

**TREVENA, INC.****(A Development-Stage Company)****Notes to Financial Statements (Continued)****December 31, 2012****8. Commitments and Contingencies (Continued)**

The Company had deferred rent of \$124,291 at December 31, 2012. This balance related entirely to the Pennsylvania office and laboratory lease.

**Legal Proceedings**

The Company is not involved in any legal proceeding that it expects to have a material effect on its business, financial condition, results of operations and cash flows.

**9. Income Taxes**

The Company provides for income taxes under ASC 740. Under ASC 740, the liability method is used in accounting for income taxes. Under this method, deferred tax assets and liabilities are determined based on differences between financial reporting and tax bases of assets and liabilities, and are measured using the enacted tax rates and laws that will be in effect when the differences are expected to reverse.

The Company did not record a current or deferred income tax expense or benefit since its inception.

The Company's loss before income taxes was \$15,810,004 and \$15,635,658 for the years ended December 31, 2011 and 2012, respectively, and was generated entirely in the United States.

Deferred taxes are recognized for temporary differences between the basis of assets and liabilities for financial statement and income tax purposes. The significant components of the Company's deferred tax assets are comprised of the following:

	<b>December 31,</b>	
	<b>2011</b>	<b>2012</b>
<b>Deferred tax assets:</b>		
Net operating losses	\$ 1,955,237	\$ 3,116,214
Research and development credits	1,484,270	1,653,174
Research and development expenses capitalized for tax purposes	15,440,387	20,042,703
Deferred rent	90,804	40,350
Depreciation	300,616	487,224
Other temporary differences	194,175	497,268
Total deferred tax assets	<u>19,465,489</u>	<u>25,836,933</u>
<b>Deferred tax liabilities:</b>		
Prepaid expenses	(105,542)	(44,561)
Total deferred tax liabilities	<u>(105,542)</u>	<u>(44,561)</u>
Net deferred tax assets	19,359,947	25,792,372
Less valuation allowance	(19,359,947)	(25,792,372)
Net deferred tax asset	<u>\$ —</u>	<u>\$ —</u>

**TREVENA, INC.****(A Development-Stage Company)****Notes to Financial Statements (Continued)****December 31, 2012****9. Income Taxes (Continued)**

The Company has evaluated the positive and negative evidence bearing upon the realizability of its deferred tax assets. Based on the Company's history of operating losses since inception, the Company has concluded that it is more likely than not that the benefit of its deferred tax assets will not be realized. Accordingly, the Company has provided a full valuation allowance for deferred tax assets as of December 31, 2011 and 2012. The valuation allowance increased by \$7,371,623 and \$6,432,425 during the years ended December 31, 2011 and 2012, respectively, due primarily to the generation of net operating losses during the periods.

A reconciliation of income tax expense computed at the statutory federal income tax rate to income taxes as reflected in the financial statements is as follows:

	December 31,	
	2011	2012
Percent of pre-tax income:		
U.S. federal statutory income tax rate	34.0%	34.0%
State taxes, net of federal benefit	6.6%	6.6%
Research and development credit	2.8%	0.0%
Change in valuation allowance	(43.4)%	(40.6)%
Effective income tax rate	<u>0.0%</u>	<u>0.0%</u>

As of December 31, 2011 and 2012, the Company had U.S. federal net operating loss carryforwards of \$4,814,828 and \$7,674,369, respectively, which may be available to offset future income tax liabilities and will begin to expire at various dates starting in 2027. As of December 31, 2011 and 2012, the Company also had U.S. state net operating loss carryforwards of \$4,828,890 and \$7,688,430 million, respectively, which may be available to offset future income tax liabilities and will begin to expire at various dates starting in 2027.

As of December 31, 2011 and 2012, the Company had federal research and development tax credit carryforwards of \$1,375,399 and \$1,499,073, respectively, available to reduce future tax liabilities which will begin to expire at various dates starting in 2027. As of December 31, 2011 and 2012, the Company had state research and development tax credit carryforwards of approximately \$165,000 and \$233,487, respectively, available to reduce future tax liabilities which will begin to expire at various dates starting in 2022.

Under the provisions of the Internal Revenue Code, the net operating loss and tax credit carryforwards are subject to review and possible adjustment by the Internal Revenue Service and state tax authorities. Net operating loss and tax credit carryforwards may become subject to an annual limitation in the event of certain cumulative changes in the ownership interest of significant shareholders over a three-year period in excess of 50 percent, as defined under Sections 382 and 383 of the Internal Revenue Code, respectively, as well as similar state provisions. This could limit the amount of tax attributes that can be utilized annually to offset future taxable income or tax liabilities. The amount of the annual limitation is determined based on the value of the Company immediately prior to the ownership change. Subsequent ownership changes may further affect the limitation in future years. The Company has completed several financings since its inception which may have resulted in a change



**TREVENA, INC.**

**(A Development-Stage Company)**

**Notes to Financial Statements (Continued)**

**December 31, 2012**

**9. Income Taxes (Continued)**

in control as defined by Sections 382 and 383 of the Internal Revenue Code, or could result in a change in control in the future.

The Company will recognize interest and penalties related to uncertain tax positions in income tax expense. As of December 31, 2011 and 2012, the Company had no accrued interest or penalties related to uncertain tax positions and no amounts have been recognized in the Company's Statements of Operations and Comprehensive Loss.

For all years through December 31, 2012, the Company generated research credits but has not conducted a study to document the qualified activities. This study may 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 for these years. 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 deferred tax asset established for the research and development credit carryforwards and the valuation allowance.

The Company files income tax returns in the United States, and various state jurisdictions. The federal and state income tax returns are generally subject to tax examinations for the tax years ended December 31, 2008 through December 31, 2012. To the extent the Company has tax attribute carryforwards, the tax years in which the attribute was generated may still be adjusted upon examination by the Internal Revenue Service or state tax authorities to the extent utilized in a future period.

**10. Related-Party Transactions**

The Company has consulting agreements with two founding scientists and shareholders, under which \$90,000 was paid in 2011 and 2012, respectively, and \$450,000 was paid for the period from November 9, 2007 (date of inception) to December 31, 2012. The consulting agreements are currently ongoing and can be terminated with 30 days' notice.

**11. Employee Benefit Plan**

The Company sponsors a 401(k) defined contribution plan for its employees. Employee contributions are voluntary. The Company matches employee contributions in an amount equal to 100% of the first 3% of eligible contributions and 50% of the next 2% of eligible contributions. During 2011, 2012 and the period from November 9, 2007 (date of inception) through December 31, 2012, the Company provided matching contributions of \$155,255, \$213,866 and \$593,328, respectively.

**12. Subsequent Events**

The Company has completed an evaluation of all subsequent events through September 6, 2013, the date on which these financial statements were available to be issued, to ensure that these financial statements include appropriate disclosure of events both recognized in the financial statements as of December 31, 2012 and events which occurred subsequently but were not recognized in the financial

**TREVENA, INC.**

**(A Development-Stage Company)**

**Notes to Financial Statements (Continued)**

**December 31, 2012**

**12. Subsequent Events (Continued)**

statements. The Company has concluded that no subsequent events have occurred that require disclosure, except as disclosed within these financial statements.

On May 3, 2013, the Company authorized the sale and issuance of up to 37,000,000 shares of Series C Preferred Stock (the Series C) and on the same date, the Company closed on the sale of the Series C and issued 36,764,704 shares at \$1.632 per share generating gross proceeds of \$59,999,997. On May 3, 2013, the Company used a portion of the proceeds from the Series C to repay the remaining Comerica Facility outstanding balance of \$4,073,485, including unpaid interest and fees.

On May 3, 2013, the Company entered into an option agreement and a license agreement with Forest, under which the Company granted to Forest an exclusive option to license its product candidate, TRV027. If Forest exercises this option, the license agreement between the Company and Forest will become effective and Forest will have an exclusive worldwide license to develop and commercialize TRV027 and specified related compounds. Under the option agreement, the Company will conduct, at its expense, a Phase 2b trial of TRV027 in acute heart failure. Forest may exercise its option during the pendency of the Phase 2b clinical trial or during a specified time period after the Company delivers the data from the Phase 2b clinical trial to Forest. During the option period, the Company is not permitted to negotiate for or enter into any agreement with a third party for the development and commercialization of TRV027 and its related compounds. Under specified circumstances linked to adverse changes in the market or with respect to TRV027, Forest has the right to renegotiate the terms of the license agreement. If Forest exercises such right, its option will expire and the Company will be obligated to negotiate in good faith with Forest for a period of time the terms of any new arrangement. If the Company and Forest are unable to agree on the terms of any new arrangement during such period of time, then the option agreement will terminate and for a specified period of time thereafter the Company may not offer a license to any third party on terms better than those last proposed by either the Company or Forest during the negotiations.

If Forest does not exercise the option during the specified period, its option will expire and the license agreement will not become effective. In that event, the Company would be free to enter into a collaboration arrangement with another party for the development and commercialization of TRV027 or to pursue development and commercialization on its own.

If Forest exercises the option, Forest will have the sole and exclusive right under the license agreement, at its sole cost and expense, to develop and commercialize TRV027 and specified related compounds throughout the world. At the Company's request, Forest will consider in good faith whether to grant the Company the right to co-promote the licensed products in the United States under terms to be agreed upon by the parties.

The Company received no consideration upon the grant of the option to Forest. If Forest exercises the option, the Company could potentially receive up to \$430 million in the aggregate, including an upfront option exercise fee of \$65 million and milestone payments depending upon the achievement of future development and commercial milestones. The Company could also receive tiered royalties between 10% and 20% on net sales of licensed products worldwide, with the royalty rates on net sales of licensed products in the United States being somewhat higher than the royalty rates on net sales of licensed products outside the United States.

**TREVENA, INC.**

**(A Development-Stage Company)**

**Notes to Financial Statements (Continued)**

**December 31, 2012**

**12. Subsequent Events (Continued)**

If Forest elects to exercise its option, the term of the royalty on sales of TRV027 for a given country would extend until the latest to occur of (i) 10 years from first commercial sale of TRV027 in that country, (ii) the expiration of the last to expire patent claiming TRV027 that is sufficient to block the entrance of a generic version of the product, or (iii) the expiration of any period of exclusivity granted by applicable law or any regulatory authority in such country that confers exclusive marketing rights on the product.

Forest has the right to grant sublicenses under the license agreement to affiliates and third parties. Any sublicensing does not act to relieve Forest of any of its obligations under the license agreement, including Forest's obligation to make milestone payments to the Company with respect to TRV027 or pay royalties to the Company on sales of TRV027 by such sublicensee.

If Forest exercises the option and the license agreement becomes effective, both Forest and the Company would have the right to terminate the license agreement in the event of an uncured material breach or insolvency of the other party. In addition, Forest would be permitted to terminate the license agreement without cause at any time upon prior written notice or immediately for product safety reasons. Following a termination of the license agreement, all licenses granted to Forest would terminate, and Forest would grant the Company an exclusive royalty bearing license under specified patents and know-how to develop and commercialize reverted licensed products. If not terminated, the license agreement would remain in effect until the expiration of the last royalty term for the last licensed product.

Forest participated in the Series C Preferred Stock financing noted above and purchased \$30 million of Series C Preferred Stock. Because the Series C Preferred Stock was acquired at the same time as the option agreement, management considered whether the Preferred Stock was issued at fair value and if not, whether the consideration received for the Preferred Stock should be allocated in the financial statements in a manner differently than the price stated in the agreement. The Series C Preferred Stock acquired by Forest was acquired at the same time and at the same price per share as all of the other investors in the Series C Preferred Stock financing and therefore the preferred stock sold to Forest was deemed to be issued at fair value and no value was allocated to the option agreement.

**TREVENA, INC.**  
**(A Development-Stage Company)**  
**Condensed Balance Sheets**

	<u>December 31,</u> <u>2012</u>	<u>September 30,</u> <u>2013</u> <u>(unaudited)</u>	<u>Pro Forma</u> <u>September 30,</u> <u>2013</u> <u>(unaudited)</u>
<b>Assets</b>			
Current assets:			
Cash and cash equivalents	\$ 6,738,659	\$ 47,983,956	\$
Receivables	11,875	190,286	
Prepaid expenses and other current assets	155,679	1,705,665	
Restricted cash	102,000	—	
Total current assets	<u>7,008,213</u>	<u>49,879,907</u>	
Property and equipment, net	909,801	441,270	
Restricted cash	112,000	112,000	
Other assets	57,672	15,625	
Total assets	<u>\$ 8,087,686</u>	<u>\$ 50,448,802</u>	<u>\$</u>
<b>Liabilities, redeemable convertible preferred stock and stockholders' deficit</b>			
Current liabilities:			
Accounts payable	\$ 459,035	\$ 1,401,653	\$
Accrued expenses and other current liabilities	1,281,660	2,032,632	
Loans payable	2,085,129	—	
Deferred rent	105,776	24,038	
Total current liabilities	<u>3,931,600</u>	<u>3,458,323</u>	
Loans payable, net of current portion	2,783,078	—	
Deferred rent, net of current portion	18,515	274,696	
Preferred stock warrant liability	1,393,674	2,643,523	
Total liabilities	<u>8,126,867</u>	<u>6,376,542</u>	
Commitments and contingencies (Note 7)			
Redeemable convertible preferred stock:			
Series A—\$0.001 par value; 25,074,999 shares authorized, issued and outstanding at December 31, 2012 and September 30, 2013 and no shares issued and outstanding at September 30, 2013 (pro forma) (liquidation preference of \$25,074,999 at September 30, 2013)	25,004,123	25,019,311	
Series B—\$0.001 par value; 35,500,000 shares authorized, 30,800,000 shares issued and outstanding at December 31, 2012 and September 30, 2013 and no shares issued and outstanding at September 30, 2013 (pro forma) (liquidation preference of \$30,800,000 at September 30, 2013)	30,770,194	30,776,573	
Series B-1—\$0.001 par value; 6,000,000 shares authorized, 4,200,000 shares issued and outstanding at December 31, 2012 and September 30, 2013 and no shares issued and outstanding at September 30, 2013 (pro forma) (liquidation preference of \$4,200,000 at September 30, 2013)	3,183,517	3,399,431	
Series C—\$0.001 par value; 37,000,000 shares authorized, 36,764,704 shares issued and outstanding at September 30, 2013 and no shares issued and outstanding at December 31, 2012 and September 30, 2013 (pro forma) (liquidation preference of \$59,999,997 at September 30, 2013)	—	59,929,585	
Total redeemable convertible preferred stock	<u>58,957,834</u>	<u>119,124,900</u>	
Stockholders' deficit:			
Common stock, \$0.001 par value; 85,000,000 and 132,000,000 shares authorized at December 31, 2012 and September 30, 2013, 4,231,510 and 5,175,066 shares issued and outstanding at December 31, 2012 and September 30, 2013 and shares issued and outstanding at September 30, 2013 (pro forma)	4,232	5,175	
Additional paid-in capital	19,679	308,851	
Deficit accumulated during the development stage	(59,020,926)	(75,366,666)	
Total stockholders' deficit	<u>(58,997,015)</u>	<u>(75,052,640)</u>	
Total liabilities, redeemable convertible preferred stock and stockholders' deficit	<u>\$ 8,087,686</u>	<u>\$ 50,448,802</u>	<u>\$</u>

See accompanying notes to unaudited condensed financial statements.

TREVENA, INC.

(A Development-Stage Company)

Condensed Statements of Operations and Comprehensive Loss

(Unaudited)

	Nine Months Ended September 30,		Period From November 9, 2007 (date of inception) to September 30, 2013
	2012	2013	
<b>Revenue:</b>			
Grant revenue	\$ 354,960	\$ 84,980	\$ 9,016,734
Collaboration revenue	200,000	50,000	450,000
Total revenue	<u>554,960</u>	<u>134,980</u>	<u>9,466,734</u>
<b>Operating expenses:</b>			
General and administrative	2,479,846	2,843,587	16,853,516
Research and development	10,547,251	12,239,679	66,252,104
Total operating expenses	<u>13,027,097</u>	<u>15,083,266</u>	<u>83,105,620</u>
Loss from operations	(12,472,137)	(14,948,286)	(73,638,886)
<b>Other expense:</b>			
Change in fair value of warrant liability	34,055	(1,249,849)	(1,194,388)
Miscellaneous income	38,395	1,245	124,037
Interest income	346	—	69,646
Interest expense	(122,771)	(148,850)	(674,862)
Total other income (expense)	<u>(49,975)</u>	<u>(1,397,454)</u>	<u>(1,675,567)</u>
Net loss and comprehensive loss	(12,522,112)	(16,345,740)	(75,314,453)
Accretion of redeemable convertible preferred stock	(237,480)	(248,149)	(736,448)
Net loss attributable to common stockholders	<u>\$ (12,759,592)</u>	<u>\$ (16,593,889)</u>	<u>\$ (76,050,901)</u>
<b>Per share information:</b>			
Net loss per share of common stock, basic and diluted	<u>\$ (3.07)</u>	<u>\$ (3.58)</u>	
Weighted average shares outstanding, basic and diluted	<u>4,154,328</u>	<u>4,628,902</u>	
Pro forma net loss per share of common stock, basic and diluted (unaudited)		<u>\$</u>	
Pro forma basic and diluted pro forma weighted average shares outstanding (unaudited)			

See accompanying notes to unaudited condensed financial statements.

**TREVENA, INC.**  
**(A Development-Stage Company)**  
**Condensed Statements of Redeemable Convertible Preferred Stock and Stockholders' Deficit**  
**For the Period From November 9, 2007 (date of inception) to September 30, 2013**

	Redeemable Convertible Preferred Stock								Stockholders' Deficit						
	Series A		Series B		Series B-1		Series C		Common Stock			Deficit			
	Number of Shares	Amount	Number of Shares	Amount	Number of Shares	Amount	Number of Shares	Amount	Total	Number of Shares	\$0.001 Par Value	Additional Paid-in Capital	Accumulated Deficit During the Development Stage	Total Stockholders' Deficit	
Balance, November 9, 2007 (date of inception)	—	\$ —	—	\$ —	—	\$ —	—	\$ —	—	—	\$ —	\$ —	—	\$ —	—
Issuance of restricted stock to founders—December 2007	—	—	—	—	—	—	—	—	—	2,316,000	2,316	—	(2,316)	—	
Net loss and comprehensive loss	—	—	—	—	—	—	—	—	—	—	—	—	(170,106)	(170,106)	
Balance, December 31, 2007	—	—	—	—	—	—	—	—	—	2,316,000	2,316	—	(172,422)	(170,106)	
Issuance of Series A convertible preferred stock, net of issuance costs of \$202,291—January and September 2008	13,040,624	12,838,333	—	—	—	—	—	—	12,838,333	—	—	—	—	—	
Issuance of restricted stock—March 2008	—	—	—	—	—	—	—	—	—	1,590,000	1,590	(1,590)	—	—	
Vesting of restricted stock	—	—	—	—	—	—	—	—	—	—	—	6,582	—	6,582	
Common stock issued for a license agreement—February and October 2008	—	—	—	—	—	—	—	—	—	83,333	83	750	—	833	
Stock-based compensation expense	—	—	—	—	—	—	—	—	—	—	—	1,439	—	1,439	
Issuance of warrants to a bank in connection with an equipment loan—September 2008	—	—	—	—	—	—	—	—	—	—	—	125	—	125	
Accretion of stock offering costs	—	33,459	—	—	—	—	—	—	33,459	—	—	(7,306)	(26,153)	(33,459)	
Net loss and comprehensive loss	—	—	—	—	—	—	—	—	—	—	—	—	(4,850,246)	(4,850,246)	
Balance, December 31, 2008	13,040,624	12,871,792	—	—	—	—	—	—	12,871,792	3,989,333	3,989	—	(5,048,821)	(5,044,832)	
Issuance of Series A convertible preferred stock, net of issuance costs of \$3,959—June and November 2009	12,034,375	12,030,416	—	—	—	—	—	—	12,030,416	—	—	—	—	—	
Issuance of restricted stock—August 2009	—	—	—	—	—	—	—	—	—	100,000	100	900	—	1,000	
Vesting of restricted stock	—	—	—	—	—	—	—	—	—	—	—	5,646	—	5,646	
Common stock issued for a license agreement—June 2009	—	—	—	—	—	—	—	—	—	41,667	42	375	—	417	
Stock-based compensation expense	—	—	—	—	—	—	—	—	—	—	—	2,769	—	2,769	
Exercise of stock options	—	—	—	—	—	—	—	—	—	55,312	55	498	—	553	
Accretion of preferred stock offering costs	—	33,932	—	—	—	—	—	—	33,932	—	—	(10,188)	(23,744)	(33,932)	
Net loss and comprehensive loss	—	—	—	—	—	—	—	—	—	—	—	—	(11,370,959)	(11,370,959)	

Balance, December 31, 2009	25,074,999	24,936,140	—	—	—	—	—	—	24,936,140	4,186,312	4,186	—	(16,443,524)	(16,439,338)
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**TREVENA, INC.**  
**(A Development-Stage Company)**  
**Condensed Statements of Redeemable Convertible Preferred Stock and Stockholders' Deficit (Continued)**  
**For the Period From November 9, 2007 (date of inception) to September 30, 2013**

	Redeemable Convertible Preferred Stock								Stockholders' Deficit						
	Series A		Series B		Series B-1		Series C		Common Stock			Deficit Accumulated During the Development Stage	Total Stockholders' Deficit		
	Number of Shares	Amount	Number of Shares	Amount	Number of Shares	Amount	Number of Shares	Amount	Total	Number of Shares	\$0.001 Par Value			Additional Paid-in Capital	
Balance, December 31, 2009 (from previous page)	25,074,999	\$24,936,140	—	\$ —	—	\$ —	—	\$ —	—	\$ 24,936,140	4,186,312	\$4,186	\$ —	(16,443,524)	(16,439,338)
Issuance of Series B convertible preferred stock, net of issuance costs of \$38,568— July 2010	—	—	17,500,000	17,461,432	—	—	—	—	17,461,432	—	—	—	—	—	—
Repurchase of restricted stock —May 2010	—	—	—	—	—	—	—	—	—	(131,250)	(131)	131	—	—	—
Vesting of restricted stock	—	—	—	—	—	—	—	—	—	—	—	2,549	—	—	2,549
Stock-based compensation expense	—	—	—	—	—	—	—	—	—	—	—	76,154	—	—	76,154
Accretion of preferred stock offering costs	—	27,483	—	3,214	—	—	—	—	30,697	—	—	(30,697)	—	—	(30,697)
Net loss and comprehensive loss	—	—	—	—	—	—	—	—	—	—	—	—	—	(11,131,740)	(11,131,740)
Balance, December 31, 2010	25,074,999	24,963,623	17,500,000	17,464,646	—	—	—	—	42,428,269	4,055,062	4,055	48,137	(27,575,264)	(27,523,072)	
Issuance of Series B convertible preferred stock, net of issuance costs of \$10,046— July and December 2011	—	—	13,300,000	13,289,954	—	—	—	—	13,289,954	—	—	—	—	—	—
Issuance of Series B-1 convertible preferred stock, net of issuance costs of \$3,172 and preferred stock warrants of \$1,347,428— July and December 2011	—	—	—	—	4,200,000	2,849,400	—	—	2,849,400	—	—	—	—	—	—
Vesting of restricted stock	—	—	—	—	—	—	—	—	—	—	—	1,966	—	—	1,966
Stock-based compensation expense	—	—	—	—	—	—	—	—	—	—	—	180,584	—	—	180,584
Accretion of preferred stock to its redemption value	—	20,250	—	7,088	—	46,231	—	—	73,569	—	—	(73,569)	—	—	(73,569)
Net loss and comprehensive loss	—	—	—	—	—	—	—	—	—	—	—	—	—	(15,810,004)	(15,810,004)
Balance, December 31, 2011	25,074,999	24,983,873	30,800,000	30,761,688	4,200,000	2,895,631	—	—	58,641,192	4,055,062	4,055	157,118	(43,385,268)	(43,224,095)	
Vesting of restricted stock	—	—	—	—	—	—	—	—	—	—	—	162	—	—	162
Stock-based compensation expense	—	—	—	—	—	—	—	—	—	—	—	176,308	—	—	176,308
Exercise of stock options	—	—	—	—	—	—	—	—	—	176,448	177	2,733	—	—	2,910
Accretion of preferred stock to its redemption value	—	20,250	—	8,506	—	287,886	—	—	316,642	—	—	(316,642)	—	—	(316,642)
Net loss and comprehensive loss	—	—	—	—	—	—	—	—	—	—	—	—	—	(15,635,658)	(15,635,658)
Balance, December 31, 2012	25,074,999	25,004,123	30,800,000	30,770,194	4,200,000	3,183,517	—	—	58,957,834	4,231,510	4,232	19,679	(59,020,926)	(58,997,015)	



Issuance of Series C convertible preferred stock, net of issuance costs of \$81,080— May 2013 (unaudited)	—	—	—	—	—	—	36,764,704	59,918,917	59,918,917	—	—	—	—	—
Stock-based compensation expense (unaudited)	—	—	—	—	—	—	—	—	—	—	—	499,742	—	499,742
Exercise of stock options (unaudited)	—	—	—	—	—	—	—	—	—	943,556	943	37,579	—	38,522
Accretion of preferred stock to its redemption value (unaudited)	—	15,188	—	6,379	—	215,914	—	10,668	248,149	—	—	(248,149)	—	(248,149)
Net loss and comprehensive loss (unaudited)	—	—	—	—	—	—	—	—	—	—	—	—	(16,345,740)	(16,345,740)
Balance, September 30, 2013 (unaudited)	25,074,999	\$25,019,311	30,800,000	\$30,776,573	4,200,000	\$3,399,431	36,764,704	\$59,929,585	\$119,124,900	5,175,066	\$5,175	\$ 308,851	\$ (75,366,666)	\$ (75,052,640)

See accompanying notes to unaudited condensed financial statements.

**TREVENA, INC.**  
**(A Development-Stage Company)**  
**Condensed Statements of Cash Flows**  
**(Unaudited)**

	<u>Nine Months Ended September 30,</u>		<u>Period From</u>
	<u>2012</u>	<u>2013</u>	<u>November 9, 2007</u> <u>(date of inception) to</u> <u>September 30, 2013</u>
<b>Operating activities:</b>			
Net loss	\$ (12,522,112)	\$ (16,345,740)	\$ (75,314,453)
<b>Adjustments to reconcile net loss to net cash used in operating activities:</b>			
Depreciation and amortization	767,539	546,763	3,806,134
Stock-based compensation	134,926	499,742	936,996
Issuance of restricted stock for consulting services	—	—	7,380
Issuance of common stock for a license agreement	—	—	1,250
Noncash interest expense on loans	30,742	121,160	190,438
Loss on disposal of assets	—	—	5,062
Revaluation of preferred stock warrant liability	(34,055)	1,249,849	1,194,388
<b>Changes in operating assets and liabilities:</b>			
Prepaid expenses, receivables and other assets	24,140	(1,345,295)	(1,616,427)
Restricted cash	92,000	102,000	(112,000)
Accounts payable and accrued expenses	28,463	1,484,277	3,349,264
<b>Net cash used in operating activities</b>	<b>(11,478,357)</b>	<b>(13,687,244)</b>	<b>(67,551,968)</b>
<b>Investing activities:</b>			
Purchase of property and equipment	(195,570)	(78,232)	(4,241,229)
<b>Net cash used in investing activities</b>	<b>(195,570)</b>	<b>(78,232)</b>	<b>(4,241,229)</b>
<b>Financing activities:</b>			
Proceeds from issuance of redeemable convertible preferred stock and warrants, net	—	59,918,917	119,735,880
Proceeds from sale of restricted common stock	—	—	11,836
Proceeds from exercise of common stock options	2,909	38,523	41,986
Repurchase of restricted stock	—	—	(1,312)
Proceeds from loans payable	5,300,000	—	7,615,278
Repayment of loans payable	(144,860)	(4,946,667)	(7,615,278)
Capital lease payments	—	—	(11,237)
<b>Net cash provided by financing activities</b>	<b>5,158,049</b>	<b>55,010,773</b>	<b>119,777,153</b>
Net (decrease) increase in cash and cash equivalents	(6,515,878)	41,245,297	47,983,956
Cash and cash equivalents—beginning of period	17,060,109	6,738,659	—
<b>Cash and cash equivalents—end of period</b>	<b>\$ 10,544,231</b>	<b>\$ 47,983,956</b>	<b>\$ 47,983,956</b>
<b>Supplemental disclosure of cash flow information:</b>			
Capital lease obligations incurred for the acquisition of office equipment	\$ —	\$ —	\$ 11,237
Cash paid for interest	\$ 89,924	\$ 84,535	\$ 564,119
Fair value of preferred stock warrants issued	\$ 101,707	\$ —	\$ 1,449,135

See accompanying notes to unaudited condensed financial statements.

**TREVENA, INC.**

**(A Development-Stage Company)**

**Notes to Unaudited Condensed Financial Statements**

**September 30, 2013**

**1. Organization and Description of the Business**

Trevena, Inc. (the Company) is a development-stage biopharmaceutical company that was incorporated in Delaware as Parallax Therapeutics, Inc. on November 9, 2007. The Company began operations in December 2007, and its name was changed to Trevena, Inc. on January 3, 2008. The Company is a drug discovery company focused on discovering and developing pharmaceutical products targeting G protein coupled receptors. The Company operates in one segment and has its principal office in King of Prussia, Pennsylvania. The Company's revenue is derived from research grants and a research collaboration with a pharmaceutical company.

**Liquidity**

The Company has incurred recurring operating losses since inception. As of September 30, 2013, the Company had an accumulated deficit of \$75,366,666 and will require substantial additional capital to fund its research and development. The Company anticipates operating losses to continue for the foreseeable future due to, among other things, costs related to research funding, development of its product candidates and its preclinical programs and the development of its administrative organization. The Company believes that its cash resources of \$47,983,956 at September 30, 2013 will be sufficient to allow the Company to fund its current operating plan through the end of 2015; however, the Company will be required to raise additional capital to fund operations beyond this time. As the Company continues to incur losses, a transition to profitability is dependent upon the successful development, approval and commercialization of its product candidates and the achievement of a level of revenue adequate to support the Company's cost structure. The Company may never achieve profitability, and unless and until it does, the Company will continue to need to raise additional capital. Management intends to fund future operations through the sale of equity, debt financings or other sources, including potential additional collaborations. There can be no assurances, however, that additional funding will be available on terms acceptable to the Company, or at all.

**2. Summary of Significant Accounting Policies**

**Basis of Presentation**

The accompanying financial statements have been prepared in conformity with accounting principles generally accepted in the United States of America (GAAP). Any reference in these notes to applicable guidance is meant to refer to the authoritative United States generally accepted accounting principles as found in the Accounting Standards Codification (ASC) and Accounting Standards Update (ASU) of the Financial Accounting Standards Board (FASB). The Company considers the U.S. dollar to be its functional currency.

**Unaudited Interim Financial Information**

The accompanying condensed balance sheet as of September 30, 2013, Statements of Operations and Comprehensive Loss and Statements of Cash Flows for the nine months ended September 30, 2012 and 2013 and the period from November 9, 2007 (date of inception) to September 30, 2013 and the Statement of Redeemable Convertible Preferred Stock and Stockholders' Deficit for the nine months ended September 30, 2013 are unaudited. The interim unaudited financial statements have been prepared on the same basis as the annual audited financial statements and, in the opinion of

TREVENA, INC.

(A Development-Stage Company)

Notes to Unaudited Condensed Financial Statements (Continued)

September 30, 2013

**2. Summary of Significant Accounting Policies (Continued)**

management, reflect all adjustments, which include only normal recurring adjustments, necessary for the fair statement of the Company's financial position as of September 30, 2013 and the results of its operations, its comprehensive loss and its cash flows for the nine months ended September 30, 2012 and 2013 and the period from November 9, 2007 (date of inception) to September 30, 2013. The financial data and other information disclosed in these notes related to the nine months ended September 30, 2012 and 2013 and the period from November 9, 2007 (date of inception) to September 30, 2013 are unaudited. The results for the nine months ended September 30, 2013 are not necessarily indicative of results to be expected for the year ending December 31, 2013, any other interim periods or any future year or period.

**Unaudited Pro Forma Information**

In September 2013, the Company's board of directors (the Board) authorized management of the Company to pursue the filing of a registration statement with the Securities and Exchange Commission (SEC) for the Company to sell shares of its common stock to the public in an initial public offering (IPO). The unaudited pro forma balance sheet information as of September 30, 2013 assumes the conversion of all outstanding shares of the Company's preferred stock as of that date into \_\_\_\_\_ shares of common stock, the net exercise of certain warrants that would otherwise expire at the IPO and the related conversion of remaining warrants to purchase preferred stock into warrants to purchase common stock. The unaudited pro forma net loss per share is computed using the weighted-average number of common shares outstanding and gives effect to the automatic conversion of all outstanding shares of the Company's preferred stock and certain exercised warrants, into an aggregate of \_\_\_\_\_ shares of the Company's common stock, which assumes a 1:1 conversion ratio, as if they had occurred at January 1, 2013, or the date of original issuance, if later. Upon conversion of the redeemable convertible preferred stock into shares of the Company's common stock in the event of an IPO, the holders of the redeemable convertible preferred stock are not entitled to receive undeclared dividends. Accordingly, the impact of the redemption value and issuance costs has been excluded from the determination of net loss per share.

**Use of Estimates**

Management considers many factors in selecting appropriate financial accounting policies and controls, and in developing the estimates and assumptions that are used in the preparation of these financial statements. Management must apply significant judgment in this process. In addition, other factors may affect estimates, including expected business and operational changes, sensitivity and volatility associated with the assumptions used in developing estimates, and whether historical trends are expected to be representative of future trends. The estimation process often may yield a range of potentially reasonable estimates of the ultimate future outcomes and management must select an amount that falls within that range of reasonable estimates. This process may result in actual results differing materially from those estimated amounts used in the preparation of the financial statements if these results differ from historical experience, or other assumptions do not turn out to be substantially accurate, even if such assumptions are reasonable when made. In preparing these financial statements, management used significant estimates in the following areas, among others: stock-based compensation expense, the determination of the fair value of stock-based awards, the fair value of liability-classified

TREVENA, INC.

(A Development-Stage Company)

Notes to Unaudited Condensed Financial Statements (Continued)

September 30, 2013

**2. Summary of Significant Accounting Policies (Continued)**

preferred stock warrants, the accounting for research and development costs, accrued expenses and the recoverability of the Company's net deferred tax assets and related valuation allowance.

The Company utilizes significant estimates and assumptions in determining the fair value of its common stock. The Board determined the estimated fair value of the Company's common stock based on a number of objective and subjective factors, including external market conditions affecting the biotechnology industry and the prices at which the Company sold shares of redeemable convertible preferred stock, the superior rights and preferences of securities senior to the Company's common stock at the time, and the likelihood of achieving a liquidity event, such as an IPO or sale of the Company.

**Significant Accounting Policies**

The Company's significant accounting policies are disclosed in the audited financial statements for the year ended December 31, 2012 included elsewhere in this prospectus. Since the date of those financial statements, there have been no changes to the Company's significant accounting policies.

**Fair Value Measurements**

ASC Topic 820, *Fair Value Measurement* (ASC 820), establishes a fair value hierarchy for instruments measured at fair value that distinguishes between assumptions based on market data (observable inputs) and the Company's own assumptions (unobservable inputs). Observable inputs are inputs that market participants would use in pricing the asset or liability based on market data obtained from sources independent of the Company. Unobservable inputs are inputs that reflect the Company's assumptions about the inputs that market participants would use in pricing the asset or liability, and are developed based on the best information available in the circumstances.

ASC 820 identifies fair value as the exchange price, or exit price, representing the amount that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants. As a basis for considering market participant assumptions in fair value measurements, ASC Topic 820 establishes a three-tier fair value hierarchy that distinguishes among the following:

- Level 1—Valuations based on unadjusted quoted prices in active markets for identical assets or liabilities that the Company has the ability to access.
- Level 2—Valuations based on quoted prices for similar assets or liabilities in active markets, quoted prices for identical or similar assets or liabilities in markets that are not active and models for which all significant inputs are observable, either directly or indirectly.
- Level 3—Valuations based on inputs that are unobservable and significant to the overall fair value measurement.

To the extent that the valuation is based on models or inputs that are less observable or unobservable in the market, the determination of fair value requires more judgment. Accordingly, the degree of judgment exercised by the Company in determining fair value is greatest for instruments

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Notes to Unaudited Condensed Financial Statements (Continued)

September 30, 2013

2. Summary of Significant Accounting Policies (Continued)

categorized in Level 3. A financial instrument's level within the fair value hierarchy is based on the lowest level of any input that is significant to the fair value measurement.

Items measured at fair value on a recurring basis include money market mutual funds, restricted cash and warrants to purchase redeemable convertible preferred stock. During the periods presented, the Company has not changed the manner in which it values assets and liabilities that are measured at fair value using Level 3 inputs. The following fair value hierarchy table presents information about each major category of the Company's financial assets and liabilities measured at fair value on a recurring basis:

	Level 1	Level 2	Level 3	Total
<b>December 31, 2012</b>				
<b>Assets</b>				
Money market mutual funds	\$ 3,050,003	\$ —	\$ —	\$ 3,050,003
Restricted cash	214,000	—	—	214,000
<b>Total assets</b>	<b>\$ 3,264,003</b>	<b>\$ —</b>	<b>\$ —</b>	<b>\$ 3,264,003</b>
<b>Liabilities</b>				
Preferred stock warrant liability	\$ —	\$ —	\$ 1,393,674	\$ 1,393,674
<b>Total liabilities</b>	<b>\$ —</b>	<b>\$ —</b>	<b>\$ 1,393,674</b>	<b>\$ 1,393,674</b>
<b>September 30, 2013</b>				
<b>Assets</b>				
Money market mutual funds	\$ 45,550,000	\$ —	\$ —	\$ 45,550,000
Restricted cash	112,000	—	—	112,000
<b>Total assets</b>	<b>\$ 45,662,000</b>	<b>\$ —</b>	<b>\$ —</b>	<b>\$ 45,662,000</b>
<b>Liabilities</b>				
Preferred stock warrant liability	\$ —	\$ —	\$ 2,643,523	\$ 2,643,523
<b>Total liabilities</b>	<b>\$ —</b>	<b>\$ —</b>	<b>\$ 2,643,523</b>	<b>\$ 2,643,523</b>

The following table sets forth a summary of changes in the fair value of the Company's preferred warrant liability, which represents a recurring measurement that is classified within Level 3 of the fair value hierarchy, wherein fair value is estimated using significant unobservable inputs:

	Preferred Stock Warrant Liability
Balance as of December 31, 2012	\$ 1,393,674
Amounts acquired or issued	—
Changes in estimated fair value	1,249,849
<b>Balance as of September 30, 2013</b>	<b>\$ 2,643,523</b>

The money market mutual funds noted above are included in cash and cash equivalents in the accompanying balance sheets. The Company recognizes transfers between levels of the fair value

**TREVENA, INC.**

**(A Development-Stage Company)**

**Notes to Unaudited Condensed Financial Statements (Continued)**

**September 30, 2013**

**2. Summary of Significant Accounting Policies (Continued)**

hierarchy as of the end of the reporting period. There were no transfers within the hierarchy during the nine months ended September 30, 2013.

The fair value of the warrants on the date of issuance and on each re-measurement date of those warrants classified as liabilities is estimated using the Black-Scholes option pricing model using the following assumptions: expected term, no dividend yield, fair value of underlying instrument of \$1.00 and \$2.21 at September 30, 2012 and 2013, respectively, weighted average risk-free interest rate of 1.67% and 2.33% at September 30, 2012 and 2013, respectively, and weighted average volatility of 80.0% and 80.5% at September 30, 2012 and 2013, respectively. For this liability, the Company developed its own assumptions that do not have observable inputs or available market data to support the fair value. This method of valuation involves using inputs such as the fair value of the Company's various classes of preferred stock, stock price volatility, the contractual term of the warrants, risk free interest rates and dividend yields. Due to the nature of these inputs, the valuation of the warrants is considered a Level 3 measurement. The Company accounts for its redeemable convertible preferred stock warrants as liabilities in accordance with the guidance for accounting for certain financial instruments with characteristics of both liabilities and equity as the warrants entitle the holder to purchase preferred stock that is considered contingently redeemable. The warrant liability is recorded on its own line item on the Company's Balance Sheets. The warrant liability is marked-to-market each reporting period with the change in fair value recorded on its own line in the Statement of Operations and Comprehensive Loss until the warrants are exercised, expire or other facts and circumstances lead the warrant liability to be reclassified as an equity instrument.

**Income Taxes**

The Company accounts for income taxes under the asset and liability method, which requires, among other things, that deferred income taxes be provided for temporary differences between the tax basis of the Company's assets and liabilities and their financial statement reported amounts. In addition, deferred tax assets are recorded for the future benefit of utilizing net operating losses and research and development credit carryforwards. A valuation allowance is established when necessary to reduce deferred tax assets to the amount expected to be realized.

The Company has adopted the accounting guidance for uncertainties in income taxes, which prescribes a recognition threshold and measurement process for recording uncertain tax positions taken, or expected to be taken, in a tax return in the financial statements. Additionally, the guidance also prescribes a new treatment for the derecognition, classification, accounting in interim periods and disclosure requirements for uncertain tax positions. The Company accrues for the estimated amount of taxes for uncertain tax positions if it is more likely than not that the Company would be required to pay such additional taxes. An uncertain tax position will not be recognized if it has less than a 50% likelihood of being sustained. As of the date of adoption of this guidance, the Company did not have any accrued interest or penalties associated with any unrecognized tax positions, and there were no such interest or penalties recognized during the nine months ended September 30, 2012 and 2013.

**TREVENA, INC.**

**(A Development-Stage Company)**

**Notes to Unaudited Condensed Financial Statements (Continued)**

**September 30, 2013**

**2. Summary of Significant Accounting Policies (Continued)**

**Segment Information**

Operating segments are identified as components of an enterprise about which separate discrete financial information is available for evaluation by the chief operating decision maker, or decision-making group, in making decisions on how to allocate resources and assess performance. The Company's chief operating decision maker is the chief executive officer. The Company and the chief executive officer view the Company's operations and manage its business as one operating segment. All long-lived assets of the Company reside in the United States.

**Recent Accounting Pronouncements**

On April 5, 2012, the Jump-Start Our Business Startups Act (the JOBS Act) was signed into law. The JOBS Act contains provisions that, among other things, reduce certain reporting requirements for an "emerging growth company." The Company is considered an emerging growth company, but has elected to not take advantage of the extended transition period afforded by the JOBS Act for the implementation of new or revised accounting standards. As a result, the Company will comply with new or revised accounting standards on the relevant dates on which adoption of such standards is required for non-emerging growth companies.

In June 2011, FASB issued ASU No. 2011-05, "Comprehensive Income (ASC Topic 220): Presentation of Comprehensive Income" (ASU 2011-05). This accounting update eliminated the option to present the components of other comprehensive income as part of the statement of stockholders' equity. Instead, comprehensive income must be presented in either a single continuous statement of comprehensive income, which contains two sections, net income and other comprehensive income, or in two separate but consecutive statements. ASU 2011-05 was effective for fiscal periods beginning after December 15, 2011 with early adoption permitted. The Company's retrospective adoption of ASU 2011-05 did not have a significant impact on its financial position, results of operations or cash flows.

In February 2013, FASB issued ASU No. 2013-02, "Comprehensive Income (Topic 220): Reporting of Amounts Reclassified Out of Accumulated Other Comprehensive Income" (ASU 2013-02). ASU 2013-02 requires companies to present either in a single note or parenthetically on the face of the financial statements; the effect of significant amounts reclassified from each component of accumulated other comprehensive income based on its source and the income statement line items affected by the reclassification. This guidance is effective for annual reporting periods beginning after December 15, 2012. The Company believes the adoption of this standard will not have a significant impact on its financial position, results of operations or cash flows.

**3. Net Loss Per Common Share**

Basic and diluted net loss per common share is determined by dividing net loss applicable to common stockholders by the weighted average common shares outstanding during the period. For the periods where there is a net loss attributable to common stockholders, the outstanding shares of preferred stock, options, unvested restricted stock and warrants have been excluded from the calculation of diluted loss per common stockholder because their effect would be anti-dilutive. Therefore, the weighted average shares used to calculate both basic and diluted loss per share would be



TREVENA, INC.

(A Development-Stage Company)

Notes to Unaudited Condensed Financial Statements (Continued)

September 30, 2013

3. Net Loss Per Common Share (Continued)

the same. The following table sets forth the computation of basic and diluted net loss per share for the periods indicated.

	Nine Months Ended September 30,	
	2012	2013
Basic and diluted net loss per common share calculation:		
Net loss	\$ (12,522,112)	\$ (16,345,740)
Accretion of redeemable and convertible preferred stock	(237,480)	(248,149)
Net loss attributable to common stockholders	\$ (12,759,592)	\$ (16,593,889)
Weighted average common shares outstanding	4,154,328	4,628,902
Net loss per share of common stock—basic and diluted	\$ (3.07)	\$ (3.58)

The following outstanding securities at September 30, 2012 and 2013 have been excluded from the computation of diluted weighted shares outstanding, as they would have been anti-dilutive:

	September 30,	
	2012	2013
Redeemable convertible preferred stock	60,074,998	96,839,703
Options outstanding	10,424,384	17,386,829
Warrants	1,790,000	1,790,000
Total	72,289,382	116,016,532

4. Accrued Expenses and Other Current Liabilities

Accrued expenses and other current liabilities consisted of the following:

	December 31, 2012	September 30, 2013
Compensation and benefits	\$ 745,820	\$ 690,279
Clinical trial fees	269,367	842,889
Research and development expenses	164,777	23,308
Professional services	60,855	459,257
Other accrued expenses and other current liabilities	40,841	16,899
Total accrued expenses and other current liabilities	\$ 1,281,660	\$ 2,032,632

**TREVENA, INC.**

**(A Development-Stage Company)**

**Notes to Unaudited Condensed Financial Statements (Continued)**

**September 30, 2013**

**5. Loans Payable**

In September 2008, the Company entered into an equipment loan facility with a bank (the Bank Facility) that provided for borrowings up to \$1,500,000, subject to certain conditions, through February 2009. Borrowings under the Bank Facility were used to finance laboratory equipment, office equipment, furnishings and, up to specified maximum percentages, software and leasehold improvements. Borrowings were secured by the related assets. In November 2011, the Company repaid the outstanding balance of the loan, plus a final payment equal to 2% of the amount borrowed. Interest expense related to the Bank Facility was \$259,993 for the period from November 9, 2007 (date of inception) to September 30, 2013. In connection with the Bank Facility, the Company incurred financing costs of \$13,768, which were included in other assets and amortized to interest expense over the term of the Bank Facility. Amortization expense of these deferred financing costs was \$13,768 for the period from November 9, 2007 (date of inception) to September 30, 2013. In connection with the borrowings under the Bank Facility, the Company issued a ten-year warrant to purchase 15,000 shares of common stock at \$0.01 per share, exercisable through June 2018.

In November 2009, the Company entered into an equipment loan facility with the Commonwealth of Pennsylvania (the PA Facility) that provided for borrowings of up to \$815,278 subject to certain conditions. Borrowings under the PA Facility were used to finance laboratory equipment and computer equipment. Borrowings were secured by the related assets. In December 2012, the Company repaid the outstanding balance of the loan. Interest expense related to the PA Facility was \$8,197 for the nine months ended September 30, 2012 and \$50,333 for the period from November 9, 2007 (date of inception) to September 30, 2013. In connection with the PA Facility, the Company incurred financing costs of \$13,745, which were included in other assets and amortized to interest expense over the term of the PA Facility. Amortization expense of these deferred financing costs was \$2,379 for the nine months ended September 30, 2012 and \$13,745 for the period from November 9, 2007 (date of inception) to September 30, 2013.

In December 2011, the Company entered into a loan facility with Comerica Bank (the Comerica Facility) that provided for borrowings of up to \$5,300,000 subject to certain conditions. Borrowings under the Comerica Facility were used to fund working capital for general business requirements and were secured by the assets of the Company, excluding intellectual property. The facility bore interest at the prime rate plus a 1% margin (4.25% as of September 30, 2013). The Company drew down the entire amount available under the Comerica Facility during 2012. The borrowings were being repaid in 30 equal monthly installments, plus interest, beginning November 1, 2012. As of December 31, 2012, \$4,946,667 of borrowings were outstanding under the Comerica Facility. Interest expense related to the Comerica Facility was \$94,480 and \$64,292 for the nine months ended September 30, 2012 and 2013, respectively, and \$215,043 for the period from November 9, 2007 (date of inception) to September 30, 2013.

On May 3, 2013, the Company used a portion of the proceeds from the Series C Preferred Stock (Note 6) to repay the remaining Comerica Facility outstanding balance of \$4,073,485, including unpaid interest and fees.

In connection with the Comerica Facility, the Company incurred financing costs of \$62,034, which were included in other assets at December 31, 2012 and were being amortized to interest expense over the term of the Comerica Facility until May 3, 2013 when the financing costs were fully expensed.

**TREVENA, INC.**

**(A Development-Stage Company)**

**Notes to Unaudited Condensed Financial Statements (Continued)**

**September 30, 2013**

**5. Loans Payable (Continued)**

Amortization expense of these deferred financing costs was \$13,833 and \$42,047 for the nine months ended September 30, 2012 and 2013, respectively, and \$62,034 for the period from November 9, 2007 (date of inception) to September 30, 2013. In connection with the borrowings under the Comerica Facility, the Company issued a ten-year warrant to purchase 125,000 shares of Series B preferred stock at \$1.00 per share, exercisable through December 2021. The Company recorded a total of \$101,707 as debt discount related to the estimated fair value of the preferred stock warrants issued, with a corresponding credit to the preferred stock warrant liability. The debt discount was being amortized to interest expense over the term of the Comerica Facility. Interest expense related to the amortization of the debt discount was \$14,530 and \$78,460 for the nine months ended September 30, 2012 and 2013, respectively, and \$101,107 for the period from November 9, 2007 (date of inception) to September 30, 2013.

**6. Redeemable Convertible Preferred Stock and Stockholder's Equity**

**Preferred Stock**

On January 4, 2008, the Company authorized the sale and issuance of up to 25,000,000 shares of Series A Convertible Preferred Stock (the Series A). On January 7, 2008, the Company completed the first closing of its sale of the Series A and issued 501,562 shares at \$1.00 per share generating gross proceeds of \$501,562. On January 31, 2008, the Company completed a second closing of its sale of the Series A and issued an additional 4,514,062 shares at \$1.00 per share generating gross proceeds of \$4,514,062. Costs associated with these offerings were \$200,137. In September 2008, the Company completed a third closing of its sale of the Series A and issued an additional 8,025,000 shares at \$1.00 per share generating gross proceeds of \$8,025,000. Costs associated with this offering were \$2,154. On June 30, 2009, the Company completed a fourth closing of its sale of the Series A and issued 11,034,375 shares at \$1.00 per share generating gross proceeds of \$11,034,375. Costs associated with this offering were \$561. On November 16, 2009, the Company amended the stock purchase agreement associated with the Series A financing and issued an additional 1,000,000 shares at \$1.00 per share generating gross proceeds of \$1,000,000. Costs associated with this offering were \$3,398. All offering costs associated with the Series A are being accreted into the carrying value of the Series A until its redemption date, adjusted on July 8, 2010 from January 2014 to July 2016.

On July 8, 2010, the Company authorized the sale and issuance of up to 35,000,000 shares of Series B Preferred Stock (the Series B) and up to 4,300,000 of Series B-1 Preferred Stock (the Series B-1). In connection with the authorization of the Series B and the Series B-1, the Company also authorized the sale and issuance of warrants to purchase up to 1,700,000 shares of the Series B-1 (the Series B-1 Warrants). On July 8, 2010, the Company completed the first closing of its sale of the Series B and issued 17,500,000 shares at \$1.00 per share generating gross proceeds of \$17,500,000. Costs associated with this offering were \$38,568. On July 8, 2011, the Company completed its second closing, issuing 5,700,000 shares of its Series B at \$1.00 per share and 1,800,000 shares of its Series B-1 at \$1.00 per share. Costs associated with this offering were \$8,229. On December 15, 2011, the Company completed its third closing issuing 7,600,000 shares of its Series B at \$1.00 per share and 2,400,000 shares of its Series B-1 at \$1.00 per share. Costs associated with this offering were \$4,989. All offering costs associated with the Series B and Series B-1 are being accreted into the carrying value of the preferred stock until its redemption date in July 2016.

TREVENA, INC.

(A Development-Stage Company)

Notes to Unaudited Condensed Financial Statements (Continued)

September 30, 2013

**6. Redeemable Convertible Preferred Stock and Stockholder's Equity (Continued)**

In connection with the issuance of the Series B-1 shares in the second and third closings, the Series B-1 shareholders received ten-year warrants to purchase a total of 1,650,000 shares of the Company's Series B-1 Preferred Stock at an exercise price of \$1.00 per share. The estimated fair value of the preferred stock warrants on the dates of issuance of \$1,347,428 was recorded as a reduction to the carrying value of the Series B-1 Preferred stock and is being accreted into the carrying value of the Series B-1 until its redemption date in July 2016. The preferred stock warrants were recorded as a liability pursuant to the guidance for accounting for certain financial instruments with characteristics of both liabilities and equity and are revalued at each reporting period to reflect any changes in fair value.

In May, 2013, the Company authorized the sale and issuance of up to 37,000,000 shares of Series C Preferred Stock (the Series C). On May 3, 2013, the Company completed the closing of its sale of the Series C and issued 36,764,704 shares at \$1.632 per share generating gross proceeds of \$59,999,997. Costs associated with this offering were \$81,080. All offering costs associated with the Series C were recorded as a discount and are being accreted into the carrying value of the Series C until its redemption date in July 2016.

Each share of the Series A, the Series B, the Series B-1 and the Series C preferred stock is convertible into one share of common stock at any time at the option of the holder. The preferred stock is automatically convertible in the event of (i) an initial public offering at a price of at least \$4.00 per share of common stock (subject to adjustment to reflect stock splits, stock dividends, stock combinations, recapitalizations and like occurrences) and net proceeds to the Company of at least \$40 million; or (ii) the affirmative vote or written consent of the holders of at least 60% of shares of the preferred stock then outstanding. Each share of Series A, B or B-1 preferred stock is also subject to a special mandatory conversion feature. In the event that any holder of shares of Series A, B or B-1 preferred stock does not participate in a Qualified Financing (as defined in the Company's Certificate of Incorporation) by purchasing, in the aggregate, in such Qualified Financing and within the time period specified by the Company, such holder's pro rata amount, then such holder's shares of preferred stock will automatically convert into common stock at the respective Conversion Price (as defined). The Company evaluated each series of its Preferred Stock and determined that each individual series is considered an equity host under ASC 815. As a result of the Company's conclusion that the Preferred Stock represents an equity host, the conversion feature of all series of Preferred Stock is considered to be clearly and closely related to the associated Preferred Stock host instrument. Accordingly, the conversion feature of all series of Preferred Stock is not considered an embedded derivative that requires bifurcation. The Company accounts for potential beneficial conversion features under FASB ASC Topic 470-20, *Debt with Conversion and Other Options*. At the time of each of the issuances of Preferred Stock, the Company's common stock into which each series of the Company's Preferred Stock is convertible had an estimated fair value less than the effective conversion prices of the Preferred Stock. Therefore, there was no intrinsic value on the respective commitment dates.

Holders of the preferred stock are entitled to receive non-cumulative dividends at the rate of 8% of the applicable purchase price per share per annum if and when declared by the board of directors. No dividends have been declared through September 30, 2013.

**TREVENA, INC.**

**(A Development-Stage Company)**

**Notes to Unaudited Condensed Financial Statements (Continued)**

**September 30, 2013**

**6. Redeemable Convertible Preferred Stock and Stockholder's Equity (Continued)**

Holders of the preferred stock, voting as a class, are entitled to elect five members of the board of directors.

Holders of the Series A, the Series B, and the Series B-1 are entitled to a liquidation preference in an amount equal to \$1.00 per share plus all declared and unpaid dividends in the event of a liquidation, dissolution, or winding-up of the Company, or in the event the Company merges with or is acquired by another entity. Holders of the Series C are entitled to a liquidation preference in an amount equal to \$1.632 per share plus all declared and unpaid dividends in the event of a liquidation, dissolution, or winding-up of the Company, or in the event the Company merges with or is acquired by another entity.

At any time on or after July 8, 2016, the holders of at least 60% of the outstanding shares of the preferred stock may require the Company to redeem, in three annual installments beginning on the date of the initial redemption, all of the outstanding shares of the preferred stock for an amount equal to the original issue price per share plus any declared and unpaid dividends.

**Common Stock**

The Company was authorized to issue 85,000,000 and 132,000,000 shares of common stock as of December 31, 2012 and September 30, 2013. The Company is required, at all times, to reserve and keep available out of its authorized but unissued shares of common stock sufficient shares to effect the conversion of the shares of the preferred stock and all stock options and warrants.

Holders of the common stock, voting as a class, are entitled to elect one member of the board of directors.

**Restricted Stock Agreements**

In connection with the formation of the Company, 2,316,000 shares of restricted common stock were sold to the Company's initial shareholders at a price of \$0.001 per share. The restricted stock agreements imposed transfer restrictions on the unvested shares of common stock and provided the Company with certain repurchase rights. The restricted shares vested ratably over four years from the time of grant.

In March 2008, the Company sold 1,590,000 shares of restricted common stock to four individuals in consideration for the performance of certain services. The Company received proceeds of \$9,420 and recorded expense of \$6,480 in 2008 related to the issuance of these shares. The restricted stock agreements imposed transfer restrictions on the unvested shares of common stock and provided the Company with certain repurchase rights. The restricted shares vested over periods ranging from two to four years from time of grant. Of these shares, 870,000 were sold under the 2008 Equity Incentive Plan discussed below.

In August 2009, the Company sold 504,000 shares of restricted common stock to one individual which were subsequently adjusted in November 2009 to 100,000 shares of fully vested common stock in consideration for the performance of certain services. The Company received proceeds of \$100 and recorded expense of \$900 in 2009 related to the issuance of these shares.

TREVENA, INC.

(A Development-Stage Company)

Notes to Unaudited Condensed Financial Statements (Continued)

September 30, 2013

6. Redeemable Convertible Preferred Stock and Stockholder's Equity (Continued)

In May 2010, the Company repurchased 131,250 shares of restricted common stock in association with the voluntary termination of one individual for a price of \$1,312.

There were no unvested shares of common stock that remain subject to repurchase rights as of September 30, 2013.

2008 Equity Incentive Plan

In January 2008, the Company adopted the 2008 Equity Incentive Plan (the Plan), amended on February 29, 2008, January 7, 2010, July 8, 2010, December 10, 2010, June 23, 2011 and June 17, 2013 that authorizes the Company to grant up to 20,528,141 shares of common stock to eligible employees, directors and consultants to the Company, in the form of restricted stock and stock options. The amount, terms of grants and exercisability provisions are determined by the board of directors. The term of the options may be up to 10 years, and options are exercisable in cash or as otherwise determined by the board of directors. Vesting generally occurs over a period of not greater than four years.

The estimated grant-date fair value of the Company's share-based awards is amortized ratably over the awards' service periods. Share-based compensation expense recognized was as follows:

	Nine Months Ended		Period from November 9, 2007 (date of inception) to September 30, 2013
	2012	2013	
Research and development	\$ 92,987	\$ 355,030	\$ 495,139
General and administrative	41,939	144,712	441,857
Total stock-based compensation	\$ 134,926	\$ 499,742	\$ 936,996

	Shares Available for Grant	Options Outstanding		
		Number of Shares	Weighted-Average Exercise Price	Weighted Average Remaining Contractual Term (in years)
Balance, December 31 2012	1,065,158	9,443,590	\$ 0.09	7.89
Granted	(9,990,978)	9,990,978	\$ 0.56	
Authorized	9,048,882	—	—	
Exercised	—	(943,556)	\$ 0.04	
Forfeitures	1,104,183	(1,104,183)	\$ 0.14	
Balance, September 30, 2013	1,227,245	17,386,829	\$ 0.36	8.99
Vested or expected to vest at September 30, 2013		17,386,829	\$ 0.36	8.99
Exercisable at September 30, 2013		4,955,315	\$ 0.08	8.31

The intrinsic value of our vested options as of September 30, 2013 was \$ million, based on a per share price of \$ , the midpoint of the price range set forth on the cover page of

## TREVENA, INC.

## (A Development-Stage Company)

## Notes to Unaudited Condensed Financial Statements (Continued)

September 30, 2013

**6. Redeemable Convertible Preferred Stock and Stockholder's Equity (Continued)**

this prospectus, and a weighted average exercise price of \$            per share. The intrinsic value of our            unvested options as of September 30, 2013 was \$            million, based on a per share price of \$           , the midpoint of the price range set forth on the cover page of this prospectus, and a weighted average exercise price of \$            per share. With respect to the            options granted since July 1, 2013, all of which remain unvested, the intrinsic value of such options is \$            million, based on a per share price of \$            per share, which is the midpoint of the price range set forth on the cover page of this prospectus, and a weighted average exercise price of \$            per share. The intrinsic value represents the difference between the estimated fair value of the Company's common stock based on a per share price of \$           , the midpoint of the price range set forth on the cover page of this prospectus and the exercise price at date of grant.

The Company uses the Black-Scholes option pricing model to estimate the fair value of stock options at the grant date. The Black-Scholes model requires the Company to make certain estimates and assumptions, including estimating the fair value of the Company's common stock, assumptions related to the expected price volatility of the Company's stock, the period during which the options will be outstanding, the rate of return on risk-free investments, and the expected dividend yield for the Company's stock.

The per-share weighted-average grant date fair value of the options granted to employees during the nine months ended September 30, 2012 and 2013 was estimated at \$0.09 and \$0.56 per share, respectively, on the date of grant using the Black-Scholes option pricing model with the following weighted-average assumptions:

	Nine Months Ended September 30,	
	2012	2013
Risk-free interest rate	1.94%	1.50%
Expected term of options (in years)	6.1	6.1
Expected volatility	80.0%	80.5%
Dividend yield	0.00%	0.00%

The weighted-average valuation assumptions were determined as follows:

- Risk-free interest rate: The Company based the risk-free interest rate on the interest rate payable on U.S. Treasury securities in effect at the time of grant for a period that is commensurate with the assumed expected option term.
- Expected term of options: The Company estimated the expected life of its employee stock options using the "simplified" method, as prescribed in Staff Accounting Bulletin (SAB) No. 107, whereby the expected life equals the arithmetic average of the vesting term and the original contractual term of the option due to its lack of sufficient historical data.
- Expected stock price volatility: The Company estimated the expected volatility based on actual historical volatility of the stock price of similar companies with publicly-traded equity securities. The Company calculated the historical volatility of the selected companies by using daily closing

TREVENA, INC.

(A Development-Stage Company)

Notes to Unaudited Condensed Financial Statements (Continued)

September 30, 2013

6. Redeemable Convertible Preferred Stock and Stockholder's Equity (Continued)

prices over a period of the expected term of the associated award. The companies were selected based on their enterprise value, risk profiles, position within the industry, and with historical share price information sufficient to meet the expected term of the associated award. A decrease in the selected volatility would have decreased the fair value of the underlying instrument.

- Expected annual dividend yield: The Company estimated the expected dividend yield based on consideration of its historical dividend experience and future dividend expectations. The Company has not historically declared or paid dividends to stockholders. Moreover, it does not intend to pay dividends in the future, but instead expects to retain any earnings to invest in the continued growth of the business. Accordingly, the Company assumed and expected dividend yield of 0.0%.
- Estimated forfeiture rate: The Company's estimated annual forfeiture rate on 2013 stock option grants was 5%, based on the historical forfeiture experience.

The fair value of the Company's common stock was determined by its board of directors with assistance of its management. The board of directors and management considered numerous objective and subjective factors in the assessment of fair value, including the price for the Company's preferred stock that was sold to investors and the rights, preferences and privileges of the preferred stock and common stock, the Company's financial condition and results of operations during the relevant periods, and the status of strategic initiatives. These estimates involve a significant level of judgment.

As of September 30, 2013, there was approximately \$3,800,000 of total unrecognized compensation expense, related to unvested options granted to employees under the Plan which will be recognized over the weighted average remaining period of 3.34 years.

Shares Reserved for Future Issuance

At September 30, 2013, the Company has reserved the following shares of common stock for issuance:

Common stock options and common stock warrants outstanding	17,401,829
Common stock options and restricted stock available for future grant	1,227,245
Series A Preferred Stock	25,074,999
Series B Preferred Stock	30,800,000
Series B-1 Preferred Stock	4,200,000
Series C Preferred Stock	36,764,704
Preferred Stock warrants outstanding	1,775,000
	<u>117,243,777</u>



**TREVENA, INC.**

**(A Development-Stage Company)**

**Notes to Unaudited Condensed Financial Statements (Continued)**

**September 30, 2013**

**7. Commitments and Contingencies**

**Licenses**

On May 3, 2013, the Company entered into an option agreement and a license agreement with Forest, under which the Company granted to Forest an exclusive option to license its product candidate, TRV027. If Forest exercises this option, the license agreement between the Company and Forest will become effective and Forest will have an exclusive worldwide license to develop and commercialize TRV027 and specified related compounds. Under the option agreement, the Company will conduct, at its expense, a Phase 2b trial of TRV027 in acute heart failure. Forest may exercise its option during the pendency of the Phase 2b clinical trial or during a specified time period after the Company delivers the data from the Phase 2b clinical trial to Forest. During the option period, the Company is not permitted to negotiate for or enter into any agreement with a third party for the development and commercialization of TRV027 and its related compounds. Under specified circumstances linked to adverse changes in the market or with respect to TRV027, Forest has the right to renegotiate the terms of the license agreement. If Forest exercises such right, its option will expire and the Company will be obligated to negotiate in good faith with Forest for a period of time the terms of any new arrangement. If the Company and Forest are unable to agree on the terms of any new arrangement during such period of time, then the option agreement will terminate and for a specified period of time thereafter the Company may not offer a license to any third party on terms better than those last proposed by either the Company or Forest during the negotiations.

If Forest does not exercise the option during the specified period, its option will expire and the license agreement will not become effective. In that event, the Company would be free to enter into a collaboration arrangement with another party for the development and commercialization of TRV027 or to pursue development and commercialization on its own.

If Forest exercises the option, Forest will have the sole and exclusive right under the license agreement, at its sole cost and expense, to develop and commercialize TRV027 and specified related compounds throughout the world. At the Company's request, Forest will consider in good faith whether to grant the Company the right to co-promote the licensed products in the United States under terms to be agreed upon by the parties.

The Company received no consideration upon the grant of the option to Forest. If Forest exercises the option, the Company could potentially receive up to \$430 million in the aggregate, including an upfront option exercise fee of \$65 million and milestone payments depending upon the achievement of future development and commercial milestones. The Company could also receive tiered royalties between 10% and 20% on worldwide net sales of licensed products worldwide, with the royalty rates on net sales of licensed products in the United States being somewhat higher than the royalty rates on net sales of licensed products outside the United States.

If Forest exercises the option and the license agreement becomes effective, both Forest and the Company would have the right to terminate the license agreement in the event of an uncured material breach or insolvency of the other party. In addition, Forest would be permitted to terminate the license agreement without cause at any time upon prior written notice or immediately for product safety reasons. Following a termination of the license agreement, all licenses granted to Forest would terminate, and Forest would grant the Company an exclusive royalty bearing license under specified

**TREVENA, INC.**

**(A Development-Stage Company)**

**Notes to Unaudited Condensed Financial Statements (Continued)**

**September 30, 2013**

**7. Commitments and Contingencies (Continued)**

patents and know-how to develop and commercialize reverted licensed products. If not terminated, the license agreement would remain in effect until the expiration of the last royalty term for the last licensed product.

If Forest elects to exercise its option, the term of the royalty on sales of TRV027 for a given country would extend until the first to occur of (i) 10 years from first commercial sale of TRV027 in that country, (ii) the expiration of the last to expire patent claiming TRV027 that is sufficient to block the entrance of a generic version of the product, or (iii) the expiration of any period of exclusivity granted by applicable law or any regulatory authority in such country that confers exclusive marketing rights on the product.

Forest has the right to grant sublicenses under the license agreement to affiliates and third parties. Any sublicensing does not act to relieve Forest of any of its obligations under the license agreement, including Forest's obligation to make milestone payments to the Company with respect to TRV027 or pay royalties to the Company on sales of TRV027 by such sublicensee.

Forest participated in the Series C Preferred Stock financing (Note 6) and purchased \$30 million of Series C Preferred Stock. Because the Series C Preferred Stock was acquired at the same time as the option agreement, management considered whether the Preferred Stock was issued at fair value and if not, whether the consideration received for the Preferred Stock should be allocated in the financial statements in a manner differently than the price stated in the agreement. The Series C Preferred Stock acquired by Forest was acquired at the same time and at the same price per share as all of the other investors in the Series C Preferred Stock financing and therefore the preferred stock sold to Forest was deemed to be issued at fair value and no value was allocated to the option agreement.

**Legal Proceedings**

The Company is not involved in any legal proceeding that it expects to have a material effect on its business, financial condition, results of operations and cash flows.

**8. Related-Party Transactions**

The Company has consulting agreements with two founding scientists and shareholders, under which \$67,500 and \$55,375 was paid for the nine months ended September 30, 2012 and 2013, respectively, and \$505,375 was paid for the period from November 9, 2007 (date of inception) to September 30, 2013. The consulting agreements are currently ongoing and can be terminated with 30 days' notice.

Shares



**Trevena, Inc.**

**Common Stock**

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Prospectus

, 2013

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**Barclays**

**Jefferies**

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**Canaccord Genuity**

**JMP Securities**

**Needham & Company**

Through and including \_\_\_\_\_, 2013 (the 25th day after the date of this prospectus), all dealers effecting transactions in these securities, whether or not participating in this offering, may be required to deliver a prospectus. This is in addition to a dealer's obligation to deliver a prospectus when acting as an underwriter and with respect to an unsold allotment or subscription.

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**PART II****INFORMATION NOT REQUIRED IN PROSPECTUS****Item 13. Other Expenses of Issuance and Distribution.**

The following table sets forth all costs and expenses, other than underwriting discounts and commissions, payable by us in connection with the sale of the common stock being registered. All amounts shown are estimates except for the SEC registration fee and the Financial Industry Regulatory Authority, or FINRA, filing fee.

	<b>Amount to be Paid</b>
SEC registration fee	\$ 11,109
FINRA filing fee	13,438
Stock exchange initial listing fee	25,000
Blue sky fees and expenses	*
Printing and engraving	*
Legal fees and expenses	*
Accounting fees and expenses	*
Transfer agent and registrar fees	*
Miscellaneous fees and expenses	*
Total	<u>\$ *</u>

\* To be filed by amendment.

**Item 14. Indemnification of Directors and Officers.**

We are incorporated under the laws of the State of Delaware. Section 102 of the Delaware General Corporation Law permits a corporation to eliminate the personal liability of directors of a corporation to the corporation or its stockholders for monetary damages for a breach of fiduciary duty as a director, except where the director breached his duty of loyalty, failed to act in good faith, engaged in intentional misconduct or knowingly violated a law, authorized the payment of a dividend or approved a stock repurchase in violation of Delaware corporate law or obtained an improper personal benefit.

Section 145 of the Delaware General Corporation Law provides that a corporation has the power to indemnify a director, officer, employee or agent of the corporation and certain other persons serving at the request of the corporation in related capacities against expenses (including attorneys' fees), judgments, fines and amounts paid in settlements actually and reasonably incurred by the person in connection with an action, suit or proceeding to which he is or is threatened to be made a party by reason of such position, if such person acted in good faith and in a manner he reasonably believed to be in or not opposed to the best interests of the corporation, and, in any criminal action or proceeding, had no reasonable cause to believe his conduct was unlawful, except that, in the case of actions brought by or in the right of the corporation, no indemnification shall be made with respect to any claim, issue or matter as to which such person shall have been adjudged to be liable to the corporation unless and only to the extent that the Court of Chancery or other adjudicating court determines that, despite the adjudication of liability but in view of all of the circumstances of the case, such person is fairly and reasonably entitled to indemnity for such expenses which the Court of Chancery or such other court shall deem proper.

As permitted by the Delaware General Corporation Law, our amended and restated certificate of incorporation and bylaws provide that: (i) we are required to indemnify our directors to the fullest

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extent permitted by the Delaware General Corporation Law; (ii) we may, in our discretion, indemnify our officers, employees and agents as set forth in the Delaware General Corporation Law; (iii) we are required, upon satisfaction of certain conditions, to advance all expenses incurred by our directors in connection with certain legal proceedings; (iv) the rights conferred in the bylaws are not exclusive; and (v) we are authorized to enter into indemnification agreements with our directors, officers, employees and agents.

We have entered into agreements with our directors that require us to indemnify them against expenses, judgments, fines, settlements and other amounts that any such person becomes legally obligated to pay (including with respect to a derivative action) in connection with any proceeding, whether actual or threatened, to which such person may be made a party by reason of the fact that such person is or was a director or officer of us or any of our affiliates, provided such person acted in good faith and in a manner such person reasonably believed to be in, or not opposed to, our best interests. The indemnification agreements also set forth certain procedures that will apply in the event of a claim for indemnification thereunder. At present, no litigation or proceeding is pending that involves any of our directors or officers regarding which indemnification is sought, nor are we aware of any threatened litigation that may result in claims for indemnification.

We maintain a directors' and officers' liability insurance policy. The policy insures directors and officers against unindemnified losses arising from certain wrongful acts in their capacities as directors and officers and reimburses us for those losses for which we have lawfully indemnified the directors and officers. The policy contains various exclusions.

In addition, the underwriting agreement filed as Exhibit 1.1 to this Registration Statement provides for indemnification by the underwriters of us and our officers and directors for certain liabilities arising under the Securities Act, or otherwise. Our investor rights agreement with certain investors also provides for cross-indemnification in connection with the registration of the our common stock on behalf of such investors.

### **Item 15. Recent Sales of Unregistered Securities.**

The following list sets forth information regarding all unregistered securities sold by us since January 1, 2010 through the date of the prospectus that is a part of this registration statement, or the Prospectus.

- 1) From January 1, 2010 through the date of the Prospectus, we have granted options under our 2008 Equity Incentive Plan to purchase an aggregate of 19,490,431 shares of our common stock to employees, consultants and directors, having exercise prices ranging from \$0.01 to \$1.20 per share. Of these, options to purchase an aggregate of 2,403,598 shares have been cancelled without being exercised. During the period from January 1, 2010 through the date of the Prospectus, an aggregate of 1,883,160 shares were issued upon the exercise of stock options, at exercise prices between \$0.01 and \$0.36 per share, for aggregate proceeds of approximately \$86,615.
- 2) In July 2010, July 2011 and December 2011, we issued and sold to investors an aggregate of 30,800,000 shares of Series B preferred stock, at a purchase price of \$1.00 per share, for aggregate consideration of \$30.8 million.
- 3) In July 2011 and December 2011, we issued and sold to investors an aggregate of 4,200,000 shares of Series B-1 preferred stock, along with warrants to purchase up to 1,650,000 shares of Series B-1 preferred stock, for an aggregate purchase price of \$1.00 per share and related warrant, for aggregate consideration of \$4.2 million. The warrants have an exercise price of \$1.00 per share of Series B-1 preferred stock.

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- 4) In May 2013, we issued and sold to investors an aggregate of 36,764,704 shares of Series C preferred stock, at a purchase price of \$1.632 per share, for aggregate consideration of \$60.0 million.

The offers, sales and issuances of the securities described in paragraph (1) were exempt from registration under Rule 701 promulgated under the Securities Act in that the transactions were under compensatory benefit plans and contracts relating to compensation as provided under Rule 701. The recipients of such securities were our employees, directors or consultants and received the securities under our 2008 Equity Incentive Plan. Appropriate legends were affixed to the securities issued in these transactions.

The offers, sales and issuances of the securities described in paragraphs (2), (3) and (4) were exempt from registration under Section 4(2) of the Securities Act and Regulation D promulgated under the Securities Act. The recipients represented to us that they acquired the securities for investment only and not with a view to or for sale in connection with any distribution thereof and appropriate legends were affixed to the securities issued in these transactions. The recipients represented to us that they were accredited investors as defined in Rule 501 promulgated under the Securities Act.

**Item 16. Exhibits and Financial Statement Schedules.**

**(a) Exhibits**

<u>Exhibit Number</u>	<u>Description of Document</u>
1.1†	Form of Underwriting Agreement.
3.1#	Amended and Restated Certificate of Incorporation, as amended to date and as currently in effect.
3.2†	Form of Certificate of Amendment of Restated Certificate of Incorporation to be filed prior to the completion of this offering.
3.3	Form of Amended and Restated Certificate of Incorporation to be effective upon completion of this offering.
3.4#	Bylaws, as amended to date and as currently in effect.
3.5	Form of Amended and Restated Bylaws to be effective upon completion of this offering.
4.1	Reference is made to exhibits 3.1 through 3.5.
4.2†	Specimen stock certificate evidencing shares of Common Stock.
5.1†	Opinion of Cooley LLP as to legality.
10.1*#	License Agreement, dated as of May 3, 2013, by and between the Registrant and Forest Laboratories Holdings Limited.
10.2*#	Option Agreement, dated as of May 3, 2013, by and between the Registrant and Forest Laboratories Holdings Limited.
10.3#	Warrant to purchase shares of Series B preferred stock issued to Comerica Bank, dated December 9, 2011.
10.4#	Warrant to purchase shares of Common Stock issued to Silicon Valley Bank, dated June 24, 2008.
10.5#	Amended and Restated Investor Rights Agreement, dated as of May 3, 2013, by and among the Registrant and certain of its stockholders.

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Exhibit Number	Description of Document
10.6#	Commercial Lease Agreement, dated as of August 4, 2008, by and between the Registrant and Pios Grande KOP Business Center, L.P. (successor-in-interest to KOPBC, Inc.).
10.7#	Amendment No. 1 to Commercial Lease Agreement, dated as of December 8, 2008, by and between the Registrant and Pios Grande KOP Business Center, L.P. (successor-in-interest to KOPBC, Inc.).
10.8#	Amendment No. 2 to Commercial Lease Agreement, dated as of July 3, 2013, by and between the Registrant and Pios Grande KOP Business Center, L.P. (successor-in-interest to KOPBC, Inc.).
10.9+#	2008 Equity Incentive Plan, as amended to date.
10.10+#	Form of Stock Option Agreement under 2008 Equity Incentive Plan.
10.11+†	2013 Equity Incentive Plan.
10.12+	Form of Stock Option Grant Notice and Stock Option Agreement under 2013 Equity Incentive Plan.
10.13+	Form of Restricted Stock Grant Notice and Restricted Stock Unit Award Agreement under 2013 Equity Incentive Plan.
10.14+	Non-Employee Director Compensation Plan to be in effect upon the completion of this offering.
10.15+†	Form of 2013 Employee Stock Purchase Plan
10.16+	Form of Indemnity Agreement with executives and directors.
10.17+#	Employment Agreement, dated as of January 4, 2008, by and between the Registrant and Maxine Gowen.
10.18+#	Employment Agreement, dated as of February 19, 2008, by and between the Registrant and Michael Lark.
10.19+#	Employment Agreement, dated as of September 3, 2013, by and between the Registrant and Roberto Cuca.
23.1	Consent of Ernst & Young LLP, independent registered public accounting firm.
23.2†	Consent of Cooley LLP (included in Exhibit 5.1).
24.1	Power of Attorney. See Page II-6 to the Registration Statement on Form S-1 (File No. 333-191643) filed with the SEC on October 9, 2013.

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# Previously filed.

† To be filed by amendment.

+ Indicates management contract or compensatory plan.

\* Portions of this exhibit, indicated by asterisks, have been omitted pursuant to a request for confidential treatment and have been separately filed with the Securities and Exchange Commission.

**(b) Financial Statement Schedules**

**Item 17. Undertakings.**

The undersigned Registrant hereby undertakes to provide to the underwriters at the closing specified in the underwriting agreement, certificates in such denominations and registered in such names as required by the underwriters 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.

The undersigned Registrant 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.





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<u>Signature</u>	<u>Title</u>	<u>Date</u>
* _____ Christopher K. Mirabelli, Ph.D.	Director	October 28, 2013
* _____ Jake R. Nunn	Director	October 28, 2013
* _____ David F. Solomon	Director	October 28, 2013
*By: _____ /s/ ROBERTO CUCA <i>Attorney-in-fact</i>		



## TREVENA, INC.

AMENDED AND RESTATED  
CERTIFICATE OF INCORPORATION

TREVENA, INC., a corporation organized and existing under the laws of the State of Delaware (the "**Company**"), does hereby certify as follows:

**FIRST:** The name of the Company is Trevena, Inc.

**SECOND:** The Company's original Certificate of Incorporation was filed on November 9, 2007. The Certificate of Incorporation was last amended and restated on May 3, 2013.

**THIRD:** This Amended and Restated Certificate of Incorporation has been duly adopted and approved by the Board of Directors of the Company.

**FOURTH:** This Amended and Restated Certificate of Incorporation was approved by the holders of the requisite number of shares of the Company in accordance with Section 228 of the Delaware General Corporate Law ("**DGCL**"). This Amended and Restated Certificate of Incorporation has been duly adopted in accordance with the provisions of Sections 242 and 245 of the DGCL by the Board of Directors and the stockholders of the Company.

**FIFTH:** The Amended and Restated Certificate of Incorporation so adopted reads in full as set forth in Exhibit A attached hereto and is incorporated herein by reference in its entirety.

\* \* \* \*

IN WITNESS WHEREOF, Trevena, Inc. has caused this Amended and Restated Certificate of Incorporation to be signed by its Chief Executive Officer on this day of 2013.

TREVENA, INC.

By:

\_\_\_\_\_  
Maxine Gowen  
Chief Executive Officer

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Exhibit A

TREVENA, INC.

AMENDED AND RESTATED  
CERTIFICATE OF INCORPORATION

I.

The name of this corporation is Trevena, Inc. (the "**Company**").

II.

The address of the registered office of the Company in the State of Delaware is 2711 Centerville Road, Suite 400, City of Wilmington, County of New Castle, Zip Code 19808, and the name of the registered agent of the Company in the State of Delaware at such address is Corporation Service Company.

III.

The purpose of the Company is to engage in any lawful act or activity for which a corporation may be organized under the Delaware General Corporation Law ("**DGCL**").

IV.

**A.** The Company is authorized to issue two classes of stock to be designated, respectively, "Common Stock" and "Preferred Stock." The total number of shares of all classes of capital stock which the Company shall have authority to issue is One Hundred Five Million (105,000,000) shares, of which One Hundred Million (100,000,000) shares shall be Common Stock (the "**Common Stock**"), each having a par value of one-tenth of one cent (\$0.001), and Five Million (5,000,000) shares shall be Preferred Stock (the "**Preferred Stock**"), each having a par value of one-tenth of one cent (\$0.001).

**B.** The Preferred Stock may be issued from time to time in one or more series. The Board of Directors of the Company (the "**Board**") is hereby expressly authorized to provide for the issue of the shares of the Preferred Stock in one or more series, and to fix the number of shares and to determine or alter for each such series, such voting powers, full or limited, or no voting powers, and such designation, preferences, and relative, participating, optional, or other rights and such qualifications, limitations, or restrictions thereof, as shall be stated and expressed in the resolution or resolutions adopted by the Board providing for the issuance of such shares and as may be permitted by the DGCL. The Board is also expressly authorized to increase or decrease the number of shares of any series subsequent to the issuance of shares of that series, but not below the number of shares of such series then outstanding. In case the number of shares of any series shall be decreased in accordance with the foregoing sentence, the shares constituting such decrease shall resume the status that they had prior to the adoption of the resolution originally fixing the number of shares of such series. The number of authorized shares of Preferred Stock may be increased or decreased (but not below the number of shares thereof).

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then outstanding) by the affirmative vote of the holders of a majority of the voting power of the stock of the Company entitled to vote thereon, without a separate vote of the holders of the Preferred Stock, or of any series thereof, unless a vote of any such holders is required pursuant to the terms of any certificate of designation filed with respect to

any series of Preferred Stock.

C. Each outstanding share of Common Stock shall entitle the holder thereof to one vote on each matter properly submitted to the stockholders of the Company for their vote; *provided, however*, that, except as otherwise required by law, holders of Common Stock shall not be entitled to vote on any amendment to this Amended and Restated Certificate of Incorporation (including any certificate of designation filed with respect to any series of Preferred Stock) that relates solely to the terms of one or more outstanding series of Preferred Stock if the holders of such affected series are entitled, either separately or together as a class with the holders of one or more other such series, to vote thereon by law or pursuant to this Amended and Restated Certificate of Incorporation (including any certificate of designation filed with respect to any series of Preferred Stock).

V.

For the management of the business and for the conduct of the affairs of the Company, and in further definition, limitation and regulation of the powers of the Company, of its directors and of its stockholders or any class thereof, as the case may be, it is further provided that:

A. **MANAGEMENT OF BUSINESS.** The management of the business and the conduct of the affairs of the Company shall be vested in its Board of Directors.

B. **BOARD OF DIRECTORS.**

1. **Number.** The number of directors that shall constitute the Board shall be fixed exclusively by resolutions adopted by a majority of the authorized number of directors constituting the Board.

2. **Term.** Subject to the rights of the holders of any series of Preferred Stock to elect additional directors under specified circumstances, following the closing of the initial public offering pursuant to an effective registration statement under the Securities Act of 1933, as amended (the "*Securities Act*") covering the offer and sale of securities to the public (the "*Initial Public Offering*"), the directors shall be divided into three classes designated as Class I, Class II and Class III, respectively. The Board is authorized to assign members of the Board already in office to such classes at the time the classification becomes effective. At the first annual meeting of stockholders following the closing of the Initial Public Offering, the term of office of the Class I directors shall expire and Class I directors shall be elected for a full term of three years. At the second annual meeting of stockholders following the closing of the Initial Public Offering, the term of office of the Class II directors shall expire and Class II directors shall be elected for a full term of three years. At the third annual meeting of stockholders following the closing of the Initial Public Offering, the term of office of the Class III directors shall expire and Class III directors shall be elected for a full term of three years. At each succeeding annual meeting of stockholders, directors shall be elected for a full term of three years to succeed the directors of the class whose terms expire at such annual meeting. Notwithstanding the foregoing provisions of this section, each director shall serve until his or her successor is duly elected and qualified or until his or her earlier death, resignation or removal.

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No decrease in the number of directors constituting the Board shall shorten the term of any incumbent director.

3. **Removal.**

a. Subject to the rights of any series of Preferred Stock to elect additional directors under specified circumstances, following the closing of the Initial Public Offering, neither the Board nor any individual director may be removed without cause.

b. Subject to any limitation imposed by law, any individual director or directors may be removed with cause by the affirmative vote of the holders of at least sixty-six and two-thirds percent (66 2/3%) of the voting power of all then-outstanding shares of capital stock of the Company entitled to vote generally at an election of directors.

4. **Vacancies.** Subject to the rights of the holders of any series of Preferred Stock, any vacancies on the Board resulting from death, resignation, disqualification, removal or other causes, and any newly created directorships resulting from any increase in the number of directors, shall, unless the Board determines by resolution that any such vacancies or newly created directorships shall be filled by the stockholders, except as otherwise provided by law, be filled only by the affirmative vote of a majority of the directors then in office, even though less than a quorum of the Board, and not by the stockholders. Any director elected in accordance with the preceding sentence shall hold office for the remainder of the full term of the director for which the vacancy was created or occurred and until such director's successor shall have been elected and qualified.

C. **BYLAW AMENDMENTS.** The Board is expressly empowered to adopt, amend or repeal the Bylaws of the Company. Any adoption, amendment or repeal of the Bylaws of the Company by the Board shall require the approval of a majority of the authorized number of directors. The stockholders shall also have power to adopt, amend or repeal the Bylaws of the Company; *provided, however*, that, in addition to any vote of the holders of any class or series of stock of the Company required by law or by this Amended and Restated Certificate of Incorporation, such action by stockholders shall require the affirmative vote of the holders of at least sixty-six and two-thirds percent (66 2/3%) of the voting power of all of the then-outstanding shares of the capital stock of the Company entitled to vote generally in the election of directors, voting together as a single class.

D. **WRITTEN BALLOTS.** The directors of the Company need not be elected by written ballot unless the Bylaws so provide.

E. **ACTION BY STOCKHOLDERS.** No action shall be taken by the stockholders of the Company except at an annual or special meeting of stockholders called in accordance with the Bylaws and no action shall be taken by the stockholders by written consent or electronic transmission.

F. **ADVANCE NOTICE.** Advance notice of stockholder nominations for the election of directors and of business to be brought by stockholders before any meeting of the stockholders of the Company shall be given in the manner provided in the Bylaws of the Company.

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VI.

A. The liability of the directors for monetary damages shall be eliminated to the fullest extent under applicable law. If the DGCL is amended to authorize corporate action further eliminating or limiting the personal liability of directors, then the liability of a director of the Company shall be eliminated to the fullest extent permitted by the DGCL, as so amended.

B. Any repeal or modification of this Article VI shall be prospective and shall not affect the rights under this Article VI in effect at the time of the alleged occurrence of any act or omission to act giving rise to liability or indemnification.

VII.

Unless the Company consents in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware shall be the sole and exclusive forum for (i) any derivative action or proceeding brought on behalf of the Company; (ii) any action asserting a claim of breach of a fiduciary duty owed by any director, officer or other employee of the Company to the Company or the Company's stockholders; (iii) any action asserting a claim against the Company arising pursuant to any provision of the General Corporation Law, the Amended and Restated Certificate of Incorporation or the Bylaws of the Company; or (iv) any action asserting a claim against the Company governed by the internal affairs doctrine. Any person or entity purchasing or otherwise acquiring any interest in shares of capital stock of the Company shall be deemed to have notice of and to have consented to the provisions of this Article VII.

#### VIII.

**A.** The Company reserves the right to amend, alter, change or repeal any provision contained in this Amended and Restated Certificate of Incorporation, in the manner now or hereafter prescribed by statute, except as provided in paragraph B. of this Article VIII, and all rights conferred upon the stockholders herein are granted subject to this reservation.

**B.** Notwithstanding any other provisions of this Amended and Restated Certificate of Incorporation or any provision of law which might otherwise permit a lesser vote or no vote, but in addition to any affirmative vote of the holders of any particular class or series of the Company required by law or by this Amended and Restated Certificate of Incorporation or any certificate of designation filed with respect to a series of Preferred Stock that may be designated from time to time, the affirmative vote of the holders of at least sixty-six and two-thirds percent (66 2/3%) of the voting power of all of the then-outstanding shares of capital stock of the Company entitled to vote generally in the election of directors, voting together as a single class, shall be required to alter, amend or repeal Articles V, VI, VII and VIII.

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## AMENDED AND RESTATED BYLAWS

OF

TREVENA, INC.  
(A DELAWARE CORPORATION)

TREVENA, INC.  
AMENDED AND RESTATED  
BYLAWS

## ARTICLE I

## OFFICES

**Section 1. Registered Office.** The registered office shall be established and maintained at the office of Corporation Service Company, in the City of Wilmington, in the County of New Castle, in the State of Delaware, and said corporation, or other such person or entity as the Board of Directors may from time to time designate, shall be the registered agent of the corporation.

**Section 2. Other Offices.** The corporation shall also have and maintain an office or principal place of business at such place as may be fixed by the Board of Directors, and may also have offices at such other places, both within and without the State of Delaware as the Board of Directors may from time to time determine or the business of the corporation may require.

## ARTICLE II

## CORPORATE SEAL

**Section 3. Corporate Seal.** The Board of Directors may adopt a corporate seal. If adopted, the corporate seal shall consist of a die bearing the name of the corporation and the inscription, "Corporate Seal-Delaware." Said seal may be used by causing it or a facsimile thereof to be impressed or affixed or reproduced or otherwise.

## ARTICLE III

## STOCKHOLDERS' MEETINGS

**Section 4. Place Of Meetings.** Meetings of the stockholders of the corporation may be held at such place, either within or without the State of Delaware, as may be determined from time to time by the Board of Directors. The Board of Directors may, in its sole discretion, determine that the meeting shall not be held at any place, but may instead be held solely by means of remote communication as provided under the Delaware General Corporation Law (the "*DGCL*").

**Section 5. Annual Meetings.**

(a) The annual meeting of the stockholders of the corporation, for the purpose of election of directors and for such other business as may properly come before it, shall be held on such date and at such time as may be designated from time to time by the Board of Directors. Nominations of persons for election to the Board of Directors of the corporation and the proposal of business to be considered by the stockholders may be made at an annual meeting of stockholders: (i) pursuant to the corporation's notice of meeting of stockholders (with respect to

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business other than nominations); (ii) brought specifically by or at the direction of the Board of Directors; or (iii) by any stockholder of the corporation who was a stockholder of record at the time of giving the stockholder's notice provided for in Section 5(b) below, who is entitled to vote at the meeting and who complied with the notice procedures set forth in this Section 5. For the avoidance of doubt, clause (iii) above shall be the exclusive means for a stockholder to make nominations and submit other business (other than matters properly included in the corporation's notice of meeting of stockholders and proxy statement under Rule 14a-8 under the Securities Exchange Act of 1934, as amended, and the rules and regulations thereunder (the "*1934 Act*")) before an annual meeting of stockholders.

(b) At an annual meeting of the stockholders, only such business shall be conducted as is a proper matter for stockholder action under Delaware law and as shall have been properly brought before the meeting.

(1) For nominations for the election to the Board of Directors to be properly brought before an annual meeting by a stockholder pursuant to clause (iii) of Section 5(a) of these Bylaws, the stockholder must deliver written notice to the Secretary at the principal executive offices of the corporation on a timely basis as set forth in Section 5(b)(3) and must update and supplement such written notice on a timely basis as set forth in Section 5(c). Such stockholder's notice shall set forth: (A) as to each nominee such stockholder proposes to nominate at the meeting: (1) the name, age, business address and residence address of such nominee, (2) the principal occupation or employment of such nominee, (3) the class and number of shares of each class of capital stock of the corporation which are owned of record and beneficially by such nominee, (4) the date or dates on which such shares were acquired and the investment intent of such acquisition and (5) such other information concerning such nominee as would be required to be disclosed in a proxy statement soliciting proxies for the election of such nominee as a director in an election contest (even if an election contest is not involved), or that is otherwise required to be disclosed pursuant to Section 14 of the 1934 Act and the rules and regulations promulgated thereunder (including such person's written consent to being named as a nominee and to serving as a director if elected); and (B) the information required by Section 5(b)(4). The corporation may require any proposed nominee to furnish such other information as it may reasonably require to determine the eligibility of such proposed nominee to serve as an independent director of the corporation or that could be material to a reasonable stockholder's understanding of the independence, or lack thereof, of such proposed nominee.

(2) Other than proposals sought to be included in the corporation's proxy materials pursuant to Rule 14a-8 under the 1934 Act, for business other than nominations for the election to the Board of Directors to be properly brought before an annual meeting by a stockholder pursuant to clause (iii) of Section 5(a) of these Bylaws, the stockholder must deliver written notice to the Secretary at the principal executive offices of the corporation on a timely basis as set forth in Section 5(b)(3), and must update and supplement such written notice on a timely basis as set forth in Section 5(c). Such stockholder's notice shall set forth: (A) as to each matter such stockholder proposes to bring before the meeting, a brief description of the business desired to be brought before the meeting, the reasons for conducting such business at the meeting, and any material interest (including any anticipated benefit of such business to any Proponent (as defined below) other than solely as a result of its ownership of the corporation's capital stock, that is material to any Proponent individually, or to the Proponents in the

aggregate) in such business of any Proponent; and (B) the information required by Section 5(b)(4).

(3) To be timely, the written notice required by Section 5(b)(1) or 5(b)(2) must be received by the Secretary at the principal executive offices of the corporation not later than the close of business on the ninetieth (90<sup>th</sup>) day nor earlier than the close of business on the one hundred twentieth (120<sup>th</sup>) day prior to the first anniversary of the preceding year's annual meeting; *provided, however*, that, subject to the last sentence of this Section 5(b)(3), in the event that the date of the annual meeting is advanced more than thirty (30) days prior to or delayed by more than thirty (30) days after the anniversary of the preceding year's annual meeting, notice by the stockholder to be timely must be so received not earlier than the close of business on the one hundred twentieth (120<sup>th</sup>) day prior to such annual meeting and not later than the close of business on the later of the ninetieth (90<sup>th</sup>) day prior to such annual meeting or the tenth (10<sup>th</sup>) day following the day on which public announcement of the date of such meeting is first made. In no event shall an adjournment or a postponement of an annual meeting for which notice has been given, or the public announcement thereof has been made, commence a new time period for the giving of a stockholder's notice as described above.

(4) The written notice required by Section 5(b)(1) or 5(b)(2) shall also set forth, as of the date of the notice and as to the stockholder giving the notice and the beneficial owner, if any, on whose behalf the nomination or proposal is made (each, a "**Proponent**" and collectively, the "**Proponents**"): (A) the name and address of each Proponent, as they appear on the corporation's books; (B) the class, series and number of shares of the corporation that are owned beneficially and of record by each Proponent; (C) a description of any agreement, arrangement or understanding (whether oral or in writing) with respect to such nomination or proposal between or among any Proponent and any of its affiliates or associates, and any others (including their names) acting in concert, or otherwise under the agreement, arrangement or understanding, with any of the foregoing; (D) a representation that the Proponents are holders of record or beneficial owners, as the case may be, of shares of the corporation entitled to vote at the meeting and intend to appear in person or by proxy at the meeting to nominate the person or persons specified in the notice (with respect to a notice under Section 5(b)(1)) or to propose the business that is specified in the notice (with respect to a notice under Section 5(b)(2)); (E) a representation as to whether the Proponents intend to deliver a proxy statement and form of proxy to holders of a sufficient number of holders of the corporation's voting shares to elect such nominee or nominees (with respect to a notice under Section 5(b)(1)) or to carry such proposal (with respect to a notice under Section 5(b)(2)); (F) to the extent known by any Proponent, the name and address of any other stockholder supporting the proposal on the date of such stockholder's notice; and (G) a description of all Derivative Transactions (as defined below) by each Proponent during the previous twelve (12) month period, including the date of the transactions and the class, series and number of securities involved in, and the material economic terms of, such Derivative Transactions.

For purposes of Sections 5 and 6, a "**Derivative Transaction**" means any agreement, arrangement, interest or understanding entered into by, or on behalf or for the benefit of, any Proponent or any of its affiliates or associates, whether record or beneficial:

- (w) the value of which is derived in whole or in part from the value of any class or series of shares or other securities of the corporation,
- (x) which otherwise provides any direct or indirect opportunity to gain or share in any gain derived from a change in the value of securities of the corporation,
- (y) the effect or intent of which is to mitigate loss, manage risk or benefit of security value or price changes, or
- (z) which provides the right to vote or increase or decrease the voting power of, such Proponent, or any of its affiliates or associates, with respect to any securities of the corporation,

which agreement, arrangement, interest or understanding may include, without limitation, any option, warrant, debt position, note, bond, convertible security, swap, stock appreciation right, short position, profit interest, hedge, right to dividends, voting agreement, performance-related fee or arrangement to borrow or lend shares (whether or not subject to payment, settlement, exercise or conversion in any such class or series), and any proportionate interest of such Proponent in the securities of the corporation held by any general or limited partnership, or any limited liability company, of which such Proponent is, directly or indirectly, a general partner or managing member.

(c) A stockholder providing written notice required by Section 5(b)(1) or (2) shall update and supplement such notice in writing, if necessary, so that the information provided or required to be provided in such notice is true and correct in all material respects as of (i) the record date for the meeting and (ii) the date that is five (5) business days prior to the meeting and, in the event of any adjournment or postponement thereof, five (5) business days prior to such adjourned or postponed meeting. In the case of an update and supplement pursuant to clause (i) of this Section 5(c), such update and supplement shall be received by the Secretary at the principal executive offices of the corporation not later than five (5) business days after the record date for the meeting. In the case of an update and supplement pursuant to clause (ii) of this Section 5(c), such update and supplement shall be received by the Secretary at the principal executive offices of the corporation not later than two (2) business days prior to the date for the meeting, and, in the event of any adjournment or postponement thereof, two (2) business days prior to such adjourned or postponed meeting.

(d) Notwithstanding anything in Section 5(b)(3) to the contrary, in the event that the number of directors in an Expiring Class is increased and there is no public announcement of the appointment of a director to such class, or, if no appointment was made, of the vacancy in such class, made by the corporation at least ten (10) days before the last day a stockholder may deliver a notice of nomination in accordance with Section 5(b)(3), a stockholder's notice required by this Section 5 and which complies with the requirements in Section 5(b)(1), other than the timing requirements in Section 5(b)(3), shall also be considered timely, but only with respect to nominees for any new positions in such Expiring Class created by such increase, if it shall be received by the Secretary at the principal executive offices of the corporation not later than the close of business on the tenth (10<sup>th</sup>) day following the day on which such public announcement is first made by the corporation. For purposes of this section,

an "**Expiring Class**" shall mean a class of directors whose term shall expire at the next annual meeting of stockholders.

(e) A person shall not be eligible for election or re-election as a director unless the person is nominated either in accordance with clause (ii) of Section 5(a), or in accordance with clause (iii) of Section 5(a). Except as otherwise required by law, the chairman of the meeting shall have the power and duty to determine whether a nomination or any business proposed to be brought before the meeting was made, or proposed, as the case may be, in accordance with the procedures set forth in these Bylaws and, if any proposed nomination or business is not in compliance with these Bylaws, or the Proponent does not act in accordance with the representations in Sections 5(b)(4)(D) and 5(b)(4)(E), to declare that such proposal or nomination shall not be presented for stockholder action at the meeting and shall be disregarded, notwithstanding that proxies in respect of such nominations or such business may have been solicited or received.

(f) Notwithstanding the foregoing provisions of this Section 5, in order to include information with respect to a stockholder proposal in the proxy statement and form of proxy for a stockholders' meeting, a stockholder must also comply with all applicable requirements of the 1934 Act and the rules and regulations thereunder. Nothing in these Bylaws shall be deemed to affect any rights of stockholders to request inclusion of proposals in the corporation's proxy statement pursuant to Rule 14a-8 under the 1934 Act; *provided, however*, that any references in these Bylaws to the 1934 Act or the rules and regulations thereunder are not intended to and shall



not limit the requirements applicable to proposals and/or nominations to be considered pursuant to Section 5(a)(iii) of these Bylaws.

(g) For purposes of Sections 5 and 6,

(1) “*public announcement*” shall mean disclosure in a press release reported by the Dow Jones News Service, Associated Press or comparable national news service or in a document publicly filed by the corporation with the Securities and Exchange Commission pursuant to Section 13, 14 or 15(d) of the 1934 Act; and

(2) “*affiliates*” and “*associates*” shall have the meanings set forth in Rule 405 under the Securities Act of 1933, as amended (the “*1933 Act*”).

#### **Section 6. Special Meetings.**

(a) Special meetings of the stockholders of the corporation may be called, for any purpose as is a proper matter for stockholder action under Delaware law, by (i) the Chairman of the Board of Directors, (ii) the Chief Executive Officer, or (iii) the Board of Directors pursuant to a resolution adopted by a majority of the total number of authorized directors (whether or not there exist any vacancies in previously authorized directorships at the time any such resolution is presented to the Board of Directors for adoption).

(b) The Board of Directors shall determine the time and place, if any, of such special meeting. Upon determination of the time and place, if any, of the meeting, the Secretary shall cause a notice of meeting to be given to the stockholders entitled to vote, in accordance

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with the provisions of Section 7 of these Bylaws. No business may be transacted at such special meeting otherwise than specified in the notice of meeting.

(c) Nominations of persons for election to the Board of Directors may be made at a special meeting of stockholders at which directors are to be elected (i) by or at the direction of the Board of Directors or (ii) by any stockholder of the corporation who is a stockholder of record at the time of giving notice provided for in this paragraph, who shall be entitled to vote at the meeting and who delivers written notice to the Secretary of the corporation setting forth the information required by Section 5(b)(1). In the event the corporation calls a special meeting of stockholders for the purpose of electing one or more directors to the Board of Directors, any such stockholder of record may nominate a person or persons (as the case may be), for election to such position(s) as specified in the corporation’s notice of meeting, if written notice setting forth the information required by Section 5(b)(1) of these Bylaws shall be received by the Secretary at the principal executive offices of the corporation not later than the close of business on the later of the ninetieth (90<sup>th</sup>) day prior to such meeting or the tenth (10<sup>th</sup>) day following the day on which public announcement is first made of the date of the special meeting and of the nominees proposed by the Board of Directors to be elected at such meeting. The stockholder shall also update and supplement such information as required under Section 5(c). In no event shall an adjournment or a postponement of a special meeting for which notice has been given, or the public announcement thereof has been made, commence a new time period for the giving of a stockholder’s notice as described above.

(d) Notwithstanding the foregoing provisions of this Section 6, a stockholder must also comply with all applicable requirements of the 1934 Act and the rules and regulations thereunder with respect to matters set forth in this Section 6. Nothing in these Bylaws shall be deemed to affect any rights of stockholders to request inclusion of proposals in the corporation’s proxy statement pursuant to Rule 14a-8 under the 1934 Act; *provided, however*, that any references in these Bylaws to the 1934 Act or the rules and regulations thereunder are not intended to and shall not limit the requirements applicable to nominations for the election to the Board of Directors to be considered pursuant to Section 6(c) of these Bylaws.

**Section 7. Notice Of Meetings.** Except as otherwise provided by law, notice, given in writing or by electronic transmission, of each meeting of stockholders shall be given not less than ten (10) nor more than sixty (60) days before the date of the meeting to each stockholder entitled to vote at such meeting, such notice to specify the place, if any, date and hour, in the case of special meetings, the purpose or purposes of the meeting, and the means of remote communications, if any, by which stockholders and proxy holders may be deemed to be present in person and vote at any such meeting. If mailed, notice is deemed given when deposited in the U.S. mail, postage prepaid, directed to the stockholder at such stockholder’s address as it appears on the records of the corporation. Notice of the time, place, if any, and purpose of any meeting of stockholders may be waived in writing, signed by the person entitled to notice thereof, or by electronic transmission by such person, either before or after such meeting, and will be waived by any stockholder by his, her or its attendance thereat in person, by remote communication, if applicable, or by proxy, except when the stockholder attends a meeting for the express purpose of objecting, at the beginning of the meeting, to the transaction of any business because the meeting is not lawfully called or convened. Any stockholder so waiving notice of such meeting

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shall be bound by the proceedings of any such meeting in all respects as if due notice thereof had been given.

**Section 8. Quorum.** At all meetings of stockholders, except where otherwise provided by statute or by the Certificate of Incorporation, or by these Bylaws, the presence, in person, by remote communication, if applicable, or by proxy duly authorized, of the holders of a majority of the outstanding shares of stock entitled to vote shall constitute a quorum for the transaction of business. In the absence of a quorum, any meeting of stockholders may be adjourned, from time to time, either by the chairman of the meeting or by vote of the holders of a majority of the shares represented thereat, but no other business shall be transacted at such meeting. The stockholders present at a duly called or convened meeting, at which a quorum is present, may continue to transact business until adjournment, notwithstanding the withdrawal of enough stockholders to leave less than a quorum. Except as otherwise provided by statute or by applicable stock exchange rules, or by the Certificate of Incorporation or these Bylaws, in all matters other than the election of directors, the affirmative vote of the majority of shares present in person, by remote communication, if applicable, or represented by proxy at the meeting and entitled to vote generally on the subject matter shall be the act of the stockholders. Except as otherwise provided by statute, the Certificate of Incorporation or these Bylaws, directors shall be elected by a plurality of the votes of the shares present in person, by remote communication, if applicable, or represented by proxy at the meeting and entitled to vote generally on the election of directors. Where a separate vote by a class or classes or series is required, except where otherwise provided by the statute or by the Certificate of Incorporation or these Bylaws, a majority of the outstanding shares of such class or classes or series, present in person, by remote communication, if applicable, or represented by proxy duly authorized, shall constitute a quorum entitled to take action with respect to that vote on that matter. Except where otherwise provided by statute or by the Certificate of Incorporation or these Bylaws, the affirmative vote of the majority (plurality, in the case of the election of directors) of shares of such class or classes or series present in person, by remote communication, if applicable, or represented by proxy at the meeting shall be the act of such class or classes or series.

**Section 9. Adjournment And Notice Of Adjourned Meetings.** Any meeting of stockholders, whether annual or special, may be adjourned from time to time either by the chairman of the meeting or by the vote of a majority of the shares present in person, by remote communication, if applicable, or represented by proxy at the meeting. When a meeting is adjourned to another time or place, if any, notice need not be given of the adjourned meeting if the time and place, if any, thereof are announced at the meeting at which the adjournment is taken. At the adjourned meeting, the corporation may transact any business which might have been transacted at the original meeting. If the adjournment is for more than thirty (30) days or if after the adjournment a new record date is fixed for the adjourned meeting, a notice of the adjourned meeting shall be given to each stockholder of record entitled to vote at the meeting.

**Section 10. Voting Rights.** For the purpose of determining those stockholders entitled to vote at any meeting of the stockholders, except as otherwise

provided by law, only persons in whose names shares stand on the stock records of the corporation on the record date, as provided in Section 12 of these Bylaws, shall be entitled to vote at any meeting of stockholders. Every person entitled to vote shall have the right to do so either in person, by remote communication, if applicable, or by an agent or agents authorized by a proxy granted in

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accordance with Delaware law. An agent so appointed need not be a stockholder. No proxy shall be voted after three (3) years from its date of creation unless the proxy provides for a longer period.

**Section 11. Joint Owners Of Stock.** If shares or other securities having voting power stand of record in the names of two (2) or more persons, whether fiduciaries, members of a partnership, joint tenants, tenants in common, tenants by the entirety, or otherwise, or if two (2) or more persons have the same fiduciary relationship respecting the same shares, unless the Secretary is given written notice to the contrary and is furnished with a copy of the instrument or order appointing them or creating the relationship wherein it is so provided, their acts with respect to voting shall have the following effect: (a) if only one (1) votes, his or her act binds all; (b) if more than one (1) votes, the act of the majority so voting binds all; (c) if more than one (1) votes, but the vote is evenly split on any particular matter, each faction may vote the securities in question proportionally, or may apply to the Delaware Court of Chancery for relief as provided in the DGCL, Section 217(b). If the instrument filed with the Secretary shows that any such tenancy is held in unequal interests, a majority or even-split for the purpose of subsection (c) shall be a majority or even-split in interest.

**Section 12. List Of Stockholders.** The Secretary shall prepare and make, at least ten (10) days before every meeting of stockholders, a complete list of the stockholders entitled to vote at said meeting, arranged in alphabetical order, showing the address of each stockholder and the number of shares registered in the name of each stockholder. Such list shall be open to the examination of any stockholder, for any purpose germane to the meeting, (a) on a reasonably accessible electronic network, provided that the information required to gain access to such list is provided with the notice of the meeting, or (b) during ordinary business hours, at the principal place of business of the corporation. In the event that the corporation determines to make the list available on an electronic network, the corporation may take reasonable steps to ensure that such information is available only to stockholders of the corporation. The list shall be open to examination of any stockholder during the time of the meeting as provided by law.

**Section 13. Action Without Meeting.** No action shall be taken by the stockholders except at an annual or special meeting of stockholders called in accordance with these Bylaws, and no action shall be taken by the stockholders by written consent or by electronic transmission.

**Section 14. Organization.**

(a) At every meeting of stockholders, the Chairman of the Board of Directors, or, if a Chairman has not been appointed or is absent, the President, or, if the President is absent, a chairman of the meeting chosen by a majority in interest of the stockholders entitled to vote, present in person or by proxy, shall act as chairman. The Secretary, or, in his or her absence, an Assistant Secretary directed to do so by the President, shall act as secretary of the meeting.

(b) The Board of Directors of the corporation shall be entitled to make such rules or regulations for the conduct of meetings of stockholders as it shall deem necessary, appropriate or convenient. Subject to such rules and regulations of the Board of Directors, if any, the chairman of the meeting shall have the right and authority to prescribe such rules, regulations and procedures and to do all such acts as, in the judgment of such chairman, are

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necessary, appropriate or convenient for the proper conduct of the meeting, including, without limitation, establishing an agenda or order of business for the meeting, rules and procedures for maintaining order at the meeting and the safety of those present, limitations on participation in such meeting to stockholders of record of the corporation and their duly authorized and constituted proxies and such other persons as the chairman shall permit, restrictions on entry to the meeting after the time fixed for the commencement thereof, limitations on the time allotted to questions or comments by participants and regulation of the opening and closing of the polls for balloting on matters which are to be voted on by ballot. The date and time of the opening and closing of the polls for each matter upon which the stockholders will vote at the meeting shall be announced at the meeting. Unless and to the extent determined by the Board of Directors or the chairman of the meeting, meetings of stockholders shall not be required to be held in accordance with rules of parliamentary procedure.

**ARTICLE IV**

**DIRECTORS**

**Section 15. Number And Term Of Office.** The authorized number of directors of the corporation shall be fixed in accordance with the Certificate of Incorporation. Directors need not be stockholders unless so required by the Certificate of Incorporation. If for any cause, the directors shall not have been elected at an annual meeting, they may be elected as soon thereafter as convenient at a special meeting of the stockholders called for that purpose in the manner provided in these Bylaws.

**Section 16. Powers.** The powers of the corporation shall be exercised, its business conducted and its property controlled by the Board of Directors, except as may be otherwise provided by statute or by the Certificate of Incorporation.

**Section 17. Classes of Directors.** Subject to the rights of the holders of any series of Preferred Stock to elect additional directors under specified circumstances, immediately following the closing of the initial public offering pursuant to an effective registration statement under the 1933 Act covering the offer and sale of Common Stock to the public (the "*Initial Public Offering*"), the directors shall be divided into three classes designated as Class I, Class II and Class III, respectively. The Board of Directors is authorized to assign members of the Board of Directors already in office to such classes at the time the classification becomes effective. At the first annual meeting of stockholders following the closing of the Initial Public Offering, the term of office of the Class I directors shall expire and Class I directors shall be elected for a full term of three years. At the second annual meeting of stockholders following the closing of the Initial Public Offering, the term of office of the Class II directors shall expire and Class II directors shall be elected for a full term of three years. At the third annual meeting of stockholders following the closing of the Initial Public Offering, the term of office of the Class III directors shall expire and Class III directors shall be elected for a full term of three years. At each succeeding annual meeting of stockholders, directors shall be elected for a full term of three years to succeed the directors of the class whose terms expire at such annual meeting.

Notwithstanding the foregoing provisions of this Section 17, each director shall serve until his or her successor is duly elected and qualified or until his or her earlier death, resignation

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or removal. No decrease in the number of directors constituting the Board of Directors shall shorten the term of any incumbent director.

**Section 18. Vacancies.** Unless otherwise provided in the Certificate of Incorporation, and subject to the rights of the holders of any series of Preferred Stock, any vacancies on the Board of Directors resulting from death, resignation, disqualification, removal or other causes and any newly created directorships resulting from any

increase in the number of directors shall, unless the Board of Directors determines by resolution that any such vacancies or newly created directorships shall be filled by stockholders, be filled only by the affirmative vote of a majority of the directors then in office, even though less than a quorum of the Board of Directors, or by a sole remaining director, and not by the stockholders, *provided, however*, that whenever the holders of any class or classes of stock or series thereof are entitled to elect one or more directors by the provisions of the Certificate of Incorporation, vacancies and newly created directorships of such class or classes or series shall, unless the Board of Directors determines by resolution that any such vacancies or newly created directorships shall be filled by stockholders, be filled by a majority of the directors elected by such class or classes or series thereof then in office, or by a sole remaining director so elected, and not by the stockholders. Any director elected in accordance with the preceding sentence shall hold office for the remainder of the full term of the director for which the vacancy was created or occurred and until such director's successor shall have been elected and qualified. A vacancy in the Board of Directors shall be deemed to exist under this Bylaw in the case of the death, removal or resignation of any director.

**Section 19. Resignation.** Any director may resign at any time by delivering his or her notice in writing or by electronic transmission to the Secretary, such resignation to specify whether it will be effective at a particular time. If no such specification is made, it shall be deemed effective at the time of delivery to the Secretary. When one or more directors shall resign from the Board of Directors, effective at a future date, a majority of the directors then in office, including those who have so resigned, shall have power to fill such vacancy or vacancies, the vote thereon to take effect when such resignation or resignations shall become effective, and each Director so chosen shall hold office for the unexpired portion of the term of the Director whose place shall be vacated and until his or her successor shall have been duly elected and qualified.

**Section 20. Removal.**

(a) Subject to the rights of holders of any series of Preferred Stock to elect additional directors under specified circumstances, neither the Board of Directors nor any individual director may be removed without cause.

(b) Subject to any limitation imposed by law, any individual director or directors may be removed with cause by the affirmative vote of the holders of at least sixty-six and two-thirds percent (66 2/3%) of the voting power of all then outstanding shares of capital stock of the corporation entitled to vote generally at an election of directors.

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**Section 21. Meetings.**

(a) **Regular Meetings.** Unless otherwise restricted by the Certificate of Incorporation, regular meetings of the Board of Directors may be held at any time or date and at any place within or without the State of Delaware which has been designated by the Board of Directors and publicized among all directors, either orally or in writing, by telephone, including a voice-messaging system or other system designed to record and communicate messages, facsimile, telegraph or telex, or by electronic mail or other electronic means. No further notice shall be required for regular meetings of the Board of Directors.

(b) **Special Meetings.** Unless otherwise restricted by the Certificate of Incorporation, special meetings of the Board of Directors may be held at any time and place within or without the State of Delaware whenever called by the Chairman of the Board, the Chief Executive Officer or a majority of the authorized number of directors.

(c) **Meetings by Electronic Communications Equipment.** Any member of the Board of Directors, or of any committee thereof, may participate in a meeting by means of conference telephone or other communications equipment by means of which all persons participating in the meeting can hear each other, and participation in a meeting by such means shall constitute presence in person at such meeting.

(d) **Notice of Special Meetings.** Notice of the time and place of all special meetings of the Board of Directors shall be orally or in writing, by telephone, including a voice messaging system or other system or technology designed to record and communicate messages, facsimile, telegraph or telex, or by electronic mail or other electronic means, during normal business hours, at least twenty-four (24) hours before the date and time of the meeting. If notice is sent by US mail, it shall be sent by first class mail, charges prepaid, at least three (3) days before the date of the meeting. Notice of any meeting may be waived in writing, or by electronic transmission, at any time before or after the meeting and will be waived by any director by attendance thereat, except when the director attends the meeting for the express purpose of objecting, at the beginning of the meeting, to the transaction of any business because the meeting is not lawfully called or convened.

(e) **Waiver of Notice.** The transaction of all business at any meeting of the Board of Directors, or any committee thereof, however called or noticed, or wherever held, shall be as valid as though it had been transacted at a meeting duly held after regular call and notice, if a quorum be present and if, either before or after the meeting, each of the directors not present who did not receive notice shall sign a written waiver of notice or shall waive notice by electronic transmission. All such waivers shall be filed with the corporate records or made a part of the minutes of the meeting.

**Section 22. Quorum And Voting.**

(a) Unless the Certificate of Incorporation requires a greater number, and except with respect to questions related to indemnification arising under Section 43 herein for which a quorum shall be one-third of the exact number of directors fixed from time to time, a quorum of the Board of Directors shall consist of a majority of the exact number of directors

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fixed from time to time by the Board of Directors in accordance with the Certificate of Incorporation *provided, however*, at any meeting whether a quorum be present or otherwise, a majority of the directors present may adjourn from time to time until the time fixed for the next regular meeting of the Board of Directors, without notice other than by announcement at the meeting.

(b) At each meeting of the Board of Directors at which a quorum is present, all questions and business shall be determined by the affirmative vote of a majority of the directors present, unless a different vote be required by law, the Certificate of Incorporation or these Bylaws.

**Section 23. Action Without Meeting.** Unless otherwise restricted by the Certificate of Incorporation or these Bylaws, any action required or permitted to be taken at any meeting of the Board of Directors or of any committee thereof may be taken without a meeting, if all members of the Board of Directors or committee, as the case may be, consent thereto in writing or by electronic transmission, and such writing or writings or transmission or transmissions are filed with the minutes of proceedings of the Board of Directors or committee. Such filing shall be in paper form if the minutes are maintained in paper form and shall be in electronic form if the minutes are maintained in electronic form.

**Section 24. Fees And Compensation.** Directors shall be entitled to such compensation for their services as may be approved by the Board of Directors, including, if so approved, by resolution of the Board of Directors, a fixed sum and expenses of attendance, if any, for attendance at each regular or special meeting of the Board of Directors and at any meeting of a committee of the Board of Directors. Nothing herein contained shall be construed to preclude any director from serving the corporation in any other capacity as an officer, agent, employee, or otherwise and receiving compensation therefor.

## Section 25. Committees.

(a) **Executive Committee.** The Board of Directors may appoint an Executive Committee to consist of one (1) or more members of the Board of Directors. The Executive Committee, to the extent permitted by law and provided in the resolution of the Board of Directors shall have and may exercise all the powers and authority of the Board of Directors in the management of the business and affairs of the corporation, and may authorize the seal of the corporation to be affixed to all papers which may require it; but no such committee shall have the power or authority in reference to (i) approving or adopting, or recommending to the stockholders, any action or matter (other than the election or removal of directors) expressly required by the DGCL to be submitted to stockholders for approval, or (ii) adopting, amending or repealing any Bylaw of the corporation.

(b) **Other Committees.** The Board of Directors may, from time to time, appoint such other committees as may be permitted by law. Such other committees appointed by the Board of Directors shall consist of one (1) or more members of the Board of Directors and shall have such powers and perform such duties as may be prescribed by the resolution or resolutions creating such committees, but in no event shall any such committee have the powers denied to the Executive Committee in these Bylaws.

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(c) **Term.** The Board of Directors, subject to any requirements of any outstanding series of Preferred Stock and the provisions of subsections (a) or (b) of this Section 25, may at any time increase or decrease the number of members of a committee or terminate the existence of a committee. The membership of a committee member shall terminate on the date of his or her death or voluntary resignation from the committee or from the Board of Directors. The Board of Directors may at any time for any reason remove any individual committee member and the Board of Directors may fill any committee vacancy created by death, resignation, removal or increase in the number of members of the committee. The Board of Directors may designate one or more directors as alternate members of any committee, who may replace any absent or disqualified member at any meeting of the committee, and, in addition, in the absence or disqualification of any member of a committee, the member or members thereof present at any meeting and not disqualified from voting, whether or not he or they constitute a quorum, may unanimously appoint another member of the Board of Directors to act at the meeting in the place of any such absent or disqualified member.

(d) **Meetings.** Unless the Board of Directors shall otherwise provide, regular meetings of the Executive Committee or any other committee appointed pursuant to this Section 25 shall be held at such times and places as are determined by the Board of Directors, or by any such committee, and when notice thereof has been given to each member of such committee, no further notice of such regular meetings need be given thereafter. Special meetings of any such committee may be held at any place which has been determined from time to time by such committee, and may be called by any director who is a member of such committee, upon notice to the members of such committee of the time and place of such special meeting given in the manner provided for the giving of notice to members of the Board of Directors of the time and place of special meetings of the Board of Directors. Notice of any special meeting of any committee may be waived in writing or by electronic transmission at any time before or after the meeting and will be waived by any director by attendance thereat, except when the director attends such special meeting for the express purpose of objecting, at the beginning of the meeting, to the transaction of any business because the meeting is not lawfully called or convened. Unless otherwise provided by the Board of Directors in the resolutions authorizing the creation of the committee, a majority of the authorized number of members of any such committee shall constitute a quorum for the transaction of business, and the act of a majority of those present at any meeting at which a quorum is present shall be the act of such committee.

**Section 26. Organization.** At every meeting of the directors and stockholders, the Chairman of the Board of Directors, or, if a Chairman has not been appointed or is absent, the Chief Executive Officer (if a director), or, if a Chief Executive Officer is absent, the President (if a director), or if the President is absent, the most senior Vice President (if a director), or, in the absence of any such person, a chairman of the meeting chosen by a majority of the directors present, shall preside over the meeting. The Secretary, or in his or her absence, any Assistant Secretary or other officer or director directed to do so by the President, shall act as secretary of the meeting. The Chairman of the Board of Directors shall also perform such other duties and have such other powers, as the Board of Directors shall designate from time to time.

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## ARTICLE V

### OFFICERS

**Section 27. Officers Designated.** The officers of the corporation shall include, if and when designated by the Board of Directors, the Chairman of the Board of Directors (provided that notwithstanding anything to the contrary contained in these Bylaws, the Chairman of the Board of Directors shall not be deemed an officer of the corporation unless so designated by the Board of Directors), the Chief Executive Officer, the President, one or more Vice Presidents, the Secretary, the Chief Financial Officer and the Treasurer. The Board of Directors may also appoint one or more Assistant Secretaries and Assistant Treasurers and such other officers and agents with such powers and duties as it shall deem necessary. The Board of Directors may assign such additional titles to one or more of the officers as it shall deem appropriate. Any one person may hold any number of offices of the corporation at any one time unless specifically prohibited therefrom by law. The salaries and other compensation of the officers of the corporation shall be fixed by or in the manner designated by the Board of Directors.

### Section 28. Tenure And Duties Of Officers.

(a) **General.** All officers shall hold office at the pleasure of the Board of Directors and until their successors shall have been duly elected and qualified, unless sooner removed. Any officer elected or appointed by the Board of Directors may be removed at any time by the Board of Directors. If the office of any officer becomes vacant for any reason, the vacancy may be filled by the Board of Directors.

(b) **Duties of Chief Executive Officer.** The Chief Executive Officer shall preside at all meetings of the stockholders and at all meetings of the Board of Directors, unless the Chairman of the Board of Directors has been appointed and is present. Unless an officer has been appointed Chief Executive Officer of the corporation, the President shall be the chief executive officer of the corporation and shall, subject to the control of the Board of Directors, have general supervision, direction and control of the business and officers of the corporation. To the extent that a Chief Executive Officer has been appointed and no President has been appointed, all references in these Bylaws to the President shall be deemed references to the Chief Executive Officer. The Chief Executive Officer shall perform other duties commonly incident to the office and shall also perform such other duties and have such other powers, as the Board of Directors shall designate from time to time.

(c) **Duties of President.** The President shall preside at all meetings of the stockholders and at all meetings of the Board of Directors, unless the Chairman of the Board of Directors or the Chief Executive Officer has been appointed and is present. Unless another officer has been appointed Chief Executive Officer of the corporation, the President shall be the chief executive officer of the corporation and shall, subject to the control of the Board of Directors, have general supervision, direction and control of the business and officers of the corporation. The President shall perform other duties commonly incident to the office and shall also perform such other duties and have such other powers, as the Board of Directors shall designate from time to time.

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(d) **Duties of Vice Presidents.** The Vice Presidents may assume and perform the duties of the President in the absence or disability of the President or whenever the office of President is vacant. The Vice Presidents shall perform other duties commonly incident to their office and shall also perform such other duties and have such other powers as the Board of Directors or the Chief Executive Officer, or, if the Chief Executive Officer has not been appointed or is absent, the President shall designate from time to time.

(e) **Duties of Secretary.** The Secretary shall attend all meetings of the stockholders and of the Board of Directors and shall record all acts and proceedings thereof in the minute book of the corporation. The Secretary shall give notice in conformity with these Bylaws of all meetings of the stockholders and of all meetings of the Board of Directors and any committee thereof requiring notice. The Secretary shall perform all other duties provided for in these Bylaws and other duties commonly incident to the office and shall also perform such other duties and have such other powers, as the Board of Directors shall designate from time to time. The President may direct any Assistant Secretary or other officer to assume and perform the duties of the Secretary in the absence or disability of the Secretary, and each Assistant Secretary shall perform other duties commonly incident to the office and shall also perform such other duties and have such other powers as the Board of Directors or the President shall designate from time to time.

(f) **Duties of Chief Financial Officer.** The Chief Financial Officer shall keep or cause to be kept the books of account of the corporation in a thorough and proper manner and shall render statements of the financial affairs of the corporation in such form and as often as required by the Board of Directors or the President. The Chief Financial Officer, subject to the order of the Board of Directors, shall have the custody of all funds and securities of the corporation. The Chief Financial Officer shall perform other duties commonly incident to the office and shall also perform such other duties and have such other powers as the Board of Directors or the President shall designate from time to time. To the extent that a Chief Financial Officer has been appointed and no Treasurer has been appointed, all references in these Bylaws to the Treasurer shall be deemed references to the Chief Financial Officer. The President may direct the Treasurer, if any, or any Assistant Treasurer, or the Controller or any Assistant Controller to assume and perform the duties of the Chief Financial Officer in the absence or disability of the Chief Financial Officer, and each Treasurer and Assistant Treasurer and each Controller and Assistant Controller shall perform other duties commonly incident to the office and shall also perform such other duties and have such other powers as the Board of Directors or the President shall designate from time to time.

(g) **Duties of Treasurer.** Unless another officer has been appointed Chief Financial Officer of the corporation, the Treasurer shall be the chief financial officer of the corporation and shall keep or cause to be kept the books of account of the corporation in a thorough and proper manner and shall render statements of the financial affairs of the corporation in such form and as often as required by the Board of Directors or the President, and, subject to the order of the Board of Directors, shall have the custody of all funds and securities of the corporation. The Treasurer shall perform other duties commonly incident to the office and shall also perform such other duties and have such other powers as the Board of Directors or the President shall designate from time to time.

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**Section 29. Delegation Of Authority.** The Board of Directors may from time to time delegate the powers or duties of any officer to any other officer or agent, notwithstanding any provision hereof.

**Section 30. Resignations.** Any officer may resign at any time by giving notice in writing or by electronic transmission to the Board of Directors or to the President or to the Secretary. Any such resignation shall be effective when received by the person or persons to whom such notice is given, unless a later time is specified therein, in which event the resignation shall become effective at such later time. Unless otherwise specified in such notice, the acceptance of any such resignation shall not be necessary to make it effective. Any resignation shall be without prejudice to the rights, if any, of the corporation under any contract with the resigning officer.

**Section 31. Removal.** Any officer may be removed from office at any time, either with or without cause, by the affirmative vote of a majority of the directors in office at the time, or by the unanimous written consent of the directors in office at the time, or by any committee or by the Chief Executive Officer or other superior officers upon whom such power of removal may have been conferred by the Board of Directors.

## ARTICLE VI

### EXECUTION OF CORPORATE INSTRUMENTS AND VOTING OF SECURITIES OWNED BY THE CORPORATION

**Section 32. Execution Of Corporate Instruments.** The Board of Directors may, in its discretion, determine the method and designate the signatory officer or officers, or other person or persons, to execute on behalf of the corporation any corporate instrument or document, or to sign on behalf of the corporation the corporate name without limitation, or to enter into contracts on behalf of the corporation, except where otherwise provided by law or these Bylaws, and such execution or signature shall be binding upon the corporation.

All checks and drafts drawn on banks or other depositories on funds to the credit of the corporation or in special accounts of the corporation shall be signed by such person or persons as the Board of Directors shall authorize so to do.

Unless authorized or ratified by the Board of Directors or within the agency power of an officer, no officer, agent or employee shall have any power or authority to bind the corporation by any contract or engagement or to pledge its credit or to render it liable for any purpose or for any amount.

**Section 33. Voting Of Securities Owned By The Corporation.** All stock and other securities of other corporations owned or held by the corporation for itself, or for other parties in any capacity, shall be voted, and all proxies with respect thereto shall be executed, by the person authorized so to do by resolution of the Board of Directors, or, in the absence of such authorization, by the Chairman of the Board of Directors, the Chief Executive Officer, the President, or any Vice President.

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## ARTICLE VII

### SHARES OF STOCK

**Section 34. Form And Execution Of Certificates.** The shares of the corporation shall be represented by certificates, or shall be uncertificated if so provided by resolution or resolutions of the Board of Directors. Certificates for the shares of stock, if any, shall be in such form as is consistent with the Certificate of Incorporation and applicable law. Every holder of stock represented by certificate in the corporation shall be entitled to have a certificate signed by or in the name of the corporation by the Chairman of the Board of Directors, or the President or any Vice President and by the Treasurer or Assistant Treasurer or the Secretary or Assistant Secretary, certifying the number of shares owned by him in the corporation. Any or all of the signatures on the certificate may be facsimiles. In case any officer, transfer agent, or registrar who has signed or whose facsimile signature has been placed upon a certificate shall have ceased to be such officer, transfer agent, or registrar before such certificate is issued, it may be issued with the same effect as if he were such officer, transfer agent, or registrar at the date of issue.

**Section 35. Lost Certificates.** A new certificate or certificates shall be issued in place of any certificate or certificates theretofore issued by the corporation alleged to have been lost, stolen, or destroyed, upon the making of an affidavit of that fact by the person claiming the certificate of stock to be lost, stolen, or destroyed. The corporation may require, as a condition precedent to the issuance of a new certificate or certificates, the owner of such lost, stolen, or destroyed certificate or certificates, or the owner's legal representative, to agree to indemnify the corporation in such manner as it shall require or to give the corporation a surety bond in such form and amount as it may direct as indemnity against any claim that may be made against the corporation with respect to the certificate alleged to have been lost, stolen, or destroyed.

**Section 36. Transfers.**

(a) Transfers of record of shares of stock of the corporation shall be made only upon its books by the holders thereof, in person or by attorney duly authorized, and, in the case of stock represented by certificate, upon the surrender of a properly endorsed certificate or certificates for a like number of shares.

(b) The corporation shall have power to enter into and perform any agreement with any number of stockholders of any one or more classes of stock of the corporation to restrict the transfer of shares of stock of the corporation of any one or more classes owned by such stockholders in any manner not prohibited by the DGCL.

**Section 37. Fixing Record Dates.**

(a) In order that the corporation may determine the stockholders entitled to notice of or to vote at any meeting of stockholders or any adjournment thereof, the Board of Directors may fix a record date, which record date shall not precede the date upon which the resolution fixing the record date is adopted by the Board of Directors, and which record date shall, subject to applicable law, not be more than sixty (60) nor less than ten (10) days before the date of such meeting. If no record date is fixed by the Board of Directors, the record date for

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determining stockholders entitled to notice of or to vote at a meeting of stockholders shall be at the close of business on the day next preceding the day on which notice is given, or if notice is waived, at the close of business on the day next preceding the day on which the meeting is held. A determination of stockholders of record entitled to notice of or to vote at a meeting of stockholders shall apply to any adjournment of the meeting; *provided, however*, that the Board of Directors may fix a new record date for the adjourned meeting.

(b) In order that the corporation may determine the stockholders entitled to receive payment of any dividend or other distribution or allotment of any rights or the stockholders entitled to exercise any rights in respect of any change, conversion or exchange of stock, or for the purpose of any other lawful action, the Board of Directors may fix, in advance, a record date, which record date shall not precede the date upon which the resolution fixing the record date is adopted, and which record date shall be not more than sixty (60) days prior to such action. If no record date is fixed, the record date for determining stockholders for any such purpose shall be at the close of business on the day on which the Board of Directors adopts the resolution relating thereto.

**Section 38. Registered Stockholders.** The corporation shall be entitled to recognize the exclusive right of a person registered on its books as the owner of shares to receive dividends, and to vote as such owner, and shall not be bound to recognize any equitable or other claim to or interest in such share or shares on the part of any other person whether or not it shall have express or other notice thereof, except as otherwise provided by the laws of Delaware.

**ARTICLE VIII**

**OTHER SECURITIES OF THE CORPORATION**

**Section 39. Execution Of Other Securities.** All bonds, debentures and other corporate securities of the corporation, other than stock certificates (covered in Section 34), may be signed by the Chairman of the Board of Directors, the President or any Vice President, or such other person as may be authorized by the Board of Directors, and the corporate seal impressed thereon or a facsimile of such seal imprinted thereon and attested by the signature of the Secretary or an Assistant Secretary, or the Chief Financial Officer or Treasurer or an Assistant Treasurer; *provided, however*, that where any such bond, debenture or other corporate security shall be authenticated by the manual signature, or where permissible facsimile signature, of a trustee under an indenture pursuant to which such bond, debenture or other corporate security shall be issued, the signatures of the persons signing and attesting the corporate seal on such bond, debenture or other corporate security may be the imprinted facsimile of the signatures of such persons. Interest coupons appertaining to any such bond, debenture or other corporate security, authenticated by a trustee as aforesaid, shall be signed by the Treasurer or an Assistant Treasurer of the corporation or such other person as may be authorized by the Board of Directors, or bear imprinted thereon the facsimile signature of such person. In case any officer who shall have signed or attested any bond, debenture or other corporate security, or whose facsimile signature shall appear thereon or on any such interest coupon, shall have ceased to be such officer before the bond, debenture or other corporate security so signed or attested shall have been delivered, such bond, debenture or other corporate security nevertheless may be adopted by the corporation and issued and delivered as though the person who signed the same

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or whose facsimile signature shall have been used thereon had not ceased to be such officer of the corporation.

**ARTICLE IX**

**DIVIDENDS**

**Section 40. Declaration Of Dividends.** Dividends upon the capital stock of the corporation, subject to the provisions of the Certificate of Incorporation and applicable law, if any, may be declared by the Board of Directors pursuant to law at any regular or special meeting. Dividends may be paid in cash, in property, or in shares of the capital stock, subject to the provisions of the Certificate of Incorporation and applicable law.

**Section 41. Dividend Reserve.** Before payment of any dividend, there may be set aside out of any funds of the corporation available for dividends such sum or sums as the Board of Directors from time to time, in their absolute discretion, think proper as a reserve or reserves to meet contingencies, or for equalizing dividends, or for repairing or maintaining any property of the corporation, or for such other purpose as the Board of Directors shall think conducive to the interests of the corporation, and the Board of Directors may modify or abolish any such reserve in the manner in which it was created.

**ARTICLE X**

**FISCAL YEAR**

**Section 42. Fiscal Year.** The fiscal year of the corporation shall be fixed by resolution of the Board of Directors.

**ARTICLE XI**

**INDEMNIFICATION**

**Section 43. Indemnification Of Directors, Officers, Employees And Other Agents.**

(a) **Directors.** The corporation shall indemnify its directors to the fullest extent not prohibited by the DGCL or any other applicable law *provided*,

however, that the corporation may modify the extent of such indemnification by individual contracts with its directors; and *provided, further*, that the corporation shall not be required to indemnify any director in connection with any proceeding (or part thereof) initiated by such person unless (i) such indemnification is expressly required to be made by law, (ii) the proceeding was authorized by the Board of Directors of the corporation, (iii) such indemnification is provided by the corporation, in its sole discretion, pursuant to the powers vested in the corporation under the DGCL or any other applicable law or (iv) such indemnification is required to be made under subsection (d).

**(b) Officers, Employees and Other Agents.** The corporation shall have power to indemnify its officers, employees and other agents as set forth in the DGCL or any other applicable law. The Board of Directors shall have the power to delegate the determination

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of whether indemnification shall be given to any such person to such officers or other persons as the Board of Directors shall determine.

**(c) Expenses.** The corporation shall advance to any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative, by reason of the fact that he is or was a director of the corporation, or is or was serving at the request of the corporation as a director or officer of another corporation, partnership, joint venture, trust or other enterprise, prior to the final disposition of the proceeding, promptly following request therefor, all expenses incurred by any director in connection with such proceeding; *provided, however*, that, if the DGCL requires, an advancement of expenses incurred by a director in his or her capacity as a director (and not in any other capacity in which service was or is rendered by such indemnitee, including, without limitation, service to an employee benefit plan) shall be made only upon delivery to the corporation of an undertaking, by or on behalf of such indemnitee, to repay all amounts so advanced if it shall ultimately be determined by final judicial decision from which there is no further right to appeal that such indemnitee is not entitled to be indemnified for such expenses under this section or otherwise.

**(d) Enforcement.** Without the necessity of entering into an express contract, all rights to indemnification and advances to directors under this Bylaw shall be deemed to be contractual rights and be effective to the same extent and as if provided for in a contract between the corporation and the director. Any right to indemnification or advances granted by this Bylaw to a director shall be enforceable by or on behalf of the person holding such right in any court of competent jurisdiction if (i) the claim for indemnification or advances is denied, in whole or in part, or (ii) no disposition of such claim is made within ninety (90) days of request therefor. To the extent permitted by law, the claimant in such enforcement action, if successful in whole or in part, shall be entitled to be paid also the expense of prosecuting the claim. In connection with any claim for indemnification, the corporation shall be entitled to raise as a defense to any such action that the claimant has not met the standards of conduct that make it permissible under the DGCL or any other applicable law for the corporation to indemnify the claimant for the amount claimed. Neither the failure of the corporation (including its Board of Directors, independent legal counsel or its stockholders) to have made a determination prior to the commencement of such action that indemnification of the claimant is proper in the circumstances because the director has met the applicable standard of conduct set forth in the DGCL or any other applicable law, nor an actual determination by the corporation (including its Board of Directors, independent legal counsel or its stockholders) that the claimant has not met such applicable standard of conduct, shall be a defense to the action or create a presumption that claimant has not met the applicable standard of conduct. In any suit brought by a director to enforce a right to indemnification or to an advancement of expenses hereunder, the burden of proving that the director is not entitled to be indemnified, or to such advancement of expenses, under this section or otherwise shall be on the corporation.

**(e) Non-Exclusivity of Rights.** The rights conferred on any person by this Bylaw shall not be exclusive of any other right which such person may have or hereafter acquire under any applicable statute, provision of the Certificate of Incorporation, Bylaws, agreement, vote of stockholders or disinterested directors or otherwise, both as to action in his or her official capacity and as to action in another capacity while holding office. The corporation is specifically

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authorized to enter into individual contracts with any or all of its directors, officers, employees or agents respecting indemnification and advances, to the fullest extent not prohibited by the DGCL, or by any other applicable law.

**(f) Survival of Rights.** The rights conferred on any person by this Bylaw shall continue as to a person who has ceased to be a director and shall inure to the benefit of the heirs, executors and administrators of such a person.

**(g) Insurance.** To the fullest extent permitted by the DGCL or any other applicable law, the corporation, upon approval by the Board of Directors, may purchase insurance on behalf of any person required or permitted to be indemnified pursuant to this section.

**(h) Amendments.** Any repeal or modification of this section shall only be prospective and shall not affect the rights under this Bylaw in effect at the time of the alleged occurrence of any action or omission to act that is the cause of any proceeding against any agent of the corporation.

**(i) Saving Clause.** If this Bylaw or any portion hereof shall be invalidated on any ground by any court of competent jurisdiction, then the corporation shall nevertheless indemnify each director to the full extent not prohibited by any applicable portion of this section that shall not have been invalidated, or by any other applicable law. If this section shall be invalid due to the application of the indemnification provisions of another jurisdiction, then the corporation shall indemnify each director to the full extent under any other applicable law.

**(j) Certain Definitions.** For the purposes of this Bylaw, the following definitions shall apply:

**(1)** The term "proceeding" shall be broadly construed and shall include, without limitation, the investigation, preparation, prosecution, defense, settlement, arbitration and appeal of, and the giving of testimony in, any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative.

**(2)** The term "expenses" shall be broadly construed and shall include, without limitation, court costs, attorneys' fees, witness fees, fines, amounts paid in settlement or judgment and any other costs and expenses of any nature or kind incurred in connection with any proceeding.

**(3)** The term the "corporation" shall include, in addition to the resulting corporation, any constituent corporation (including any constituent of a constituent) absorbed in a consolidation or merger which, if its separate existence had continued, would have had power and authority to indemnify its directors, officers, and employees or agents, so that any person who is or was a director, officer, employee or agent of such constituent corporation, or is or was serving at the request of such constituent corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise, shall stand in the same position under the provisions of this section with respect to the resulting or surviving corporation as he would have with respect to such constituent corporation if its separate existence had continued.

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**(4)** References to a "director," "executive officer," "officer," "employee," or "agent" of the corporation shall include, without limitation,

situations where such person is serving at the request of the corporation as, respectively, a director, executive officer, officer, employee, trustee or agent of another corporation, partnership, joint venture, trust or other enterprise.

(5) References to "other enterprises" shall include employee benefit plans; references to "fines" shall include any excise taxes assessed on a person with respect to an employee benefit plan; and references to "serving at the request of the corporation" shall include any service as a director, officer, employee or agent of the corporation which imposes duties on, or involves services by, such director, officer, employee, or agent with respect to an employee benefit plan, its participants, or beneficiaries; and a person who acted in good faith and in a manner such person reasonably believed to be in the interest of the participants and beneficiaries of an employee benefit plan shall be deemed to have acted in a manner "not opposed to the best interests of the corporation" as referred to in this section.

## ARTICLE XII

### NOTICES

#### Section 44. Notices.

(a) **Notice To Stockholders.** Written notice to stockholders of stockholder meetings shall be given as provided in Section 7 herein. Without limiting the manner by which notice may otherwise be given effectively to stockholders under any agreement or contract with such stockholder, and except as otherwise required by law, written notice to stockholders for purposes other than stockholder meetings may be sent by U.S. mail or nationally recognized overnight courier, or by facsimile, telegraph or telex or by electronic mail or other electronic means.

(b) **Notice To Directors.** Any notice required to be given to any director may be given by the method stated in subsection (a), as otherwise provided in these Bylaws, or by overnight delivery service, facsimile, telex or telegram, except that such notice other than one which is delivered personally shall be sent to such address as such director shall have filed in writing with the Secretary, or, in the absence of such filing, to the last known post office address of such director.

(c) **Affidavit Of Mailing.** An affidavit of mailing, executed by a duly authorized and competent employee of the corporation or its transfer agent appointed with respect to the class of stock affected, or other agent, specifying the name and address or the names and addresses of the stockholder or stockholders, or director or directors, to whom any such notice or notices was or were given, and the time and method of giving the same, shall in the absence of fraud, be prima facie evidence of the facts therein contained.

(d) **Methods of Notice.** It shall not be necessary that the same method of giving notice be employed in respect of all recipients of notice, but one permissible method may

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be employed in respect of any one or more, and any other permissible method or methods may be employed in respect of any other or others.

(e) **Notice To Person With Whom Communication Is Unlawful.** Whenever notice is required to be given, under any provision of law or of the Certificate of Incorporation or Bylaws of the corporation, to any person with whom communication is unlawful, the giving of such notice to such person shall not be required and there shall be no duty to apply to any governmental authority or agency for a license or permit to give such notice to such person. Any action or meeting which shall be taken or held without notice to any such person with whom communication is unlawful shall have the same force and effect as if such notice had been duly given. In the event that the action taken by the corporation is such as to require the filing of a certificate under any provision of the DGCL, the certificate shall state, if such is the fact and if notice is required, that notice was given to all persons entitled to receive notice except such persons with whom communication is unlawful.

(f) **Notice to Stockholders Sharing an Address.** Except as otherwise prohibited under DGCL, any notice given under the provisions of DGCL, the Certificate of Incorporation or the Bylaws shall be effective if given by a single written notice to stockholders who share an address if consented to by the stockholders at that address to whom such notice is given. Such consent shall have been deemed to have been given if such stockholder fails to object in writing to the corporation within sixty (60) days of having been given notice by the corporation of its intention to send the single notice. Any consent shall be revocable by the stockholder by written notice to the corporation.

## ARTICLE XIII

### AMENDMENTS

**Section 45. Bylaw Amendments.** Subject to the limitations set forth in Section 43(h) of these Bylaws or the provisions of the Certificate of Incorporation, the Board of Directors is expressly empowered to adopt, amend or repeal the Bylaws of the corporation. Any adoption, amendment or repeal of the Bylaws of the corporation by the Board of Directors shall require the approval of a majority of the authorized number of directors. The stockholders also shall have power to adopt, amend or repeal the Bylaws of the corporation; *provided, however*, that, in addition to any vote of the holders of any class or series of stock of the corporation required by law or by the Certificate of Incorporation, such action by stockholders shall require the affirmative vote of the holders of at least sixty-six and two-thirds percent (66-2/3%) of the voting power of all of the then-outstanding shares of the capital stock of the corporation entitled to vote generally in the election of directors, voting together as a single class.

## ARTICLE XIV

### LOANS TO OFFICERS OR EMPLOYEES

**Section 46. Loans To Officers Or Employees.** Except as otherwise prohibited by applicable law, including the Sarbanes-Oxley Act of 2002, the corporation may lend money to, or guarantee any obligation of, or otherwise assist any officer or other employee of the

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corporation or of its subsidiaries, including any officer or employee who is a director of the corporation or its subsidiaries, whenever, in the judgment of the Board of Directors, such loan, guarantee or assistance may reasonably be expected to benefit the corporation. The loan, guarantee or other assistance may be with or without interest and may be unsecured, or secured in such manner as the Board of Directors shall approve, including, without limitation, a pledge of shares of stock of the corporation. Nothing in these Bylaws shall be deemed to deny, limit or restrict the powers of guaranty or warranty of the corporation at common law or under any statute.

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TREVENA, INC.  
STOCK OPTION GRANT NOTICE  
(2013 EQUITY INCENTIVE PLAN)

Trevena, Inc. (the "Company"), pursuant to its 2013 Equity Incentive Plan (the "Plan"), hereby grants to Optionholder an option to purchase the number of shares of the Company's Common Stock set forth below. This option is subject to all of the terms and conditions as set forth in this notice, in the Option Agreement, the Plan and the Notice of Exercise, all of which are attached hereto and incorporated herein in their entirety. Capitalized terms not explicitly defined herein but defined in the Plan or the Option Agreement will have the same definitions as in the Plan or the Option Agreement. If there is any conflict between the terms in this notice and the Plan, the terms of the Plan will control.

Optionholder:  
Date of Grant:  
Vesting Commencement Date:  
Number of Shares Subject to Option:  
Exercise Price (Per Share):  
Total Exercise Price:  
Expiration Date:

Type of Grant:  Incentive Stock Option(1)  Nonstatutory Stock Option

Exercise Schedule:  Same as Vesting Schedule  Early Exercise Permitted

Vesting Schedule:

Payment: By one or a combination of the following items (described in the Option Agreement):

- By cash, check, bank draft or money order payable to the Company
- Pursuant to a Regulation T Program if the shares are publicly traded
- By delivery of already-owned shares if the shares are publicly traded
- If and only to the extent this option is a Nonstatutory Stock Option, and subject to the Company's consent at the time of exercise, by a "net exercise" arrangement

(1) If this is an Incentive Stock Option, it (plus other outstanding Incentive Stock Options) cannot be firstexercisable for more than \$100,000 in value (measured by exercise price) in any calendar year. Any excess over \$100,000 is a Nonstatutory Stock Option.

**Additional Terms/Acknowledgements:** Optionholder acknowledges receipt of, and understands and agrees to, this Stock Option Grant Notice, the Option Agreement and the Plan. Optionholder acknowledges and agrees that this Stock Option Grant Notice and the Option Agreement may not be modified, amended or revised except as provided in the Plan. Optionholder further acknowledges that as of the Date of Grant, this Stock Option Grant Notice, the Option Agreement, and the Plan set forth the entire understanding between Optionholder and the Company regarding this option award and supersede all prior oral and written agreements, promises and/or representations on that subject with the exception of (i) options previously granted and delivered to Optionholder, (ii) any compensation recovery policy that is adopted by the Company or is otherwise required by applicable law and (iii) any written employment or severance arrangement that would provide for vesting acceleration of this option upon the terms and conditions set forth therein. By accepting this option, Optionholder consents to receive such documents by electronic delivery and to participate in the Plan through an on-line or electronic system established and maintained by the Company or another third party designated by the Company.

TREVENA, INC.

OPTIONHOLDER:

By: \_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Date: \_\_\_\_\_

ATTACHMENTS: Option Agreement, 2013 Equity Incentive Plan and Notice of Exercise

TREVENA, INC.  
2013 EQUITY INCENTIVE PLAN

OPTION AGREEMENT  
(INCENTIVE STOCK OPTION OR NONSTATUTORY STOCK OPTION)

Pursuant to your Stock Option Grant Notice ("Grant Notice") and this Option Agreement, Trevena, Inc. (the "Company") has granted you an option under its 2013 Equity Incentive Plan (the "Plan") to purchase the number of shares of the Company's Common Stock indicated in your Grant Notice at the exercise price indicated in your Grant Notice. The option is granted to you effective as of the date of grant set forth in the Grant Notice (the "Date of Grant"). If there is any conflict between the terms in this Option Agreement and the Plan, the terms of the Plan will control. Capitalized terms not explicitly defined in this Option Agreement or in the Grant Notice but defined in the Plan will have the same definitions as in the Plan.

The details of your option, in addition to those set forth in the Grant Notice and the Plan, are as follows:

1. **VESTING.** Subject to the provisions contained herein, your option will vest as provided in your Grant Notice. Vesting will cease upon the termination of your Continuous Service.
2. **NUMBER OF SHARES AND EXERCISE PRICE.** The number of shares of Common Stock subject to your option and your exercise price per share in

your Grant Notice will be adjusted for Capitalization Adjustments.

**3. EXERCISE RESTRICTION FOR NON-EXEMPT EMPLOYEES.** If you are an Employee eligible for overtime compensation under the Fair Labor Standards Act of 1938, as amended (that is, a “*Non-Exempt Employee*”), and except as otherwise provided in the Plan, you may not exercise your option until you have completed at least six (6) months of Continuous Service measured from the Date of Grant, even if you have already been an employee for more than six (6) months. Consistent with the provisions of the Worker Economic Opportunity Act, you may exercise your option as to any vested portion prior to such six (6) month anniversary in the case of (i) your death or disability, (ii) a Corporate Transaction in which your option is not assumed, continued or substituted, (iii) a Change in Control or (iv) your termination of Continuous Service on your “retirement” (as defined in the Company’s benefit plans).

**4. EXERCISE PRIOR TO VESTING (“EARLY EXERCISE”).** You may not exercise your option prior to vesting.

**5. METHOD OF PAYMENT.** You must pay the full amount of the exercise price for the shares you wish to exercise. You may pay the exercise price in cash or by check, bank draft or money order payable to the Company or in any other manner *permitted by your Grant Notice*, which may include one or more of the following:

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(a) Provided that at the time of exercise the Common Stock is publicly traded, pursuant to a program developed under Regulation T as promulgated by the Federal Reserve Board that, prior to the issuance of Common Stock, results in either the receipt of cash (or check) by the Company or the receipt of irrevocable instructions to pay the aggregate exercise price to the Company from the sales proceeds. This manner of payment is also known as a “broker-assisted exercise”, “same day sale”, or “sell to cover”.

(b) Provided that at the time of exercise the Common Stock is publicly traded, by delivery to the Company (either by actual delivery or attestation) of already-owned shares of Common Stock that are owned free and clear of any liens, claims, encumbrances or security interests, and that are valued at Fair Market Value on the date of exercise. “Delivery” for these purposes, in the sole discretion of the Company at the time you exercise your option, will include delivery to the Company of your attestation of ownership of such shares of Common Stock in a form approved by the Company. You may not exercise your option by delivery to the Company of Common Stock if doing so would violate the provisions of any law, regulation or agreement restricting the redemption of the Company’s stock.

(c) If this option is a Nonstatutory Stock Option, subject to the consent of the Company at the time of exercise, by a “net exercise” arrangement pursuant to which the Company will reduce the number of shares of Common Stock issued upon exercise of your option by the largest whole number of shares with a Fair Market Value that does not exceed the aggregate exercise price. You must pay any remaining balance of the aggregate exercise price not satisfied by the “net exercise” in cash or other permitted form of payment. Shares of Common Stock will no longer be outstanding under your option and will not be exercisable thereafter if those shares (i) are used to pay the exercise price pursuant to the “net exercise,” (ii) are delivered to you as a result of such exercise, and (iii) are withheld to satisfy your tax withholding obligations.

**6. WHOLE SHARES.** You may exercise your option only for whole shares of Common Stock.

**7. SECURITIES LAW COMPLIANCE.** In no event may you exercise your option unless the shares of Common Stock issuable upon exercise are then registered under the Securities Act or, if not registered, the Company has determined that your exercise and the issuance of the shares would be exempt from the registration requirements of the Securities Act. The exercise of your option also must comply with all other applicable laws and regulations governing your option, and you may not exercise your option if the Company determines that such exercise would not be in material compliance with such laws and regulations (including any restrictions on exercise required for compliance with Treas. Reg. 1.401(k)-1(d)(3), if applicable).

**8. TERM.** You may not exercise your option before the Date of Grant or after the expiration of the option’s term. The term of your option expires, subject to the provisions of Section 5(h) of the Plan, upon the earliest of the following:

(a) immediately upon the termination of your Continuous Service for Cause;

(b) three (3) months after the termination of your Continuous Service for any reason other than Cause, your Disability or your death (except as otherwise provided in Section 8(d) below); *provided, however*, that if during any part of such three (3) month period your option is not exercisable solely because of the condition set forth in the section above relating to “Securities Law Compliance,” your option will not expire until the earlier of the Expiration Date or until it has been exercisable for an aggregate period of three (3) months after the termination of your Continuous Service; *provided further*, if during any part of such three (3) month period, the sale of any Common Stock received upon exercise of your option would violate the Company’s insider trading policy, then your option will not expire until the earlier of the Expiration Date or until it has been exercisable for an aggregate period of three (3) months after the termination of your Continuous Service during which the sale of the Common Stock received upon exercise of your option would not be in violation of the Company’s insider trading policy. Notwithstanding the foregoing, if (i) you are a Non-Exempt Employee, (ii) your Continuous Service terminates within six (6) months after the Date of Grant, and (iii) you have vested in a portion of your option at the time of your termination of Continuous Service, your option will not expire until the earlier of (x) the later of (A) the date that is seven (7) months after the Date of Grant, and (B) the date that is three (3) months after the termination of your Continuous Service, and (y) the Expiration Date;

(c) twelve (12) months after the termination of your Continuous Service due to your Disability (except as otherwise provided in Section 8(d) below);

(d) eighteen (18) months after your death if you die either during your Continuous Service or within three (3) months after your Continuous Service terminates for any reason other than Cause;

(e) the Expiration Date indicated in your Grant Notice; or

(f) the day before the tenth (10th) anniversary of the Date of Grant.

If your option is an Incentive Stock Option, note that to obtain the federal income tax advantages associated with an Incentive Stock Option, the Code requires that at all times beginning on the Date of Grant and ending on the day three (3) months before the date of your option’s exercise, you must be an employee of the Company or an Affiliate, except in the event of your death or Disability. The Company has provided for extended exercisability of your option under certain circumstances for your benefit but cannot guarantee that your option will necessarily be treated as an Incentive Stock Option if you continue to provide services to the Company or an Affiliate as a Consultant or Director after your employment terminates or if you otherwise exercise your option more than three (3) months after the date your employment with the Company or an Affiliate terminates.

**9. EXERCISE.**

(a) You may exercise the vested portion of your option (and the unvested portion of your option if your Grant Notice so permits) during its term by (i) delivering a Notice of Exercise (in a form designated by the Company) or completing such other documents and/or procedures designated by the Company for exercise and (ii) paying the exercise price and any

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applicable withholding taxes to the Company's Secretary, stock plan administrator, or such other person as the Company may designate, together with such additional documents as the Company may then require.

(b) By exercising your option you agree that, as a condition to any exercise of your option, the Company may require you to enter into an arrangement providing for the payment by you to the Company of any tax withholding obligation of the Company arising by reason of (i) the exercise of your option, (ii) the lapse of any substantial risk of forfeiture to which the shares of Common Stock are subject at the time of exercise, or (iii) the disposition of shares of Common Stock acquired upon such exercise.

(c) If your option is an Incentive Stock Option, by exercising your option you agree that you will notify the Company in writing within fifteen (15) days after the date of any disposition of any of the shares of the Common Stock issued upon exercise of your option that occurs within two (2) years after the Date of Grant or within one (1) year after such shares of Common Stock are transferred upon exercise of your option.

(d) By accepting your option you agree that you will not sell, dispose of, transfer, make any short sale of, grant any option for the purchase of, or enter into any hedging or similar transaction with the same economic effect as a sale, any shares of Common Stock or other securities of the Company held by you, for a period of one hundred eighty (180) days following the effective date of a registration statement of the Company filed under the Securities Act or such longer period as the underwriters or the Company will request to facilitate compliance with FINRA Rule 2711 or NYSE Member Rule 4720 or any successor or similar rule or regulation (the "Lock-Up Period"); *provided, however*, that nothing contained in this section will prevent the exercise of a repurchase option, if any, in favor of the Company during the Lock-Up Period. You further agree to execute and deliver such other agreements as may be reasonably requested by the Company or the underwriters that are consistent with the foregoing or that are necessary to give further effect thereto. In order to enforce the foregoing covenant, the Company may impose stop-transfer instructions with respect to your shares of Common Stock until the end of such period. You also agree that any transferee of any shares of Common Stock (or other securities) of the Company held by you will be bound by this Section 9(d). The underwriters of the Company's stock are intended third party beneficiaries of this Section 9(d) and will have the right, power and authority to enforce the provisions hereof as though they were a party hereto.

**10. TRANSFERABILITY.** Except as otherwise provided in this Section 10, your option is not transferable, except by will or by the laws of descent and distribution, and is exercisable during your life only by you.

(a) **Certain Trusts.** Upon receiving written permission from the Board or its duly authorized designee, you may transfer your option to a trust if you are considered to be the sole beneficial owner (determined under Section 671 of the Code and applicable state law) while the option is held in the trust. You and the trustee must enter into transfer and other agreements required by the Company.

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(b) **Domestic Relations Orders.** Upon receiving written permission from the Board or its duly authorized designee, and provided that you and the designated transferee enter into transfer and other agreements required by the Company, you may transfer your option pursuant to the terms of a domestic relations order, official marital settlement agreement or other divorce or separation instrument as permitted by Treasury Regulation 1.421-1(b)(2) that contains the information required by the Company to effectuate the transfer. You are encouraged to discuss the proposed terms of any division of this option with the Company prior to finalizing the domestic relations order or marital settlement agreement to help ensure the required information is contained within the domestic relations order or marital settlement agreement. If this option is an Incentive Stock Option, this option may be deemed to be a Nonstatutory Stock Option as a result of such transfer.

(c) **Beneficiary Designation.** Upon receiving written permission from the Board or its duly authorized designee, you may, by delivering written notice to the Company, in a form approved by the Company and any broker designated by the Company to handle option exercises, designate a third party who, on your death, will thereafter be entitled to exercise this option and receive the Common Stock or other consideration resulting from such exercise. In the absence of such a designation, your executor or administrator of your estate will be entitled to exercise this option and receive, on behalf of your estate, the Common Stock or other consideration resulting from such exercise.

**11. OPTION NOT A SERVICE CONTRACT.** Your option is not an employment or service contract, and nothing in your option will be deemed to create in any way whatsoever any obligation on your part to continue in the employ of the Company or an Affiliate, or of the Company or an Affiliate to continue your employment. In addition, nothing in your option will obligate the Company or an Affiliate, their respective stockholders, boards of directors, officers or employees to continue any relationship that you might have as a Director or Consultant for the Company or an Affiliate.

**12. WITHHOLDING OBLIGATIONS.**

(a) At the time you exercise your option, in whole or in part, and at any time thereafter as requested by the Company, you hereby authorize withholding from payroll and any other amounts payable to you, and otherwise agree to make adequate provision for (including by means of a "same day sale" pursuant to a program developed under Regulation T as promulgated by the Federal Reserve Board to the extent permitted by the Company), any sums required to satisfy the federal, state, local and foreign tax withholding obligations of the Company or an Affiliate, if any, which arise in connection with the exercise of your option.

(b) If this option is a Nonstatutory Stock Option, then upon your request and subject to approval by the Company, and compliance with any applicable legal conditions or restrictions, the Company may withhold from fully vested shares of Common Stock otherwise issuable to you upon the exercise of your option a number of whole shares of Common Stock having a Fair Market Value, determined by the Company as of the date of exercise, not in excess of the minimum amount of tax required to be withheld by law (or such lower amount as may be necessary to avoid classification of your option as a liability for financial accounting purposes). If the date of determination of any tax withholding obligation is deferred to a date later than the

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date of exercise of your option, share withholding pursuant to the preceding sentence shall not be permitted unless you make a proper and timely election under Section 83(b) of the Code, covering the aggregate number of shares of Common Stock acquired upon such exercise with respect to which such determination is otherwise deferred, to accelerate the determination of such tax withholding obligation to the date of exercise of your option. Notwithstanding the filing of such election, shares of Common Stock shall be withheld solely from fully vested shares of Common Stock determined as of the date of exercise of your option that are otherwise issuable to you upon such exercise. Any adverse consequences to you arising in connection with such share withholding procedure shall be your sole responsibility.

(c) You may not exercise your option unless the tax withholding obligations of the Company and/or any Affiliate are satisfied. Accordingly, you may not be able to exercise your option when desired even though your option is vested, and the Company will have no obligation to issue a certificate for such shares of Common Stock or release such shares of Common Stock from any escrow provided for herein, if applicable, unless such obligations are satisfied.

**13. TAX CONSEQUENCES.** You hereby agree that the Company does not have a duty to design or administer the Plan or its other compensation programs in a manner that minimizes your tax liabilities. You will not make any claim against the Company, or any of its Officers, Directors, Employees or Affiliates related to tax

liabilities arising from your option or your other compensation. In particular, you acknowledge that this option is exempt from Section 409A of the Code only if the exercise price per share specified in the Grant Notice is at least equal to the "fair market value" per share of the Common Stock on the Date of Grant and there is no other impermissible deferral of compensation associated with the option.

**14. NOTICES.** Any notices provided for in your option or the Plan will be given in writing (including electronically) and will be deemed effectively given upon receipt or, in the case of notices delivered by mail by the Company to you, five (5) days after deposit in the United States mail, postage prepaid, addressed to you at the last address you provided to the Company. The Company may, in its sole discretion, decide to deliver any documents related to participation in the Plan and this option by electronic means or to request your consent to participate in the Plan by electronic means. By accepting this option, you consent to receive such documents by electronic delivery and to participate in the Plan through an on-line or electronic system established and maintained by the Company or another third party designated by the Company.

**15. GOVERNING PLAN DOCUMENT.** Your option is subject to all the provisions of the Plan, the provisions of which are hereby made a part of your option, and is further subject to all interpretations, amendments, rules and regulations, which may from time to time be promulgated and adopted pursuant to the Plan. If there is any conflict between the provisions of your option and those of the Plan, the provisions of the Plan will control. In addition, your option (and any compensation paid or shares issued under your option) is subject to recoupment in accordance with The Dodd—Frank Wall Street Reform and Consumer Protection Act and any implementing regulations thereunder, any clawback policy adopted by the Company and any compensation recovery policy otherwise required by applicable law.

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**16. OTHER DOCUMENTS.** You hereby acknowledge receipt of and the right to receive a document providing the information required by Rule 428(b) (1) promulgated under the Securities Act, which includes the Plan prospectus. In addition, you acknowledge receipt of the Company's policy permitting certain individuals to sell shares only during certain "window" periods and the Company's insider trading policy, in effect from time to time.

**17. EFFECT ON OTHER EMPLOYEE BENEFIT PLANS.** The value of this option will not be included as compensation, earnings, salaries, or other similar terms used when calculating your benefits under any employee benefit plan sponsored by the Company or any Affiliate, except as such plan otherwise expressly provides. The Company expressly reserves its rights to amend, modify, or terminate any of the Company's or any Affiliate's employee benefit plans.

**18. VOTING RIGHTS.** You will not have voting or any other rights as a stockholder of the Company with respect to the shares to be issued pursuant to this option until such shares are issued to you. Upon such issuance, you will obtain full voting and other rights as a stockholder of the Company. Nothing contained in this option, and no action taken pursuant to its provisions, will create or be construed to create a trust of any kind or a fiduciary relationship between you and the Company or any other person.

**19. SEVERABILITY.** If all or any part of this Option Agreement or the Plan is declared by any court or governmental authority to be unlawful or invalid, such unlawfulness or invalidity will not invalidate any portion of this Option Agreement or the Plan not declared to be unlawful or invalid. Any Section of this Option Agreement (or part of such a Section) so declared to be unlawful or invalid shall, if possible, be construed in a manner which will give effect to the terms of such Section or part of a Section to the fullest extent possible while remaining lawful and valid.

**20. MISCELLANEOUS.**

(a) The rights and obligations of the Company under your option will be transferable to any one or more persons or entities, and all covenants and agreements hereunder will inure to the benefit of, and be enforceable by the Company's successors and assigns.

(b) You agree upon request to execute any further documents or instruments necessary or desirable in the sole determination of the Company to carry out the purposes or intent of your option.

(c) You acknowledge and agree that you have reviewed your option in its entirety, have had an opportunity to obtain the advice of counsel prior to executing and accepting your option, and fully understand all provisions of your option.

(d) This Option Agreement will be subject to all applicable laws, rules, and regulations, and to such approvals by any governmental agencies or national securities exchanges as may be required.

(e) All obligations of the Company under the Plan and this Option Agreement will be binding on any successor to the Company, whether the existence of such successor is the

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result of a direct or indirect purchase, merger, consolidation, or otherwise, of all or substantially all of the business and/or assets of the Company.

\* \* \*

This Option Agreement will be deemed to be signed by you upon the signing by you of the Stock Option Grant Notice to which it is attached.

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**TREVENA, INC.  
RESTRICTED STOCK UNIT GRANT NOTICE  
(2013 EQUITY INCENTIVE PLAN)**

Trevena, Inc. (the “*Company*”), pursuant to Section 6(b) of the Company’s 2013 Equity Incentive Plan (the “*Plan*”), hereby awards to Participant a Restricted Stock Unit Award for the number of shares of the Company’s Common Stock (“*Restricted Stock Units*”) set forth below (the “*Award*”). The Award is subject to all of the terms and conditions as set forth in this notice of grant (this “*Restricted Stock Unit Grant Notice*”) and in the Plan and the Restricted Stock Unit Award Agreement (the “*Award Agreement*”), both of which are attached hereto and incorporated herein in their entirety. Capitalized terms not otherwise defined herein shall have the meanings set forth in the Plan or the Award Agreement. In the event of any conflict between the terms in the Award and the Plan, the terms of the Plan shall control.

Participant:  
ID:  
Date of Grant:  
Grant Number:  
Vesting Commencement Date:  
Number of Restricted Stock Units/Shares:

**Vesting Schedule:** The shares subject to the Award shall vest as follows:

**Issuance Schedule:** Subject to any change on a Capitalization Adjustment, one share of Common Stock will be issued for each Restricted Stock Unit that vests at the time set forth in Section 6 of the Award Agreement.

**Additional Terms/Acknowledgements:** Participant acknowledges receipt of, and understands and agrees to, this Restricted Stock Unit Grant Notice, the Award Agreement and the Plan. Participant further acknowledges that as of the Date of Grant, this Restricted Stock Unit Grant Notice, the Award Agreement and the Plan set forth the entire understanding between Participant and the Company regarding the acquisition of the Common Stock pursuant to the Award specified above and supersede all prior oral and written agreements on the terms of this Award with the exception, if applicable, of (i) the written employment agreement or offer letter agreement entered into between the Company and Participant specifying the terms that should govern this specific Award, and (ii) any compensation recovery policy that is adopted by the Company or is otherwise required by applicable law.

By accepting this Award, Participant acknowledges having received and read the Restricted Stock Unit Grant Notice, the Award Agreement and the Plan and agrees to all of the terms and conditions set forth in these documents. Participant consents to receive Plan documents by electronic delivery and to participate in the Plan through an on-line or electronic system established and maintained by the Company or another third party designated by the Company.

Other Agreements:

**TREVENA, INC.**

**PARTICIPANT**

By: \_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Date: \_\_\_\_\_

**ATTACHMENTS:** Award Agreement and 2013 Equity Incentive Plan

**TREVENA, INC.  
2013 EQUITY INCENTIVE PLAN  
RESTRICTED STOCK UNIT AWARD AGREEMENT**

Pursuant to the Restricted Stock Unit Grant Notice (the “*Grant Notice*”) and this Restricted Stock Unit Award Agreement (the “*Agreement*”), Trevena, Inc. (the “*Company*”) has awarded you (“*Participant*”) a Restricted Stock Unit Award (the “*Award*”) pursuant to Section 6(b) of the Company’s 2013 Equity Incentive Plan (the “*Plan*”) for the number of Restricted Stock Units/shares indicated in the Grant Notice. Capitalized terms not explicitly defined in this Agreement or the Grant Notice shall have the same meanings given to them in the Plan. The terms of your Award, in addition to those set forth in the Grant Notice, are as follows.

**1. GRANT OF THE AWARD.** This Award represents the right to be issued on a future date one (1) share of Common Stock for each Restricted Stock Unit that vests on the applicable vesting date(s) (subject to any adjustment under Section 3 below) as indicated in the Grant Notice. As of the Date of Grant, the Company will credit to a bookkeeping account maintained by the Company for your benefit (the “*Account*”) the number of Restricted Stock Units/shares of Common Stock subject to the Award. This Award was granted in consideration of your services to the Company.

**2. VESTING.** Subject to the limitations contained herein, your Award will vest, if at all, in accordance with the vesting schedule provided in the Grant Notice, provided that vesting will cease upon the termination of your Continuous Service. Upon such termination of your Continuous Service, the Restricted Stock Units/shares of Common Stock credited to the Account that were not vested on the date of such termination will be forfeited at no cost to the Company and you will have no further right, title or interest in or to such underlying shares of Common Stock.

**3. NUMBER OF SHARES.** The number of Restricted Stock Units/shares subject to your Award may be adjusted from time to time for Capitalization Adjustments, as provided in the Plan. Any additional Restricted Stock Units, shares, cash or other property that becomes subject to the Award pursuant to this Section 3, if any, shall be subject, in a manner determined by the Board, to the same forfeiture restrictions, restrictions on transferability, and time and manner of delivery as applicable to the other Restricted Stock Units and shares covered by your Award. Notwithstanding the provisions of this Section 3, no fractional shares or rights for fractional shares of Common Stock shall be created pursuant to this Section 3. Any fraction of a share will be rounded down to the nearest whole share.

**4. SECURITIES LAW COMPLIANCE.** You may not be issued any Common Stock under your Award unless the shares of Common Stock underlying the Restricted Stock Units are either (i) then registered under the Securities Act, or (ii) the Company has determined that such issuance would be exempt from the registration

requirements of the Securities Act. Your Award must also comply with other applicable laws and regulations governing the Award, and you shall not receive such Common Stock if the Company determines that such receipt would not be in material compliance with such laws and regulations.

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**5. TRANSFER RESTRICTIONS.** Prior to the time that shares of Common Stock have been delivered to you, you may not transfer, pledge, sell or otherwise dispose of this Award or the shares issuable in respect of your Award, except as expressly provided in this Section 5. For example, you may not use shares that may be issued in respect of your Restricted Stock Units as security for a loan. The restrictions on transfer set forth herein will lapse upon delivery to you of shares in respect of your vested Restricted Stock Units.

(a) **Death.** Your Award is transferable by will and by the laws of descent and distribution. At your death, vesting of your Award will cease and your executor or administrator of your estate shall be entitled to receive, on behalf of your estate, any Common Stock or other consideration that vested but was not issued before your death.

(b) **Domestic Relations Orders.** Upon receiving written permission from the Board or its duly authorized designee, and provided that you and the designated transferee enter into transfer and other agreements required by the Company, you may transfer your right to receive the distribution of Common Stock or other consideration hereunder, pursuant to a domestic relations order or marital settlement agreement that contains the information required by the Company to effectuate the transfer. You are encouraged to discuss the proposed terms of any division of this Award with the Company General Counsel prior to finalizing the domestic relations order or marital settlement agreement to verify that you may make such transfer, and if so, to help ensure the required information is contained within the domestic relations order or marital settlement agreement.

**6. DATE OF ISSUANCE.**

(a) The issuance of shares in respect of the Restricted Stock Units is intended to comply with Treasury Regulations Section 1.409A-1(b)(4) and will be construed and administered in such a manner. Subject to the satisfaction of the withholding obligations set forth in this Agreement, in the event one or more Restricted Stock Units vests, the Company shall issue to you one (1) share of Common Stock for each Restricted Stock Unit that vests on the applicable vesting date(s) (subject to any adjustment under Section 3 above). The issuance date determined by this paragraph is referred to as the **“Original Issuance Date”**.

(b) If the Original Issuance Date falls on a date that is not a business day, delivery shall instead occur on the next following business day. In addition, if:

(i) the Original Issuance Date does not occur (1) during an “open window period” applicable to you, as determined by the Company in accordance with the Company’s then-effective policy on trading in Company securities, or (2) on a date when you are otherwise permitted to sell shares of Common Stock on an established stock exchange or stock market, *and*

(ii) either (1) Withholding Taxes do not apply, or (2) the Company decides, prior to the Original Issuance Date, (A) not to satisfy the Withholding Taxes by withholding shares of Common Stock from the shares otherwise due, on the Original Issuance Date, to you under this Award, and (B) not to permit you to pay your Withholding Taxes in cash,

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then the shares that would otherwise be issued to you on the Original Issuance Date will not be delivered on such Original Issuance Date and will instead be delivered on the first business day when you are not prohibited from selling shares of the Company’s Common Stock in the open public market, but in no event later than December 31 of the calendar year in which the Original Issuance Date occurs (that is, the last day of your taxable year in which the Original Issuance Date occurs), or, if and only if permitted in a manner that complies with Treasury Regulations Section 1.409A-1(b)(4), no later than the date that is the 15th day of the third calendar month of the applicable year following the year in which the shares of Common Stock under this Award are no longer subject to a “substantial risk of forfeiture” within the meaning of Treasury Regulations Section 1.409A-1(d).

(c) The form of delivery (*e.g.*, a stock certificate or electronic entry evidencing such shares) shall be determined by the Company.

**7. DIVIDENDS.** You shall receive no benefit or adjustment to your Award with respect to any cash dividend, stock dividend or other distribution that does not result from a Capitalization Adjustment.

**8. RESTRICTIVE LEGENDS.** The shares of Common Stock issued under your Award shall be endorsed with appropriate legends as determined by the Company.

**9. EXECUTION OF DOCUMENTS.** You hereby acknowledge and agree that the manner selected by the Company by which you indicate your consent to your Grant Notice is also deemed to be your execution of your Grant Notice and of this Agreement. You further agree that such manner of indicating consent may be relied upon as your signature for establishing your execution of any documents to be executed in the future in connection with your Award.

**10. AWARD NOT A SERVICE CONTRACT.**

(a) Nothing in this Agreement (including, but not limited to, the vesting of your Award or the issuance of the shares subject to your Award), the Plan or any covenant of good faith and fair dealing that may be found implicit in this Agreement or the Plan shall: (i) confer upon you any right to continue in the employ of, or affiliation with, the Company or an Affiliate; (ii) constitute any promise or commitment by the Company or an Affiliate regarding the fact or nature of future positions, future work assignments, future compensation or any other term or condition of employment or affiliation; (iii) confer any right or benefit under this Agreement or the Plan unless such right or benefit has specifically accrued under the terms of this Agreement or Plan; or (iv) deprive the Company of the right to terminate you at will and without regard to any future vesting opportunity that you may have.

(b) The Company has the right to reorganize, sell, spin-out or otherwise restructure one or more of its businesses or Affiliates at any time or from time to time, as it deems appropriate (a **“reorganization”**). Such a reorganization could result in the termination of your Continuous Service, or the termination of Affiliate status of your employer and the loss of benefits available to you under this Agreement, including but not limited to, the termination of the right to continue vesting in the Award. This Agreement, the Plan, the transactions contemplated hereunder and the vesting schedule set forth herein or any covenant of good faith

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and fair dealing that may be found implicit in any of them do not constitute an express or implied promise of continued engagement as an employee or consultant for the term

of this Agreement, for any period, or at all, and shall not interfere in any way with the Company's right to conduct a reorganization.

#### 11. WITHHOLDING OBLIGATIONS.

(a) On each vesting date, and on or before the time you receive a distribution of the shares underlying your Restricted Stock Units, and at any other time as reasonably requested by the Company in accordance with applicable tax laws, you hereby authorize any required withholding from the Common Stock issuable to you and/or otherwise agree to make adequate provision in cash for any sums required to satisfy the federal, state, local and foreign tax withholding obligations of the Company or any Affiliate that arise in connection with your Award (the "**Withholding Taxes**"). Additionally, the Company or any Affiliate may, in its sole discretion, satisfy all or any portion of the Withholding Taxes obligation relating to your Award by any of the following means or by a combination of such means: (i) withholding from any compensation otherwise payable to you by the Company; (ii) causing you to tender a cash payment; (iii) permitting or requiring you to enter into a "same day sale" commitment, if applicable, with a broker-dealer that is a member of the Financial Industry Regulatory Authority (a "**FINRA Dealer**") whereby you irrevocably elect to sell a portion of the shares to be delivered in connection with your Restricted Stock Units to satisfy the Withholding Taxes and whereby the FINRA Dealer irrevocably commits to forward the proceeds necessary to satisfy the Withholding Taxes directly to the Company and/or its Affiliates; or (iv) withholding shares of Common Stock from the shares of Common Stock issued or otherwise issuable to you in connection with the Award with a Fair Market Value (measured as of the date shares of Common Stock are issued pursuant to Section 6) equal to the amount of such Withholding Taxes; *provided, however*, that the number of such shares of Common Stock so withheld will not exceed the amount necessary to satisfy the Company's required tax withholding obligations using the minimum statutory withholding rates for federal, state, local and foreign tax purposes, including payroll taxes, that are applicable to supplemental taxable income; and *provided*, further, that to the extent necessary to qualify for an exemption from application of Section 16(b) of the Exchange Act, if applicable, such share withholding procedure will be subject to the express prior approval of the Company's Compensation Committee.

(b) Unless the tax withholding obligations of the Company and/or any Affiliate are satisfied, the Company shall have no obligation to deliver to you any Common Stock.

(c) In the event the Company's obligation to withhold arises prior to the delivery to you of Common Stock or it is determined after the delivery of Common Stock to you that the amount of the Company's withholding obligation was greater than the amount withheld by the Company, you agree to indemnify and hold the Company harmless from any failure by the Company to withhold the proper amount.

12. **TAX CONSEQUENCES.** The Company has no duty or obligation to minimize the tax consequences to you of this Award and shall not be liable to you for any adverse tax consequences to you arising in connection with this Award. You are hereby advised to consult

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with your own personal tax, financial and/or legal advisors regarding the tax consequences of this Award and by signing the Grant Notice, you have agreed that you have done so or knowingly and voluntarily declined to do so. You understand that you (and not the Company) shall be responsible for your own tax liability that may arise as a result of this investment or the transactions contemplated by this Agreement.

13. **UNSECURED OBLIGATION.** Your Award is unfunded, and as a holder of a vested Award, you shall be considered an unsecured creditor of the Company with respect to the Company's obligation, if any, to issue shares or other property pursuant to this Agreement. You shall not have voting or any other rights as a stockholder of the Company with respect to the shares to be issued pursuant to this Agreement until such shares are issued to you pursuant to Section 6 of this Agreement. Upon such issuance, you will obtain full voting and other rights as a stockholder of the Company. Nothing contained in this Agreement, and no action taken pursuant to its provisions, shall create or be construed to create a trust of any kind or a fiduciary relationship between you and the Company or any other person.

14. **NOTICES.** Any notice or request required or permitted hereunder shall be given in writing to each of the other parties hereto and shall be deemed effectively given on the earlier of (i) the date of personal delivery, including delivery by express courier, or delivery via electronic means, or (ii) the date that is five (5) days after deposit in the United States Post Office (whether or not actually received by the addressee), by registered or certified mail with postage and fees prepaid, addressed at the following addresses, or at such other address(es) as a party may designate by ten (10) days' advance written notice to each of the other parties hereto:

**COMPANY:** Trevena, Inc.  
Attn: Stock Administrator  
1018 West 9<sup>th</sup> Avenue, Suite A  
King of Prussia, PA 19406

**PARTICIPANT:** Your address as on file with the Company  
at the time notice is given

15. **HEADINGS.** The headings of the Sections in this Agreement are inserted for convenience only and shall not be deemed to constitute a part of this Agreement or to affect the meaning of this Agreement.

#### 16. MISCELLANEOUS.

(a) The rights and obligations of the Company under your Award shall be transferable by the Company to any one or more persons or entities, and all covenants and agreements hereunder shall inure to the benefit of, and be enforceable by, the Company's successors and assigns.

(b) You agree upon request to execute any further documents or instruments necessary or desirable in the sole determination of the Company to carry out the purposes or intent of your Award.

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(c) You acknowledge and agree that you have reviewed your Award in its entirety, have had an opportunity to obtain the advice of counsel prior to executing and accepting your Award and fully understand all provisions of your Award.

(d) This Agreement shall be subject to all applicable laws, rules, and regulations, and to such approvals by any governmental agencies or national securities exchanges as may be required.

(e) All obligations of the Company under the Plan and this Agreement shall be binding on any successor to the Company, whether the existence of such successor is the result of a direct or indirect purchase, merger, consolidation, or otherwise, of all or substantially all of the business and/or assets of the Company.

17. **GOVERNING PLAN DOCUMENT.** Your Award is subject to all the provisions of the Plan, the provisions of which are hereby made a part of your Award, and is further subject to all interpretations, amendments, rules and regulations which may from time to time be promulgated and adopted pursuant to the Plan. Your Award (and any compensation paid or shares issued under your Award) is subject to recoupment in accordance with The Dodd—Frank Wall Street Reform and Consumer Protection Act and any implementing regulations thereunder, any clawback policy adopted by the Company and any compensation recovery policy otherwise required by

applicable law. No recovery of compensation under such a clawback policy will be an event giving rise to a right to voluntarily terminate employment upon a resignation for “good reason,” or for a “constructive termination” or any similar term under any plan of or agreement with the Company.

**18. EFFECT ON OTHER EMPLOYEE BENEFIT PLANS.** The value of the Award subject to this Agreement shall not be included as compensation, earnings, salaries, or other similar terms used when calculating benefits under any employee benefit plan (other than the Plan) sponsored by the Company or any Affiliate except as such plan otherwise expressly provides. The Company expressly reserves its rights to amend, modify, or terminate any or all of the employee benefit plans of the Company or any Affiliate.

**19. CHOICE OF LAW.** The interpretation, performance and enforcement of this Agreement shall be governed by the law of the State of Delaware without regard to that state’s conflicts of laws rules.

**20. SEVERABILITY.** If all or any part of this Agreement or the Plan is declared by any court or governmental authority to be unlawful or invalid, such unlawfulness or invalidity shall not invalidate any portion of this Agreement or the Plan not declared to be unlawful or invalid. Any Section of this Agreement (or part of such a Section) so declared to be unlawful or invalid shall, if possible, be construed in a manner which will give effect to the terms of such Section or part of a Section to the fullest extent possible while remaining lawful and valid.

**21. OTHER DOCUMENTS.** You hereby acknowledge receipt or the right to receive a document providing the information required by Rule 428(b) (1) promulgated under the Securities Act. In addition, you acknowledge receipt of the Company’s *Insider Trading and Trading Window Policy*.

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**22. AMENDMENT.** This Agreement may not be modified, amended or terminated except by an instrument in writing, signed by you and by a duly authorized representative of the Company. Notwithstanding the foregoing, this Agreement may be amended solely by the Board by a writing which specifically states that it is amending this Agreement, so long as a copy of such amendment is delivered to you, and provided that, except as otherwise expressly provided in the Plan, no such amendment materially adversely affecting your rights hereunder may be made without your written consent. Without limiting the foregoing, the Board reserves the right to change, by written notice to you, the provisions of this Agreement in any way it may deem necessary or advisable to carry out the purpose of the Award as a result of any change in applicable laws or regulations or any future law, regulation, ruling, or judicial decision, provided that any such change shall be applicable only to rights relating to that portion of the Award which is then subject to restrictions as provided herein.

**23. COMPLIANCE WITH SECTION 409A OF THE CODE.** This Award is intended to comply with the “short-term deferral” rule set forth in Treasury Regulation Section 1.409A-1(b)(4). Notwithstanding the foregoing, if it is determined that the Award fails to satisfy the requirements of the short-term deferral rule and is otherwise deferred compensation subject to Section 409A, and if you are a “Specified Employee” (within the meaning set forth in Section 409A(a)(2)(B)(i) of the Code) as of the date of your “separation from service” (within the meaning of Treasury Regulation Section 1.409A-1(h) and without regard to any alternative definition thereunder), then the issuance of any shares that would otherwise be made upon the date of the separation from service or within the first six (6) months thereafter will not be made on the originally scheduled date(s) and will instead be issued in a lump sum on the date that is six (6) months and one day after the date of the separation from service, with the balance of the shares issued thereafter in accordance with the original vesting and issuance schedule set forth above, but if and only if such delay in the issuance of the shares is necessary to avoid the imposition of adverse taxation on you in respect of the shares under Section 409A of the Code. Each installment of shares that vests is intended to constitute a “separate payment” for purposes of Treasury Regulation Section 1.409A-2(b)(2).

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This Restricted Stock Unit Award Agreement shall be deemed to be signed by the Company and the Participant upon the signing by the Participant of the Restricted Stock Unit Grant Notice to which it is attached.

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**TREVENA, INC.**  
**NON-EMPLOYEE DIRECTOR COMPENSATION POLICY**

Each member of the Board of Directors (the “**Board**”) who is not also serving as an employee of Trevena, Inc. (the “**Company**”) or any of its subsidiaries (each such member, an “**Eligible Director**”) will receive the compensation described in this Non-Employee Director Compensation Policy for his or her Board service on and following the date of the underwriting agreement between Company and the underwriters managing the initial public offering of the common stock of Company (the “**Common Stock**”), pursuant to which the Common Stock is priced in such initial public offering (the “**Effective Date**”). This policy is effective as of the Effective Date and may be amended at any time in the sole discretion of the Board or the Compensation Committee of the Board.

**Annual Cash Compensation**

The annual cash compensation amount set forth below is payable in equal quarterly installments, payable in arrears on the last day of each fiscal quarter in which the service occurred. If an Eligible Director joins the Board or a committee of the Board at a time other than effective as of the first day of a fiscal quarter, each annual retainer set forth below will be pro-rated based on days served in the applicable fiscal year, with the pro-rated amount paid for the first fiscal quarter in which the Eligible Director provides the service, and regular full quarterly payments thereafter. All annual cash fees are vested upon payment.

1. Annual Board Service Retainer:
  - a. All Eligible Directors: \$30,000
  - b. Chairman of the Board Service Retainer (in addition to Eligible Director Service Retainer): \$30,000
2. Annual Committee Member Service Retainer:
  - a. Member of the Audit Committee: \$7,500
  - b. Member of the Compensation Committee: \$5,000
  - c. Member of the Nominating & Governance Committee: \$3,500
3. Annual Committee Chair Service Retainer (in addition to Committee Member Service Retainer)
  - a. Chairman of the Audit Committee: \$15,000
  - b. Chairman of the Compensation Committee: \$10,000
  - c. Chairman of the Nominating & Governance Committee: \$7,000

**Equity Compensation**

The equity compensation set forth below will be granted under the Trevena, Inc. 2013 Equity Incentive Plan (the “**Plan**”), subject to the approval of the Plan by the Company’s stockholders. All stock options granted under this policy will be nonstatutory stock options, with an exercise

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price per share equal to 100% of the Fair Market Value (as defined in the Plan) of the underlying Common Stock on the date of grant, and a term of ten years from the date of grant (subject to earlier termination in connection with a termination of service as provided in the Plan).

1. Initial Grant: On (a) the Effective Date, for each Eligible Director who is serving on the Board as of such date, or (b) the date of the Eligible Director’s initial election to the Board, for each Eligible Director who is first elected to the Board following the Effective Date (or, if either such date in (a) or (b) is not a market trading day, the first market trading day thereafter), the Eligible Director will be automatically, and without further action by the Board or Compensation Committee of the Board, granted a stock option for 110,000 shares, subject to appropriate adjustment for any stock split, stock dividend, reverse stock split, stock combination or other change in the capitalization of the Company, including the reverse stock split contemplated prior to the Effective Date. Commencing on the first date that is three months after the date of grant, the shares subject to each stock option will vest in a series of 12 equal quarterly installments, such that the option is fully vested on the third anniversary of the date of grant, subject to the Eligible Director’s Continuous Service (as defined in the Plan) through each such vesting date; provided that the vesting date for the quarterly period in which the Company’s annual stockholders’ meeting occurs shall be the date immediately prior to such annual meeting.
2. Annual Grant: On the date of each Company’s annual stockholder meeting held after the Effective Date, each Eligible Director who continues to serve as a non-employee member of the Board immediately therefore will be automatically, and without further action by the Board or Compensation Committee of the Board, granted a stock option for 55,000 shares, subject to appropriate adjustment for any stock split, stock dividend, reverse stock split, stock combination or other change in the capitalization of the Company, including the reverse stock split contemplated prior to the Effective Date. The shares subject to the stock option will vest on the day immediately prior to the next annual stockholders’ meeting held after the date of grant, subject to the Eligible Director’s Continuous Service (as defined in the Plan) through such vesting date.

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## INDEMNITY AGREEMENT

THIS INDEMNITY AGREEMENT (this “*Agreement*”) dated as of \_\_\_\_\_, 201\_, is made by and between TREVENA, INC., a Delaware corporation (the “*Company*”), and \_\_\_\_\_ (the “*Indemnitee*”).

## RECITALS

- A.** The Company desires to attract and retain the services of highly qualified individuals as directors, officers, employees and agents.
- B.** The Company’s Amended and Restated Bylaws (the “*Bylaws*”) require that the Company indemnify its directors, and empowers the Company to indemnify its officers, employees and agents, as authorized by the Delaware General Corporation Law, as amended (the “*Code*”), under which the Company is organized and such Bylaws expressly provide that the indemnification provided therein is not exclusive and contemplates that the Company may enter into separate agreements with its directors, officers and other persons to set forth specific indemnification provisions.
- C.** Indemnitee does not regard the protection currently provided by applicable law, the Company’s governing documents and available insurance as adequate under the present circumstances, and the Company has determined that Indemnitee and other directors, officers, employees and agents of the Company may not be willing to serve or continue to serve in such capacities without additional protection.
- D.** The Company desires and has requested Indemnitee to serve or continue to serve as a director, officer, employee or agent of the Company, as the case may be, and has proffered this Agreement to Indemnitee as an additional inducement to serve in such capacity.
- E.** Indemnitee is willing to serve, or to continue to serve, as a director, officer, employee or agent of the Company, as the case may be, if Indemnitee is furnished the indemnity provided for herein by the Company.
- F.** This Agreement supersedes and replaces in its entirety any previous Indemnity Agreement entered into between the Company and the Indemnitee.

## AGREEMENT

**NOW THEREFORE**, in consideration of the mutual covenants and agreements set forth herein, the parties hereto, intending to be legally bound, hereby agree as follows:

**1. Definitions.**

**(a) Agent.** For purposes of this Agreement, the term “*agent*” of the Company means any person who: (i) is or was a director, officer, employee or other fiduciary of the Company or a subsidiary of the Company; or (ii) is or was serving at the request or for the convenience of, or representing the interests of, the Company or a subsidiary of the Company, as

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a director, officer, employee or other fiduciary of a foreign or domestic corporation, partnership, joint venture, trust or other enterprise.

**(b) Expenses.** For purposes of this Agreement, the term “*expenses*” shall be broadly construed and shall include, without limitation, all direct and indirect costs of any type or nature whatsoever (including, without limitation, all attorneys’, witness, or other professional fees and related disbursements, and other out-of-pocket costs of whatever nature), actually and reasonably incurred by Indemnitee in connection with the investigation, defense or appeal of a proceeding or establishing or enforcing a right to indemnification under this Agreement, the Code or otherwise, and amounts paid in settlement by or on behalf of Indemnitee, but shall not include any judgments, fines or penalties actually levied against Indemnitee for such individual’s violations of law. The term “*expenses*” shall also include reasonable compensation for time spent by Indemnitee for which he is not compensated by the Company or any subsidiary or third party (i) for any period during which Indemnitee is not an agent, in the employment of, or providing services for compensation to, the Company or any subsidiary; and (ii) if the rate of compensation and estimated time involved is approved by the directors of the Company who are not parties to any action with respect to which expenses are incurred, for Indemnitee while an agent of, employed by, or providing services for compensation to, the Company or any subsidiary.

**(c) Proceedings.** For purposes of this Agreement, the term “*proceeding*” shall be broadly construed and shall include, without limitation, any threatened, pending, or completed action, suit, arbitration, alternate dispute resolution mechanism, investigation, inquiry, administrative hearing or any other actual, threatened or completed proceeding, whether brought in the right of the Company or otherwise and whether of a civil, criminal, administrative or investigative nature, and whether formal or informal in any case, in which Indemnitee was, is or will be involved as a party or otherwise by reason of: (i) the fact that Indemnitee is or was a director or officer of the Company; (ii) the fact that any action taken by Indemnitee or of any action on Indemnitee’s part while acting as director, officer, employee or agent of the Company; or (iii) the fact that Indemnitee is or was serving at the request of the Company as a director, officer, employee or agent of another corporation, partnership, joint venture, trust, employee benefit plan or other enterprise, and in any such case described above, whether or not serving in any such capacity at the time any liability or expense is incurred for which indemnification, reimbursement, or advancement of expenses may be provided under this Agreement.

**(d) Subsidiary.** For purposes of this Agreement, the term “*subsidiary*” means any corporation or limited liability company of which more than 50% of the outstanding voting securities or equity interests are owned, directly or indirectly, by the Company and one or more of its subsidiaries, and any other corporation, limited liability company, partnership, joint venture, trust, employee benefit plan or other enterprise of which Indemnitee is or was serving at the request of the Company as a director, officer, employee, agent or fiduciary.

**(e) Independent Counsel.** For purposes of this Agreement, the term “*independent counsel*” means a law firm, or a partner (or, if applicable, member) of such a law firm, that is experienced in matters of corporation law and neither presently is, nor in the past five (5) years has been, retained to represent: (i) the Company or Indemnitee in any matter material to either such party, or (ii) any other party to the proceeding giving rise to a claim for indemnification hereunder. Notwithstanding the foregoing, the term “*independent counsel*” shall

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not include any person who, under the applicable standards of professional conduct then prevailing, would have a conflict of interest in representing either the Company or Indemnitee in an action to determine Indemnitee’s rights under this Agreement.

**2. Agreement to Serve.** Indemnitee will serve, or continue to serve, as a director, officer, employee or agent of the Company or any subsidiary, as the case

may be, faithfully and to the best of his or her ability, at the will of such corporation (or under separate agreement, if such agreement exists), in the capacity Indemnitee currently serves as an agent of such corporation, so long as Indemnitee is duly appointed or elected and qualified in accordance with the applicable provisions of the bylaws or other applicable charter documents of such corporation, or until the effective date of Indemnitee's written resignation; provided, however, that nothing contained in this Agreement is intended as an employment agreement between Indemnitee and the Company or any of its subsidiaries or to create any right to continued employment of Indemnitee with the Company or any of its subsidiaries in any capacity.

The Company acknowledges that it has entered into this Agreement and assumes the obligations imposed on it hereby, in addition to and separate from its obligations to Indemnitee under the Bylaws, to induce Indemnitee to serve, or continue to serve, as a director, officer, employee or agent of the Company, and the Company acknowledges that Indemnitee is relying upon this Agreement in serving as a director, officer, employee or agent of the Company.

### 3. Indemnification.

(a) **Indemnification in Third Party Proceedings.** Subject to Section 10 below, the Company shall indemnify Indemnitee to the fullest extent permitted by the Code, as the same may be amended from time to time (but only to the extent that such amendment permits Indemnitee to broader indemnification rights than the Code permitted prior to adoption of such amendment), if Indemnitee is a party to or threatened to be made a party to or otherwise involved in any proceeding, for any and all expenses, actually and reasonably incurred by Indemnitee in connection with the investigation, defense, settlement or appeal of such proceeding.

(b) **Indemnification in Derivative Actions and Direct Actions by the Company.** Subject to Section 10 below, the Company shall indemnify Indemnitee to the fullest extent permitted by the Code, as the same may be amended from time to time (but only to the extent that such amendment permits Indemnitee to broader indemnification rights than the Code permitted prior to adoption of such amendment), if Indemnitee is a party to or threatened to be made a party to or otherwise involved in any proceeding by or in the right of the Company to procure a judgment in its favor, against any and all expenses actually and reasonably incurred by Indemnitee in connection with the investigation, defense, settlement, or appeal of such proceedings.

(c) **Fund Indemnitors.** The Company hereby acknowledges that Indemnitee has or may have in the future certain rights to indemnification, advancement of expenses and/or insurance provided by other entities and/or organizations (collectively, the "*Fund Indemnitors*"). The Company hereby agrees (i) that it is the indemnitor of first resort (i.e., its obligations to Indemnitee are primary and any obligation of the Fund Indemnitors to advance expenses or to provide indemnification for the same expenses or liabilities incurred by

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Indemnitee are secondary), (ii) that it shall be required to advance the full amount of expenses incurred by Indemnitee and shall be liable for the full amount of all expenses, judgments, penalties, fines and amounts paid in settlement to the extent legally permitted and as required by the terms of this Agreement and the Company's Amended and Restated Certificate of Incorporation, as amended (the "*Certificate of Incorporation*") or Bylaws of the Company (or any other agreement between the Company and Indemnitee), without regard to any rights Indemnitee may have against the Fund Indemnitors, and, (iii) that it irrevocably waives, relinquishes and releases the Fund Indemnitors from any and all claims against the Fund Indemnitors for contribution, subrogation or any other recovery of any kind in respect thereof. The Company further agrees that no advancement or payment by the Fund Indemnitors on behalf of Indemnitee with respect to any claim for which Indemnitee has sought indemnification from the Company shall affect the foregoing and the Fund Indemnitors shall have a right of contribution and/or be subrogated to the extent of such advancement or payment to all of the rights of recovery of Indemnitee against the Company. The Company and Indemnitee agree that the Fund Indemnitors are express third party beneficiaries of the terms of this Section 3(c).

4. **Indemnification of Expenses of Successful Party.** Notwithstanding any other provision of this Agreement, to the extent that Indemnitee has been successful on the merits or otherwise in defense of any proceeding or in defense of any claim, issue or matter therein, including the dismissal of any action without prejudice, the Company shall indemnify Indemnitee against all expenses actually and reasonably incurred in connection with the investigation, defense or appeal of such proceeding.

5. **Partial Indemnification.** If Indemnitee is entitled under any provision of this Agreement to indemnification by the Company for some or a portion of any expenses actually and reasonably incurred by Indemnitee in the investigation, defense, settlement or appeal of a proceeding, but is precluded by applicable law or the specific terms of this Agreement to indemnification for the total amount thereof, the Company shall nevertheless indemnify Indemnitee for the portion thereof to which Indemnitee is entitled.

6. **Advancement of Expenses.** To the extent not prohibited by law, the Company shall advance the expenses incurred by Indemnitee in connection with any proceeding, and such advancement shall be made within twenty (20) days after the receipt by the Company of a statement or statements requesting such advances (which shall include invoices received by Indemnitee in connection with such expenses but, in the case of invoices in connection with legal services, any references to legal work performed or to expenditures made that would cause Indemnitee to waive any privilege accorded by applicable law shall not be included with the invoice) and upon request of the Company, an undertaking to repay the advancement of expenses if and to the extent that it is ultimately determined by a court of competent jurisdiction in a final judgment, not subject to appeal, that Indemnitee is not entitled to be indemnified by the Company. Advances shall be unsecured, interest free and without regard to Indemnitee's ability to repay the expenses. Advances shall include any and all expenses actually and reasonably incurred by Indemnitee pursuing an action to enforce Indemnitee's right to indemnification under this Agreement, or otherwise and this right of advancement, including expenses incurred preparing and forwarding statements to the Company to support the advances claimed. Indemnitee acknowledges that the execution and delivery of this Agreement shall constitute an undertaking providing that Indemnitee shall, to the fullest extent required by law, repay the

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advance if and to the extent that it is ultimately determined by a court of competent jurisdiction in a final judgment, not subject to appeal, that Indemnitee is not entitled to be indemnified by the Company. The right to advances under this Section shall continue until final disposition of any proceeding, including any appeal therein. This Section 6 shall not apply to any claim made by Indemnitee for which indemnity is excluded pursuant to Section 10(b).

### 7. Notice and Other Indemnification Procedures.

(a) **Notification of Proceeding.** Indemnitee will notify the Company in writing promptly upon being served with any summons, citation, subpoena, complaint, indictment, information or other document relating to any proceeding or matter which may be subject to indemnification or advancement of expenses covered hereunder. The failure of Indemnitee to so notify the Company shall not relieve the Company of any obligation which it may have to Indemnitee under this Agreement or otherwise.

(b) **Request for Indemnification and Indemnification Payments.** Indemnitee shall notify the Company promptly in writing upon receiving notice of any demand, judgment or other requirement for payment that Indemnitee reasonably believes to be subject to indemnification under the terms of this Agreement, and shall request payment thereof by the Company. Indemnification payments requested by Indemnitee under Section 3 hereof shall be made by the Company no later than sixty (60) days after receipt of the written request of Indemnitee. Claims for advancement of expenses shall be made under the provisions of Section 6 herein.

(c) **Application for Enforcement.** In the event the Company fails to make timely payments as set forth in Sections 6 or 7(b) above, Indemnitee shall have the right to apply to any court of competent jurisdiction for the purpose of enforcing Indemnitee's right to indemnification or advancement of expenses pursuant to this

Agreement. In such an enforcement hearing or proceeding, the burden of proof shall be on the Company to prove that indemnification or advancement of expenses to Indemnitee is not required under this Agreement or permitted by applicable law. Any determination by the Company (including its Board of Directors, stockholders or independent counsel) that Indemnitee is not entitled to indemnification hereunder, shall not be a defense by the Company to the action nor create any presumption that Indemnitee is not entitled to indemnification or advancement of expenses hereunder.

**(d) Indemnification of Certain Expenses.** The Company shall indemnify Indemnitee against all expenses incurred in connection with any hearing or proceeding under this Section 7 unless the Company prevails in such hearing or proceeding on the merits in all material respects.

**8. Assumption of Defense.** In the event the Company shall be requested by Indemnitee to pay the expenses of any proceeding, the Company, if appropriate, shall be entitled to assume the defense of such proceeding, or to participate to the extent permissible in such proceeding, with counsel reasonably acceptable to Indemnitee. Upon assumption of the defense by the Company and the retention of such counsel by the Company, the Company shall not be liable to Indemnitee under this Agreement for any fees of counsel subsequently incurred by Indemnitee with respect to the same proceeding, provided that Indemnitee shall have the right to

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employ separate counsel in such proceeding at Indemnitee's sole cost and expense. Notwithstanding the foregoing, if Indemnitee's counsel delivers a written notice to the Company stating that such counsel has reasonably concluded that there may be a conflict of interest between the Company and Indemnitee in the conduct of any such defense or the Company shall not, in fact, have employed counsel or otherwise actively pursued the defense of such proceeding within a reasonable time, then in any such event the fees and expenses of Indemnitee's counsel to defend such proceeding shall be subject to the indemnification and advancement of expenses provisions of this Agreement.

**9. Insurance.** To the extent that the Company maintains an insurance policy or policies providing liability insurance for directors, officers, employees, or agents of the Company or of any subsidiary ("**D&O Insurance**"), Indemnitee shall be covered by such policy or policies in accordance with its or their terms to the maximum extent of the coverage available for any such director, officer, employee or agent under such policy or policies. If, at the time of the receipt of a notice of a claim pursuant to the terms hereof, the Company has D&O Insurance in effect, the Company shall give prompt notice of the commencement of such proceeding to the insurers in accordance with the procedures set forth in the respective policies. The Company shall thereafter take all necessary or desirable action to cause such insurers to pay, on behalf of Indemnitee, all amounts payable as a result of such proceeding in accordance with the terms of such policies.

**10. Exceptions.**

**(a) Certain Matters.** Any provision herein to the contrary notwithstanding, the Company shall not be obligated pursuant to the terms of this Agreement to indemnify Indemnitee on account of any proceeding with respect to (i) remuneration paid to Indemnitee if it is determined by final judgment or other final adjudication that such remuneration was in violation of law (and, in this respect, both the Company and Indemnitee have been advised that the Securities and Exchange Commission believes that indemnification for liabilities arising under the federal securities laws is against public policy and is, therefore, unenforceable and that claims for indemnification should be submitted to appropriate courts for adjudication, as indicated in Section 10(d) below); (ii) a final judgment rendered against Indemnitee for an accounting, disgorgement or repayment of profits made from the purchase or sale by Indemnitee of securities of the Company against Indemnitee pursuant to the provisions of Section 16(b) of the Securities Exchange Act of 1934, as amended, or other provisions of any federal, state or local statute or rules and regulations thereunder; (iii) a final judgment or other final adjudication that Indemnitee's conduct was in bad faith, knowingly fraudulent or deliberately dishonest or constituted willful misconduct (but only to the extent of such specific determination); or (iv) on account of conduct that is established by a final judgment as constituting a breach of Indemnitee's duty of loyalty to the Company or resulting in any personal profit or advantage to which Indemnitee is not legally entitled. For purposes of the foregoing sentence, a final judgment or other adjudication may be reached in either the underlying proceeding or action in connection with which indemnification is sought or a separate proceeding or action to establish rights and liabilities under this Agreement.

**(b) Claims Initiated by Indemnitee.** Any provision herein to the contrary notwithstanding, the Company shall not be obligated to indemnify or advance expenses to

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Indemnitee with respect to proceedings or claims initiated or brought by Indemnitee against the Company or its directors, officers, employees or other agents and not by way of defense, except (i) with respect to proceedings brought to establish or enforce a right to indemnification under this Agreement or under any other agreement, provision in the Bylaws or Certificate of Incorporation or applicable law, or (ii) with respect to any other proceeding initiated by Indemnitee that is either approved by the Board of Directors or Indemnitee's participation is required by applicable law. However, indemnification or advancement of expenses may be provided by the Company in specific cases if the Board of Directors determines it to be appropriate.

**(c) Unauthorized Settlements.** Any provision herein to the contrary notwithstanding, the Company shall not be obligated pursuant to the terms of this Agreement to indemnify Indemnitee under this Agreement for any amounts paid in settlement of a proceeding effected without the Company's written consent. Neither the Company nor Indemnitee shall unreasonably withhold consent to any proposed settlement; provided, however, that the Company may in any event decline to consent to (or to otherwise admit or agree to any liability for indemnification hereunder in respect of) any proposed settlement if the Company is also a party in such proceeding and determines in good faith that such settlement is not in the best interests of the Company and its stockholders.

**(d) Securities Act Liabilities.** Any provision herein to the contrary notwithstanding, the Company shall not be obligated pursuant to the terms of this Agreement to indemnify Indemnitee or otherwise act in violation of any undertaking appearing in and required by the rules and regulations promulgated under the Securities Act of 1933, as amended (the "**Act**"), or in any registration statement filed with the SEC under the Act. Indemnitee acknowledges that paragraph (h) of Item 512 of Regulation S-K currently generally requires the Company to undertake in connection with any registration statement filed under the Act to submit the issue of the enforceability of Indemnitee's rights under this Agreement in connection with any liability under the Act on public policy grounds to a court of appropriate jurisdiction and to be governed by any final adjudication of such issue. Indemnitee specifically agrees that any such undertaking shall supersede the provisions of this Agreement and to be bound by any such undertaking.

**11. Nonexclusivity and Survival of Rights.** The provisions for indemnification and advancement of expenses set forth in this Agreement shall not be deemed exclusive of any other rights which Indemnitee may at any time be entitled under any provision of applicable law, the Certificate of Incorporation, Bylaws or other agreements, both as to action in Indemnitee's official capacity and Indemnitee's action as an agent of the Company, in any court in which a proceeding is brought, and Indemnitee's rights hereunder shall continue after Indemnitee has ceased acting as an agent of the Company and shall inure to the benefit of the heirs, executors, administrators and assigns of Indemnitee. The obligations and duties of the Company to Indemnitee under this Agreement shall be binding on the Company and its successors and assigns until terminated in accordance with its terms. The Company shall require any successor (whether direct or indirect, by purchase, merger, consolidation or otherwise) to all or substantially all of the business or assets of the Company, expressly to assume and agree to perform this Agreement in the same manner and to the same extent that the Company would be required to perform if no such succession had taken place.

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No amendment, alteration or repeal of this Agreement or of any provision hereof shall limit or restrict any right of Indemnitee under this Agreement in respect of any action taken or omitted by such Indemnitee in his or her corporate status prior to such amendment, alteration or repeal. To the extent that a change in the Code, whether by statute or judicial decision, permits greater indemnification or advancement of expenses than would be afforded currently under the Certificate of Incorporation, Bylaws and this Agreement, it is the intent of the parties hereto that Indemnitee shall enjoy by this Agreement the greater benefits so afforded by such change. No right or remedy herein conferred is intended to be exclusive of any other right or remedy, and every other right and remedy shall be cumulative and in addition to every other right and remedy given hereunder or now or hereafter existing at law or in equity or otherwise. The assertion or employment of any right or remedy hereunder, or otherwise, by Indemnitee shall not prevent the concurrent assertion or employment of any other right or remedy by Indemnitee.

**12. Term.** This Agreement shall continue until and terminate upon the later of: (a) five (5) years after the date that Indemnitee shall have ceased to serve as a director or and/or officer, employee or agent of the Company; or (b) one (1) year after the final termination of any proceeding, including any appeal then pending, in respect to which Indemnitee was granted rights of indemnification or advancement of expenses hereunder.

No legal action shall be brought and no cause of action shall be asserted by or in the right of the Company against an Indemnitee or an Indemnitee's estate, spouse, heirs, executors or personal or legal representatives after the expiration of five (5) years from the date of accrual of such cause of action, and any claim or cause of action of the Company shall be extinguished and deemed released unless asserted by the timely filing of a legal action within such five-year period; provided, however, that if any shorter period of limitations is otherwise applicable to such cause of action, such shorter period shall govern.

**13. Subrogation.** In the event of payment under this Agreement, the Company shall be subrogated to the extent of such payment to all of the rights of recovery of Indemnitee, who, at the request and expense of the Company, shall execute all papers required and shall do everything that may be reasonably necessary to secure such rights, including the execution of such documents necessary to enable the Company effectively to bring suit to enforce such rights.

**14. Interpretation of Agreement.** It is understood that the parties hereto intend this Agreement to be interpreted and enforced so as to provide indemnification to Indemnitee to the fullest extent now or hereafter permitted by law.

**15. Severability.** If any provision of this Agreement shall be held to be invalid, illegal or unenforceable for any reason whatsoever, (a) the validity, legality and enforceability of the remaining provisions of the Agreement (including without limitation, all portions of any paragraphs of this Agreement containing any such provision held to be invalid, illegal or unenforceable, that are not themselves invalid, illegal or unenforceable) shall not in any way be affected or impaired thereby; and (b) to the fullest extent possible, the provisions of this Agreement (including, without limitation, all portions of any paragraph of this Agreement containing any such provision held to be invalid, illegal or unenforceable, that are not themselves invalid, illegal or unenforceable) shall be construed so as to give effect to the intent manifested by the provision held invalid, illegal or unenforceable and to give effect to Section 14 hereof.

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**16. Amendment and Waiver.** No supplement, modification, amendment, or cancellation of this Agreement shall be binding unless executed in writing by the parties hereto. No waiver of any of the provisions of this Agreement shall be deemed or shall constitute a waiver of any other provision hereof (whether or not similar) nor shall such waiver constitute a continuing waiver.

**17. Notice.** Except as otherwise provided herein, any notice or demand which, by the provisions hereof, is required or which may be given to or served upon the parties hereto shall be in writing and, if by telegram, teletype or telex, shall be deemed to have been validly served, given or delivered when sent, if by overnight delivery, courier or personal delivery, shall be deemed to have been validly served, given or delivered upon actual delivery and, if mailed, shall be deemed to have been validly served, given or delivered three (3) business days after deposit in the United States mail, as registered or certified mail, with proper postage prepaid and addressed to the party or parties to be notified at the addresses set forth on the signature page of this Agreement (or such other address(es) as a party may designate for itself by like notice). If to the Company, notices and demands shall be delivered to the attention of the Secretary of the Company.

**18. Governing Law.** This Agreement shall be governed exclusively by and construed according to the laws of the State of Delaware, as applied to contracts between Delaware residents entered into and to be performed entirely within Delaware.

**19. Counterparts.** This Agreement may be executed in one or more counterparts, each of which shall for all purposes be deemed to be an original but all of which together shall constitute but one and the same Agreement. Only one such counterpart need be produced to evidence the existence of this Agreement.

**20. Headings.** The headings of the sections of this Agreement are inserted for convenience only and shall not be deemed to constitute part of this Agreement or to affect the construction hereof.

**21. Entire Agreement.** This Agreement constitutes the entire agreement between the parties with respect to the subject matter hereof and supersedes all prior agreements, understandings and negotiations, written and oral, between the parties with respect to the subject matter of this Agreement; provided, however, that this Agreement is a supplement to and in furtherance of the Certificate of Incorporation, Bylaws, the Code and any other applicable law, and shall not be deemed a substitute therefor, and does not diminish or abrogate any rights of Indemnitee thereunder.

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IN WITNESS WHEREOF, the parties hereto have entered into this Agreement effective as of the date first above written.

TREVENA, INC.

By: \_\_\_\_\_  
Name: \_\_\_\_\_  
Title: \_\_\_\_\_

INDEMNITEE

\_\_\_\_\_  
Signature of Indemnitee

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Print or Type Name of Indemnitee

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**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 September 6, 2013, in Amendment No. 2 to the Registration Statement (Form S-1 No. 333-191643) and related Prospectus of Trevena, Inc. for the registration of its common stock.

/s/ ERNST & YOUNG LLP

Philadelphia, Pennsylvania  
October 28, 2013

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