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

SCHEDULE 14A

Proxy Statement Pursuant to Section 14(a) of
the Securities Exchange Act of 1934 (Amendment No.)

Filed by the Registrant

Filed by a Party other than the Registrant

Check the appropriate box:

- Preliminary Proxy Statement
- Confidential, for Use of the Commission Only (as permitted by Rule 14a-6(e)(2))**
- Definitive Proxy Statement
- Definitive Additional Materials
- Soliciting Material under §240.14a-12

IDERA PHARMACEUTICALS, INC.

(Name of Registrant as Specified In Its Charter)

(Name of Person(s) Filing Proxy Statement, if other than the Registrant)

Payment of Filing Fee (Check the appropriate box):

- No fee required.
 - Fee computed on table below per Exchange Act Rules 14a-6(i)(1) and 0-11.
 - (1) Title of each class of securities to which transaction applies:

 - (2) Aggregate number of securities to which transaction applies:

 - (3) Per unit price or other underlying value of transaction computed pursuant to Exchange Act Rule 0-11 (set forth the amount on which the filing fee is calculated and state how it was determined):

 - (4) Proposed maximum aggregate value of transaction:

 - (5) Total fee paid:

 - Fee paid previously with preliminary materials.
 - Check box if any part of the fee is offset as provided by Exchange Act Rule 0-11(a)(2) and identify the filing for which the offsetting fee was paid previously. Identify the previous filing by registration statement number, or the Form or Schedule and the date of its filing.
 - (1) Amount Previously Paid:

 - (2) Form, Schedule or Registration Statement No.:

 - (3) Filing Party:

 - (4) Date Filed:

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IDERA PHARMACEUTICALS, INC.

505 Eagleview Blvd., Suite 212
Exton, PA 19341

NOTICE OF 2019 ANNUAL MEETING OF STOCKHOLDERS

Date and Time: Tuesday, June 4, 2019 at 8:30 a.m., local time

Place: Idera Pharmaceuticals, Inc.
505 Eagleview Boulevard
Suite 212
Exton, Pennsylvania 19341

- Items of Business:**
- Elect two Class III directors to our board of directors for terms to expire at the 2022 annual meeting of stockholders;
 - Approve, by non-binding vote, executive compensation;
 - Approve an amendment to our 2013 Stock Incentive Plan to increase the number of shares authorized for issuance thereunder;
 - Approve an amendment to our 2017 Employee Stock Purchase Plan to increase the number of shares authorized for issuance thereunder;
 - Ratify the selection of Ernst & Young LLP as our independent registered public accounting firm for the fiscal year ending December 31, 2019; and
 - Transact any other business as may properly come before the 2019 annual meeting or any postponement or adjournment of the 2019 annual meeting.

The board of directors has no knowledge of any other business to be transacted at the 2019 annual meeting.

Record Date: You may vote at the 2019 annual meeting if you were a stockholder of record at the close of business on April 18, 2019.

Proxy Voting: It is important that your shares be represented and voted at the 2019 annual meeting. Whether or not you plan to attend the 2019 annual meeting, please mark, sign, date and promptly mail your proxy card in the enclosed postage-paid envelope or follow the instructions on the proxy card to vote by telephone or over the internet. You may revoke your proxy at any time before its exercise at the 2019 annual meeting.

By order of the board of directors,

/s/ BRYANT D. LIM

Bryant D. Lim
*Senior Vice President, General Counsel
and Corporate Secretary*

Exton, Pennsylvania

April 25, 2019

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IDERA PHARMACEUTICALS, INC.

505 Eagleview Blvd., Suite 212
Exton, PA 19341

PROXY STATEMENT

For our Annual Meeting of Stockholders to be held on June 4, 2019

Idera Pharmaceuticals, Inc., a Delaware corporation, which is referred to as "we," "us," the "Company" or "Idera" in this proxy statement, is sending you this proxy statement and the enclosed proxy card because our board of directors is soliciting your proxy to vote at our 2019 annual meeting of stockholders, or the 2019 annual meeting. The 2019 annual meeting will be held on Tuesday, June 4, 2019, at 8:30 a.m., local time, at our office located at 505 Eagleview Boulevard, Suite 212, Exton, Pennsylvania 19341. If the 2019 annual meeting is adjourned for any reason, then proxies submitted may be used at any adjournment of the 2019 annual meeting.

This proxy statement summarizes information about the proposals to be considered at the 2019 annual meeting and other information you may find useful in determining how to vote. The proxy card is one means by which you may authorize another person to vote your shares in accordance with your instructions.

We are mailing this proxy statement and the enclosed proxy card to stockholders on or about April 25, 2019.

In this mailing, we are also including copies of our annual report to stockholders for the year ended December 31, 2018, or 2018 Annual Report. Our 2018 Annual Report consists of our annual report on Form 10-K for the year ended December 31, 2018, as filed with the Securities and Exchange Commission, or the SEC, on March 6, 2019, including our audited financial statements, which annual report on Form 10-K is available free of charge on our website, www.iderapharma.com, where it can be accessed by clicking "Investors" and then "SEC Filings," or through the SEC's electronic data system at www.sec.gov. **To obtain directions to be able to attend the 2019 annual meeting and vote in person, write to Investor Relations, Idera Pharmaceuticals, Inc., 505 Eagleview Blvd., Suite 212, Exton, PA 19341, call our toll-free number (877) 888-6550, or email Investor Relations at ir@iderapharma.com.**

**Important Notice Regarding the Availability of
Proxy Materials for the 2019 Annual Meeting
to Be Held on June 4, 2019:**

**The Notice of Annual Meeting, Proxy Statement and 2018 Annual Report are available at
[<http://ir.iderapharma.com/shareholder-services/annual-meeting>.]**

INFORMATION ABOUT THE 2019 ANNUAL MEETING

Who may vote?

Holders of record of our common stock at the close of business on April 18, 2019, the record date for the 2019 annual meeting, are entitled to vote on each matter properly brought before the 2019 annual meeting. Holders of our common stock will be entitled to one vote for each share of common stock held as of the record date. As of the close of business on April 18, 2019, the record date for the 2019 annual meeting, we had 28,021,756 shares of common stock outstanding.

How do I vote my shares if I am a stockholder of record?

If you are a stockholder of record (meaning that you hold shares in your name in the records of our transfer agent, Computershare Trust Company, N.A., and that your shares are not held in "street name" by a bank or brokerage firm), you may vote your shares in any one of the following ways:

- *You may vote by mail.* To vote by mail, you need to complete, date and sign the proxy card that accompanies this proxy statement and promptly mail it in the enclosed postage-prepaid envelope. You do not need to put a stamp on the enclosed envelope if you mail it from within the United States.
- *You may vote by telephone.* To vote by telephone through services provided by Computershare Trust Company, N.A., call 1-800-652-VOTE (8683), and follow the instructions provided on the proxy card that accompanies this proxy statement. If you vote by telephone, you do not need to complete and mail your proxy card.
- *You may vote over the internet.* To vote over the internet through services provided by Computershare Trust Company, N.A., please go to the following website: <http://www.investorvote.com/IDRA> and follow the instructions at that site for submitting your proxy. If you vote over the internet, you do not need to complete and mail your proxy card.
- *You may vote in person.* If you attend the 2019 annual meeting, you may vote by delivering your completed proxy card in person or you may vote by completing a ballot at the 2019 annual meeting. Ballots will be available at the 2019 annual meeting.

Your proxy will only be valid if you complete and return the proxy card, vote by telephone or vote over the internet at or before the 2019 annual meeting. The persons named in the proxy card will vote the shares you own in accordance with your instructions on your proxy card, in your vote by telephone or in your vote over the internet. If you return the proxy card, vote by telephone or vote over the internet, but do not give any instructions on a particular matter described in this proxy statement, the persons named in the proxy card will vote the shares you own in accordance with the recommendations of our board of directors.

How do I vote my shares if I hold them in "street name"?

If the shares you own are held in "street name" by a bank or brokerage firm, your bank or brokerage firm, as the record holder of your shares, is required to vote your shares according to your instructions. In order to vote your shares, you will need to follow the directions that your bank or brokerage firm provides to you. Many banks and brokerage firms solicit voting instructions over the internet or by telephone.

Under applicable stock exchange rules, banks or brokerage firms subject to these rules that hold shares in street name for customers have the discretion to vote those shares with respect to certain matters if they have not received instructions from the beneficial owners. Banks or brokerage firms will have this discretionary authority with respect to routine or "discretionary" matters. Among the proposals to be presented at the 2019 annual meeting, Proposal Five (the ratification of the selection of

our independent registered public accounting firm) is a discretionary matter, and banks and brokerage firms are permitted to vote your shares even if you have not given voting instructions. Proposal One (the election of directors), Proposal Two (the approval of a non-binding vote on executive compensation), Proposal Three (the approval of an amendment to our 2013 Stock Incentive Plan to increase the number of shares authorized for issuance thereunder) and Proposal Four (approval of an amendment to our 2017 Employee Stock Purchase Plan to increase the number of shares authorized for issuance thereunder) are non-routine or "non-discretionary" matters, and banks and brokerage firms cannot vote your shares on such proposals if you have not given voting instructions. "Broker non-votes" occur when a bank or brokerage firm submits a proxy for shares but does not indicate a vote for a particular proposal because the bank or brokerage firm either does not have authority to vote on that proposal and has not received voting instructions from the beneficial owner, or has discretionary authority but chooses not to exercise it. The effect of broker non-votes is discussed below in the answer to the question "What vote is required to approve each matter and how will votes be counted?".

Even if your shares are held in street name, you are welcome to attend the 2019 annual meeting. If your shares are held in street name, you may not vote your shares in person at the 2019 annual meeting unless you obtain a proxy, executed in your favor, from the holder of record (i.e., your bank or brokerage firm). If you hold your shares in street name and wish to vote in person, please contact your bank or brokerage firm before the 2019 annual meeting to obtain the necessary proxy from the holder of record.

How may I change or revoke my vote?

If you are a stockholder of record, even if you complete and return a proxy card or vote by telephone or over the internet, you may change or revoke your vote at any time before your proxy is exercised by taking one of the following actions:

- send written notice to our Secretary, Bryant Lim, at our address above, stating that you wish to revoke your vote;
- deliver to us another signed proxy card with a later date or vote by telephone or over the internet at a later date; or
- attend the 2019 annual meeting, notify our Secretary that you are present and then vote by ballot.

If you own shares in street name, your bank or brokerage firm should provide you with instructions for changing or revoking your vote.

What constitutes a quorum?

In order for business to be conducted at the 2019 annual meeting, a quorum must be present. A quorum consists of the holders of a majority of the shares of our common stock issued, outstanding and entitled to vote at the 2019 annual meeting.

Shares of common stock present in person or represented by proxy (including broker non-votes and shares that are abstained or withheld or with respect to which no voting instructions are provided for one or more of the matters to be voted upon) will be counted for the purpose of determining whether a quorum exists.

If a quorum is not present, the 2019 annual meeting will be adjourned until a quorum is obtained.

What vote is required to approve each matter and how will votes be counted?

The table below sets forth the vote required for each matter being submitted to our stockholders at the 2019 annual meeting to be approved and the effect that abstentions, withheld votes and broker

Proposal	Affirmative Vote Required	Abstentions/Withholds	Broker Non-Votes
Election of Directors (<i>Proposal One</i>)	Plurality of votes cast by holders of common stock entitled to vote	No effect(1)	No effect
Advisory Vote on Executive Compensation (<i>Proposal Two</i>)	Majority of common stock present or represented and voting on the matter	No effect	No effect
Approval of Amendment to 2013 Stock Incentive Plan (<i>Proposal Three</i>)	Majority of common stock present or represented and voting on the matter	No effect	No effect
Approval of Amendment to 2017 Employee Stock Purchase Plan (<i>Proposal Four</i>)	Majority of common stock present or represented and voting on the matter	No effect	No effect
Ratification of Selection of Ernst & Young LLP (<i>Proposal Five</i>)	Majority of common stock present or represented and voting on the matter	No effect	N/A

(1) You may vote FOR all of the director nominees, WITHHOLD your vote from all of the director nominees or WITHHOLD your vote from any of the director nominees.

Each share of common stock will be counted as one vote.

How does the board of directors recommend that I vote?

Our board of directors recommends that you vote as follows:

- To elect the three nominees to our board of directors (Proposal One); and
- FOR Proposal Two, Proposal Three, Proposal Four and Proposal Five.

Under the Securities Exchange Act of 1934, as amended, or the Exchange Act, and related SEC regulations, the vote on executive compensation, as described in greater detail in Proposal Two, set forth elsewhere in this proxy statement, is an advisory vote, meaning it is non-binding. The vote on the ratification of the selection of Ernst & Young LLP as our independent registered public accounting firm, as described in greater detail in Proposal Five, is also advisory. Our board will carefully consider the outcome of each of these votes.

Will any other business be conducted at the 2019 annual meeting of stockholders?

Our board of directors does not know of any other business to be conducted or matters to be voted upon at the 2019 annual meeting. If any other matter properly comes before the 2019 annual meeting, the persons named in the proxy card that accompanies this proxy statement will exercise their judgment in deciding how to vote or otherwise act with respect to that matter at the 2019 annual meeting.

Who is making and paying for the solicitation of proxies and how is it made?

We are making the solicitation and will bear the costs of soliciting proxies. In addition to solicitations by mail, our directors, officers and employees, without additional remuneration, may solicit proxies by telephone, facsimile, email, personal interviews and other means. We may engage a proxy solicitor to distribute our proxy materials and solicit proxies, and if we were to do so would pay a fee for such services and reimburse the solicitor for reasonable disbursements. We have requested that brokerage houses, custodians, nominees and fiduciaries forward copies of the proxy materials to the persons for whom they hold shares and request instructions for voting the proxies. We will reimburse the brokerage houses and other persons for their reasonable out-of-pocket expenses in connection with this distribution.

How and when may I submit a proposal for the 2020 annual meeting of stockholders?

If you are interested in submitting a proposal for inclusion in the proxy statement and proxy card for our 2020 annual meeting of stockholders, or the 2020 annual meeting, you need to follow the procedures outlined in Rule 14a-8 of the Exchange Act. We must receive your proposal intended for inclusion in the proxy statement at our principal executive offices, 505 Eagleview Blvd., Suite 212, Exton, Pennsylvania 19341, Attention: Secretary, no later than December 27, 2019. SEC rules set standards for the types of stockholder proposals and the information that must be provided by the stockholder making the request.

If you wish to present a proposal at the 2020 annual meeting, but do not wish to have the proposal considered for inclusion in the proxy statement and proxy card or have not complied with the requirements for inclusion of such proposal in our proxy statement under SEC rules, you must also give written notice to us at the address noted above. Our bylaws specify the information that must be included in any such notice, including a brief description of the business to be brought before the annual meeting, the name of the stockholder proposing such business and stock ownership information for such stockholder. In accordance with our bylaws, we must receive this notice at least 60 days, but not more than 90 days, prior to the date of the 2020 annual meeting and the notice must include specified information regarding the proposal and the stockholder making the proposal.

Notwithstanding the foregoing, if we provide less than 70 days' notice or prior public disclosure of the date of the annual meeting to the stockholders, notice by the stockholders must be received by our Secretary no later than the close of business on the tenth day following the date on which the notice of the annual meeting was mailed or such public disclosure was made, whichever occurs first. If a stockholder who wished to present a proposal fails to notify us by this date, the proxies that management solicits for that meeting will have discretionary authority to vote on the stockholder's proposal if it is otherwise properly brought before that meeting. If a stockholder makes timely notification, the proxies may still exercise discretionary authority to vote on stockholder proposals under circumstances consistent with the SEC's rules.

Are annual meeting materials househanded?

Some banks and brokerage firms may be participating in the practice of "householding" proxy statements and annual reports. This means that the banks and brokerage firms send only one copy of this proxy statement and the accompanying 2018 Annual Report to multiple stockholders in the same household. Upon request, we will promptly deliver separate copies of this proxy statement and our annual report to stockholders. To make such a request, please call Investor Relations at (877) 888-6550, write to Investor Relations, 505 Eagleview Blvd., Suite 212, Exton, Pennsylvania 19341 or email Investor Relations at ir@iderapharma.com. To receive separate copies of our annual report to stockholders and proxy statement in the future, or to receive only one copy for the household, please contact us or your bank or brokerage firm.

PROPOSAL ONE
ELECTION OF DIRECTORS

General Information

Our board of directors is divided into three classes and currently consists of three Class I directors: Vincent J. Milano, Cristina Csimma, PharmD, MHP, and Michael R. Dougherty; three Class II directors: Howard Pien, James A. Geraghty and Maxine Gowen, Ph.D.; and two Class III directors: Mark Goldberg, M.D. and Carol A. Schafer. Each member of a class is elected for a three-year term, with the terms staggered so that approximately one-third of our directors stand for election at each annual meeting of stockholders. The Class I, Class II and Class III directors were elected to serve until the annual meeting of stockholders to be held in 2020, 2021 and 2019, respectively, and until their respective successors are elected and qualified.

Our board of directors, on the recommendation of the members of our nominating and corporate governance committee, has nominated Dr. Goldberg and Ms. Schafer for election as Class III directors at the 2019 annual meeting. At the 2019 annual meeting, stockholders will be asked to consider the election of Dr. Goldberg and Ms. Schafer. Ms. Schafer has been nominated for election as a director at a meeting of our stockholders for the first time. In December 2019, Ms. Schafer was elected to our board of directors as a Class III director by action of our board of directors with a term expiring at our 2019 annual meeting. Ms. Schafer was recommended for initial election to our board of directors by our nominating and corporate governance committee.

The persons named in the enclosed proxy card will vote to elect Dr. Goldberg and Ms. Schafer to our board of directors unless you indicate that you withhold authority to vote for the election of any or all nominees. You may not vote for more than two directors. Each Class III director will be elected to hold office until our 2022 annual meeting of stockholders and until his or her successor is elected and qualified or until his or her earlier resignation, death or removal. Each of the nominees is presently a director and each has indicated a willingness to serve as a director, if elected. If a nominee becomes unable or unwilling to serve, however, the persons acting under the proxy may vote for substitute nominees selected by the board of directors.

Information about our Directors

Set forth below is information about each member of our board of directors, including (a) the year in which each director first became a director, (b) their age as of March 31, 2019, (c) their positions and offices with our Company, (d) their principal occupations and business experience during at least the past five years and (e) the names of other public companies for which they currently serve, or have served within the past five years, as a director. We have also included information about each director's specific experience, qualifications, attributes or skills that led our board of directors to conclude that such individual should serve as one of our directors. We also believe that all of our directors have a reputation for integrity, honesty and adherence to high ethical standards. They each have demonstrated business acumen and an ability to exercise sound judgment, as well as a commitment of service to our Company and our board of directors.

Recommendation of the Board of Directors

Our board of directors unanimously recommends that the stockholders vote FOR the election of Dr. Goldberg and Ms. Schafer as Class III directors.

Class III Directors—Terms to Expire in 2019

Mark Goldberg, M.D.

Director since 2014

Dr. Goldberg, age 64, has served as a member of the board of directors, compensation committee and governance and nomination committee of ImmunoGen, Inc. since November 2011, a member of the board of directors, governance and nomination committee and compensation committee of GlycoMimetics, Inc. since July 2014, a member of the board of directors, audit committee and scientific committee of Idera Pharmaceuticals, Inc. since March 2014, and a member of the board of directors and compensation committee of Audentes Therapeutics, Inc. since December 2017, and from April 2015 until December 2017 was a member of the board of directors of aTyr Pharma. Dr. Goldberg served as a member of the board of directors of Synageva Biopharma Corp., or Synageva, from October 2008 until November 2011, when he stepped down to become a member of the executive management team at Synageva. Dr. Goldberg served as a member of the executive management team at Synageva until late 2014, rising to executive vice president, medical and regulatory strategy. In late 2014, Dr. Goldberg stepped down from the executive management team at Synageva and continued to be employed part-time, contributing to medical and regulatory strategy until leaving Synageva in June 2015 upon its acquisition by Alexion Pharmaceuticals, Inc. Prior to joining Synageva, Dr. Goldberg served in various management capacities of increasing responsibility at Genzyme from November 1996 to July 2011, including most recently as senior vice president, clinical development and global therapeutic head, oncology, genetic health, and as chairman of Genzyme's early product development board. Prior to joining Genzyme, Dr. Goldberg was a full-time staff physician at Brigham and Women's Hospital and the Dana-Farber Cancer Institute, where he still holds appointments. Dr. Goldberg is a part-time Associate Professor of Medicine at Harvard Medical School. From 2010 to 2017, Dr. Goldberg served as on the board of directors of the New England Division of the American Cancer Society. Since December 2017 he has chaired the eastern New England Board of the American Cancer Society and since January 2019 has been a member of the national board of directors of the American Cancer Society. Dr. Goldberg received an A.B. in biochemistry and molecular biology from Harvard University and an M.D. from Harvard Medical School. We believe Dr. Goldberg is qualified to serve on our board of directors due to his extensive healthcare and regulatory experience. We believe that Dr. Goldberg's qualifications to sit on our board of directors include his extensive scientific and medical background, public company board experience and extensive experience in the management and operations of pharmaceutical companies.

Carol A. Schafer

Director since 2018

Ms. Schafer, age 55, has more than 25 years of experience in investment banking, equity capital markets, corporate finance and business development in the biopharmaceutical sector, with substantial experience financing and facilitating investor access for public and private healthcare companies. Ms. Schafer most recently served as Vice Chair, Equity Capital Markets at Wells Fargo Securities. Prior to Wells Fargo, Ms. Schafer served as Vice President of Finance and Business Development at Lexicon Pharmaceuticals. Earlier in her career, Ms. Schafer was a Managing Director and Equity Capital Markets Sector Head at J.P. Morgan. Ms. Schafer received a B.A. from Boston College and an M.B.A from New York University. We believe that Ms. Schafer's qualifications to sit on our board of directors include her extensive financial background and her many years of experience providing investment banking, equity capital markets and strategic support to companies within the healthcare sector.

Class I Directors—Terms to Expire in 2020

Vincent J. Milano

Director since 2014

Vincent Milano, age 55, has been our President and Chief Executive Officer, and a member of our board of directors, since December 2014. Prior to joining us, Mr. Milano served as Chairman, President and Chief Executive Officer of ViroPharma Inc., a pharmaceutical company that was acquired by Shire Plc in January 2014, from March 2008 to January 2014, as its Vice President, Chief Financial Officer and Chief Operating Officer from January 2006 to March 2008 and as its Vice President, Chief Financial Officer and Treasurer from April 1996 to December 2005. Mr. Milano also served on the board of directors of ViroPharma from March 2008 to January 2014. Prior to joining ViroPharma, Mr. Milano served in increasingly senior roles, most recently senior manager, at KPMG LLP, an independent registered public accounting firm, from July 1985 to March 1996. Mr. Milano currently serves on the board of directors of Spark Therapeutics, Inc. and Vanda Pharmaceuticals Inc., each a publicly traded company, and VenatoRx Pharmaceuticals, Inc. Mr. Milano holds a Bachelor of Science degree in Accounting from Rider College. We believe Mr. Milano's qualifications to sit on our board of directors include his knowledge of our company as our President and Chief Executive Officer, knowledge of our industry, including over 20 years of experience serving in a variety of roles of increasing responsibility in the finance department, corporate administration and operations of a multinational biopharmaceutical company, and understanding of pharmaceutical research and development, sales and marketing, strategy, and operations in both the United States and overseas. He also has corporate governance experience through service on other public company boards.

Cristina Csimma, PharmD, MHP

Director since 2019

Dr. Csimma, age 60, currently serves as an independent director and Chair of the Nominating and Corporate Governance Committee of Neuralstem Inc. (CUR) and is a Board Director of T1D Exchange (non-profit-Type 1 Diabetes). She also serves on advisory boards including the Muscular Dystrophy Association Venture Philanthropy Scientific Advisory Committee; the Executive Oversight Board to the National Institutes of Health (NIH) NeuroNext Network, the Harvard and Brigham and Women's Hospital MRCT Center External Advisory Board, and the TREAT-NMD Advisory Committee for Therapeutics (TACT). Dr. Csimma previously served as a Director on the boards of Juniper Pharma (acquired by Catalent in 2018), Vtesse Pharma (acquired by Sucampo in 2017), was the Executive Chair of Exonics Therapeutics, and was President, founding CEO and Board Director of Cydan Inc. She also served on the NIH Blueprint Neurotherapeutics Network External Oversight Committee, was Vice President of Drug Development at Virdante Pharmaceuticals Inc. (acquired by Momenta), Principal at Clarus Ventures LLC (now Blackstone Life Science) and held roles of increasing responsibility in Clinical Development and Translational Research at Wyeth (now Pfizer), Genetics Institute and Dana Farber Cancer Institute. Dr. Csimma holds both a Doctor of Pharmacy and a Bachelor of Science in Pharmacy from the Massachusetts College of Pharmacy and Allied Health Sciences, as well as a Master of Health Professions from Northeastern University. We believe that Dr. Csimma's qualifications to sit on our board of directors include her significant public company management and board experience and knowledge of our industry.

Michael R. Dougherty

Director since 2019

Mr. Dougherty, age 61, was Executive Chairman of Celator Pharmaceuticals, Inc., a biopharmaceutical company, from August 2015 until its acquisition by Jazz Pharmaceuticals in July 2016; he also served as a director of Celator from July 2013 to July 2016. Mr. Dougherty previously served in a variety of senior positions, including chief executive officer of Kalidex Pharmaceuticals, Inc.,

chief executive officer of Adolor Corporation, chief operating officer of Genomics Collaborative, Inc., chief executive officer of Genaera Corporation, and chief financial officer at Centocor, Inc. He currently serves on the board of directors of Marinus Pharmaceuticals, Inc. and Trevena, Inc., both publicly traded life sciences organizations. Mr. Dougherty also served on the board of directors of Foundation Medicine, Inc., Aviragen Therapeutics, Inc., Cempra, Inc., and ViroPharma Incorporated. Mr. Dougherty received a B.S. in Accounting from Villanova University. We believe that Mr. Dougherty's qualifications to sit on our board of directors include his significant public company management and board experience and knowledge of our industry.

Class II Nominees—Terms to Expire in 2021

James A. Geraghty

Director since 2013

Mr. Geraghty, age 64, has served as chairman of our board of directors since July 2013. Mr. Geraghty is an industry leader with over 35 years of strategic and leadership experience, including more than 25 years as a senior member of executive teams at biotechnology companies developing and commercializing innovative therapies. From May 2013 to October 2016, Mr. Geraghty was an Entrepreneur in Residence at Third Rock Ventures, a leading biotech venture fund. From April 2011 to December 2012, he served as a Senior Vice President of Sanofi, a global healthcare company. Prior to that, he served in various senior management roles at Genzyme Corporation, a biotechnology company, from 1992 to April 2011, including as Senior Vice President, International Development and President of Genzyme Europe. Mr. Geraghty currently serves as chairman of the board of Orchard Therapeutics and of Pieris Pharmaceuticals, and as a member of the board of Voyager Therapeutics and of Fulcrum Therapeutics, a private company. We believe that Mr. Geraghty's qualifications to sit on our board of directors include his public company board and management experience and his broad and deep knowledge of the industry in which we operate.

Maxine Gowen, Ph.D.

Director since 2016

Dr. Gowen, age 61, served as the founding CEO and President of Trevena, Inc., a biopharmaceutical company, from November 2007 until her retirement in 2018, and remains a member of its board of directors. Prior to joining Trevena, 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. Dr. Gowen has served as a director of Akebia Therapeutics, Inc., a publicly traded company, since July 2014. From 2008 until 2012, Dr. Gowen served as a director of Human Genome Sciences, Inc., a publicly traded 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. We believe that Dr. Gowen's qualifications to sit on our board of directors include her significant public company management and board experience and knowledge of our industry.

Howard Pien

Director since 2018

Mr. Pien, age 61, has worked in the pharmaceutical and biotechnology industries for over 30 years. He was Non-Executive Chairman of Juno Therapeutics, a development stage company focused on immunotherapy aimed to cure cancer, until its acquisition by Celgene in 2018. He was also previously a director of Vanda, a commercial-stage public company specializing in CNS (three years as Chairman), ImmunoGen, a public biotechnology company, and an advisor to the Life Sciences Practice of Warburg

Pincus. From 2007 to 2009, Mr. Pien was the Chairman and CEO of Medarex, Inc., a public biotechnology company, until it was acquired by Bristol-Myers Squibb. From 2003 to 2006, he was the Chairman and CEO of Chiron, a public biotechnology company, which was acquired by Novartis. Mr. Pien's previous Board directorships include Talon, Arresto, Ikaria, Sage, Immunogen and ViroPharma, Incorporated (where he was lead independent director)—all biopharmaceutical companies that were acquired in strategic transactions. Between 1991 and 2003, he held various executive positions at GlaxoSmithKline plc (GSK) and SmithKline Beecham, as Presidents of US, International, and Pharmaceuticals. Prior to GSK, Mr. Pien worked for Abbott Labs for six years and Merck & Co., Inc. for five years. Mr. Pien holds a BS in engineering from MIT and an MBA from Carnegie-Mellon University. We believe that Mr. Pien's qualifications to sit on our board of directors include Mr. Pien's extensive experience as a chief executive officer in the pharmaceutical industry, including an immuno-oncology company, and his expertise in corporate governance matters.

Director Compensation

We use a combination of cash and equity-based compensation to attract and retain candidates to serve on our board of directors. We do not compensate directors who are also our employees for their service on our board of directors. As a result, Mr. Milano does not receive any compensation for his service on our board of directors.

We generally review our director compensation program every two years with the advice of an independent compensation consultant. In January 2018, we modified our director compensation program, effective January 1, 2018, to include annual cash compensation for directors serving as members of the Scientific Advisory Committee. In September 2018, we modified our director compensation program, effective September 18, 2018, to revise the number of shares issued and awarded upon initial election and on an annual basis. In November 2018, we modified our director compensation program, effective January 1, 2019, to increase the cash compensation for service on the board of directors from \$35,000 to \$40,000.

Under our director compensation program, we pay our non-employee directors retainers in cash. Each director receives a cash retainer for service on the board of directors and for service on each committee on which the director is a member. The chairmen of each committee receive higher retainers for such service. These fees are paid quarterly in arrears. The fees paid to non-employee directors for service on the board of directors and for service on each committee of the board of directors on which the director was a member during 2018 were as follows:

	<u>Member Annual Fee</u>	<u>Chairman Annual Fee</u>
Board of Directors	\$ 35,000	\$ 70,000
Audit Committee	\$ 7,500	\$ 15,000
Compensation Committee	\$ 6,250	\$ 12,500
Nominating and Corporate Governance Committee	\$ 4,000	\$ 8,000
Scientific Advisory Committee	\$ 4,000	\$ 4,000

Our director compensation program includes a stock-for-fees policy, under which directors have the right to elect to receive common stock in lieu of cash fees. These shares of common stock are issued under our 2013 Stock Incentive Plan. The number of shares issued to participating directors is determined on a quarterly basis by dividing the cash fees to be paid through the issuance of common stock by the fair market value of our common stock, which is the closing price of our common stock, on the first business day of the quarter following the quarter in which the fees are earned. In 2018, several of our directors elected to receive shares of our common stock in lieu of cash fees as set forth in the footnotes to the Director Compensation table below.

Under our director compensation program, we also reimburse our directors for travel and other related expenses for attendance at meetings.

Under our current director compensation program, upon their initial election to the board of directors, new non-employee directors receive an initial option grant to purchase 23,000 shares of our common stock, and all non-employee directors, other than the chairman, receive an annual option grant to purchase 11,500 shares of our common stock. The chairman receives an annual option grant for 14,500 shares of our common stock. The annual grants are made on the date of our annual meeting of stockholders and fully vest one year from that date of grant. The initial options granted to our non-employee directors vest with respect to one third of the underlying shares on the first anniversary of the date of grant and the balance of the underlying shares vest in eight equal quarterly installments following the first anniversary of the date of grant, subject to continued service as a director, and are granted under our 2013 Stock Incentive Plan. These options are granted with exercise prices equal to the fair market value of our common stock, which is the closing price of our common stock, on the date of grant and will become immediately exercisable in full if there is a change in control of our company.

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

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

Under the policy, a non-employee director will be deemed to have retired if:

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

The following table sets forth a summary of the compensation we paid to our non-employee directors who served on our board in 2018.

DIRECTOR COMPENSATION FOR 2018

<u>Name</u>	<u>Fees Earned or Paid in Cash (\$)</u>	<u>Option Awards (\$)(1)</u>	<u>All Other Compensation (\$)</u>	<u>Total (\$)</u>
Julian C. Baker(2)	25,014(3)	53,955	—	78,969
James A. Geraghty	85,500(4)	67,983	—	153,483
Mark Goldberg	46,500	53,955	—	100,455
Maxine Gowen	47,033	53,955	—	100,988
Kelvin M. Neu	51,500(5)	53,955	—	105,455
Howard Pien(6)	11,770(7)	130,365	—	142,135
William S. Reardon	54,000	53,955	—	107,955
Carol A. Schafer(8)	1,617	50,246	—	52,043

- (1) These amounts represent the aggregate grant date fair value of option awards made to each listed director in 2017 as computed in accordance with Financial Accounting Standards Board Accounting Standards Codification Topic 718, "Stock Compensation," or ASC 718. These amounts do not represent the actual amounts paid to or realized by the directors during 2018. See Note 11

to the financial statements included in our annual report on Form 10-K for the year ended December 31, 2018 regarding assumptions we made in determining the fair value of option awards. As of December 31, 2018, our non-employee directors, or former director in the case of Mr. Baker, held options to purchase shares of our common stock as follows: Mr. Baker: 34,375; Mr. Geraghty: 96,686; Dr. Goldberg: 34,375; Dr. Gowen: 25,625; Dr. Neu: 34,375; Mr. Pien: 23,000; Mr. Reardon: 40,625; and Ms. Schafer: 23,000.

- (2) Mr. Baker resigned from our board of directors on September 18, 2018.
- (3) Includes cash meeting fees of \$25,014 in lieu of which Mr. Baker elected to receive 12,892 shares of our common stock.
- (4) Includes cash meeting fees of \$10,688 in lieu of which Mr. Geraghty elected to receive 8,096 shares of our common stock.
- (5) Includes cash meeting fees of \$51,500 in lieu of which Dr. Neu elected to receive 22,838 shares of our common stock.
- (6) Mr. Pien was appointed to our board of directors on September 18, 2018.
- (7) Includes cash meeting fees of \$10,313 in lieu of which Mr. Pien elected to receive 2,929 shares of our common stock.
- (8) Ms. Schafer was appointed to our board of directors on December 18, 2018.

CORPORATE GOVERNANCE INFORMATION

Board of Directors

Our board of directors is responsible for establishing our broad corporate policies and overseeing the management of our company. Our chief executive officer and our other executive officers are responsible for our day-to-day operations. Our board evaluates our corporate performance and approves, among other things, our corporate strategies and objectives, operating plans, major commitments of corporate resources and significant policies. Our board also evaluates and appoints our executive officers.

Our board of directors met nine times during 2018, including regular, special and telephonic meetings. Each director who served as a director during 2018 attended at least 75% of the total number of board meetings held during 2018 while he or she was a director and of the total number of meetings held by all board committees on which he or she served during 2018.

Directors are responsible for attending our annual meetings of stockholders. Seven of our directors attended the 2018 annual meeting of stockholders in person.

Board Leadership Structure

Our board of directors does not have a policy on whether the offices of chairman of the board of directors and chief executive officer should be separate and, if they are to be separate, whether the chairman of the board of directors should be selected from among the independent directors or should be an employee of our company. Our board of directors believes that it should have the flexibility to make these determinations at any given point in time in the way that it believes best to provide appropriate leadership for our company at that time. Currently, Mr. Geraghty serves as chairman of our board of directors and Mr. Milano serves as chief executive officer. Our board of directors believes that this separation allows our chief executive officer to focus on our day-to-day business, while allowing the chairman of the board of directors to lead the board of directors in its fundamental role of providing advice to and independent oversight of management.

Our board of directors recognizes that no single leadership model is right for all companies and at all times and that depending on the circumstances, other leadership models, such as a combined chairman and chief executive officer, might be appropriate. Accordingly, the board of directors periodically reviews its leadership structure. Pursuant to our corporate governance guidelines, if the chairman is not an independent director, the board of directors may elect a lead director from its independent directors. In such case, the chairman and chief executive officer would consult periodically with the lead director on board of directors matters and on issues facing our company. In addition, the lead director would serve as the principal liaison between the chairman of the board of directors and the independent directors and would preside at any executive session of independent directors.

Board of Directors' Role in Risk Oversight

Our board of directors, as a whole, has responsibility for risk oversight, with reviews of certain areas being conducted by relevant committees that report directly to the board of directors. The oversight responsibility of the board of directors and its committees is enabled by management reporting processes that are designed to provide visibility to the board of directors about the identification, assessment and management of critical risks and management's risk mitigation strategies. These areas of focus include competitive, economic, operational, financial (accounting, credit, liquidity and tax), legal, regulatory, compliance, health, safety, environmental, political and reputational risks. Our board of directors regularly reviews information regarding our strategy, operations, credit and liquidity, as well as the risks associated with each. Our compensation committee is responsible for overseeing risks relating to our executive compensation plans and arrangements. Our audit committee

is responsible for overseeing financial risks and risks associated with related party transactions. Our nominating and corporate governance committee is responsible for overseeing risks associated with the independence of the board of directors. While each committee is responsible for evaluating certain risks and overseeing the management of such risks, our entire board of directors is regularly informed through committee reports about such risks.

Board Committees

Our board of directors has established three standing committees: audit, compensation and nominating and corporate governance. Each of our audit, compensation and nominating and corporate governance committees operates under a charter that has been approved by our board of directors. Our board of directors has also adopted corporate governance guidelines to assist our board of directors in the exercise of its duties and responsibilities. Current copies of the charters for the audit, compensation and nominating and corporate governance committees and the corporate governance guidelines are posted on our website, www.iderapharma.com, and can be accessed by clicking "Investors" and "Corporate Governance."

Audit Committee

Our board of directors has established a standing committee. Our audit committee operates under a charter that has been approved by our board of directors. A current copy of the charter for the audit committee is posted on our website, www.iderapharma.com, and can be accessed by clicking "Investors" and "Corporate Governance."

Our audit committee's responsibilities include:

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

The current members of our audit committee are Ms. Schaefer (Chair), Mr. Geraghty and Dr. Goldberg. Our board of directors has determined that Ms. Schafer is an "audit committee financial expert" within the meaning of SEC rules and regulations. Each member of the audit committee is independent as defined under applicable rules of the Nasdaq Stock Market, including the independence requirements contemplated by Rule 10A-3 under the Exchange Act. During 2018, our audit committee held seven meetings in person or by teleconference.

Compensation Committee

Our compensation committee's responsibilities include:

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

The current members of our compensation committee are Dr. Gowen (Chair) and Mr. Pien. During 2018, the compensation committee held five meetings in person or by teleconference.

The processes and procedures followed by our compensation committee in considering and determining executive compensation are described below under the heading "Executive Compensation."

Nominating and Corporate Governance Committee

Our nominating and corporate governance committee's responsibilities include:

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

The current member of our nominating and corporate governance committee is Mr. Geraghty (Chairman). During 2018, the nominating and corporate governance committee held two meetings in person or by teleconference.

The processes and procedures followed by our nominating and corporate governance committee in identifying and evaluating director candidates are described below under the heading "Director Nomination Process."

Director Independence

Under applicable rules of the Nasdaq Stock Market, a director will only qualify as an "independent director" if, in the opinion of our board of directors, that person does not have a relationship which would interfere with the exercise of independent judgment in carrying out the responsibilities of a director. Our board of directors has determined that Mr. Geraghty, Dr. Goldberg, Dr. Gowen, Dr. Neu, Mr. Pien, Ms. Schafer and all of the members of each of the audit, compensation and nominating and corporate governance committees are independent as defined under applicable

rules of the Nasdaq Stock Market including, in the case of all members of the audit committee, the independence requirements contemplated by Rule 10A-3 under the Exchange Act and, in the case of all members of the compensation committee, the independence requirements contemplated by Rule 10C-1 under the Exchange Act.

Our board of directors had previously made a similar determination of independence with respect to Mr. Baker and Mr. Reardon, who served as directors until September 2018 and March 2019, respectively.

Director Nomination Process

The process followed by our nominating and corporate governance committee to identify and evaluate director candidates includes requests to members of our board of directors and others for recommendations, meetings from time to time to evaluate biographical information and background material relating to potential candidates and interviews of selected candidates by members of our nominating and corporate governance committee and our board of directors. The nominating and corporate governance committee has from time to time used a third-party recruiting firm to identify and interview potential candidates.

In considering whether to recommend any particular candidate for inclusion in the board of director's slate of recommended director nominees, the nominating and corporate governance committee will apply the criteria set forth in our corporate governance guidelines. These criteria include the candidate's:

- business acumen;
- knowledge of our business and industry;
- age;
- experience;
- diligence;
- conflicts of interest;
- ability to act in the interests of all stockholders; and
- in the case of the renomination of existing directors, performance on our board of directors and on any committee of which the director was a member.

Our corporate governance guidelines also provide that candidates should not be discriminated against on the basis of race, religion, national origin, sex, sexual orientation, disability or any other basis proscribed by law and that our nominating and corporate governance committee should consider the value of diversity of the board of directors when evaluating particular candidates. The committee has not adopted any formal or informal diversity policy and treats diversity as one of the criteria to be considered by the committee. The committee does not assign specific weights to particular criteria that the committee reviews and no particular criterion is a prerequisite for the consideration of any prospective nominee. We believe that the backgrounds and qualifications of our directors, considered as a group, should provide a composite and diverse mix of experience, knowledge and abilities that will allow the board of directors to fulfill its responsibilities.

Stockholder Nominees

Stockholders may recommend individuals to the nominating and corporate governance committee for consideration as potential director candidates by submitting the individuals' name, together with appropriate biographical information and background materials and a statement as to whether the

stockholder or group of stockholders making the recommendation has beneficially owned more than 5% of our common stock for at least one year as of the date such recommendation is made, to Nominating and Corporate Governance Committee, c/o Secretary, Idera Pharmaceuticals, Inc., 505 Eagleview Blvd., Suite 212, Exton, PA 19341. Assuming that appropriate biographical and background material has been provided on a timely basis, the nominating and corporate governance committee will evaluate stockholder-recommended candidates by following substantially the same process, and applying substantially the same criteria, as it follows for candidates submitted by others. If the board of directors determines to nominate a stockholder-recommended candidate and recommends his or her election, then his or her name will be included in our proxy card for the next annual meeting.

Stockholders also have the right under our bylaws to nominate director candidates directly, without any action or recommendation on the part of the nominating and corporate governance committee or the board of directors, by following the procedures set forth in our bylaws, including advance notice requirements. Candidates nominated by stockholders in accordance with the procedures set forth in our bylaws will not be included in our proxy card for the next annual meeting. See "Information about the 2019 annual meeting—How and when may I submit a proposal for the 2020 annual meeting of stockholders?" for more information about these procedures.

Communicating with our Board of Directors

Our board of directors will give appropriate attention to written communications that are submitted by stockholders and will respond if and as appropriate. The chairman of the board of directors (if an independent director) or the lead independent director, if any, is primarily responsible for monitoring communications from stockholders and for providing copies or summaries to the other directors, as he or she considers appropriate.

Communications are forwarded to all directors if they relate to important substantive matters and include suggestions or comments that the chairman of the board of directors or lead independent director, as the case may be, considers to be important for the directors to know. In general, communications relating to corporate governance and long-term corporate strategy are more likely to be forwarded than communications relating to ordinary business affairs, personal grievances and matters that involve repetitive or duplicative communications.

Stockholders who wish to send communications on any topic to the board of directors should address such communications to Board of Directors, c/o Secretary, Idera Pharmaceuticals, Inc., 505 Eagleview Blvd., Suite 212, Exton, PA 19341.

Each communication from a stockholder should include the following information in order to permit stockholder status to be confirmed and to provide an address to forward a response if deemed appropriate:

- the name, mailing address and telephone number of the stockholder sending the communication;
- the number of shares held by the stockholder; and
- if the stockholder is not a record owner of our securities, the name of the record owner of our securities beneficially owned by the stockholder.

Code of Business Conduct and Ethics

We have adopted a written code of business conduct and ethics that applies to our principal executive officer, principal financial officer, principal accounting officer or controller, or persons performing similar functions. We have posted a current copy of the Code of Business Conduct and Ethics in the "Investors—Corporate Governance" section of our website, which is located at www.iderapharma.com. We intend to satisfy the disclosure requirements under Item 5.05 of Form 8-K

regarding an amendment to, or waiver from, a provision of our code of business conduct and ethics by posting such information on our website at www.iderapharma.com.

Compensation Committee Interlocks and Insider Participation

Our compensation committee currently consists of Dr. Gowen and Mr. Pien. Dr. Gowen, Mr. Pien and Dr. Neu each served as members of our compensation committee for all or a portion of 2018. No member of our compensation committee was at any time during 2018, or was formerly, an officer or employee of ours. No member of our compensation committee engaged in any related person transaction involving our company during 2018. None of our executive officers has served as a director or member of the compensation committee (or other committee serving the same function as the compensation committee) of any other entity, while an executive officer of that other entity served as a director or member of our compensation committee.

EXECUTIVE OFFICERS

Our executive officers and their respective ages and positions as of March 31, 2019 are described below. Our executive officers serve until they resign or the board of directors terminates their position.

Name	Age	Position
Vincent J. Milano*	55	President and Chief Executive Officer
R. Clayton Fletcher	56	Senior Vice President, Business Development and Strategy
Joanna Horobin, M.B., Ch.B	64	Senior Vice President, Chief Medical Officer
John J. Kirby	47	Vice President of Finance, Principal Financial and Accounting Officer
Bryant D. Lim	48	Senior Vice President, General Counsel and Corporate Secretary
Jonathan Yingling, Ph.D.	50	Senior Vice President, Chief Scientific Officer

* Mr. Milano is a member of our board of directors. See "Information about our Directors" above for more information about Mr. Milano.

R. Clayton Fletcher has been our Senior Vice President, Business Development and Strategic Planning since January 2015. Prior to joining us, Mr. Fletcher served in increasingly senior positions at ViroPharma Incorporated, which was acquired by Shire Plc in January 2014, from April 2001 until January 2014, including as Vice President, Business Development and Project Management from 2005 until January 2014. Mr. Fletcher served as Senior Project Manager at SmithKline Beecham plc, a pharmaceutical company, which was purchased by Glaxo Wellcome plc in December 2000, from 1997 until 2001. Prior to working at SmithKline Beecham, he served as Project Scientist, at Becton, Dickinson and Company, a medical devices company and as Principal Scientist at Intracel Corporation, a biopharmaceutical company. Prior to working at Intracel, he served as Senior Associate Scientist at Centocor Biotech, Inc., a biotechnology company from 1991 until 1993. Mr. Fletcher holds a B.S. and a M.S. in biology from Wake Forest University.

Joanna Horobin, M.B., Ch.B has been our Senior Vice President and Chief Medical Officer since November 2015. Prior to joining us, Dr. Horobin served as the Chief Medical Officer of Verastem, Inc., a biopharmaceutical company, from October 2012 to June 2015. Prior to joining Verastem, she served as President of Syndax Pharmaceuticals, a biopharmaceutical company, from September 2006 to October 2012 and as Chief Executive Officer from September 2006 until April 2012. Prior to that, Dr. Horobin held several roles of increasing responsibility at global pharmaceutical corporations such as Rhône-Poulenc Rorer (now Sanofi) and Chugai-Rhône-Poulenc. Dr. Horobin received her medical degree from the University of Manchester, England.

John J. Kirby joined the Company in 2015 as the Company's Vice President of Corporate Accounting and has served as Vice President of Finance since July 2018 and as principal financial officer and principal accounting officer since October 2018. Prior to joining us, Mr. Kirby served as Assistant Controller at Endo Pharmaceuticals, Inc. from November 2014 to October 2015. From August 2012 to July 2014, Mr. Kirby served as Vice President, Chief Accounting Officer and Corporate Controller at ViroPharma Incorporated. Mr. Kirby began his career at KPMG, LLP in their Healthcare and Life Science Practice and served as a Regional Audit Director at AstraZeneca Pharmaceuticals L.P. prior to joining ViroPharma Incorporated. Mr. Kirby received his B.S. in Accountancy from Villanova University and is a licensed certified public accountant in the Commonwealth of Pennsylvania.

Bryant D. Lim has been our Senior Vice President, General Counsel and Secretary since September 2018. Prior to joining us, Mr. Lim served as Vice President, Assistant General Counsel, and prior to that, Chief Compliance Officer at Incyte Corporation from March 2014 to September 2018. Prior to Incyte, Mr. Lim held roles of increasing responsibility at ViroPharma Incorporated from January 2009 until March 2014. Mr. Lim served as Assistant Counsel at Merck & Co., Inc. and also

was associated with Morgan, Lewis & Bockius, LLP. Mr. Lim began his legal career as a law clerk for a federal judge. Mr. Lim received his J.D. from Villanova University School of Law, where he currently serves on its adjunct faculty. Mr. Lim received his B.A. from the University of Rochester.

Jonathan Yingling, Ph.D. joined our company as Senior Vice President, Early Development in February 2017 and since January 2018 has been serving as our Chief Scientific Officer. Prior to joining us, Dr. Yingling was Chief Scientific Officer at Bind Therapeutics Inc., a biotechnology company that filed for bankruptcy in May 2016, from December 2015 to August 2016. Prior to joining Bind Therapeutics, Dr. Yingling served as vice president, Oncology Discovery and Translational Research at Bristol-Myers Squibb Company, or BMS, a pharmaceutical company, from June 2013 to October 2015. During his tenure at BMS, he was responsible for the oncology research portfolio as well as translational capabilities in immuno-oncology. Dr. Yingling earned his Ph.D. in Cell and Molecular Biology and Pharmacology at Duke University and was a Howard Hughes Postdoctoral Fellow at Vanderbilt University.

SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT

The following table sets forth, as of March 31, 2019, information we know about the beneficial ownership of our common stock by:

- each person or entity, including any "group" as that term is used in Section 13(d)(3) of the Exchange Act, who is known by us to own beneficially more than 5% of the issued and outstanding shares of our common stock;
- each of our current directors;
- each of our named executive officers, as set forth in the Summary Compensation Table set forth in this proxy; and
- all of our current directors and executive officers as a group.

We have determined beneficial ownership in accordance with the rules of the SEC, and the information in the table below is not necessarily indicative of beneficial ownership for any other purpose. The SEC has defined "beneficial" ownership of a security to mean the possession, directly or indirectly, of voting power and/or investment power. In computing the percentage ownership of each person, shares of common stock subject to options, warrants or rights held by that person that are currently exercisable, or exercisable within 60 days of March 31, 2019, are deemed to be outstanding and beneficially owned by that person. These shares, however, are not deemed outstanding for the purpose of computing the percentage ownership of any other person.

To our knowledge and except as indicated in the notes to this table and pursuant to applicable community property laws, each stockholder named in the table has sole voting and investment power with respect to the shares set forth opposite such stockholder's name. The percentage of ownership is

based on 28,008,037 shares of our common stock issued and outstanding on March 31, 2019. All fractional common share amounts have been rounded to the nearest whole number.

<u>Name and Address of Beneficial Owner(1)</u>	<u>Number of Shares Beneficially Owned</u>	<u>Percentage of Outstanding Shares</u>
5% Stockholders		
Affiliates of Baker Brothers Advisors, LLC, 860 Washington Street, 3rd Floor, New York, NY 10014	4,895,415(2)	17.44%
Pillar Investment Entities c/o Pillar Invest Offshore SAL, Starco Center, Bloc B, 3rd Flr, Omar Daouk St., Beirut, M8 2020-3313, Lebanon	2,481,777(3)	8.85%
Castellina Ventures Ltd., 325 Waterfront Drive, Omar Hodge Building, 2nd Floor, Wickham's Cay, Road Town, Tortola, British Virgin Islands	2,137,638(4)	7.63%
Blackrock, Inc., 55 East 52 nd Street, New York, NY 10055	1,478,231(5)	5.28%
Named Executive Officers and Directors		
Vincent J. Milano	380,814(6)	1.34%
Louis J. Arcudi, III	198,645(7)	*
R. Clayton Fletcher	117,341(8)	*
Cristina Csimma	—(9)	
Michael R. Dougherty	—(9)	
James A. Geraghty	153,697(10)	*
Mark Goldberg	37,760(11)	*
Maxine Gowen	19,885(12)	*
Joanna Horobin	91,648(13)	*
John J. Kirby	41,553(14)	*
Kelvin M. Neu	44,319(15)	*
Howard Pien	2,929	*
William S. Reardon	44,746(16)	*
Carol A. Schafer	5,000	*
Jonathan Yingling	52,731(17)	*
All current directors and executive officers as a group (15 individuals)	997,166(18)	3.46%

* Denotes less than 1% beneficial owner.

- (1) Except as otherwise noted, the address for each person listed above is c/o Idera Pharmaceuticals, Inc., 505 Eagleview Boulevard, Suite 212, Exton, PA 19341.
- (2) Consists of (i) 496,758 shares of our common stock owned by 667, L.P., (ii) 4,258,065 shares of our common stock owned by Baker Brothers Life Sciences, L.P., (iii) 59,267 shares of our common stock owned by 14159, L.P., (iv) (a) 9,246 shares of our common stock held directly by Julian Baker and (b) 16,559 shares of our common stock held directly by Dr. Neu, and in which each of 667, L.P., Baker Brothers Life Sciences, L.P. and 14159, L.P., which we refer to collectively as the Funds, has an indirect pecuniary interest and may be deemed to own a portion of these shares, and (v) (a) 27,760 shares of common stock subject to outstanding stock options that are exercisable within 60 days after March 31, 2019 held by Mr. Baker and (b) 27,760 shares of common stock subject to outstanding options that are exercisable within 60 days after March 31, 2019 held by Dr. Neu. As a result of the application of the Beneficial Ownership Cap, as described below in this footnote, the table above does not include the following as being beneficially owned by the Funds: (a) 298,741 shares of common stock issuable upon exercise of warrants to purchase common stock owned by 667, L.P., (b) 2,410,071 shares of common stock issuable upon exercise of warrants to

purchase common stock owned by Baker Brothers Life Sciences, L.P. and (c) 60,070 shares of common stock issuable upon exercise of warrants to purchase common stock owned by 14159, L.P. The information in this footnote is based on a Schedule 13D/A filed with the SEC on September 20, 2018; Form 4s filed with the SEC on October 3, 2018 and January 4, 2019; and on information provided to us by the Funds, Julian Baker and Dr. Neu. Mr. Baker, a member of the our board until his resignation in September 2018, is a managing member of Baker Bros. Advisors LP and is a principal of Baker Bros. Advisors (GP), LLC, the sole general partner of Baker Bros. Advisors LP. Baker Bros. Advisors LP serves as the investment advisor to the Funds. Accordingly, Mr. Baker may be deemed to have sole power to direct the voting and disposition of the shares of common stock held directly by the Funds and indirectly by Baker Bros. Advisors LP and Baker Bros. Advisors (GP), LLC. Mr. Baker expressly disclaims beneficial ownership over shares held directly by the Funds and indirectly by Baker Bros. Advisors LP and Baker Bros. Advisors (GP), LLC, except to the extent of his pecuniary interest therein, if any, by virtue of his pecuniary interest therein. Dr. Neu, a member of the Idera board, is an employee of Baker Bros. Advisors LP. Under the terms of the warrants issued to the Funds, the Funds are not permitted to exercise such warrants to purchase common stock to the extent that such exercise would result in the Funds (and their affiliates) beneficially owning more than 4.99% of the number of shares of our common stock issued and outstanding immediately after giving effect to the issuance of shares of common stock issuable upon exercise of such warrants to purchase common stock. This limitation on exercise of the warrants to purchase common stock issued to the Funds is referred to in this footnote as the Beneficial Ownership Cap. The Funds have the right to increase this beneficial ownership limitation in their discretion on 61 days' prior written notice to us, provided that in no event are the Funds permitted to exercise such warrants to purchase common stock to the extent that such exercise would result in the Funds (and their affiliates) beneficially owning in the aggregate more than 19.99% of the number of shares of our common stock issued and outstanding or the combined voting power of our securities outstanding immediately after giving effect to the issuance of shares of common stock issuable upon exercise of such warrants to purchase common stock.

- (3) Consists of (i) 216,266 shares of common stock held by Pillar Pharmaceuticals I, L.P., or Pillar I, (ii) 673,985 shares of common stock held by Pillar Pharmaceuticals II, L.P., or Pillar II, (iii) 293,980 shares of common stock held by Pillar Pharmaceuticals III, L.P., or Pillar III, (iv) 25,000 shares of common stock held by Pillar Pharmaceuticals IV, L.P., or Pillar IV, (v) 109,375 shares of common stock held by Pillar V, (vi) 1,061,212 shares of common stock held by Participations Besancon, or Besancon, and over which Pillar Invest Corporation has investment discretion, pursuant to an advisory agreement between Pillar Invest Corporation and Besancon, or the Advisory Agreement, (vii) 67,584 shares of common stock held directly by Youssef El Zein and (viii) 34,375 shares of common stock subject to outstanding stock options that are exercisable within 60 days after March 31, 2019 held by Mr. El Zein. Mr. El Zein, a member of our board until October 31, 2017, is a director and controlling stockholder of Pillar Invest Corporation, which is the general partner of Pillar I, Pillar II, Pillar III, Pillar IV and Pillar V and is a limited partner of Pillar I, Pillar II, Pillar III, Pillar IV and Pillar V. Mr. El Zein expressly disclaims beneficial ownership over shares held directly by Pillar I, Pillar II, Pillar III, Pillar IV, Pillar V and indirectly by Pillar Invest Corporation. Besancon is an investment fund having no affiliation with Mr. El Zein, Pillar I, Pillar II, Pillar III, Pillar IV, Pillar V or Pillar Invest Corporation. The information in this footnote is based on a Schedule 13D/A filed with the SEC on October 17, 2016; Form 4s filed with the SEC on October 17, 2017 and August 17, 2018; and on information provided to us by Pillar Invest Corporation and Mr. El Zein.
- (4) Based on Schedule 13G filed with the SEC on September 4, 2018 by Castellina Ventures Ltd. ("Castellina"). The Ballaison Trust ("Ballaison"), a trust established under the laws of New Zealand whose principal business address and principal office address is 14, rue de la Corraterie,

PO Box 5209, CH-1211 Geneva 11, is the sole shareholder of Castellina and may be deemed a beneficial owner. Edward Martin-Du Pan and Yves Bruderlein are the trustees of Ballaison. The Ballaison Trust was established for the principal purpose of holding and preserving assets for the benefit of its beneficiaries. Castellina reported that it had sole voting power and sole dispositive power over all shares beneficially owned. The Schedule 13G does not identify any shares with respect to which there is a right to acquire beneficial ownership. The Schedule 13G states that the shares were acquired and are held in the ordinary course of business and were not acquired and are not held for the purpose of or with the effect of changing or influencing the control of us.

- (5) Based on the Schedule 13G filed with the SEC on February 8, 2019 by BlackRock, Inc. and certain subsidiaries ("BlackRock"). BlackRock reported that it had sole voting power over 1,451,102 shares and sole dispositive power over all shares beneficially owned. The Schedule 13G does not identify any shares with respect to which there is a right to acquire beneficial ownership. The Schedule 13G states that the shares were acquired and are held in the ordinary course of business and were not acquired and are not held for the purpose of or with the effect of changing or influencing the control of us.
- (6) Includes 324,998 shares of common stock subject to outstanding stock options that are exercisable within 60 days after March 31, 2019.
- (7) Includes 192,251 shares of common stock subject to outstanding stock options that are exercisable within 60 days after March 31, 2019.
- (8) Consists of 117,341 shares of common stock subject to outstanding stock options that are exercisable within 60 days after March 31, 2019.
- (9) As of April 8, 2019, the effective date of the director's appointment to the Board.
- (10) Includes of 88,264 shares of common stock subject to outstanding stock options that are exercisable within 60 days after March 31, 2019.
- (11) Includes of 27,760 shares of common stock subject to outstanding stock options that are exercisable within 60 days after March 31, 2019.
- (12) Includes 19,010 shares of common stock subject to outstanding stock options that are exercisable within 60 days after March 31, 2019, and 875 shares of common stock held in the name Brian Macdonald for Maxine Gowen Trust, for which Dr. Gowen is a beneficiary and trustee.
- (13) Includes 89,177 shares of common stock subject to outstanding stock options that are exercisable within 60 days after March 31, 2019.
- (14) Consists of 37,849 shares of common stock subject to outstanding stock options that are exercisable within 60 days after March 31, 2019.
- (15) Includes of 27,760 shares of common stock subject to outstanding stock options that are exercisable within 60 days after March 31, 2019.
- (16) Includes 40,625 shares of common stock subject to outstanding stock options that are exercisable within 60 days after March 31, 2019. Mr. Reardon retired from the Board in March 2019.
- (17) Consists of 52,731 shares of common stock subject to outstanding stock options that are exercisable within 60 days after March 31, 2019.
- (18) Includes 825,515 shares of common stock subject to outstanding stock options held by the directors and executive officers as a group that are exercisable within 60 days after March 31, 2019.

EXECUTIVE COMPENSATION

Compensation Discussion and Analysis

This Compensation Discussion and Analysis, or CD&A, should be read in conjunction with the compensation tables and narratives that immediately follow this section.

Introduction

This CD&A provides an overview and analysis of the philosophy, objectives, process, components and additional aspects of our 2018 executive compensation program. This analysis focuses on the compensation paid to our named executive officers, or NEOs:

- Vincent J. Milano, President and Chief Executive Officer,
- R. Clayton Fletcher, Senior Vice President of Business Development and Strategy
- Joanna Horobin, Senior Vice President and Chief Medical Officer
- John J. Kirby, Vice President of Finance, Principal Financial and Accounting Officer
- Jonathan Yingling, Senior Vice President and Chief Scientific Officer
- Louis J. Arcudi, III, Former Chief Financial Officer and Senior Vice President, Operations

Compensation Philosophy and Objectives

Our general executive compensation philosophy has been established by our compensation committee, which acts pursuant to authority delegated to it by our board. Our compensation committee is comprised solely of independent directors as defined by applicable rules and regulations of Nasdaq and the SEC. The compensation committee seeks to achieve the following broad goals in connection with our executive compensation program:

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

To achieve these objectives, the compensation committee:

- sets short- and long-term compensation at levels the compensation committee believes are competitive with those of other companies in our industry and our region that compete with us for executive talent;
- ties a substantial portion of each executive officer's overall cash compensation to key strategic, financial, research, and operational goals such as clinical trial and regulatory progress, intellectual property portfolio development, establishment and maintenance of key strategic relationships, and exploration of business development opportunities, as well as our financial and operational performance; and
- provides a portion of our executive compensation in the form of stock options that vest over time from the date of grant of the option awards and from the time of achievement of performance milestones when applicable, which we believe helps to retain our executives and

align their interests with those of our stockholders by allowing them to participate in the longer term success of our company as reflected in stock price appreciation.

Advisory Vote on Executive Compensation

We conducted an advisory vote on executive compensation, commonly referred to as a "say-on-pay" proposal, at our 2018 Annual Meeting of Stockholders. While this vote was not binding on us, we value the opinions of our stockholders and, to the extent there is any significant vote against the compensation of our named executive officers in the future, we will consider our stockholders' concerns and our board and compensation committee will evaluate whether any actions are necessary to address those concerns.

At our 2018 Annual Meeting of Stockholders, approximately 97% of the votes cast on the advisory vote on executive compensation approved the compensation paid to our named executive officers as disclosed in the proxy statement for that meeting. The board of directors and compensation committee considered the results of this advisory vote, together with the other factors and data, in determining executive compensation decisions and will continue to consider the outcome of our say-on-pay votes when making future compensation decisions for our named executive officers.

Executive Compensation Process

Role of Our Compensation Committee and Our Chief Executive Officer

In order to accomplish its objectives consistent with its philosophy for executive compensation and determine compensation for our named executive officers, our compensation committee reviews competitive information on executive compensation practices from peer companies as well as an assessment of overall corporate performance and individual performance. In connection therewith, our compensation committee typically takes the following actions annually:

- reviews chief executive officer performance;
- seeks input from our chief executive officer on the performance of all other executive officers;
- reviews all components of executive officer compensation, including base salary, cash bonus targets and awards, equity compensation, the dollar value to the executive and cost to us of all health and life insurance and other employee benefits, and the estimated payout obligations under severance and change in control scenarios;
- consults with its independent compensation consultant;
- holds executive sessions (without our management present);
- reviews information regarding the performance and executive compensation of other companies; and
- reviews the outcomes from the foregoing with the board of directors.

Our chief executive officer does not submit an assessment of his own performance, does not present a recommendation on his own compensation, and does not participate in the portion of the meeting where his compensation is determined. Our compensation committee determines and recommends for final approval by the full Board, the compensation for our chief executive officer and other executive officers.

Under our annual performance review program for our executive officers, annual performance goals are determined for our company as a whole and for each executive officer individually.

- **Annual corporate goals** are proposed by management and approved by the board of directors. These corporate goals target the achievement of specific research, clinical, operational, and

financial milestones. The compensation committee determines how the components of our annual corporate goals will contribute to the overall performance evaluation.

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

At the end of each year, the compensation committee evaluates corporate and individual performance.

In assessing corporate performance, the compensation committee evaluates corporate performance alongside the approved corporate goals for the year and also evaluates other aspects of corporate performance, including achievements and progress made by us outside of the corporate goals.

In assessing individual performance, the compensation committee evaluates corporate performance in the areas of each officer's responsibility and relies on the chief executive officer's evaluation of each other officer. The chief executive officer prepares evaluations of the other executives and in doing so compares individual performance to the individual performance goals. The chief executive officer recommends annual executive salary increases, annual stock option awards and bonuses, if any, for the other executives, which are then reviewed and approved by the compensation committee. In the case of the chief executive officer, the compensation committee conducts his individual performance evaluation.

During this process, the compensation committee consults with its independent compensation consultant. To that end, in connection with the compensation committee's annual performance and compensation review in the fourth quarter of 2017, Pearl Meyer & Partners, LLC, or Pearl Meyer, provided the compensation committee with a blend of the data from the 2017 peer group (identified below) and compensation survey data from the Radford 2017 Global Life Sciences Survey, a survey of U.S. biotech companies. We refer to this blended data as the "2017 market compensation data."

For all executives, annual base salary increases, if any, are awarded during the first quarter following the end of the fiscal year. Annual stock option awards and bonuses, if any, are granted as determined by the compensation committee and are typically granted in the first quarter of the fiscal year. Beginning in 2019, the annual stock option awards will be given in two biannual tranches.

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

Role of the Compensation Committee's Independent Consultant

In the fourth quarter of 2017, our compensation committee engaged Pearl Meyer in connection with our 2018 annual compensation assessment to review our executive compensation practices and to provide the compensation committee with an assessment of our compensation program against competitive market data. See "*Use of Market Compensation Data*" below for a discussion of the competitive market compensation data compiled by Pearl Meyer. Based on this assessment, Pearl Meyer made recommendations to our compensation committee regarding the amount and form of executive compensation, equity incentive programs, and compensation generally. Pearl Meyer did not

provide any services to our company during 2017 or 2018 other than pursuant to their respective engagement by the compensation committee.

Our compensation committee analyzed whether the work of Pearl Meyer as a compensation consultant has raised any conflict of interest, taking into consideration the following factors: (a) the provision of other services to us by Pearl Meyer; (b) the amount of fees received from us by Pearl Meyer, as a percentage of the total revenue of Pearl Meyer; (c) Pearl Meyer's policies and procedures that are designed to prevent conflicts of interest; (d) any business or personal relationship of Pearl Meyer or the individual advisors employed by Pearl Meyer with a member of the compensation committee or any executive officer; and (e) any shares of our stock owned by Pearl Meyer or the individual advisors employed by Pearl Meyer. Our compensation committee determined, based on its analysis of the above factors, that the work of Pearl Meyer and the individual compensation advisors employed by Pearl Meyer as compensation consultants has not created any conflict of interest and the compensation committee is satisfied with the independence of Pearl Meyer. Going forward, the compensation committee intends to assess the independence of any of our compensation advisers by reference to the foregoing factors, consistent with applicable rules and regulations of Nasdaq and the SEC.

Use of Market Compensation Data

In making compensation decisions, our compensation committee reviewed competitive market compensation data compiled by Pearl Meyer. As part of its engagement, Pearl Meyer worked with the compensation committee in the fourth quarter of 2017 to select a peer group of publicly traded companies to be used in connection with our 2018 compensation decisions, including stock options granted during 2018, fiscal year 2018 salary adjustments and fiscal year 2018 target bonus percentages. In selecting this peer group, the compensation committee and Pearl Meyer generally targeted mid- to late-development stage companies in the Pharmaceuticals, Biotechnology and Life Sciences sectors that generally met the following screening criteria:

- Company Size: revenue less than or equal to \$150M; operating expense less than or equal to four times our operating expense (i.e., less than or equal to \$240M); employees between 20-200;
- Business Operations: conducting Phase 2 or Phase 3 clinical trials in at least one of oncology, rare diseases, or leveraging a 'technology platform' model; and
- Other: exclude subsidiaries; companies with business challenges; companies having market valuations below \$50M; and companies that have recently conducted an initial public offering.

The following table lists the companies included in the 2017 peer group used in connection with our 2018 compensation decisions referred to above:

Aduro BioTech, Inc.	Endocyte, Inc.	Regulus Therapeutics, Inc.
Advaxis, Inc.	Genocea Biosciences, Inc.	Sangamo Therapeutics, Inc.
Arrowhead Research Corp.	GlycoMimetics, Inc.	WAVE Life Sciences, Inc.
Celldex Therapeutics, Inc.	Immune Design Corp.	Xencor, Inc.
Concert Pharmaceuticals, Inc.	Immunomedics, Inc.	ZIOPHARM Oncology, Inc.
Dicerna Pharmaceuticals, Inc.	Inovio Pharmaceuticals, Inc.	
Dynavax Technologies Corp.	OncoMed Pharmaceuticals, Inc.	

The foregoing peer group companies were recommended by Pearl Meyer and approved by our compensation committee because they have similar business profiles to ours taking into account number of employees, market value and stage of development. Additionally, while there were no changes to the screening criteria used for determining the 2017 peer group used for 2018 compensation decisions, as compared to the determination of the 2016 peer group used for 2017 compensation

decisions, certain companies were excluded from or added to the 2017 peer group, primarily due to application of our screening criteria (e.g. quantitative metrics and market capitalization).

Our compensation committee intends that if we achieve our corporate goals and the executive performs at the level expected, the executive should have the opportunity to receive compensation that is competitive with industry norms. Accordingly, our compensation committee generally targets overall compensation for executives towards the 50th percentile of the market data. However, the compensation committee does not apply those targets formulaically and allows for individuals to be positioned at different percentiles based on experience, performance levels and potential performance levels of the executive, and changes in duties and responsibilities.

Components of Executive Compensation

The primary elements of our executive compensation program are:

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

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

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

We are party to employment agreements and employment offer letters with each of our named executive officers. Employment agreements and employment offer letters with our named executive officers are described below under the caption "Employment and Separation Agreements with our Named Executive Officers."

Base Salary

In establishing base salaries for our named executive officers, our compensation committee typically reviews the market compensation data presented by the committee's independent compensation consultant, considers historic salary levels of the executive officer and the nature of the executive officer's responsibilities, compares the executive officer's base salary with those of our other executives, and considers the executive officer's experience, performance and contributions. The compensation committee also typically considers the challenges involved in hiring and retaining executive talent in our industry and region. In assessing the executive officer's performance, the compensation committee considers the executive officer's role in the achievement of the annual corporate goals, as well as, in the case of our executive officers other than our chief executive officer, the performance evaluation prepared by our chief executive officer with respect to such executive officer. The compensation committee considers such evaluation as a means of informing the compensation committee's decision as to whether the executive officer's performance was generally consistent with our expectations.

As part of our 2017 annual performance and compensation review, the compensation committee approved annual base salaries for our executive officers for 2018. In setting these annual base salaries, the compensation committee reviewed the 2017 market compensation data presented by Pearl Meyer. Similarly, as part of our December 2018 annual performance and compensation review, the compensation committee reviewed the 2018 market compensation data and approved new annual base salaries for our executive officers for 2019. In each of the 2017 and 2018 reviews, after considering each named executive officer's current salary, performance, and experience in the context of the market compensation data as well as relative to one another, the compensation committee approved the following salary increases and resulting base salaries:

<u>Executive</u>	<u>2017 Base Salary</u>	<u>2018 Base Salary</u>	<u>% Increase</u>	<u>2019 Base Salary</u>	<u>% Increase</u>
Mr. Milano	\$ 600,000	\$ 600,000	0.0	\$ 600,000	0.0
Mr. Fletcher	\$ 386,300	\$ 400,000	3.5	\$ 400,000	0.0
Dr. Horobin	\$ 410,000	\$ 425,000	3.7	\$ 425,000	0.0
Mr. Kirby(1)	\$ 231,750	\$ 280,000	20.8	\$ 280,000	0.0
Dr. Yingling	\$ 385,000	\$ 400,000	3.9	\$ 400,000	0.0
Mr. Arcudi(2)	\$ 357,900	\$ 370,000	3.4	—	—

- (1) Mr. Kirby commenced employment with us in November 2015 and became the Company's principal financial officer and principal accounting officer effective October 31, 2018. In connection with Mr. Kirby's appointment as principal financial officer and principal accounting officer, Mr. Kirby's annual base salary was increased from \$239,850 to \$280,000.
- (2) Effective October 31, 2018, Mr. Arcudi, our former Chief Financial Officer and Senior Vice President, Operations, departed from us as a result of our consolidation to our Exton, PA headquarters.

Annual Cash Performance Bonuses

The compensation committee generally structures cash bonuses by linking them to the achievement of the annual corporate goals, corporate performance outside of the corporate goals (i.e. an unexpected opportunistic business development deal would be factored subjectively as an adjustment to the score that the committee derived from evaluation of the corporate goals), and individual performance. The amount of the bonus paid, if any, varies among the executive officers depending on individual performance and their contribution to the achievement of our annual corporate goals and corporate performance generally. The compensation committee reviews and assesses corporate goals and individual performance by executive officers and considers the reasons why specific goals have been achieved or have not been achieved. While achievement against the applicable corporate goals is given substantial weight in connection with the determination of annual bonuses, we also factor in an evaluation of our named executive officers' individual performance based on analysis of achievement of individual performance goals as well as the following subjective criteria:

- leadership;
- management;
- judgment and decision-making skills;
- results orientation; and
- communication

The compensation committee sets the individual bonus target percentages for each of our named executive officers. In determining the target bonus percentages to be used for 2018, the compensation committee concluded that the target bonus percentages should be competitive with the 50th percentile of the 2017 market compensation data and that there be no difference in the target bonus percentages of our named executive officers, other than for Mr. Milano. The following table sets forth the individual bonus target percentages for each of our named executive officers for 2018 and 2019.

Executive	Target Cash Bonus (% of Base Salary)	
	2018	2019
Mr. Milano	50%	50%
Mr. Fletcher	40%	40%
Dr. Horobin	40%	40%
Mr. Kirby	30%	30%
Mr. Lim	40%	40%
Dr. Yingling	40%	40%
Mr. Arcudi	40%	—

Consistent with our company-wide annual incentive plan applicable to all employees, including our named executive officers, both a corporate performance score and individual performance score factored into the determination of each executive officer's cash bonus award for 2018.

Under the terms of our incentive plan, the corporate performance score is based on the degree to which corporate performance objectives have been achieved. This score is determined by the compensation committee and may range from 0-125%. The individual performance score is based on:

- the degree to which individual performance objectives have been achieved;
- the competencies and behaviors demonstrated in achieving results;
- the technical skills required by the position; and
- the completion of the ongoing responsibilities required by the position.

The individual performance score may range from 0-125% and is approved by the compensation committee. The individual's actual award is then calculated as follows:



In setting corporate goals in the first quarter of 2018, the committee agreed to group the business objectives into one of three primary categories, each of which would contribute toward the overall assessment of our corporate performance. In assessing our corporate performance against our 2018

corporate goals, and determining the corporate performance score, the compensation committee considered the extent to which the company achieved the business objectives in each of the categories, and assigned a score for each category, as summarized in the following table:

<u>Primary Goals</u>	<u>Contribution toward Corporate Performance Score</u>	<u>Committee's Assessment of Performance (out of 100%)</u>	<u>Highlights of Performance on Key Objectives</u>
Advance Tilsotolimod (IMO-2125) program through Phase 3 and beyond PD-1 refractory melanoma	75%	40%	<ul style="list-style-type: none"> • Initiated ILLUMINATE-301 study. • Progressed ILLUMINATE-204 and ILLUMINATE-301 enrollment. • Continued program expansion initiatives for beyond anti-PD1 refractory melanoma. • Timely analysis of both studies resulted in no-go decision for both 3GA and IMO-8400.
Advance 3GA program and IMO-8400 program to next decision point	15%	10%	<ul style="list-style-type: none"> • Implemented an "at-the-market" equity program to facilitate future capital raising.
Enhance our ability to be successful through relevant foundational objectives	10%	10%	<ul style="list-style-type: none"> • Reviewed strategic business development options.

Based on these achievements and resulting category scores, the compensation committee approved a corporate performance score of 60%. However, as a result of additional factors the compensation committee considered in determining the company score to be applied to executives, including proposed merger outcome and discovery outcomes during 2018, the compensation committee reduced the overall corporate performance score by 10% for the 2018 bonus calculation for executives and determined to use a corporate performance score of 50%, excluding Mr. Kirby due to the timing of his appointment.

In assessing each named executive officer's individual performance score, the compensation committee determined:

- Mr. Milano's overall score would be equivalent to the corporate performance score of 50%;
- Mr. Fletcher's individual performance score, recognizing his achievement against his personal objectives, including his role in business development along with his general leadership contributions, would be 115%, resulting in an overall bonus equal to 58% of his bonus target;
- Dr. Horobin's individual performance score, recognizing her achievement against her personal objectives, including her role in achievements against our tilsotolimod (IMO-2125) clinical program goals along with her general leadership contributions, would be 85%, resulting in an overall bonus equal to 43% of her bonus target;
- Mr. Kirby's individual performance score, recognizing his achievement against his personal objectives, including his role as principal financial and accounting officer, and general leadership contributions, would be 120%. Using the broader corporate score of 60%, as noted above, this resulted in an overall bonus equal to 86% of his bonus target; and
- Dr. Yingling's individual performance score, recognizing his achievement against his personal objectives, including his role in advancing objective knowledge and understanding of our

discovery platform, contributions to business development, and his general leadership contributions, would be 100%, resulting in an overall bonus equal to 50% of his bonus target.

Mr. Arcudi separated from the Company prior to the compensation committee's determinations and in connection with his severance agreement, received a prorated bonus for 2018 at 100% of target.

Equity Compensation

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

- the achievement of our annual corporate goals;
- individual performance;
- the applicable executive officer's previous awards, including the exercise price of such previous awards;
- the recommendations of management;
- the market compensation data presented by the committee's independent compensation consultant, and
- the combined components of the executive officer's compensation.

The compensation committee approves all equity awards to our executive officers. Our equity awards have typically taken the form of stock options. However, under the terms of our stock incentive plans, we may grant equity awards other than stock options, such as restricted stock awards, stock appreciation rights, and restricted stock units. In January 2019, restricted stock units were granted to all employees, including our executive officers, as part of our annual incentive program.

The compensation committee typically makes initial stock option awards to named executive officers upon commencement of their employment and annual stock option awards thereafter. Stock option awards to our named executive officers after the initial stock option awards have typically been granted annually after the annual performance review. For 2018, this review occurred at the regularly scheduled meeting of the compensation committee held in the first quarter of 2018. Beginning in 2019, the annual stock option awards will be given in two biannual tranches. In general, annual stock option grants vest with respect to 25% of the shares subject to the option on the first anniversary of the date of grant and with respect to the balance of the shares subject to the option in 12 equal quarterly installments over the three-year period thereafter. The exercise price of stock options equals the fair market value of our common stock on the date of grant, which is typically equal to the closing price of our common stock on Nasdaq on the date of compensation committee approval except in the case of new-hire grants, which are approved in advance by the compensation committee with the grant occurring at an exercise price established at the closing price of our common stock on the first day of employment.

In December 2017, as part of its annual executive compensation and performance review, the compensation committee reviewed the 2017 market compensation data regarding annual stock option grants. In January 2018, the committee granted our named executive officers options to purchase shares

of our common stock. Additionally, in August 2018, in consideration of historical stock performance as well as reference to 2017 market compensation data, the compensation committee further granted our named executive officer options to purchase shares of our common stock. The following table sets forth the number of options granted to our named executive officers in January 2018 and August 2018:

<u>Executive</u>	<u>Option Awards</u>	
	<u>January 2018</u> <u>(# options)</u>	<u>August 2018</u> <u>(# options)</u>
Mr. Milano	74,999	65,000
Mr. Fletcher	33,749	32,500
Dr. Horobin	33,749	32,500
Mr. Kirby	16,874	10,000
Dr. Yingling	33,749	32,500
Mr. Arcudi	33,749	32,500

Benefits and Other Compensation

We maintain broad-based benefits that are provided to all employees, including health and dental insurance, life and disability insurance, and a 401(k) plan. Through August 2018, consistent with our prior practice, we matched 50% of the employee contributions to our 401(k) plan up to a maximum of 6% of the participating employee's annual salary, resulting in a maximum company match of 3% of the participating employee's annual salary, and subject to certain additional statutory dollar limitations. Commencing in August 2018 and retroactive to January 2018, we matched 100% of the employee contributions to our 401(k) plan up to a maximum of 5% of the participating employee's annual salary. Named executive officers are eligible to participate in all of our employee benefit plans, in each case on the same basis as other employees and subject to any limitations in such plans. Each of our named executive officers except for Mr. Fletcher contributed to our 401(k) plan and their contributions were matched by us.

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

- all outstanding options held by the employee will automatically vest in full; and
- the period during which the employee may exercise the options will be extended to the expiration of the term of the option under the applicable option agreement.

Our board adopted this policy for our employees in recognition of the importance of stock options to the compensation of employees and in order to provide each of our employees with the opportunity to get the full benefit of the options held by the employee in the event of his or her retirement after making 10 years of contributions to our company.

We occasionally pay relocation expenses for newly-hired executive officers who we require to relocate as a condition to their employment by us. We also occasionally pay local housing expenses and travel costs for executives who maintain a primary residence outside of a reasonable daily commuting range to our headquarters. We believe that these are typical benefits offered by comparable companies to executives who are asked to relocate and that we would be at a competitive disadvantage in trying to attract executives who would need to relocate in order to work for us if we did not offer such assistance. We did not provide any relocation benefits to any of our executives in 2018.

Our named executive officers may also participate in our employee stock purchase plan, which is generally available to all employees who work over 20 hours per week, so long as they own less than

5% of our common stock, including for this purpose vested and unvested stock options. Dr. Horobin, Mr. Kirby and Mr. Arcudi participated in the employee stock purchase plan in 2018.

Severance and Change in Control Benefits

Under our employment agreements and employment offer letters with our named executive officers, other than with Mr. Kirby, we have agreed to provide severance and other benefits in the event of the termination of their employment under specified circumstances. On March 7, 2017, the board of directors approved a form of Severance and Change of Control Agreement to be entered into between the Company and our named executive officers. The severance benefits contained in the Change of Control Agreements supersede the severance and change of control terms contained in the existing employment agreements and employment offer letters. We have provided more detailed information about these benefits, along with estimates of their value under various circumstances, under the captions "Employment and Separation Agreements with our Named Executive Officers" and "Potential Payments Upon Termination or Change in Control" below.

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

Tax Deductibility of Executive Compensation

Prior to December 22, 2017, when the TCJA was signed into law, Section 162(m) of the Internal Revenue Code of 1986, as amended (the "Code") generally disallowed a tax deduction to publicly held companies for compensation paid to the chief executive officer and the three other most highly compensated executives (other than the chief financial officer) in excess of \$1 million per officer in any year that such compensation did not qualify as performance-based. In connection with fiscal 2018 compensation decisions, the compensation committee considered the potential tax deductibility of executive compensation under Section 162(m) of the Internal Revenue Code and sought to qualify certain elements of these applicable executives' compensation as performance-based while also delivering competitive levels and forms of compensation.

Under the TCJA, the performance-based exception has been repealed and the \$1 million deduction limit now applies to anyone serving as the chief executive officer or the chief financial officer at any time during the taxable year and the top three other highest compensated executive officers serving at fiscal year end. In addition, once an individual becomes a covered employee under Section 162(m) for any taxable year beginning after December 31, 2016, this status carries forward to all future years, even in the event of the employee's termination or death. The new rules generally apply to taxable years beginning after December 31, 2017, but do not apply to remuneration provided pursuant to a written binding contract in effect on November 2, 2017 that is not modified in any material respect after that date.

The compensation committee reserves the right to use its judgment to authorize compensation payments that may be subject to the limit when the compensation committee believes such payments are appropriate and in the best interests of our company and our stockholders. There can be no assurance that compensation awarded to our executive officers will be treated as qualified performance-based compensation under Section 162(m).

Employment and Separation Agreements with our Named Executive Officers

We have entered into agreements with our named executive officers, as discussed below, that provide benefits to the executives upon their termination of employment in certain circumstances or under which we have agreed to specific compensation elements. Our named executive officers are at-will employees.

Employment Agreements and Offer Letters

Vincent J. Milano

We are a party to an employment offer letter with Mr. Milano, our President and Chief Executive Officer. Under the employment offer letter, Mr. Milano is entitled to receive an annual base salary of \$600,000 or such higher amount as our compensation committee or our board of directors may determine. In addition, under the employment offer letter, Mr. Milano is eligible to receive an annual bonus of 50% of his base salary, subject to adjustment, based on the achievement of both individual and company performance objectives as developed and determined by our board of directors.

Under the employment offer letter, if we terminate Mr. Milano's employment without cause, prior to a change-in-control, as such terms are defined in the agreement, he will be entitled to severance payments for 24 months equivalent to his then-current base salary, payable in accordance with our then-current payroll practices, and benefits continuation for the shorter of 24 months or the date his COBRA continuation coverage expires and to receive any bonus that he earned and that our board of directors approved prior to the termination to the extent not then paid. If we terminate Mr. Milano's employment without cause or Mr. Milano terminates his employment with us for good reason, as such terms are defined in the agreement, upon or within one year after a change in control, he will be entitled to severance payments for 24 months equivalent to his then-current base salary, payable in accordance with our then-current payroll practices, and benefits continuation for the shorter of 24 months or the date his COBRA continuation coverage expires and to receive any bonus that he earned and that our board of directors approved prior to the termination to the extent not then paid and the inducement option award that he received upon his commencement of employment with us will vest in full and become immediately exercisable.

Our agreement to pay severance and benefits pursuant to the employment offer letter is subject to Mr. Milano entering into a separation and release agreement and is superseded by his severance and change in control agreement described below to the extent then in effect.

R. Clayton Fletcher

We are a party to an employment letter with Mr. Fletcher, our Senior Vice President of Business Development and Strategic Planning. Under the terms of the employment letter, Mr. Fletcher is entitled to receive an annual base salary of \$360,000 or such higher amount as our compensation committee or our board of directors may determine. In addition, under the employment letter, Mr. Fletcher is eligible to receive an annual bonus of 35% of his base salary, subject to adjustment, based on the achievement of both individual and company performance objectives as established by our board of directors. Under the employment letter, if we terminate Mr. Fletcher's employment without cause at any time, or if he terminates his employment for good reason upon a change in control or within one year after a change in control, as such terms are defined in the agreement, we have agreed to:

- continue to pay Mr. Fletcher his base salary as severance for 12 months following such termination payable in accordance with our then current payroll practices plus any bonus earned and approved by the board of directors but unpaid at the time of termination;

- continue to provide Mr. Fletcher with health and dental benefits for 12 months following such termination, except to the extent another employer provides Mr. Fletcher with comparable benefits; and
- only in the event of a termination described above that occurs upon or within one year after a change in control, fully vest all options granted to Mr. Fletcher upon the commencement of his employment.

Our agreement to pay severance and benefits pursuant to the employment offer letter is subject to Mr. Fletcher entering into a separation and release agreement and is superseded by his severance and change in control agreement (described below) to the extent then in effect.

Joanna Horobin, M.B., Ch.B

We are a party to an employment letter with Dr. Horobin, our Chief Medical Officer. Under the terms of the employment letter, Dr. Horobin is entitled to receive an annual base salary of \$390,000 or such higher amount as our compensation committee or our board of directors may determine. In addition, under the employment letter, Dr. Horobin is eligible to receive an annual bonus of 40% of her base salary, subject to adjustment, based on the achievement of both individual and company performance objectives as established by our board of directors. Under the employment letter, if we terminate Dr. Horobin's employment without cause at any time, or if she terminates her employment for good reason upon a change in control or within one year after a change in control, as such terms are defined in the agreement, we have agreed to:

- continue to pay Dr. Horobin her base salary as severance for 12 months following such termination payable in accordance with our then current payroll practices plus any bonus earned and approved by the board of directors but unpaid at the time of termination;
- continue to provide Dr. Horobin with health and dental benefits for 12 months following such termination, except to the extent another employer provides Dr. Horobin with comparable benefits; and
- only in the event of a termination described above that occurs upon or within one year after a change in control, fully vest all options granted to Dr. Horobin upon the commencement of her employment.

Our agreement to pay severance and benefits pursuant to the employment offer letter is subject to Dr. Horobin entering into a separation and release agreement and is superseded by her severance and change in control agreement (described below) to the extent then in effect.

John J. Kirby

We are a party to an employment letter with Mr. Kirby, our prior Vice President of Corporate Accounting and, effective October 31, 2018, our current Vice President of Finance and principal financial and accounting officer. Under the terms of the employment letter, Mr. Kirby is entitled to receive an annual base salary of \$225,000 or such higher amount as our compensation committee or our board of directors may determine. In addition, under the employment letter, Mr. Kirby is eligible to receive an annual bonus of 30% of his base salary, subject to adjustment, based on the achievement of both individual and company performance objectives as established by our board of directors. Mr. Kirby currently does not have a severance and change in control agreement (described below) with us.

Jonathan Yingling, Ph.D.

We are a party to an employment letter with Dr. Yingling, our prior Senior Vice President of Early Development and, effective January 1, 2018, our current Chief Scientific Officer. Under the terms of the employment letter, Dr. Yingling is entitled to receive an annual base salary of \$385,000 or such higher amount as our compensation committee or our board of directors may determine. In addition, under the employment letter, Dr. Yingling is eligible to receive an annual bonus of 40% of his base salary, subject to adjustment, based on the achievement of both individual and company performance objectives as established by our board of directors. Under the employment letter, if we terminate Dr. Yingling's employment without cause at any time, or if he terminates his employment for good reason upon a change in control or within one year after a change in control, as such terms are defined in the agreement, we have agreed to:

- continue to pay Dr. Yingling his base salary as severance for 12 months following such termination payable in accordance with our then current payroll practices plus any bonus earned and approved by the board of directors but unpaid at the time of termination;
- continue to provide Dr. Yingling with health and dental benefits for 12 months following such termination, except to the extent another employer provides Dr. Yingling with comparable benefits; and
- only in the event of a termination described above that occurs upon or within one year after a change in control, fully vest all options granted to Dr. Yingling upon the commencement of his employment.

Our agreement to pay severance and benefits pursuant to the employment offer letter is subject to Dr. Yingling entering into a separation and release agreement and is superseded by his severance and change in control agreement (described below) to the extent then in effect.

Louis J. Arcudi, III

Prior to his resignation on October 31, 2018, the terms of Mr. Arcudi's employment as our Senior Vice President of Operations, Chief Financial Officer, Treasurer and Assistant Secretary were set forth in an employment letter, as amended, with Mr. Arcudi. Under the employment letter, Mr. Arcudi was initially entitled to receive an annual base salary of \$315,000, such amount subject to adjustment from time to time in accordance with normal business practices. In addition, under the employment letter, Mr. Arcudi was entitled to receive an annual bonus in an amount approved by our board or the compensation committee based on the achievement of both individual and company performance objectives as developed and determined by our board of directors.

Pursuant to his employment letter, if we terminated Mr. Arcudi's employment without cause at any time, or if he terminated his employment for good reason upon a change in control or within one year after a change of control, as such terms are defined in the agreement, we agreed to:

- continue to pay Mr. Arcudi his base salary as severance for 12 months following such termination payable in accordance with our then current payroll practices; and
- continue to provide Mr. Arcudi with health and dental benefits for 12 months following such termination, except to the extent another employer provides Mr. Arcudi with comparable benefits.

Our agreement to pay severance and benefits pursuant to the employment letter is subject to Mr. Arcudi entering into a separation and release agreement and is superseded by his severance and change in control agreement described below to the extent then in effect.

On October 31, 2018, we entered into a separation agreement and release with Mr. Arcudi, under which Mr. Arcudi agreed to resign as our Senior Vice President of Operations, Chief Financial Officer, Treasurer and Assistant Secretary. Pursuant to the agreement, we provided Mr. Arcudi the following separation benefits in exchange for him agreeing to a release of claims and complying with certain other continuing obligations contained therein (including compliance with the restrictive covenants in his employment agreement):

- We paid Mr. Arcudi a pro-rated 2018 bonus payment of \$103,182, less all applicable taxes and withholdings;
- We have agreed that, commencing on the first regular payroll date following his separation date until October 31, 2019, we will pay Mr. Arcudi with severance pay in the total gross amount of \$525,115, payable in equal installments in accordance with our regular payroll practices;
- Mr. Arcudi is eligible to receive health and dental benefits through reimbursement of COBRA premiums from his separation date through no later than October 31, 2019; and
- Any stock options or other equity incentive awards previously granted to Mr. Arcudi and held by Mr. Arcudi on his separation date shall continue to remain exercisable until the earlier of (i) twelve months from the end of the quarter in which Mr. Arcudi terminates services from the with us, or (ii) the original expiration date of such option.

In addition, we (a) paid all of Mr. Arcudi's compensation due and owing to him as of October 31, 2018 in accordance with our usual compensation and payroll practices, and (b) reimbursed Mr. Arcudi for all reasonable unreimbursed business expenses incurred by him as of October 31, 2018 in accordance with our expense reimbursement policy.

Mr. Arcudi also entered into a consulting agreement with us, effective October 31, 2018, under which Mr. Arcudi agreed to provide consulting services to us, and we have agreed to pay Mr. Arcudi consulting fees at a rate of \$500 per hour for any such services provided, not to exceed \$50,000 without our consent, as well as reimbursement for pre-approved reasonable expenses for a term of twelve months. The agreement also contains non-solicit provisions that apply during the consulting period and the one-year period thereafter.

Severance and Change in Control Agreements

We have entered into a Severance and Change of Control Agreement with each of Messrs. Milano, Arcudi and Fletcher, and Drs. Yingling and Horobin.

The Severance and Change of Control Agreements provide that if we consummate a change of control (as defined in the Severance and Change of Control Agreements), we will employ the executive for a period of 24 months from the date of the consummation of the change of control. Pursuant to the Severance and Change of Control Agreements, during such period:

- (i) the executive's position and duties for the company will be commensurate with the most significant of the duties and positions held by the executive during the 90 day period preceding the date of the consummation of the change of control;
- (ii) the executive's annual base salary will equal at least 12 times the highest monthly base salary paid to the executive during the 12 months prior to the date of the change of control;
- (iii) the executive will be entitled to an annual bonus equal to at least the greatest of (a) the average bonus paid to the executive in respect of the three years immediately preceding the year in which the change of control occurs, (b) the annual bonus paid for the year immediately preceding the year in which the change of control occurs and (c) 100% of the target bonus for (1) the year immediately preceding the year in which the change of control

occurs, (2) the year in which the change of control occurs or (3) any year following the year in which the change of control occurs and prior to the then-current year, whichever is highest; and

- (iv) the executive will be entitled to certain other benefits as are consistent with the benefits paid to the executive during the year prior to the change of control.

The Severance and Change of Control Agreements also provide that if an executive is terminated without "cause" or resigns for "good reason" (as such terms are defined in the Severance and Change of Control Agreements) in either case, within 24 months following a change of control, subject to the executive's timely execution and non-revocation of a general release of claims in a form provided by us and the executive's continued compliance with the invention, non-disclosure and non-competition agreement previously entered into in connection with the commencement of executive's employment, executives would receive a lump sum cash payment payable within 30 days after the date of termination equal to:

- (i) the executive's target bonus for the year of termination prorated for the portion of the year worked;
- (ii) 150% of the sum of (a) such executive's annual base salary for the year immediately preceding the year of termination and (b) the greatest of (1) the average bonus paid or earned and accrued, but unpaid to the executive in respect of the three years immediately preceding the year of termination, (2) the annual bonus paid for the year immediately preceding the year of termination and (3) the target bonus for the year of termination; and
- (iii) 150% of the Company's share of the annual premium for group medical and/or dental insurance coverage that was in place for the executive immediately prior to the date of termination.

In addition, all unvested options, restricted stock or stock appreciation rights held by the executive as of the date of termination will be immediately and automatically vested and/or exercisable in full as of the date of termination, and the executive will have the right to exercise any such options or stock appreciation rights for the longer of (A) the period of time provided for in the applicable equity award agreement or plan, or (B) the shorter of one year after the date of termination or the remaining term of the applicable equity award. However, under the terms of the Merger Agreement the post-termination exercise period of all outstanding stock options will continue in the event of the executive's termination of employment within 24 months following the effective time of the Mergers (other than for cause or due to the executive's resignation without good reason), until the three-year anniversary of such executive's termination, but in no event past the remaining term of the applicable equity award.

If the executive is terminated without "cause" or resigns for "good reason," prior to the date of a change of control, such executive will be entitled to the following under the Severance and Change of Control Agreement, subject to the executive's timely execution and non-revocation of a general release of claims in a form provided by us and the executive's continued compliance with the invention, non-disclosure and non-competition agreement previously entered into in connection with the commencement of executive's employment:

- (i) a lump sum cash payment payable within 30 days after the date of termination in an amount equal to the greater of (x) the average bonus paid or earned and accrued, but unpaid to the executive in respect of the three years immediately preceding the year of termination, and (y) the annual bonus paid for the year immediately preceding the year of termination prorated for the portion of the year worked;

- (ii) continued payment of the executive's base salary payable in accordance with our standard payroll practices over the one-year period following termination; and
- (iii) if the executive elects to continue receiving group medical and/or dental insurance under COBRA (to the extent the executive previously participated in such group insurance plans immediately prior to the date of termination), payment by us of our share of the premium for such coverage that we pay for active and similarly-situated employees who receive the same type of coverage for the one-year period following termination.

The Severance and Change of Control Agreements expire on December 31, 2018, but on each anniversary thereof, unless notice of termination has been provided by a party, the term of such agreements will automatically be extended by one year.

Indemnification Agreements

On March 7, 2017, the board of directors approved a form of Indemnification Agreement to be entered into between the Company and our directors and officers. Each of Messrs. Milano, Arcudi, Fletcher and Kirby and Drs. Horobin and Yingling entered into an Indemnification agreement with the Company. In general, the Indemnification Agreements provide that the Company will indemnify the director or officer to the fullest extent permitted by law for claims arising in his or her capacity as a director or officer of the Company or in connection with their service at our request for another corporation or entity. The Indemnification Agreements also provide for procedures that will apply in the event that a director or officer makes a claim for indemnification and establish certain presumptions that are favorable to the director or officer.

Formal Clawback Policy

In April 2015, ahead of any such requirement in the Dodd-Frank Wall Street Reform and Consumer Protection Act, our compensation committee adopted a formal clawback policy, which will apply in the event we are required to prepare an accounting restatement after the adoption of the clawback policy due to any material noncompliance with any financial reporting requirement under the U.S. federal securities laws. This policy requires us to use reasonable efforts to recover from any of our current or former executive officers who receive incentive-based compensation (including stock options awarded as compensation) during the three-year period preceding the date on which we are required to prepare an accounting restatement based on erroneous data, the excess of what would have been paid to such executive officer under the accounting restatement.

Summary Compensation Table

The table below summarizes compensation paid to or earned by our named executive officers for 2018, 2017 and 2016.

Summary Compensation Table for Fiscal Year 2018

<u>Name and Principal Position</u>	<u>Year</u>	<u>Salary (\$)</u>	<u>Bonus (\$)</u>	<u>Option Awards (\$)(1)</u>	<u>Non-Equity Incentive Plan Compensation (\$)</u>	<u>All Other Compensation (\$)(2)</u>	<u>Total (\$)</u>
Vincent J. Milano	2018	600,000	—	998,081	150,000	33,863	1,781,944
President and Chief Executive Officer	2017	600,000	—	296,634	270,000	31,106	1,197,740
	2016	600,000	—	573,780	211,680	31,555	1,417,015
R. Clayton Fletcher	2018	400,000	—	461,837	92,000	23,613	977,450
Senior Vice President, Business Development and Strategy	2017	386,300	—	182,924	145,908	22,988	738,120
	2016	375,000	—	353,831	114,660	23,580	867,071
Joanna Horobin	2018	425,000	—	461,837	72,250	34,838	993,925
Senior Vice President, Chief Medical Officer	2017	410,000	—	182,924	132,840	31,754	757,518
	2016	390,000	—	—	119,246	31,187	540,433
John J. Kirby	2018	249,888	—	206,479	64,771	32,735	553,873
Vice President of Finance, Principal Financial and Accounting Officer(3)	2017	231,750	—	98,878	62,573	28,676	421,877
	2016	225,000	—	172,150	54,607	28,540	480,297
Jonathan Yingling	2018	400,000	—	461,837	80,000	33,926	975,763
Senior Vice President, Chief Scientific Officer(4)	2017	348,542	—	577,782	144,296	31,277	1,101,897
Louis J. Arcudi, III	2018	308,333	103,183(6)	461,837	—	112,776	986,129
Former Senior Vice President of Operations, Chief Financial Officer, Treasurer and Assistant Secretary(5)	2017	357,900	—	182,924	122,436	25,786	689,046
	2016	347,500	—	353,831	116,760	26,276	844,367

- (1) Represents the aggregate grant date fair value of options granted to each of the named executive officers as computed in accordance with ASC 718. These amounts do not represent the actual amounts paid to or realized by the named executive officers. See Note 11 to the financial statements included elsewhere in our annual report on Form 10-K for the year ended December 31, 2018 regarding assumptions we made in determining the fair value of option awards.

- (2) "All Other Compensation" for 2018 for each of the named executive officers includes the following:

	Premiums paid by us for all insurance plans (\$)	Company match on 401(k) (\$)	Severance (\$)	Total (\$)
Mr. Milano	23,613	10,250	—	33,863
Mr. Fletcher	23,613	—	—	23,613
Dr. Horobin	24,525	10,313	—	34,838
Mr. Kirby	23,239	9,496	—	32,735
Dr. Yingling	23,613	10,313	—	33,926
Mr. Arcudi	14,944	10,313	87,519	112,776

- (3) Upon Mr. Kirby's appointment as our principal financial officer and principal accounting officer effective October 31, 2018, Mr. Kirby's annual base salary was increased from \$239,850 to \$280,000.
- (4) Dr. Yingling joined our company and became our Senior Vice President, Early Development effective as of February 6, 2017 and has served as our Chief Scientific Officer since January 1, 2018.
- (5) Mr. Arcudi served as our Senior Vice President of Operations, Chief Financial Officer, Treasurer and Assistant Secretary until his resignation, effective October 31, 2018.
- (6) Pursuant to Mr. Arcudi's separation agreement, Mr. Arcudi received a pro-rated cash bonus in 2018 calculated as the product of (i) the greater of (a) the average bonus paid or that has been earned and accrued, but unpaid to Mr. Arcudi by us, in respect of the three fiscal years immediately preceding the fiscal year in which the separation date occurred, and (b) the annual bonus paid for the fiscal year immediately preceding the separation date (both (a) and (b) annualized for any fiscal year consisting of less than twelve full months or with respect to which Mr. Arcudi has been employed by us for less than twelve full months) and (ii) a fraction, the numerator of which is the number of days in the current fiscal year through the separation date, and the denominator of which is 365.

CEO Pay Ratio

Following is a reasonable estimate, prepared under applicable SEC rules, of the ratio of the annual total compensation of our CEO to the median of the annual total compensation of our other employees. We determined our median employee based on annualized 2018 base salary and annualized 2018 bonus awards for each of our 36 employees (excluding the CEO) as of December 31, 2018. The annual total compensation of our median employee (other than the CEO) for 2018 was \$297,391. As disclosed in the Summary Compensation Table included in this CD&A, our CEO's annual total compensation for 2018 was \$1,781,944. Based on the foregoing, the ratio of the 2018 annual total compensation of our CEO to the median of the annual total compensation of all other employees was 6 to 1. Given the different methodologies that various public companies will use to determine an estimate of their pay ratio, the estimated ratio reported above should not be used as a basis for comparison between companies.

Grants of Plan-Based Awards

The following table sets forth information regarding grants of plan-based awards to our named executive officers during 2018.

Grants of Plan-Based Awards for Fiscal Year 2018

Name	Grant Date	Estimated Possible Payouts Under Non-Equity Incentive Plan Awards			All Other Option Awards: Number of Securities Underlying Options (#)(1)	Exercise or Base Price of Option Awards (\$/Sh)	Grant Date Fair Value of Option Awards \$(2)
		Threshold (\$)	Target (\$)	Maximum (\$)			
Vincent J. Milano	1/3/2018(3)	—	300,000	468,750	74,999	17.92	743,965
	8/13/2018(3)				65,000	7.39	254,116
R. Clayton Fletcher	1/3/2018(3)	—	160,000	250,000	33,749	17.92	334,779
	8/13/2018(3)				32,500	7.39	127,058
Joanna Horobin	1/3/2018(3)	—	170,000	265,625	33,749	17.92	334,779
	8/13/2018(3)				32,500	7.39	127,058
John J. Kirby	1/3/2018(3)	—	74,966	117,135	16,874	17.92	167,384
	8/13/2018(3)				10,000	7.39	39,095
Jonathan Yingling	1/3/2018(3)	—	160,000	250,000	33,749	17.92	334,779
	8/13/2018(3)				32,500	7.39	127,058
Louis J. Arcudi, III(4)	1/3/2018(3)	—	123,333	192,708	33,749	17.92	334,779
	8/13/2018(3)				32,500	7.39	127,058

- (1) The term of these options is ten years. The vesting of these stock options is time-based. See "Compensation Discussion and Analysis—Components of Executive Compensation—Equity Compensation" for a full description of the vesting terms for these options. See "Employment and Separation Agreements with our Named Executive Officers" for further information about acceleration of vesting of options in the event of the termination of employment and/or a change of control.
- (2) Represents the aggregate grant date fair value of option awards made to the named executive officers in 2017 as computed in accordance with ASC 718. These amounts do not represent the actual amounts paid to or realized by the named executive officers during 2018. See Note 11 to the financial statements included elsewhere in our annual report on Form 10-K for the year ended December 31, 2018 regarding assumptions we made in determining the fair value of option awards.
- (3) Granted pursuant to our 2013 Stock Incentive Plan.
- (4) The target and maximum amounts reported under Estimated Possible Payouts Under Non-Equity Incentive Plan Awards for Mr. Arcudi are pro-rated for Mr. Arcudi's resignation effective October 31, 2018. Pursuant to the Separation Agreement and Release dated October 31, 2018 by and between Mr. Arcudi and us, Mr. Arcudi received a pro-rated bonus for 2018 in the amount of \$103,183, the calculation of which is more fully described in the footnotes to the "Summary Compensation Table for Fiscal Year 2018."

Outstanding Equity Awards at Fiscal Year-End

The following table sets forth information regarding the outstanding stock options held by our named executive officers as of December 31, 2018. None of our named executive officers held shares of unvested restricted stock as of December 31, 2018.

Outstanding Equity Awards at Fiscal Year-End for 2018

<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>
Vincent J. Milano	250,000	—	24.96	12/1/2024
	25,780	11,719(1)	23.04	1/6/2026
	16,406	21,094(2)	12.72	1/4/2027
	—	74,999(3)	17.92	1/3/2028
	—	65,000(4)	7.39	8/13/2028
R. Clayton Fletcher	70,312	4,688(5)	37.36	1/26/2025
	15,897	7,227(1)	23.04	1/6/2026
	10,117	13,007(2)	12.72	1/4/2027
	—	33,749(3)	17.92	1/3/2028
	—	32,500(4)	7.39	8/13/2028
Joanna Horobin	56,248	18,751(6)	31.04	11/30/2025
	10,117	13,007(2)	12.72	1/4/2027
	—	33,749(3)	17.92	1/3/2028
	—	32,500(4)	7.39	8/13/2028
John J. Kirby	14,061	4,689(7)	24.88	11/2/2025
	7,734	3,515(1)	23.04	1/6/2026
	5,468	7,031(2)	12.72	1/4/2027
	—	16,874(3)	17.92	1/3/2028
	—	10,000(4)	7.39	8/13/2028
Jonathan Yingling	32,811	42,188(8)	12.40	2/6/2027
	—	33,749(3)	17.92	1/3/2028
	—	32,500(4)	7.39	8/13/2028
Louis J. Arcudi, III	13,749	—	41.92	12/23/2019
	11,874	—	21.92	12/27/2020
	18,247	—	9.26	11/28/2021
	43,541	—	5.52	5/22/2023
	37,500	—	20.48	12/10/2023
	24,999	—	31.76	12/10/2024
	15,898	7,226(1)	23.04	1/6/2026
	10,117	13,007(2)	12.72	1/4/2027
	—	33,749(3)	17.92	1/3/2028
	—	32,500(4)	7.39	8/13/2028

(1) Represents unvested portion of stock option award that vested 25% on January 6, 2017 (first anniversary date following the January 6, 2016 grant date), with the remainder vesting in 12 equal

quarterly installments thereafter (until January 6, 2020), provided the named executive officer is still employed with us on each vesting date.

- (2) Represents unvested portion of stock option award that vested 25% on January 4, 2018 (first anniversary date following the January 4, 2017 grant date), with the remainder vesting in 12 equal quarterly installments thereafter (until January 4, 2021), provided the named executive is still employed with us on each vesting date.
- (3) Represents unvested portion of stock option award that will vest 25% on the first anniversary date following the January 3, 2018 grant date, with the remainder vesting in 12 equal quarterly installments thereafter (until January 3, 2022), provided the named executive is still employed with us on each vesting date.
- (4) Represents unvested portion of stock option award that will vest 25% on the first anniversary date following the August 13, 2018 grant date, with the remainder vesting in 12 equal quarterly installments thereafter (until August 13, 2022), provided the named executive is still employed with us on each vesting date.
- (5) Represents unvested portion of stock option award that vested 25% on January 26, 2016 (first anniversary date following the January 26, 2015 grant date), with the remainder vesting in 12 equal quarterly installments thereafter (until January 26, 2019), provided the named executive is still employed with us on each vesting date.
- (6) Represents unvested portion of stock option award that vested 25% on November 30, 2016 (first anniversary date following the November 30, 2015 grant date), with the remainder vesting in 12 equal quarterly installments thereafter (until November 30, 2019), provided the named executive is still employed with us on each vesting date.
- (7) Represents unvested portion of stock option award that vested 25% on November 2, 2016 (first anniversary date following the November 2, 2015 grant date), with the remainder vesting in 12 equal quarterly installments thereafter (until November 2, 2019), provided the named executive is still employed with us on each vesting date.
- (8) Represents unvested portion of stock option award that will vest 25% on the first anniversary date following the February 6, 2017 grant date, with the remainder vesting in 12 equal quarterly installments thereafter (until February 6, 2021), provided the named executive is still employed with us on each vesting date.

Option Exercises and Stock Vested

None of our named executive officers exercised any options during the year ended December 31, 2018.

Potential Payments Upon Termination or Change in Control

Under our employment agreement and employment offer letters with our executive officers, we have agreed to provide severance and other benefits in the event of the termination of their employment under specified circumstances. These agreements are described above under the caption "Employment and Separation Agreements with our Named Executive Officers."

However, in March 2017, we entered into a Severance and Change of Control Agreement with each of Messrs. Milano, Arcudi and Fletcher, and Drs. Horobin and Yingling that superseded the severance and change in control provisions of each of their respective employment offer letters. These agreements are also described above under the caption "Employment and Separation Agreements with our Named Executive Officers."

In October 2018, we entered into a separation agreement and release with Mr. Arcudi, in connection with Mr. Arcudi's resignation effective October 31, 2018, as our Senior Vice President of Operations, Chief Financial Officer, Treasurer and Assistant Secretary, and we agreed to provide him certain severance benefits and other compensation. This agreement is described above under the caption "Employment and Separation Agreements with our Named Executive Officers," and the payments upon Mr. Arcudi's resignation were paid in accordance with this agreement and are set forth above in the "Summary Compensation Table."

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

The following table sets forth the estimated potential benefits that our named executive officers would be entitled to receive upon their termination of employment with our company (other than a termination in connection with or following a change in control of our company) if the named executive officer's employment was terminated on December 31, 2018. This table represents estimates only and does not necessarily reflect the actual amounts that would be paid to our named executive officers, which would only be known at the time that they become eligible for payment following their termination.

Name	Cash Severance(1) (\$)	Perquisites/ Benefits(2) (\$)	Total (\$)
Vincent J. Milano	810,560	25,414	835,974
R. Clayton Fletcher	517,523	25,414	542,937
Joanna Horobin	533,112	25,414	558,526
John J. Kirby(3)	—	—	—
Jonathan Yingling	519,695	25,414	545,109

- (1) Cash severance under the Severance and Change of Control Agreements would be payable to Messrs. Milano and Fletcher, and Drs. Horobin and Yingling upon a termination of the executive's employment by the executive for "good reason" or by us without "cause", in either case, subject to the executive's timely execution and non-revocation of a general release of claims in a form provided by the Company and the executive's continued compliance with the invention, non-disclosure and non-competition agreement previously entered into in connection with the commencement of executive's employment. In such an event, executives would receive:
 - (i) a lump sum cash payment payable within 30 days after the date of termination equal to the greater of (1) the average bonus paid or earned and accrued, but unpaid to the executive in respect of the three fiscal years immediately preceding the year of termination, and (2) the annual bonus paid for the year immediately preceding the year of termination (\$210,560 for Mr. Milano, \$117,523 for Mr. Fletcher, \$108,112 for Dr. Horobin and \$119,695 for Dr. Yingling); and
 - (ii) salary continuation payments at the executive's base salary on termination date for a period of 12 months paid in accordance with the Company's normal payroll practices and subject to applicable tax withholding (\$600,000 for Mr. Milano, \$400,000 for Mr. Fletcher, \$425,000 for Dr. Horobin and \$400,000 for Dr. Yingling).
- (2) Under the Severance and Change of Control Agreements, upon a qualifying termination by Messrs. Milano and Fletcher, and Drs. Horobin and Yingling, to the extent the executives participated in our group medical/dental insurance immediately prior to the termination date, if executives elect to continue receiving group medical and/or dental insurance under the continuation coverage rules known as COBRA, the Company will pay the Company's share of the premium for such coverage that it pays for active and similarly-situated employees who receive the

same type of coverage until the end of the period for which the Company is paying the salary continuation payments described within note (1)(ii), above.

The payments described in this column include an estimated value of the employer share of the premiums for our insurance plans as follows:

Name	Medical Insurance Premiums (\$)	Dental Insurance Premiums (\$)	Total (\$)
Vincent J. Milano	23,584	1,830	25,414
R. Clayton Fletcher	23,584	1,830	25,414
Joanna Horobin	23,584	1,830	25,414
Jonathan Yingling	23,584	1,830	25,414

- (3) Mr. Kirby currently does not have a Severance and Change in Control Agreement with us.

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

The following table sets forth the estimated potential benefits that our named executive officers would be entitled to receive upon their termination of employment with our company in connection with or following a change in control of our company if the named executive officer's employment was terminated on December 31, 2018. The amounts indicated below are estimates based on the material assumptions described in the notes to the table below, which may or may not actually occur. Some of these assumptions are based on information currently available and, as a result, the actual amounts, if any, that may become payable to a named executive officer may differ in material respects from the amounts set forth below. Furthermore, for purposes of calculating such amounts, we have assumed:

- a change of control date of December 31, 2018;
- each named executive officer's employment is terminated by us without "cause" or by the named executive officer for "good reason", in each case on the date of the change of control; and
- the value of the accelerated vesting of any equity award is calculated assuming a market price per share of our common stock equal to \$2.77 (which equals the closing price of a share of our common stock on the Nasdaq Capital Market on December 31, 2018).

This table represents estimates only and does not necessarily reflect the actual amounts that would be paid to our named executive officers, which would only be known at the time that they become eligible for payment following their termination.

Name	Cash Severance(1) (\$)	Equity(2) (\$)	Perquisites/Benefits(3) (\$)	Total (\$)
Vincent J. Milano	1,650,000	—	38,121	1,688,121
R. Clayton Fletcher	1,000,000	—	38,121	1,038,121
Joanna Horobin	1,062,500	—	38,121	1,100,621
John J. Kirby(4)	—	—	—	—
Jonathan Yingling	1,000,000	—	38,121	1,038,121

- (1) Cash severance under the Severance and Change of Control Agreements would be payable to Messrs. Milano and Fletcher, and Drs. Horobin and Yingling upon a termination of the executive's employment by the executive for "good reason" or by us without "cause", in either case, within 24 months following a change of control (i.e., pursuant to a "double trigger" arrangement), subject to the executive's timely execution and non-revocation of a general release of claims in a form provided by the Company and the executive's continued compliance with the invention,

non-disclosure and non-competition agreement previously entered into in connection with the commencement of executive's employment. In such an event, executives would receive a lump sum cash payment payable within 30 days after the date of termination equal to:

- (i) the executive's target bonus for the year of termination prorated for the portion of the year worked (\$300,000 for Mr. Milano, \$160,000 for Mr. Fletcher, \$170,000 for Dr. Horobin and \$160,000 for Dr. Yingling); and
 - (ii) 150% of the sum of (a) such executive's annual base salary for the year immediately preceding the year of termination and (b) the greatest of (1) the average bonus paid or earned and accrued, but unpaid to the executive in respect of the three years immediately preceding the year of termination, (2) the annual bonus paid for the year immediately preceding the year of termination and (3) the target bonus for the year in which the termination occurs (\$1,350,000 for Mr. Milano, \$840,000 for Mr. Fletcher, \$892,500 for Dr. Horobin and \$840,000 for Dr. Yingling).
- (2) Amounts in this column quantify the intrinsic value of the unvested stock options held by the named executive officers that would accelerate upon a qualifying termination of employment in connection with a change in control based on the assumptions described above.

Under the Severance and Change of Control Agreements, upon a qualifying termination by Messrs. Milano and Fletcher, and Drs. Horobin and Yingling within 24 months following a change of control, all outstanding stock options held by the executive as of the date of termination will be automatically vested in full as of the date of termination, and the executive will have the ability to exercise any such options until the three year anniversary of such executive's termination, but in no event past the remaining term of the applicable equity award. Upon a qualifying change in control event, Mr. Kirby's outstanding options shall fully vest, regardless of whether a termination event also occurs.

- (3) Under the Severance and Change of Control Agreements, upon a qualifying termination by Messrs. Milano and Fletcher, and Drs. Horobin and Yingling within 24 months following a change of control, the executive will be eligible to receive 150% of the Company's share of the annual premium for group medical and/or dental insurance coverage that was in place for the executive immediately prior to the date of termination, payable in a lump sum cash payment within 30 days after the date of termination.

The payments described in this column include an estimated value of the employer share of the premiums for our insurance plans as follows:

Name	Medical Insurance Premiums (\$)	Dental Insurance Premiums (\$)	Total (\$)
Vincent J. Milano	35,376	2,745	38,121
R. Clayton Fletcher	35,376	2,745	38,121
Joanna Horobin	35,376	2,745	38,121
Jonathan Yingling	35,376	2,745	38,121

- (4) Mr. Kirby currently does not have a Severance and Change in Control Agreement with us. However, following a qualifying change in control event, unvested stock options held by Mr. Kirby would accelerate in connection with a change control as governed by his outstanding stock option agreements.

EQUITY COMPENSATION PLAN INFORMATION

The following table provides information as of December 31, 2018 regarding total shares subject to outstanding stock options, warrants and rights and total additional shares available for issuance under our existing equity incentive and employee stock purchase plans. In addition, from time to time, we grant "inducement grants" pursuant to Nasdaq Listing Rule 5635(c)(4).

Plan Category	Number of Securities to be Issued Upon Exercise of Outstanding Options, Warrants and Rights (a)	Weighted-Average Exercise Price of Outstanding Options, Warrants and Rights (b)	Number of Securities Remaining Available for Future Issuance Under Equity Compensation Plans (Excluding Securities Reflected in Column (a)) (c)
Equity compensation plans approved by stockholders(1)	2,910,781	\$ 17.28	989,790
Equity compensation plans not approved by stockholders(2)	393,750	\$ 26.76	—
Total	3,304,531	\$ 18.41	989,790

- (1) Consists of our: 2008 Stock Incentive Plan; 2013 Stock Incentive Plan and 2017 Employee Stock Purchase Plan. Shares are available for future issuance only under our 2013 Stock Incentive Plan and 2017 Employee Stock Purchase Plan.
- (2) Consists of stock options issued as inducement grants as of December 31, 2018. These stock options are generally subject to the same terms and conditions as those awarded pursuant to the plans approved by our stockholders.

PROPOSAL TWO

APPROVAL, BY NON-BINDING VOTE, OF EXECUTIVE COMPENSATION

We are providing our stockholders the opportunity to vote to approve, on an advisory, non-binding basis, the compensation of our named executive officers as disclosed in this proxy statement in accordance with the SEC's rules. This proposal, which is commonly referred to as "say on pay," is required by the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, which added Section 14A to the Exchange Act. Consistent with the preference expressed by our stockholders at our 2017 annual meeting of stockholders, we have determined to hold an advisory vote on executive compensation annually.

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

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

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

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

The value of our variable, performance-based compensation is split between short-term compensation in the form of a cash bonus and long-term compensation in the form of stock option awards that vest over time from the date of grant of the option awards and from the time of achievement of performance milestones. The annual cash bonus is intended to provide an incentive to our executives to achieve short-term operational objectives. The stock option awards provide an incentive for our executives to achieve longer-term strategic business goals, which should lead to higher stock prices and increased stockholder value.

The "Executive Compensation" section set forth elsewhere in this proxy statement, including the "Compensation Discussion and Analysis," describes in detail our executive compensation programs and the decisions made by the compensation committee and the board of directors with respect to the fiscal year ended December 31, 2018.

Our board of directors is asking stockholders to approve a non-binding advisory vote on the following resolution:

RESOLVED, that the compensation paid to the company's named executive officers, as disclosed pursuant to the compensation disclosure rules of the Securities and Exchange Commission, including

the compensation discussion and analysis, the compensation tables and any related material disclosed in this proxy statement, is hereby approved.

As an advisory vote, this proposal is not binding. The outcome of this advisory vote will not overrule any decision by us or our board of directors (or any committee thereof), create or imply any change to our fiduciary duties or the fiduciary duties of our board of directors (or any committee thereof), or create or imply any additional fiduciary duties on us or our board of directors (or any committee thereof). However, our compensation committee and board of directors value the opinions expressed by our stockholders in their vote on this proposal and will consider the outcome of the vote when making future compensation decisions for named executive officers.

Recommendation of the Board of Directors

Our board of directors unanimously recommends that stockholders vote to approve the compensation of our named executive officers by voting FOR this proposal.

PROPOSAL THREE

APPROVAL OF AN AMENDMENT TO THE COMPANY'S 2013 STOCK INCENTIVE PLAN

Our 2013 Stock Incentive Plan was adopted by our board of directors in May 2013 and was approved by our stockholders in July 2013. In April 2014, April 2015 and March 2017, the board of directors adopted amendments to the 2013 Stock Incentive Plan, to, among other things, increase the number of shares authorized to be issued pursuant to awards granted under the 2013 Stock Incentive Plan, which amendments were thereafter approved by the stockholders. In April 2019, the board of directors adopted a further amendment, or the Amendment, to the 2013 Stock Incentive Plan, subject to stockholder approval, to increase the number of shares of common stock authorized for issuance under the 2013 Stock Incentive Plan by 2,500,000 shares.

A copy of the Amendment is attached as Appendix A to this proxy statement and is incorporated herein by reference. All other provisions of the 2013 Stock Incentive Plan will remain in full force and effect. A copy of the 2013 Stock Incentive Plan as amended by the Amendment, is attached as Appendix B to this proxy statement.

If the Amendment is approved, the total number of shares of common stock authorized for issuance under the 2013 Stock Incentive Plan would be 27,724,460 shares, plus such additional number of shares of common stock (up to 6,946,978 shares) as is equal to the number of shares of common stock subject to awards granted under our 2005 Stock Incentive Plan or 2008 Stock Incentive Plan which awards expire, terminate or are otherwise surrendered, cancelled, forfeited or repurchased by us at their original issuance price pursuant to a contractual repurchase right.

As of March 31, 2019, options to purchase 2,880,400 shares of common stock and 193,625 unvested restricted stock units were outstanding under the 2013 Stock Incentive Plan, 43,727 shares had been issued to non-employee directors in lieu of the payment of cash board fees, and an additional 323,418 shares were available for issuance pursuant to future awards under the 2013 Stock Incentive Plan (plus such additional number of shares of common stock as is equal to the number of shares of common stock subject to awards granted under our 2005 Stock Incentive Plan or 2008 Stock Incentive Plan which awards expire, terminate or are otherwise surrendered, cancelled, forfeited or repurchased by us at their original issuance price pursuant to a contractual repurchase right).

In consideration of the limited number of shares remaining available for issuance under the 2013 Stock Incentive Plan and our need for equity compensation to maintain a competitive position in attracting, retaining and motivating key personnel, our board of directors adopted the Amendment. In calculating the size of the increase in the authorized number of shares issuable under the 2013 Stock Incentive Plan, our board of directors considered, among other things, our hiring plans and expected number of employees, our historic share usage under our stock incentive plans, our "burn rate," our current overhang in shares issuable upon exercise of outstanding awards granted under our stock incentive plans or as inducement grants, the existing terms of such outstanding awards and assumptions regarding stock option exercise activity and forfeiture rates.

If stockholders approve the Amendment, we will have 2,823,418 shares of common stock available for issuance pursuant to future awards under the 2013 Stock Incentive Plan (plus such additional number of shares of common stock as is equal to the number of shares of common stock subject to awards granted under our 2005 Stock Incentive Plan or 2008 Stock Incentive Plan which awards expire, terminate or are otherwise surrendered, cancelled, forfeited or repurchased by us at their original issuance price pursuant to a contractual repurchase right). We expect that this number of shares available for issuance, given our historical and projected utilization and assuming relative stock price stability, will meet our grant needs until approximately the first half of 2021. This time period assumes that no shares will expire, terminate or otherwise be surrendered, cancelled, forfeited or repurchased by

us at their original issuance price pursuant to a contractual repurchase right under our 2005 Stock Incentive Plan or 2008 Stock Incentive Plan.

Burn rate provides a measure of the potential dilutive impact of the equity awards we grant. Set forth below is a table that reflects our burn rate for 2016, 2017 and 2018, as well as the average over those years.

<u>Fiscal Year</u>	<u>Equity Awards Granted</u>	<u>Basic Weighted Average Number of Shares of Common Stock Outstanding</u>	<u>Gross Burn Rate(1)</u>
2018	1,137,000	26,601,000	4.3%
2017	527,000	19,675,000	2.7%
2016	418,000	15,950,000	2.6%
Three-Year Average	694,000	20,742,000	3.3%

- (1) "Gross Burn Rate" is defined as the number of equity awards granted in the year divided by the basic weighted average of shares of common stock outstanding.

Overhang provides a measure of the potential dilutive effect of all outstanding equity awards and shares available for future grant. We calculated overhang as the total number of options outstanding, plus shares available to be granted, divided by the total shares of common stock outstanding. Our overhang at December 31, 2018 was 15.7%, and our overhang at March 31, 2019 was 15.2%. If the 2,500,000 additional shares proposed to be authorized for issuance under our 2013 Stock Incentive Plan are included in the calculations our overhang would have been 24.9% at December 31, 2018 and 24.1% at March 31, 2019. If we also add the shares of common stock issuable upon exercise of our pre-funded warrants to our total shares of common stock outstanding, our overhang would have been 22.6% at December 31, 2018 and 21.9% at March 31, 2018. See Note 15 to the financial statements in our annual report on Form 10-K for the year ended December 31, 2018 for more information regarding our pre-funded warrants.

The only equity compensation plans from which we may currently issue new awards are our 2017 Employee Stock Purchase Plan and our 2013 Stock Incentive Plan. We may also issue new awards as inducement grants. The following table summarizes information regarding all of our outstanding options under all of our equity compensation plans and shares available for future awards under all of our equity plans as of March 31, 2019.

	<u>March 31, 2019*</u>
Total shares of common stock underlying all outstanding options and RSUs	3,537,022
Weighted-average exercise price of outstanding options	\$ 15.29
Weighted-average remaining contractual life of outstanding options (in years)	7.15
Total shares available for future awards	355,712

- * Excludes inducement awards granted pursuant to Nasdaq Listing Rule 5635(c)(4).

Promotion of Sound Corporate Governance Practices

We have designed the 2013 Stock Incentive Plan to include a number of features that reinforce and promote alignment of equity compensation arrangements for employees, officers, non-employee

directors and consultants with the interests of our stockholders. These features include, but are not limited to, the following:

- *Limitation on Awards to Non-Employee Directors.* The 2013 Stock Incentive Plan places a limit on the aggregate value of awards that may be granted to non-employee directors of the Company.
- *No Discounted Stock Options or Stock Appreciation Rights.* Stock options and stock appreciation rights may not be granted with exercise prices lower than the fair market value of the underlying shares on the grant date.
- *Prohibition on Repricing.* The exercise price of a stock option or stock appreciation right may not be reduced, directly or indirectly, without the prior approval of stockholders, including by a cash repurchase of "underwater" awards.
- *Minimum Vesting Requirements.* Subject to certain limited exceptions, awards granted under the 2013 Stock Incentive Plan will be subject to a minimum vesting period of one year.
- *No Liberal Share Recycling.* Shares retained by or delivered to the Company to pay the exercise price of a stock option or stock appreciation right or to satisfy tax withholding taxes in connection with the exercise or settlement of an award count against the number of shares remaining available under the 2013 Stock Incentive Plan.
- *No Dividends on Unearned or Unvested Awards.* The 2013 Stock Incentive Plan prohibits the current payment of dividends or dividend equivalent rights on unearned or unvested awards.
- *Awards Subject to Clawback Policy.* Awards under the 2013 Stock Incentive Plan will be subject to the Company's compensation recoupment policy.
- *No Tax Gross-Ups.* The 2013 Stock Incentive Plan does not provide for any tax gross-ups.
- *No Liberal Change in Control Definition.* The 2013 Stock Incentive Plan defines reorganization event based on the consummation of the transaction rather than the announcement or stockholder approval of the transaction.

Summary of the 2013 Stock Incentive Plan, as amended

The following summary of the 2013 Stock Incentive Plan, as amended, is qualified in its entirety by reference to the 2013 Stock Incentive Plan, a copy of which is attached hereto as Appendix B. References to the board of directors in this summary shall include the compensation committee of the board of directors or any similar committee appointed by the board of directors to administer the 2013 Stock Incentive Plan.

Types of Awards; Shares Available for Issuance

The 2013 Stock Incentive Plan allows for the issuance of incentive stock options intended to qualify under Section 422 of the Internal Revenue Code, nonstatutory stock options, stock appreciation rights, restricted stock awards, restricted stock units, other stock-based awards and performance awards. We refer to these securities as Awards. Subject to adjustment in the event of stock splits, stock dividends or similar events, and assuming the Amendment is approved by our stockholders, Awards may be made under the 2013 Stock Incentive Plan for up to 27,724,460 shares of common stock, plus such additional number of shares of common stock (up to 6,946,978 shares) as is equal to the number of shares of common stock subject to awards granted under our 2005 Stock Incentive Plan or 2008 Stock Incentive Plan which awards expire, terminate or are otherwise surrendered, cancelled, forfeited or repurchased by us at their original issuance price pursuant to a contractual repurchase right (subject, however, in the case of incentive stock options to any limitations under the Internal Revenue Code). In

addition, if any Award granted under the 2013 Stock Incentive Plan expires or is terminated, surrendered, cancelled, forfeited or otherwise results in any common stock not being issued, the unused common stock covered by such Award shall again be available for the grant of Awards under the 2013 Stock Incentive Plan (subject, in the case of incentive stock options, to any limitations under the Internal Revenue Code). However, shares of common stock delivered to us by a participant to purchase common stock upon exercise of an Award or to satisfy tax withholding obligations (including shares retained from the Award creating the tax obligation) shall not be added back to the number of shares of common stock available for the future grant of Awards under the 2013 Stock Incentive Plan. In addition, common stock repurchased by us on the open market using proceeds from the exercise of an Award shall not increase the number of shares of common stock available for future grant of Awards under the 2013 Stock Incentive Plan.

All shares of common stock covered by stock appreciation rights, if any, shall be counted against the number of shares available for grant under the 2013 Stock Incentive Plan and the sub-limitations on Awards to non-employee directors. However, stock appreciation rights that may be settled only in cash shall not be so counted, and if a stock appreciation right is granted in tandem with an option for the same number of shares of common stock and the grant provides that only one such Award may be exercised, or tandem SAR, only the shares covered by the option shall be counted, and the expiration of one in connection with the other's exercise will not restore shares to the 2013 Stock Incentive Plan. The shares covered by a tandem SAR will not again become available for grant under the 2013 Stock Incentive Plan upon the expiration or termination of the tandem SAR. In the case of the exercise of a stock appreciation right, the number of shares counted against the shares available under the 2013 Stock Incentive Plan and the sub-limitation on Awards to non-employee directors (described below) and shall be the full number of shares subject to the stock appreciation right multiplied by the percentage of the stock appreciation right actually exercised, regardless of the number of shares actually used to settle the stock appreciation right upon exercise.

Subject to adjustment in the event of changes in capitalization and reorganization events (as defined below), any Award granted under the 2013 Stock Incentive Plan that is not a "full-value award" shall be counted against the number of shares available for grant under the 2013 Stock Incentive Plan and the sub-limitation on Awards to non-employee directors as one share for each share of common stock subject to such Award, and any Award that is a "full-value award" shall be counted as 1.25 shares for each share of common stock subject to such Award. "Full-value award" means any Award of restricted stock or restricted stock units or any other stock-based Award with a per share price or per unit purchase price lower than 100% of the fair market value of our common stock on the date of grant. To the extent a share that was subject to an Award that counted as one share is returned to the plan as described above, each applicable share reserve will be credited with one share, and to the extent a share that was subject to an Award that counted as 1.25 shares is returned to the plan as described above, each applicable share reserve will be credited with 1.25 shares.

Certain sub-limitations apply to the shares of common stock available for issuance under the 2013 Stock Incentive Plan. The maximum number of shares with respect to which Awards may be granted to any participant under the 2013 Stock Incentive Plan is 1,500,000 shares per calendar year. The maximum number of shares with respect to which Awards may be granted to directors who are not employees of Idera at the time of grant shall be 20% of the maximum number of authorized shares under the 2013 Stock Incentive Plan. Performance Awards can also provide for cash payments of up to a maximum of \$1,500,000 per fiscal year per individual.

In connection with a merger or consolidation of an entity with us or our acquisition of property or stock of an entity, our board of directors may grant Awards under the 2013 Stock Incentive Plan in substitution for an option or other stock or stock-based Awards granted by such entity or an affiliate thereof on such terms as our board of directors determines appropriate in the circumstances, notwithstanding any limitation on Awards contained in the 2013 Stock Incentive Plan. Substitute

Awards granted under the 2013 Stock Incentive Plan in connection with a merger or consolidation of an entity with Idera or the acquisition by Idera of property or stock of an entity shall not count against the overall share limits and sub-limitations described above, except as required by reason of Section 422 and related provisions of the Internal Revenue Code.

Shares issued under the 2013 Stock Incentive Plan may consist in whole or in part of authorized but unissued shares or treasury shares.

Descriptions of Awards

Options. Optionees receive the right to purchase a specified number of shares of common stock at a specified option price and subject to such other terms and conditions as are specified in connection with the option grant. Only our employees or employees of our subsidiaries, if any, may receive "incentive stock options" as defined in Section 422 of the Internal Revenue Code. An option that is not intended to be an incentive stock option is a nonstatutory stock option. Options may not be granted at an exercise price that is less than 100% of the fair market value of the common stock on the effective date of grant; provided, however, that if our board of directors approves the grant of an option with an exercise price to be determined on a future date, the exercise price may not be less than 100% of the fair market value of the common stock on such future date. Under present law, incentive stock options may not be granted at an exercise price less than 110% of the fair market value in the case of stock options granted to optionees holding more than 10% of the total combined voting power of all classes of our stock. Under the terms of the 2013 Stock Incentive Plan, stock options may not be granted for a term in excess of 10 years (and, under present law, five years in the case of incentive stock options granted to optionees holding greater than 10% of the total combined voting power of all classes of our stock). Any or all of the Awards available under the 2013 Stock Incentive Plan may be in the form of incentive stock options. The 2013 Stock Incentive Plan permits participants to pay the exercise price of options using one or more of the following manners of payment: (i) payment by cash, check or wire transfer, or, except as may otherwise be provided in the applicable option agreement or approved by our board of directors, in connection with a "cashless exercise" through a broker, (ii) to the extent provided in the applicable option agreement or approved by our board of directors, and subject to certain conditions, by surrender to us of shares of common stock owned by the participant valued at their fair market value, (iii) to the extent provided in an applicable nonstatutory stock option agreement or approved by our board of directors, and subject to certain conditions, by delivery of a notice of "net exercise" as a result of which we will retain a number of shares of common stock otherwise issuable pursuant to the stock option equal to the aggregate exercise price for the portion of the option being exercised divided by the fair market value of our common stock on the date of exercise, (iv) to the extent provided by applicable law and provided for in the applicable option agreement or approved by our board of directors, by any other lawful means, or (v) any combination of the foregoing.

Stock Appreciation Rights. A stock appreciation right, or SAR, is an award entitling the holder, upon exercise, to receive a number of shares of common stock or cash (or a combination thereof) determined by reference to appreciation, from and after the date of grant, in the fair market value of a share of our common stock over the measurement price. SARs may be granted independently or in tandem with stock options granted under the 2013 Stock Incentive Plan. When a SAR is granted in tandem with a stock option, the SAR will be exercisable only at such time or times, and to the extent, that the related stock option is exercisable (except to the extent designated by our board of directors in connection with a reorganization event), will terminate and no longer be exercisable upon the termination or exercise of the related option (except to the extent designated by our board of directors in connection with a reorganization event), and will be transferable only with the related stock option. The related stock option will terminate and no longer be exercisable upon the exercise of the SAR. The 2013 Stock Incentive Plan provides that the measurement price of an SAR may not be less than

100% of the fair market value of our common stock on the effective date of grant (provided, however, that if our board of directors approves the grant of a SAR effective as of a future date, the measurement price shall not be less than 100% of the fair market value on such future date) and that SARs granted under the 2013 Stock Incentive Plan may not have a term in excess of 10 years.

Limitation on Repricing of Options or SARs; No Reload Rights or Dividend Equivalents. With respect to options and SARs, unless such action is approved by stockholders or otherwise permitted under the terms of the 2013 Stock Incentive Plan in connection with certain changes in capitalization and reorganization events, we may not (i) amend any outstanding option or SAR granted under the 2013 Stock Incentive Plan to provide an exercise price or measurement price per share that is lower than the then-current exercise price or measurement price per share of such outstanding option or SAR, (ii) cancel any outstanding option or SAR (whether or not granted under the 2013 Stock Incentive Plan) and grant in substitution therefor new Awards under the 2013 Stock Incentive Plan (other than certain substitute Awards described above) covering the same or a different number of shares of common stock and having an exercise price or measurement price per share lower than the then-current exercise price or measurement price per share of the cancelled option or SAR, (iii) cancel in exchange for a cash payment any outstanding option or SAR with an exercise price or measurement price per share above the then-current fair market value of our common stock, or (iv) take any other action under the 2013 Stock Incentive Plan that constitutes a "repricing" within the meaning of the rules of the Nasdaq Stock Market. No option or SAR granted under the 2013 Stock Incentive Plan shall contain any provision entitling the grantee to the automatic grant of additional options or SARs in connection with any exercise of the original option or SAR or provide for the payment or accrual of dividend equivalents.

Restricted Stock Awards. We may issue Awards entitling recipients to acquire shares of our common stock subject to our right to repurchase all or part of such shares at their issue price or other stated or formula price (or to require forfeiture of such shares if issued at no cost) from the recipient in the event that conditions specified by the board of directors in the applicable Award are not satisfied prior to the end of the applicable restriction period established for such Award. We refer to these Awards as Restricted Stock. Unless otherwise provided in the applicable Award agreement, any dividend declared and paid by us with respect to a share of Restricted Stock shall be paid to the participant (without interest) only if and when such shares of Restricted Stock become free from any applicable restrictions on transferability and forfeiture.

Restricted Stock Units. We may also grant Awards entitling the recipient to receive shares of our common stock (or cash equal to the fair market value of such shares) to be delivered at the time such Award vests. We refer to these Awards as Restricted Stock Units. Our board of directors may, in its discretion, provide that settlement of Restricted Stock Units shall be deferred, on a mandatory basis or at the election of the participant in a manner that complies with Section 409A of the Internal Revenue Code. A participant has no voting rights with respect to any Restricted Stock Units. A grant of Restricted Stock Units may provide the participant with a right to receive dividend equivalents, which shall be subject to the same restrictions on transfer and forfeiture as the underlying Restricted Stock Units.

Other Stock-Based Awards. Under the 2013 Stock Incentive Plan, our board of directors may grant other Awards of shares of common stock and other Awards that are valued in whole or in part by reference to, or are otherwise based upon our common stock or other property, having such terms and conditions as the board of directors may determine. We refer to these types of Awards as Other Stock-Based Awards. Other Stock-Based Awards may be available as a form of payment in the settlement of other Awards granted under the 2013 Stock Incentive Plan or as payment in lieu of compensation to which a participant is otherwise entitled. Other Stock-Based Awards may be paid in shares of our common stock or cash, as our board of directors determines. Unless otherwise provided in the

applicable Award agreement, any dividend declared and paid by us with respect to a share of common stock granted under an Other Stock-Based Award shall be paid to the participant (without interest) only if and when such shares become free from any applicable restrictions on transferability and forfeitability. A grant of an Other Stock-Based Award may provide the participant with a right to receive dividend equivalents, which shall be subject to the same restrictions on transfer and forfeitability as the underlying Other Stock-Based Award.

Performance Awards. Restricted Stock, Restricted Stock Units and Other Stock-Based Awards granted under the 2013 Stock Incentive Plan may be made subject to achievement of performance goals. We refer to these types of Awards as Performance Awards. Performance Awards may also provide for cash payments of up to \$1,500,000 per fiscal year per individual. With respect to Performance Awards intended to qualify as "performance-based compensation" under Section 162(m) of the Internal Revenue Code, the compensation committee of our board of directors shall specify, at the time of grant, that such Performance Award will be granted, vest and/or pay out solely upon the achievement of specified objective performance criteria that are based on the relative or absolute attainment of specified levels of one or any combination of the following, which may be determined pursuant to generally accepted accounting principles, or GAAP, or on a non-GAAP basis, as determined by the compensation committee:

- earnings per share;
- return on average equity or average assets with respect to a pre-determined peer group;
- earnings;
- earnings growth;
- revenues;
- expenses;
- stock price;
- market share;
- return on sales, assets, equity or investment;
- regulatory compliance;
- achievement of balance sheet or income statement objectives;
- total shareholder return;
- net operating profit after tax;
- pre-tax or after tax income;
- cash flow;
- achievement of research, development, clinical or regulatory milestones;
- product sales;
- business development activities;
- the entry into an arrangement or agreement with a third party for the development, commercialization, marketing or distribution of products, services or technologies, or for conducting a research program to discover and develop a product, service or technology, and/or the achievement of milestones under such arrangement or agreement, including events that trigger an obligation or payment right;

- achievement of domestic and international regulatory milestones, including the submission of filings required to advance products, services and technologies in clinical development and the achievement of approvals by regulatory authorities relating to the commercialization of products, services and technologies;
- the achievement of discovery, preclinical and clinical stage scientific objectives, discoveries or inventions for products, services and technologies under research and development;
- the entry into or completion of a phase of clinical development for any product, service or technology, such as the entry into or completion of Phase 1, 2 and/or 3 clinical trials;
- the consummation of debt or equity financing transactions, or acquisitions of business, technologies and assets;
- new product or service releases;
- specified levels of product sales, net income, earnings before or after discontinued operations, interest, taxes, depreciation and/or amortization, operating profit before or after discontinued operations and/or taxes, sales, sales growth, earnings growth, cash flow or cash position, gross margins, stock price, market share, return on sales, assets, equity or investment; and
- improvement of financial ratings.

The preceding performance criteria may reflect absolute entity or business unit performance or a relative comparison to the performance of a peer group of entities or other external measure of selected performance criteria and may be absolute in their terms or measured against or in relationship to other companies comparably, similarly or otherwise situated. The compensation committee may specify that such performance measures shall be adjusted to exclude any one or more of:

- extraordinary items;
- gains or losses on the dispositions of discontinued operations;
- the cumulative effects of changes in accounting principles;
- the writedown of any asset;
- fluctuation in foreign currency exchange rates; and
- charges for restructuring and rationalization programs.

Such performance measures (i) may vary by participant and may be different for different Awards; (ii) may be particular to a participant or the department, branch, line of business, subsidiary or other unit in which the participant works and may cover such period as may be specified by the compensation committee; and (iii) shall be set by the compensation committee within the time period prescribed by, and shall otherwise comply with the requirements of, Section 162(m). The compensation committee may adjust downwards, but not upwards, the cash or number of shares payable pursuant to such Awards and may not waive the achievement of the applicable performance measures except in the case of the death or disability of the participant or a change in control of Idera. Performance Awards that are not intended to qualify as "performance-based compensation" under Section 162(m) may be based on these or other performance measures as determined by our board of directors. Dividend equivalents with respect to Performance Awards will be subject to the same restrictions on transfer and forfeitability as the underlying Performance Award.

Transferability of Awards

Except as the board of directors may otherwise determine or provide in an Award in connection with certain gratuitous transfers, Awards may not be sold, assigned, transferred, pledged or otherwise

encumbered by the person to whom they are granted, either voluntarily or by operation of law, except by will or the laws of descent and distribution or, other than in the case of an incentive stock option, pursuant to a qualified domestic relations order. During the life of the participant, Awards are exercisable only by the participant.

Eligibility to Receive Awards

Employees, officers, directors, consultants and advisors of Idera and of our present or future parent or subsidiary corporations and any other business venture in which Idera has a controlling interest (as determined by our board of directors) are eligible to be granted Awards under the 2013 Stock Incentive Plan. However, incentive stock options may only be granted to our employees, employees of our present or future parent or subsidiary corporations, and employees of any other entities the employees of which are eligible to receive incentive stock options under the Internal Revenue Code. As of March 31, 2017, approximately 70 persons were eligible to receive Awards under the 2013 Stock Incentive Plan, including our executive officers and non-employee directors. The granting of Awards under the 2013 Stock Incentive Plan is discretionary, and we cannot now determine the number or type of Awards to be granted in the future to any particular person or group, except that Awards are subject to the limitations described above. On April 18, 2019, the last reported sale price of our common stock on the Nasdaq Capital Market was \$2.39 per share.

Options Granted under the Existing Plan

Since the approval of the 2013 Stock Incentive Plan in 2013 through March 31, 2019, the following number of stock options have been granted to the individuals and groups described in the table. No other options have been granted to any other individuals or groups under the 2013 Stock Incentive Plan.

<u>Name of Beneficial Owner</u>	<u>Number of Shares of Common Stock Underlying Options and RSUs Granted under the 2013 Stock Incentive Plan</u>
Named Executive Officers	
Vincent J. Milano (President and Chief Executive Officer)(1)	333,248
R. Clayton Fletcher (Senior Vice President, Business Development and Strategy)(1)	176,097
Joanna Horobin (Senior Vice President, Chief Medical Officer)(1)	193,597
John J. Kirby (Vice President of Finance)	105,222
Jonathan Yingling (Senior Vice President, Chief Scientific Officer)(1)	170,473
Louis J. Arcudi, III (Former Senior Vice President of Operations, Chief Financial Officer, Treasurer and Assistant Secretary)	174,996
All current executive officers as a group(2)	1,172,237
All current directors (who are not executive officers) as a group(2)	180,811
Nominees for director	
Mark Goldberg, M.D.	34,375
Carol A. Schafer	23,000
All other employees, including all current officers who are not executive officers, as a group	1,670,501

(1) Received an inducement award granted pursuant to Nasdaq Listing Rule 5635(c)(4).

(2) All current reporting officers under Section 16(a) of the Securities and Exchange Act of 1934, as amended.

Administration

Our board of directors administers the 2013 Stock Incentive Plan and is authorized to grant Awards and to adopt, amend and repeal the administrative rules, guidelines and practices relating to the 2013 Stock Incentive Plan and to construe and interpret the provisions of the 2013 Stock Incentive Plan and any Award agreements entered into under the 2013 Stock Incentive Plan. Our board of directors may correct any defect, supply any omission or reconcile any inconsistency in the 2013 Stock Incentive Plan or any Award in the manner and to the extent it shall deem expedient and it shall be the sole and final judge of such expediency.

Pursuant to the terms of the 2013 Stock Incentive Plan, our board of directors may delegate authority under the 2013 Stock Incentive Plan to one or more committees or subcommittees of our board of directors. Our board of directors has authorized the compensation committee to administer certain aspects of the 2013 Stock Incentive Plan, including the granting of awards to directors and executive officers. The compensation committee, with the input of management, selects the recipients of Awards and determines, in addition to other items, and subject to the terms of the 2013 Stock Incentive Plan:

- the number of shares of common stock, cash or other consideration covered by Awards and the terms and conditions of such Awards, including the dates upon which such Awards become exercisable or otherwise vest;
- the exercise or measurement price of Awards, if any;
- the effect on Awards of a change in control of Idera; and
- the duration of Awards.

To the extent permitted by applicable law, our board of directors may delegate to one or more of our officers the power to grant stock options and certain Awards to our employees or non-executive officers and to exercise such other powers under the 2013 Stock Incentive Plan as the board of directors may determine, provided that the board of directors shall fix the terms of the Awards to be granted by such officers (including the exercise price of such Awards, which may include a formula by which the exercise price will be determined) and the maximum number of shares subject to Awards that the officers may grant. No officer shall be authorized to grant Awards to any of our executive officers. The board of directors has delegated to our chief executive officer the authority under the 2013 Stock Incentive Plan to grant stock options and restricted stock units to our non-executive employees subject to certain specified limitations and oversight by the compensation committee.

Awards to non-employee directors will only be granted and administered by a committee, all the members of which are independent as defined by Section 5605(a)(2) of the Nasdaq Listing Rules.

Except as otherwise provided under the 2013 Stock Incentive Plan, each Award may be made alone or in addition or in relation to any other Award. The terms of each Award need not be identical, and our board of directors need not treat participants uniformly. Our board of directors shall determine the effect on an Award of the disability, death, retirement, termination or other cessation of employment, authorized leave of absence or other change in the employment or other status of a participant and the extent to which, and the period during which, the participant (or the participant's legal representative, conservator, guardian or designated beneficiary) may exercise rights under the Award.

We are required to make equitable adjustments (in the manner determined by our board of directors) to the number and class of securities available under the 2013 Stock Incentive Plan and any outstanding awards under the 2013 Stock Incentive Plan and the share counting rules and sub-limits set forth in the 2013 Stock Incentive Plan to reflect stock splits, stock dividends, recapitalizations, combinations of shares, reclassifications of shares, spin-offs and other similar changes in capitalization

or events or any dividends or distributions to holders of our common stock other than ordinary cash dividends.

All decisions by the board of directors shall be made in the board of directors' sole discretion and shall be final and binding on all persons having or claiming any interest in the 2013 Stock Incentive Plan or in any Award. We will indemnify and hold harmless each director, officer, employee or agent to whom any duty or power relating to the administration or interpretation of the 2013 Stock Incentive Plan has been or will be delegated against any cost or expense (including attorneys' fees) or liability (including any sum paid in settlement of a claim with the board of directors' approval) arising out of any act or omission to act concerning the 2013 Stock Incentive Plan unless arising out of such person's own fraud or bad faith.

Minimum Vesting. No Award granted after April 13, 2015 under the 2013 Stock Incentive Plan may vest earlier than the first anniversary of its date of grant. This vesting limitation does not apply to (i) Awards granted on or prior to April 13, 2015 and (ii) Awards granted after April 13, 2015 representing an aggregate of up to 5% of the maximum number of authorized shares available for issuance under the 2013 Stock Incentive Plan. In addition, the 2013 Stock Incentive Plan prohibits our board of directors from amending any Award granted after April 13, 2015 to make such Award immediately exercisable in whole or in part, free of some or all restrictions or conditions, or otherwise realizable in whole or in part, as the case may be, except (i) to the extent required under any contractual obligation or other policy of Idera in effect on April 13, 2015, (ii) upon the death or disability of the participant or (iii) upon the merger, consolidation, reorganization or change in control of Idera or as a result of any other circumstance described below under the heading "Reorganization Events."

Amendment of Awards. Except as otherwise provided under the 2013 Stock Incentive Plan with respect to repricing outstanding stock options or SARs, Performance Awards, the minimum vesting rules and exclusions thereto, the prohibitions on acceleration of vesting and exclusions thereto, or actions requiring stockholder approval, our board of directors may amend, modify or terminate any outstanding Award, including but not limited to, substituting therefor another Award of the same or a different type, changing the date of exercise or realization, and converting an incentive stock option to a nonstatutory stock option, provided that the participant's consent to any such action will be required unless our board of directors determines that the action, taking into account any related action, does not materially and adversely affect the participant's rights under the 2013 Stock Incentive Plan or the change is otherwise permitted under the terms of the 2013 Stock Incentive Plan in connection with a change in capitalization or reorganization event.

Reorganization Events

Definitions. The 2013 Stock Incentive Plan contains provisions addressing the consequences of any reorganization event. A "reorganization event" is defined under the terms of the 2013 Stock Incentive Plan to mean (a) any merger or consolidation of us with or into another entity as a result of which all of our common stock is converted into or exchanged for the right to receive cash, securities or other property, or is cancelled, (b) any transfer or disposition of all of our common stock for cash, securities or other property pursuant to a share exchange or other transaction or (c) our liquidation or dissolution.

Awards Other than Restricted Stock; Options Available to the Board of Directors. Under the 2013 Stock Incentive Plan, if a reorganization event occurs, our board of directors may take any one or more of the following actions as to all or any (or any portion of) outstanding Awards other than Restricted Stock on such terms as the board of directors determines (except to the extent specifically provided otherwise in an applicable Award agreement or another agreement between a participant and us): (A) provide that such Awards shall be assumed, or substantially equivalent Awards shall be substituted,

by the acquiring or succeeding corporation (or an affiliate thereof), (B) upon written notice to a participant, provide that all of the participant's unexercised Awards will terminate immediately prior to the consummation of such reorganization event unless exercised by the participant (to the extent then exercisable) within a specified period following the date of such notice, (C) provide that outstanding Awards shall become exercisable, realizable, or deliverable, or restrictions applicable to an Award shall lapse, in whole or in part prior to or upon such reorganization event, (D) in the event of a reorganization event under the terms of which holders of common stock will receive upon consummation thereof a cash payment for each share surrendered in the reorganization event, which we refer to as the Acquisition Price, make or provide for a cash payment to participants with respect to each Award held by a participant equal to (X) the number of shares of common stock subject to the vested portion of the Award (after giving effect to any acceleration of vesting that occurs upon or immediately prior to such reorganization event) multiplied by (Y) the excess, if any, of (I) the Acquisition Price over (II) the exercise, measurement or purchase price of such Award and any applicable tax withholdings, in exchange for the termination of such Award, (E) provide that, in connection with our liquidation or dissolution, Awards shall convert into the right to receive liquidation proceeds (if applicable, net of the exercise, measurement or purchase price thereof and any applicable tax withholdings) and (F) any combination of the foregoing. Our board of directors is not obligated to treat all Awards, all Awards held by a participant, or all Awards of the same type, identically.

The 2013 Stock Incentive Plan also provides, however, that for Restricted Stock Units that are subject to Section 409A of the Internal Revenue Code: (A) if the applicable Restricted Stock Unit agreement provides that the Restricted Stock Units shall be settled upon a "change in control event" within the meaning of Treasury Regulation Section 1.409A-3(i)(5)(i), and the reorganization event constitutes such a "change in control event," then no assumption or substitution of the Restricted Stock Unit shall be permitted, and the Restricted Stock Units shall instead be settled in accordance with the terms of the applicable Restricted Stock Unit agreement; and (B) the board of directors may only undertake the actions set forth in clauses (C), (D) or (E) above if the reorganization event is a "change in control event" as so defined under the Treasury Regulation and such action is permitted or required by Section 409A of the Internal Revenue Code. If the reorganization event does not constitute a "change in control event" as defined in the Treasury Regulation or such action is not permitted or required by Section 409A of the Internal Revenue Code, and the acquiring or succeeding corporation does not assume or substitute the Restricted Stock Units pursuant to clause (A) above, then the unvested Restricted Stock Units shall terminate immediately prior to the consummation of the reorganization event without any payment in exchange therefor.

Provisions Applicable to Restricted Stock. Upon the occurrence of a reorganization event other than our liquidation or dissolution, our repurchase and other rights with respect to outstanding Restricted Stock shall inure to the benefit of our successor and shall, unless the board of directors determines otherwise, apply to the cash, securities or other property which the common stock was converted into or exchanged for pursuant to such reorganization event in the same manner and to the same extent as they applied to such Restricted Stock; provided, however, that the board of directors may provide for termination or deemed satisfaction of such repurchase or other rights under the instrument evidencing any Restricted Stock or any other agreement between a participant and us, either initially or by amendment.

Upon the occurrence of a reorganization event involving our liquidation or dissolution, except to the extent specifically provided to the contrary in the instrument evidencing any Restricted Stock or any other agreement between the participant and us, all restrictions and conditions on all Restricted Stock then outstanding shall automatically be deemed terminated or satisfied.

Provisions for Foreign Participants

Our board of directors may from time to time establish one or more sub-plans under the 2013 Stock Incentive Plan for purposes of satisfying applicable securities, tax or other laws of various jurisdictions. Our board of directors shall establish such sub-plans by adopting supplements to the 2013 Stock Incentive Plan containing any limitations on our board of directors' discretion under the 2013 Stock Incentive Plan as our board of directors shall deem necessary or desirable and any additional terms and conditions not otherwise inconsistent with the 2013 Stock Incentive Plan that our board shall deem necessary or desirable. All supplements adopted by our board of directors shall be deemed to be part of the 2013 Stock Incentive Plan, but each supplement shall apply only to participants within the affected jurisdiction.

Amendment or Termination

Our board of directors may amend, suspend or terminate the 2013 Stock Incentive Plan or any portion thereof at any time provided that (i) to the extent required by Section 162(m) of the Internal Revenue Code, no Award granted to a participant that is intended to comply with Section 162(m) after the date of such amendment shall become exercisable, realizable or vested, as applicable to such Award, unless and until our stockholders approve such amendment in the manner required by Section 162(m); (ii) no amendment that would require stockholder approval under the rules of the Nasdaq Stock Market may be made effective unless and until our stockholders approve such amendment; and (iii) if the Nasdaq Stock Market amends the rules of the Nasdaq Stock Market so that such rules no longer require stockholder approval of material amendments to equity compensation plans, then, from and after the effective date of such amendment to the rules of the Nasdaq Stock Market, no amendment to the 2013 Stock Incentive Plan (A) materially increasing the number of shares authorized under the 2013 Stock Incentive Plan (other than as provided for in the 2013 Stock Incentive Plan in connection with substitute Awards, changes in capitalization or reorganization events), (B) expanding the types of Awards that may be granted under the 2013 Stock Incentive Plan, or (C) materially expanding the class of participants eligible to participate in the 2013 Stock Incentive Plan shall be effective unless and until our stockholders approve such amendment. In addition, if at any time the approval of our stockholders is required as to any other modification or amendment under Section 422 of the Internal Revenue Code or any successor provision with respect to incentive stock options, the board of directors may not effect such modification or amendment without such approval. Unless otherwise specified in the amendment, any amendment to the 2013 Stock Incentive Plan adopted in accordance with the procedures described above shall apply to, and be binding on the holders of, all Awards outstanding under the 2013 Stock Incentive Plan at the time the amendment is adopted, provided that the board of directors determines that such amendment, taking into account any related action, does not materially and adversely affect the rights of participants under the 2013 Stock Incentive Plan.

Effective Date and Term of 2013 Stock Incentive Plan

The 2013 Stock Incentive Plan became effective on July 26, 2013, the date the plan was approved by our stockholders. No Awards shall be granted under the 2013 Stock Incentive Plan after the expiration of 10 years from the effective date, but Awards previously granted may extend beyond that date.

Federal Income Tax Consequences

The following generally summarizes the United States federal income tax consequences that generally will arise with respect to Awards granted under the 2013 Stock Incentive Plan. This summary is based on the federal tax laws in effect as of the date of this proxy statement. In addition, this summary assumes that all Awards are exempt from, or comply with, the rules under Section 409A of

the Internal Revenue Code regarding nonqualified deferred compensation. Changes to these laws or assumptions could alter the tax consequences described below.

Incentive Stock Options. A participant will not have income upon the grant of an incentive stock option. Also, except as described below, a participant will not have income upon exercise of an incentive stock option if the participant has been employed by us or our corporate parent or 50% or more-owned corporate subsidiary at all times beginning with the option grant date and ending three months before the date the participant exercises the option. If the participant has not been so employed during that time, then the participant will be taxed as described below under "Nonstatutory Stock Options." The exercise of an incentive stock option may subject the participant to the alternative minimum tax.

A participant will have income upon the sale of the stock acquired under an incentive stock option, which we refer to as ISO stock, at a profit (if sales proceeds exceed the exercise price). The type of income will depend on when the participant sells the ISO stock. If a participant sells the ISO stock more than two years after the option was granted and more than one year after the option was exercised, then all of the profit will be long-term capital gain. If a participant sells the ISO stock prior to satisfying these waiting periods, then the participant will have engaged in a disqualifying disposition and a portion of the profit will be ordinary income and a portion may be capital gain. This capital gain will be long-term if the participant has held the ISO stock for more than one year and otherwise will be short-term. If a participant sells the ISO stock at a loss (sales proceeds are less than the exercise price), then the loss will be a capital loss. This capital loss will be long-term if the participant held the ISO stock for more than one year and otherwise will be short-term.

Nonstatutory Stock Options. A participant will not have income upon the grant of a nonstatutory stock option. A participant will have compensation income upon the exercise of a nonstatutory stock option equal to the fair market value of the stock on the day the participant exercised the option less the exercise price. Upon sale of the stock, which we refer to as NSO stock, the participant will have capital gain or loss equal to the difference between the sales proceeds and the fair market value of the NSO stock on the day the option was exercised. This capital gain or loss will be long-term if the participant has held the NSO stock for more than one year and otherwise will be short-term.

Stock Appreciation Rights. A participant will not have income upon the grant of an SAR but generally will recognize compensation income upon the exercise of an SAR equal to the amount of the cash and the fair market value of any stock received. Upon the sale of the stock, the participant will have capital gain or loss equal to the difference between the sales proceeds and the fair market value of the stock on the day the SAR was exercised. This capital gain or loss will be long-term if the participant held the stock for more than one year and otherwise will be short-term.

Restricted Stock. A participant will not have income upon the grant of Restricted Stock unless an election under Section 83(b) of the Internal Revenue Code is made within 30 days of the date of grant. If a timely Section 83(b) election is made, then a participant will have compensation income equal to the fair market value of the stock less the purchase price, if any. When the stock is sold, the participant will have capital gain or loss equal to the difference between the sales proceeds and the fair market value of the stock on the date of grant. If the participant does not make a Section 83(b) election, then when the shares of Restricted Stock vest the participant will have compensation income equal to the fair market value of the stock on the vesting date less the purchase price. When the stock is sold, the participant will have capital gain or loss equal to the sales proceeds less the fair market value of the stock on the vesting date. Any capital gain or loss will be long-term if the participant held the stock for more than one year and otherwise will be short-term.

Restricted Stock Units. A participant will not have income upon the grant of a Restricted Stock Unit. A participant is not permitted to make a Section 83(b) election with respect to a Restricted Stock

Unit. When the Restricted Stock Unit vests, the participant will have compensation income on the vesting date in an amount equal to the fair market value of the stock on the vesting date less the purchase price, if any. When the stock is sold, the participant will have capital gain or loss equal to the sales proceeds less the fair market value of the stock on the vesting date. Any capital gain or loss will be long-term if the participant held the stock for more than one year and otherwise will be short-term.

Other Stock-Based Awards. The tax consequences associated with any Other Stock-Based Award granted under the 2013 Stock Incentive Plan will vary depending on the specific terms of the Award. Among the relevant factors are whether or not the Award has a readily ascertainable fair market value, whether or not the Award is subject to forfeiture provisions or restrictions on transfer, the nature of the property to be received by the participant under the Award and the participant's holding period and tax basis for the Award or underlying common stock.

Tax Consequences to Idera. There will be no tax consequences to us except that we will be entitled to a deduction when a participant has compensation income. Any such deduction will be subject to the limitations of Section 162(m) of the Internal Revenue Code.

Recommendation of the Board of Directors

Our board of directors unanimously recommends that you vote FOR the approval of the amendment to the Company's 2013 Stock Incentive Plan.

PROPOSAL FOUR
APPROVAL OF AN AMENDMENT TO THE COMPANY'S 2017 EMPLOYEE STOCK PURCHASE PLAN

Our 2017 Employee Stock Purchase Plan, or 2017 ESPP, was adopted by our board of directors in March 2017 and was approved by our stockholders in June 2017. The 2017 ESPP is intended to qualify as an "employee stock purchase plan" as defined in Section 423 of the Internal Revenue Code, and is intended to encourage our employees to become stockholders of ours, to stimulate increased interest in our affairs and success, to afford employees the opportunity to share in our earnings and growth and to promote systematic savings by them. The board of directors believes that the future success of our company depends, in large part, upon our ability to maintain a competitive position in attracting, retaining and motivating key personnel, and the board of directors believes that the ability to participate in the 2017 ESPP is an attractive feature for our employees and potential employees.

In April 2019, the board of directors adopted an amendment, or the Amendment, to the 2017 ESPP, subject to stockholder approval, to increase the number of shares of common stock authorized for issuance under the 2017 ESPP by 350,000 shares. If the Amendment is approved, the total number of shares of common stock authorized for issuance under the 2017 ESPP would be 850,000 shares. A copy of the Amendment is attached as Appendix C to this proxy statement and is incorporated herein by reference. All other provisions of the 2017 ESPP will remain in full force and effect. A copy of the 2017 ESPP, as amended by the Amendment, is attached as Appendix D to this proxy statement.

We believe approval of the Amendment is advisable to ensure we have enough shares of common stock available for our compensation programs and to reflect current best practices for stock incentive plans.

Description of the 2017 ESPP, as amended

The following summary of the 2017 ESPP, as amended, is qualified in its entirety by reference to the 2017 ESPP, a copy of which is attached hereto as Appendix D. The 2017 ESPP is administered by our board of directors or by a committee appointed by our board of directors. As of March 31, 2019, approximately 467,706 shares of common stock had been issued under the 2017 ESPP. Thus, as amended, the 2017 ESPP will provide participating employees with the opportunity to purchase an aggregate of 382,294 shares of our common stock, subject to adjustment as described below, in connection with certain changes in capitalization and reorganization events.

All of our employees and employees of any of our designated subsidiaries, as defined in the 2017 ESPP, are eligible to participate in the 2017 ESPP, provided that:

- such person is customarily employed by us or a designated subsidiary for more than 20 hours a week and for more than five months in a calendar year;
- such person has been employed by us or by a designated subsidiary for at least three months prior to enrolling in the 2017 ESPP; and
- such person was our employee or an employee of a designated subsidiary on the first day of the applicable offering period under the 2017 ESPP.

As of March 31, 2019, approximately 36 persons, including our executive officers, were eligible to participate in the 2017 ESPP.

No employee may be granted an option to purchase shares of our common stock under the 2017 ESPP and any of our other employee stock purchase plans that would accrue at a rate which exceeds \$25,000 of the fair market value of our common stock (as of the date of the option grant) in any calendar year. In addition, no employee may be granted the right to purchase shares of our common

stock under the 2017 ESPP if after the exercise of the option, the employee would own 5% or more of the total combined voting power or value of our stock.

We expect to make one or more offerings to our eligible employees to purchase stock under the 2017 ESPP beginning at such time as our board of directors may determine. Each offering will consist of a specified offering period during which payroll deductions will be made and held for the purchase of our common stock at the end of the offering period. Our board of directors may, at its discretion, choose an offering period of 12 months or less for offerings.

Eligible employees may elect to participate in the 2017 ESPP by authorizing up to a maximum of 10% of his or her compensation to be deducted by us during the offering period. Such deductions must be set at whole percentage point intervals, and any change in compensation during the offering period will result in an automatic corresponding change in the dollar amount withheld. On the first day of each offering period, employees who have elected to participate in the 2017 ESPP will be granted an option to purchase up to a number of shares equal to \$2,083 multiplied by the number of whole months in the offering period, divided by the fair market value of our stock on the first day of the offering period. Each employee who continues to be a participant in the 2017 ESPP on the last business day of the offering period will be deemed to have exercised an option to purchase from us the number of whole shares of our common stock that his or her accumulated payroll deductions on such date will buy, not in excess of the maximum numbers set forth above. Under the terms of the 2017 ESPP, the purchase price shall be determined by our board of directors for each offering period and will be at least 85% of the applicable closing price of our common stock. If our board of directors does not make a determination of the purchase price, the purchase price will be 85% of the lesser of the closing price of our common stock on the first business day of the offering period or on the last business day of the offering period.

An employee may for any reason withdraw from participation in an offering prior to the end of an offering period and permanently withdraw the balance accumulated in the employee's account. If an employee elects to discontinue his or her payroll deductions during an offering period but does not elect to withdraw his or her funds, funds previously deducted will be applied to the purchase of common stock at the end of the offering period. If a participating employee's employment ends before the last business day of an offering period, no additional payroll deductions will be made and the balance in the employee's account will be paid to the employee.

We will be required to make equitable adjustments to the number and class of securities available under the 2017 ESPP, the share limitations under the 2017 ESPP and the purchase price for an offering period under the 2017 ESPP to reflect stock splits, reverse stock splits, stock dividends, recapitalizations, combinations of shares, reclassifications of shares, spin-offs and other similar changes in capitalization or events or any dividends or distributions to holders of our common stock other than ordinary cash dividends.

In connection with a merger or other reorganization event (as defined in the 2017 ESPP), our board of directors or a committee of our board of directors may take any one or more of the following actions as to outstanding options to purchase shares of our common stock under the 2017 ESPP on such terms as our board or committee determines:

- provide that options shall be assumed, or substantially equivalent options shall be substituted, by the acquiring or succeeding corporation (or an affiliate thereof);
- upon written notice to employees, provide that all outstanding options will be terminated immediately prior to the consummation of such reorganization event and that all such outstanding options will become exercisable to the extent of accumulated payroll deductions as of a date specified by our board or committee in such notice, which date shall not be less than ten days preceding the effective date of the reorganization event;

- upon written notice to employees, provide that all outstanding options will be cancelled as of a date prior to the effective date of the reorganization event and that all accumulated payroll deductions will be returned to participating employees on such date;
- in the event of a reorganization event under the terms of which holders of our common stock will receive upon consummation thereof a cash payment for each share surrendered in the reorganization event, change the last day of the offering period to be the date of the consummation of the reorganization event and make or provide for a cash payment to each employee equal to (1) the cash payment for each share surrendered in the reorganization event times the number of shares of our common stock that the employee's accumulated payroll deductions as of immediately prior to the reorganization event could purchase at the applicable purchase price, where the acquisition price is treated as the fair market value of our common stock on the last day of the applicable offering period for purposes of determining the purchase price and where the number of shares that could be purchased is subject to the applicable limitations under the 2017 ESPP minus (2) the result of multiplying such number of shares by the purchase price; and/or
- provide that, in connection with our liquidation or dissolution, options shall convert into the right to receive liquidation proceeds (net of the purchase price thereof).

We may, in order to comply with the laws of a foreign jurisdiction, grant options to eligible employees who are citizens or residents of such jurisdiction on terms that are less favorable than the terms applicable to eligible employees who are resident in the United States. In addition, we may exclude from the 2017 ESPP otherwise eligible employees who are citizens or residents of a foreign jurisdiction if (i) the grant of an option to a citizen or resident of such foreign jurisdiction is prohibited under the laws of such jurisdiction or (ii) compliance with the laws of such foreign jurisdiction would cause the 2017 ESPP to violate Section 423 of the Internal Revenue Code. Further, we may establish one or more sub-plans of the 2017 ESPP with respect to one or more designated subsidiaries.

Our board of directors may at any time amend or suspend the 2017 ESPP, except that if the approval of any such amendment by our stockholders is required under Section 423 of the Internal Revenue Code, such amendment will not be effective unless stockholder approval is obtained.

The 2017 ESPP may be terminated at any time by our board of directors. Upon termination, we will refund all amounts in the accounts of participating employees.

Participation in the 2017 ESPP is discretionary. The benefits received by any individual under the plan are dependent upon the individual's decision to participate in the 2017 ESPP, the amount that the individual decides to contribute to the 2017 ESPP and the applicable closing price of our common stock. As a result, it is not possible to determine the benefits that would be received under the 2017 ESPP by our executive officers, employee directors and other employees. Non-employee directors are not eligible to participate in the ESPP.

Federal Income Tax Consequences

The following generally summarizes the United States federal income tax consequences that will arise with respect to participation in the 2017 ESPP and with respect to the sale of common stock acquired under the plan. This summary is based on the tax laws in effect as of the date of this proxy statement. The 2017 ESPP is intended to qualify as an "employee stock purchase plan" as defined in Section 423 of the Internal Revenue Code. This summary assumes that the 2017 ESPP complies with Section 423 of the Internal Revenue Code. Further, this summary assumes that the purchase price for shares is 85% of the closing price of a share of our common stock on the first day of the offering period or the last day of the offering period, whichever is lower. Changes to these laws could alter the tax consequences described below.

Tax Consequences to Participants

A participant will not have income upon enrolling in the 2017 ESPP or upon purchasing stock at the end of a purchase period. A participant may have both compensation income and a capital gain or loss upon the sale of stock that was acquired under the 2017 ESPP. The amount of each type of income and loss will depend on whether the participant disposes of the stock in a qualifying or disqualifying disposition. A qualifying disposition is when the participant sells the stock more than two years after the commencement of the offering during which the stock was purchased and more than one year after the date on which the participant purchased the stock at a profit (i.e., the sales proceeds exceed the purchase price). In a qualifying disposition, the participant will have compensation income equal to the lesser of:

- 15% of the value of the stock on the day the offering commenced; and
- the difference between the fair market value of the stock on the date of disposition and the purchase price.

Any profit in excess of compensation income will be long-term capital gain. If the participant sells the stock at a loss (i.e., if sales proceeds are less than the purchase price) after satisfying these waiting periods, then the loss will be a long-term capital loss.

If the participant sells the stock prior to satisfying these waiting periods, then he or she will have engaged in a disqualifying disposition. Upon a disqualifying disposition, the participant will have compensation income equal to the value of the stock on the day he or she purchased the stock less the purchase price. The participant also will have a capital gain or loss equal to the difference between the sales proceeds and the value of the stock on the day he or she purchased the stock. This capital gain or loss will be long-term if the participant has held the stock for more than one year and short-term if held one year or less.

Tax Consequences to Us

There will be no tax consequences to us except that we will be entitled to a deduction when a participant recognizes compensation income upon a disqualifying disposition. Any such deduction will be subject to the limitations of Section 162(m) of the Internal Revenue Code.

Recommendation of the Board of Directors

Our board of directors unanimously recommends that you vote FOR the approval of the amendment to the Company's 2017 Employee Stock Purchase Plan.

**PROPOSAL FIVE
RATIFICATION OF SELECTION OF INDEPENDENT REGISTERED
PUBLIC ACCOUNTING FIRM**

The audit committee of our board of directors has selected the firm of Ernst & Young LLP as our independent registered public accounting firm for the fiscal year ending December 31, 2019. Ernst & Young LLP has served as our independent registered public accounting firm since 2002. Although stockholder approval of the audit committee's selection of Ernst & Young LLP is not required by law, our board of directors believes that it is advisable to give stockholders an opportunity to ratify this selection. If this proposal is not approved at the 2019 annual meeting, the audit committee of our board of directors may reconsider its selection.

Representatives of Ernst & Young LLP are expected to be present at the 2019 annual meeting. They will have the opportunity to make a statement if they desire to do so and will also be available to respond to appropriate questions from stockholders.

Recommendation of the Board of Directors

Our board of directors unanimously recommends that you vote FOR the ratification of the selection of Ernst & Young LLP as our independent registered public accounting firm for the fiscal year ending December 31, 2019.

ACCOUNTING MATTERS

Report of the Audit Committee

The audit committee has reviewed our audited financial statements for the fiscal year ended December 31, 2018 and discussed them with our management and our independent registered public accounting firm.

The audit committee has also received from, and discussed with, our independent registered public accounting firm various communications that our independent registered public accounting firm is required to provide to the audit committee, including the matters required to be discussed by the AS 1301: *Communications with Audit Committees*, as adopted by the Public Company Accounting Oversight Board.

The audit committee has received from Ernst & Young LLP the letter and other written disclosures required by applicable requirements of the Public Company Accounting Oversight Board regarding its communication with the audit committee concerning independence, and has discussed with Ernst & Young LLP its independence from the Company. The audit committee has also considered whether the provision of other non-audit services by Ernst & Young LLP is compatible with maintaining their independence.

Based on the review and discussions referred to above, the audit committee recommended to our board of directors that the audited financial statements be included in our annual report on Form 10-K for the year ended December 31, 2018.

By the audit committee of the board of directors,

William S. Reardon, Chairman
James Geraghty
Mark Goldberg, M.D.
Carol Schafer

The report of the Audit Committee is not "soliciting material," is not deemed "filed" with the SEC and is not to be incorporated by reference into any filing of the Company under the Securities Act of 1933 or the Securities Exchange Act of 1934, both as amended.

Independent Registered Public Accounting Firm Fees

The following table sets forth all fees paid or accrued by us for professional services rendered by Ernst & Young LLP during the years ended December 31, 2018 and 2017:

<u>Fee Category</u>	<u>2018</u>	<u>2017</u>
Audit Fees	\$ 581,145	\$ 600,122
Audit-Related Fees	230,318	204,814
Tax Fees	26,780	126,980
All Other Fees	1,925	1,995
Total Fees	\$ 840,168	\$ 933,911

Audit Fees

Audit fees represent the aggregate fees billed for professional services rendered by our independent registered public accounting firm for the audit of our annual financial statements and internal controls over financial reporting, review of financial statements included in our quarterly reports on Form 10-Q and services that are normally provided in connection with statutory and regulatory filings or engagements.

Audit-Related Fees

Audit-related fees represent the aggregate fees billed for assurance and related professional services rendered by our independent registered public accounting firm that are reasonably related to the performance of the audit or review of our financial statements and that are not reported under "Audit Fees" including consultations regarding internal controls, financial accounting and reporting standards; the issuance of consents in connection with registration statement filings with the SEC and comfort letters in connection with securities offerings.

Tax Fees

Tax fees represent the aggregate fees billed for professional services rendered by our independent registered public accounting firm for tax compliance, tax advice and tax planning services. Tax compliance services, which relate to preparation of tax returns, accounted for \$27,000 of the total tax fees billed in both 2018 and 2017. Tax advice and tax planning services primarily relate to consultations on our net operating loss carry forwards and payroll taxes.

All Other Fees

All other fees represent the aggregate fees billed for all other products and services rendered by our independent registered public accounting firm other than the services reported in the other categories. All other fees for all periods presented related to our subscription to Ernst & Young's online accounting research tool.

Our audit committee believes that the non-audit services described above did not compromise Ernst & Young LLP's independence. Our audit committee charter, which you can find by clicking "Investors" and "Corporate Governance" on our website, www.iderapharma.com, requires that all proposals to engage Ernst & Young LLP for services, and all proposed fees for these services, be submitted to the audit committee for approval before Ernst & Young LLP may provide the services.

Pre-Approval Policies and Procedures

Our audit committee has adopted policies and procedures relating to the approval of all audit and non-audit services that are to be performed by our independent registered public accounting firm. This policy generally provides that we will not engage our independent registered public accounting firm to render audit or non-audit services unless the service is specifically approved in advance by the audit committee or the engagement is entered into pursuant to the pre-approval procedures described below.

From time to time, the audit committee may pre-approve specified types of services that are expected to be provided to us by our independent registered public accounting firm during the next 12 months. Any such pre-approval is detailed as to the particular service or type of services to be provided and is also generally subject to a maximum dollar amount. All of the services described above under the headings "Audit Fees," "Audit-Related Fees," "Tax Fees" and "All Other Fees" were pre-approved by our audit committee.

TRANSACTIONS WITH RELATED PERSONS

Since January 1, 2018, we have not entered into or engaged in any related party transactions, as defined by the SEC, with our directors, officers and stockholders who beneficially owned more than 5% of our outstanding common stock, as well as affiliates or immediate family members of those directors, officers and stockholders.

Policies and Procedures for Related Person Transactions

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

In accordance with our audit committee charter, members of the audit committee, all of whom are independent directors, review and approve all related party transactions for which approval is required under applicable laws or regulations, including SEC and the Nasdaq Listing Rules. Current SEC rules define a related party transaction to include any transaction, arrangement or relationship in which we are a participant and the amount involved exceeds \$120,000, and in which any of the following persons has or will have a direct or indirect interest:

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

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

SECTION 16(a) BENEFICIAL OWNERSHIP REPORTING COMPLIANCE

Section 16(a) of the Exchange Act requires our directors, officers and the holders of more than 10% of our common stock, which we refer to collectively as reporting persons, to file with the SEC initial reports of ownership of our common stock and other equity securities on a Form 3 and reports of changes in such ownership on a Form 4 or Form 5. Reporting persons are required by SEC regulations to furnish us with copies of all Section 16(a) forms they file. To our knowledge, based solely on a review of our records and written representations by the persons required to file these reports, during 2018, the reporting persons complied with all Section 16(a) filing requirements, except that a Form 4 filed by Mr. Lim with respect to a grant of options to Mr. Lim upon his commencement of employment on September 10, 2018, was filed one day late, on September 13, 2018.

By order of the board of directors,

/s/ BRYANT D. LIM

Bryant D. Lim
Senior Vice President, General Counsel and Corporate Secretary

Exton, Pennsylvania
April 25, 2019

**AMENDMENT TO THE
IDERA PHARMACEUTICALS, INC. 2013 STOCK INCENTIVE PLAN**

WHEREAS, Idera Pharmaceuticals, Inc. (the "Company") desires to amend the Idera Pharmaceuticals, Inc. 2013 Stock Incentive Plan, as amended (the "2013 Plan"), in the manner set forth below (the "Amendment"); and

WHEREAS, on April [·], 2019, subject to stockholder approval, the Board of Directors of the Company approved the Amendment; and

NOW THEREFORE, in accordance with Section 11(d) of the 2013 Plan, the 2013 Plan is hereby amended as follows:

1. Section 4(a) of the 2013 Plan is hereby amended by deleting subsection (1) thereof in its entirety and substituting the following in lieu thereof:

"(1) Authorized Number of Shares. Subject to adjustment under Section 9, Awards may be made under the Plan, any or all of which Awards may be in the form of Incentive Stock Options (as defined in Section 5(b)), for up to such number of shares of common stock, \$0.001 par value per share, of the Company (the "Common Stock") as is equal to the sum of:

(A) 27,724,460 shares of Common Stock; plus

(B) such additional number of shares of Common Stock (up to 6,946,978 shares) as is equal to the sum of the number of shares of Common Stock subject to awards granted under the Company's 2005 Stock Incentive Plan (the "2005 Plan") or the Company's 2008 Stock Incentive Plan (the "2008 Plan" and, together with the 2005 Plan, the "Existing Plans") which awards expire, terminate or are otherwise surrendered, canceled, forfeited or repurchased by the Company at their original issuance price pursuant to a contractual repurchase right (subject, however, in the case of Incentive Stock Options to any limitations of the Code).

Shares issued under the Plan may consist in whole or in part of authorized but unissued shares or treasury shares."

The Amendment shall be effective upon approval of the stockholders of the Company at the Company's 2019 annual meeting of stockholders and shall only be applicable with respect to Awards granted after such approval. If the Amendment is not so approved at such meeting, then the amendment to the 2013 Plan set forth herein shall be void ab initio.

Except as herein above provided, the 2013 Plan is hereby ratified, confirmed and approved in all respects.

For convenience, the following reflects the proposed changes to our 2013 Stock Incentive Plan, as amended by the Amendment (Appendix A) and as more fully described in Proposal Three. The text indicated by underline shows additions, and the text indicated by strikethrough shows deletions.

IDERA PHARMACEUTICALS, INC.

2013 STOCK INCENTIVE PLAN

1. *Purpose*

The purpose of this 2013 Stock Incentive Plan (the "**Plan**") of Idera Pharmaceuticals, Inc., a Delaware corporation (the "**Company**"), is to advance the interests of the Company's stockholders by enhancing the Company's ability to attract, retain and motivate persons who are expected to make important contributions to the Company and by providing such persons with equity ownership opportunities and performance-based incentives that are intended to better align the interests of such persons with those of the Company's stockholders. Except where the context otherwise requires, the term "**Company**" shall include any of the Company's present or future parent or subsidiary corporations as defined in Sections 424(e) or (f) of the Internal Revenue Code of 1986, as amended, and any regulations thereunder (the "**Code**") and any other business venture (including, without limitation, joint venture or limited liability company) in which the Company has a controlling interest, as determined by the Board of Directors of the Company (the "**Board**").

2. *Eligibility*

All of the Company's employees, officers and directors, as well as consultants and advisors to the Company (as such terms are defined and interpreted for purposes of Form S-8 under the Securities Act of 1933, as amended (the "**Securities Act**"), or any successor form) are eligible to be granted Awards under the Plan. Each person who is granted an Award under the Plan is deemed a "**Participant**." "**Award**" means Options (as defined in Section 5), SARs (as defined in Section 6), Restricted Stock (as defined in Section 7), Restricted Stock Units (as defined in Section 7) and Other Stock-Based Awards (as defined in Section 8).

3. *Administration and Delegation*

(a) *Administration by Board of Directors.* The Plan will be administered by the Board. The Board shall have authority to grant Awards and to adopt, amend and repeal such administrative rules, guidelines and practices relating to the Plan as it shall deem advisable. The Board may construe and interpret the terms of the Plan and any Award agreements entered into under the Plan. The Board may correct any defect, supply any omission or reconcile any inconsistency in the Plan or any Award in the manner and to the extent it shall deem expedient and it shall be the sole and final judge of such expediency. All decisions by the Board shall be made in the Board's sole discretion and shall be final and binding on all persons having or claiming any interest in the Plan or in any Award.

(b) *Appointment of Committees.* To the extent permitted by applicable law, the Board may delegate any or all of its powers under the Plan to one or more committees or subcommittees of the Board (a "**Committee**"). All references in the Plan to the "**Board**" shall mean the Board or a Committee of the Board or the officers referred to in Section 3(c) to the extent that the Board's powers or authority under the Plan have been delegated to such Committee or officers.

(c) *Delegation to Officers.* To the extent permitted by applicable law, the Board may delegate to one or more officers of the Company the power to grant Options and other Awards that constitute rights under Delaware law (subject to any limitations under the Plan) to employees or officers of the Company and to exercise such other powers under the Plan as the Board may determine, provided that the Board shall fix the terms of such Awards to be granted by such officers (including the exercise price

of such Awards, which may include a formula by which the exercise price will be determined) and the maximum number of shares subject to such Awards that the officers may grant; provided further, however, that no officer shall be authorized to grant such Awards to any "executive officer" of the Company (as defined by Rule 3b-7 under the Securities Exchange Act of 1934, as amended (the "**Exchange Act**")) or to any "officer" of the Company (as defined by Rule 16a-1 under the Exchange Act). The Board may not delegate authority under this Section 3(c) to grant Restricted Stock, unless Delaware law then permits such delegation.

(d) *Awards to Non-Employee Directors.* Discretionary Awards to non-employee directors may be granted and administered only by a Committee, all of the members of which are independent directors as defined by Section 5605(a)(2) of the NASDAQ Marketplace Rules.

4. *Stock Available for Awards*

(a) *Number of Shares; Share Counting.*

(1) *Authorized Number of Shares.* Subject to adjustment under Section 9, Awards may be made under the Plan, any or all of which Awards may be in the form of Incentive Stock Options (as defined in Section 5(b)), for up to such number of shares of common stock, \$0.001 par value per share, of the Company (the "**Common Stock**") as is equal to the sum of:

(A) ~~25,224,460~~ 27,724,460 shares of Common Stock; plus

(B) such additional number of shares of Common Stock (up to 6,946,978 shares) as is equal to the sum of the number of shares of Common Stock subject to awards granted under the Company's 2005 Stock Incentive Plan (the "**2005 Plan**") or the Company's 2008 Stock Incentive Plan (the "**2008 Plan**") and, together with the 2005 Plan, the "**Existing Plans**") which awards expire, terminate or are otherwise surrendered, canceled, forfeited or repurchased by the Company at their original issuance price pursuant to a contractual repurchase right (subject, however, in the case of Incentive Stock Options to any limitations of the Code).

Shares issued under the Plan may consist in whole or in part of authorized but unissued shares or treasury shares.

(2) *Fungible Share Pool.* Subject to adjustment under Section 9, any Award that is not a Full-Value Award shall be counted against the share limits specified in Sections 4(a)(1) and 4(b)(2) as one share for each share of Common Stock subject to such Award and any Award that is a Full-Value Award shall be counted against the share limits specified in Sections 4(a)(1) and 4(b)(2) as 1.25 shares for each one share of Common Stock subject to such Full-Value Award. "**Full-Value Award**" means any Award of Restricted Stock, Restricted Stock Unit Award or Other Stock-Based Award (as defined below) with a per share price or per unit purchase price lower than 100% of Fair Market Value (as defined below) on the date of grant. To the extent a share that was subject to an Award that counted as one share is returned to the Plan pursuant to Section 4(a)(3), each applicable share reserve will be credited with one share. To the extent that a share that was subject to an Award that counts as 1.25 shares is returned to the Plan pursuant to Section 4(a)(3), each applicable share reserve will be credited with 1.25 shares.

(3) *Share Counting.* For purposes of counting the number of shares available for the grant of Awards under the Plan and under the sublimits contained in Section 4(b)(2):

(A) all shares of Common Stock covered by SARs shall be counted against the number of shares available for the grant of Awards under the Plan and against the sublimit listed in the first clause of this Section 4(a)(3); provided, however, that (i) SARs that may be settled only in cash shall not be so counted and (ii) if the Company grants an SAR in tandem with an Option for the same number of shares of Common Stock and provides that only one such Award may be exercised (a "**Tandem SAR**"), only the shares covered by the Option, and not

the shares covered by the Tandem SAR, shall be so counted, and the expiration of one in connection with the other's exercise will not restore shares to the Plan;

(B) if any Award (i) expires or is terminated, surrendered or canceled without having been fully exercised or is forfeited in whole or in part (including as the result of shares of Common Stock subject to such Award being repurchased by the Company at the original issuance price pursuant to a contractual repurchase right) or (ii) results in any Common Stock not being issued (including as a result of an SAR that was settleable either in cash or in stock actually being settled in cash), the unused Common Stock covered by such Award shall again be available for the grant of Awards; provided, however, that (1) in the case of Incentive Stock Options, the foregoing shall be subject to any limitations under the Code, (2) in the case of the exercise of an SAR, the number of shares counted against the shares available under the Plan and against the sublimit listed in the first clause of this Section 4(a)(3) shall be the full number of shares subject to the SAR multiplied by the percentage of the SAR actually exercised, regardless of the number of shares actually used to settle such SAR upon exercise and (3) the shares covered by a Tandem SAR shall not again become available for grant upon the expiration or termination of such Tandem SAR;

(C) shares of Common Stock delivered (either by actual delivery, attestation, or net exercise) to the Company by a Participant to (i) purchase shares of Common Stock upon the exercise of an Award or (ii) satisfy tax withholding obligations (including shares retained from the Award creating the tax obligation) shall not be added back to the number of shares available for the future grant of Awards; and

(D) shares of Common Stock repurchased by the Company on the open market using the proceeds from the exercise of an Award shall not increase the number of shares available for future grant of Awards.

(b) *Sub-limits.* Subject to adjustment under Section 9, the following sub-limits on the number of shares subject to Awards shall apply:

(1) *Section 162(m) Per-Participant Limit.* The maximum number of shares of Common Stock with respect to which Awards may be granted to any Participant under the Plan shall be 1,500,000 per calendar year. For purposes of the foregoing limit, (i) the combination of an Option in tandem with an SAR shall be treated as a single Award and (ii) each share of Common Stock subject to an Award (including each share of Common Stock subject to a Full-Value Award) shall be counted as one share of Common Stock. The per Participant limit described in this Section 4(b)(1) shall be construed and applied consistently with Section 162(m) of the Code or any successor provision thereto, and the regulations thereunder ("**Section 162(m)**").

(2) *Limit on Awards to Directors.* The maximum number of shares with respect to which Awards may be granted to directors who are not employees of the Company at the time of grant shall be 20% of the maximum number of authorized shares set forth in Section 4(a)(1).

(c) *Substitute Awards.* In connection with a merger or consolidation of an entity with the Company or the acquisition by the Company of property or stock of an entity, the Board may grant Awards in substitution for any options or other stock or stock-based awards granted by such entity or an affiliate thereof. Substitute Awards may be granted on such terms as the Board deems appropriate in the circumstances, notwithstanding any limitations on Awards contained in the Plan. Substitute Awards shall not count against the overall share limit set forth in Section 4(a)(1) or any sublimits contained in the Plan, except as may be required by reason of Section 422 and related provisions of the Code.

5. *Stock Options*

(a) *General.* The Board may grant options to purchase Common Stock (each, an "**Option**") and determine the number of shares of Common Stock to be covered by each Option, the exercise price of each Option and the conditions and limitations applicable to the exercise of each Option, including conditions relating to applicable federal or state securities laws, as it considers necessary or advisable.

(b) *Incentive Stock Options.* An Option that the Board intends to be an "incentive stock option" as defined in Section 422 of the Code (an "**Incentive Stock Option**") shall only be granted to employees of Idera Pharmaceuticals, Inc., any of Idera Pharmaceuticals, Inc.'s present or future parent or subsidiary corporations as defined in Sections 424(e) or (f) of the Code, and any other entities the employees of which are eligible to receive Incentive Stock Options under the Code, and shall be subject to and shall be construed consistently with the requirements of Section 422 of the Code. An Option that is not intended to be an Incentive Stock Option shall be designated a "**Nonstatutory Stock Option.**" The Company shall have no liability to a Participant, or any other party, if an Option (or any part thereof) that is intended to be an Incentive Stock Option is not an Incentive Stock Option or if the Company converts an Incentive Stock Option to a Nonstatutory Stock Option.

(c) *Exercise Price.* The Board shall establish the exercise price of each Option and specify the exercise price in the applicable Option agreement. The exercise price shall be not less than 100% of the fair market value per share of Common Stock as determined by (or in a manner approved by) the Board ("**Fair Market Value**") on the date the Option is granted; provided that if the Board approves the grant of an Option with an exercise price to be determined on a future date, the exercise price shall be not less than 100% of the Fair Market Value on such future date.

(d) *Duration of Options.* Each Option shall be exercisable at such times and subject to such terms and conditions as the Board may specify in the applicable option agreement; provided, however, that no Option will be granted with a term in excess of 10 years.

(e) *Exercise of Options.* Options may be exercised by delivery to the Company of a notice of exercise in a form (which may be electronic) approved by the Company, together with payment in full (in the manner specified in Section 5(f)) of the exercise price for the number of shares for which the Option is exercised. Shares of Common Stock subject to the Option will be delivered by the Company as soon as practicable following exercise.

(f) *Payment Upon Exercise.* Common Stock purchased upon the exercise of an Option granted under the Plan shall be paid for as follows:

(1) in cash, by check or by wire transfer, payable to the order of the Company;

(2) except as may otherwise be provided in the applicable Option agreement or approved by the Board, in its sole discretion, by (i) delivery of an irrevocable and unconditional undertaking by a creditworthy broker to deliver promptly to the Company sufficient funds to pay the exercise price and any required tax withholding or (ii) delivery by the Participant to the Company of a copy of irrevocable and unconditional instructions to a creditworthy broker to deliver promptly to the Company cash or a check sufficient to pay the exercise price and any required tax withholding;

(3) to the extent provided for in the applicable Option agreement or approved by the Board, in its sole discretion, by delivery (either by actual delivery or attestation) of shares of Common Stock owned by the Participant valued at their Fair Market Value, provided (i) such method of payment is then permitted under applicable law, (ii) such Common Stock, if acquired directly from the Company, was owned by the Participant for such minimum period of time, if any, as may be established by the Board in its discretion and (iii) such Common Stock is not subject to any repurchase, forfeiture, unfulfilled vesting or other similar requirements;

(4) to the extent provided for in the applicable Nonstatutory Stock Option agreement or approved by the Board in its sole discretion, by delivery of a notice of "net exercise" to the Company, as a result of which the Participant would receive (i) the number of shares underlying the portion of the Option being exercised, less (ii) such number of shares as is equal to (A) the aggregate exercise price for the portion of the Option being exercised divided by (B) the Fair Market Value on the date of exercise;

(5) to the extent permitted by applicable law and provided for in the applicable Option agreement or approved by the Board, in its sole discretion, by payment of such other lawful consideration as the Board may determine; or

(6) by any combination of the above permitted forms of payment.

(g) *Limitation on Repricing.* Unless such action is approved by the Company's stockholders, the Company may not (except as provided for under Section 9): (1) amend any outstanding Option granted under the Plan to provide an exercise price per share that is lower than the then-current exercise price per share of such outstanding Option, (2) cancel any outstanding option (whether or not granted under the Plan) and grant in substitution therefor new Awards under the Plan (other than Awards granted pursuant to Section 4(c)) covering the same or a different number of shares of Common Stock and having an exercise price per share lower than the then-current exercise price per share of the cancelled option, (3) cancel in exchange for a cash payment any outstanding Option with an exercise price per share above the then-current Fair Market Value, other than pursuant to Section 9, or (4) take any other action under the Plan that constitutes a "repricing" within the meaning of the rules of the NASDAQ Stock Market ("*NASDAQ*").

(h) *No Reload Options.* No Option granted under the Plan shall contain any provision entitling the Participant to the automatic grant of additional Options in connection with any exercise of the original Option.

(i) *No Dividend Equivalents.* No option shall provide for the payment or accrual of Dividend Equivalents (as defined below).

6. *Stock Appreciation Rights*

(a) *General.* The Board may grant Awards consisting of stock appreciation rights ("*SARs*") entitling the holder, upon exercise, to receive an amount of Common Stock or cash or a combination thereof (such form to be determined by the Board) determined by reference to appreciation, from and after the date of grant, in the Fair Market Value of a share of Common Stock over the measurement price established pursuant to Section 6(c). The date as of which such appreciation is determined shall be the exercise date.

(b) *Grants.* SARs may be granted in tandem with, or independently of, Options granted under the Plan.

(1) *Tandem Awards.* When SARs are expressly granted in tandem with Options, (i) the SAR will be exercisable only at such time or times, and to the extent, that the related Option is exercisable (except to the extent designated by the Board in connection with a Reorganization Event) and will be exercisable in accordance with the procedure required for exercise of the related Option; (ii) the SAR will terminate and no longer be exercisable upon the termination or exercise of the related Option, except to the extent designated by the Board in connection with a Reorganization Event and except that a SAR granted with respect to less than the full number of shares covered by an Option will not be reduced until the number of shares as to which the related Option has been exercised or has terminated exceeds the number of shares not covered by the SAR; (iii) the Option will terminate and no longer be exercisable upon the exercise of the related SAR; and (iv) the SAR will be transferable only with the related Option.

(2) *Independent SARs.* A SAR not expressly granted in tandem with an Option will become exercisable at such time or times, and on such conditions, as the Board may specify in the SAR Award.

(c) *Measurement Price.* The Board shall establish the measurement price of each SAR and specify it in the applicable SAR agreement. The measurement price shall not be less than 100% of the Fair Market Value on the date the SAR is granted; provided that if the Board approves the grant of an SAR effective as of a future date, the measurement price shall be not less than 100% of the Fair Market Value on such future date.

(d) *Duration of SARs.* Each SAR shall be exercisable at such times and subject to such terms and conditions as the Board may specify in the applicable SAR agreement; provided, however, that no SAR will be granted with a term in excess of 10 years.

(e) *Exercise of SARs.* SARs may be exercised by delivery to the Company of a notice of exercise in a form (which may be electronic) approved by the Company, together with any other documents required by the Board.

(f) *Limitation on Repricing.* Unless such action is approved by the Company's stockholders, the Company may not (except as provided for under Section 9): (1) amend any outstanding SAR granted under the Plan to provide a measurement price per share that is lower than the then-current measurement price per share of such outstanding SAR, (2) cancel any outstanding SAR (whether or not granted under the Plan) and grant in substitution therefor new Awards under the Plan (other than Awards granted pursuant to Section 4(c)) covering the same or a different number of shares of Common Stock and having an exercise or measurement price per share lower than the then-current measurement price per share of the cancelled SAR, (3) cancel in exchange for a cash payment any outstanding SAR with a measurement price per share above the then-current Fair Market Value, other than pursuant to Section 9, or (4) take any other action under the Plan that constitutes a "repricing" within the meaning of the rules of NASDAQ.

(g) *No Reload Rights.* No SAR granted under the Plan shall contain any provision entitling the grantee to the automatic grant of additional SARs in connection with any exercise of the original SAR.

(h) *No Dividend Equivalents.* No SAR shall provide for the payment or accrual of Dividend Equivalents.

7. *Restricted Stock; Restricted Stock Units*

(a) *General.* The Board may grant Awards entitling recipients to acquire shares of Common Stock ("**Restricted Stock**"), subject to the right of the Company to repurchase all or part of such shares at their issue price or other stated or formula price (or to require forfeiture of such shares if issued at no cost) from the recipient in the event that conditions specified by the Board in the applicable Award are not satisfied prior to the end of the applicable restriction period or periods established by the Board for such Award. The Board may also grant Awards entitling the recipient to receive shares of Common Stock or cash to be delivered at the time such Award vests ("**Restricted Stock Units**") (Restricted Stock and Restricted Stock Units are each referred to herein as a "**Restricted Stock Award**").

(b) *Terms and Conditions for All Restricted Stock Awards.* The Board shall determine the terms and conditions of a Restricted Stock Award, including the conditions for vesting and repurchase (or forfeiture) and the issue price, if any.

(c) *Additional Provisions Relating to Restricted Stock.*

(1) *Dividends.* Unless otherwise provided in the applicable Award agreement, any dividends (whether paid in cash, stock or property) declared and paid by the Company with respect to shares of Restricted Stock ("**Accrued Dividends**") shall be paid to the Participant only if and when such

shares become free from the restrictions on transferability and forfeitability that apply to such shares. Each payment of Accrued Dividends will be made no later than the end of the calendar year in which the dividends are paid to stockholders of that class of stock or, if later, the 15th day of the third month following the lapsing of the restrictions on transferability and the forfeitability provisions applicable to the underlying shares of Restricted Stock.

(2) *Stock Certificates.* The Company may require that any stock certificates issued in respect of shares of Restricted Stock, as well as dividends or distributions paid on such Restricted Stock, shall be deposited in escrow by the Participant, together with a stock power endorsed in blank, with the Company (or its designee). At the expiration of the applicable restriction periods, the Company (or such designee) shall deliver the certificates no longer subject to such restrictions to the Participant or if the Participant has died, to his or her Designated Beneficiary. "**Designated Beneficiary**" means (i) the beneficiary designated, in a manner determined by the Board, by a Participant to receive amounts due or exercise rights of the Participant in the event of the Participant's death or (ii) in the absence of an effective designation by a Participant, the Participant's estate.

(d) *Additional Provisions Relating to Restricted Stock Units.*

(1) *Settlement.* Upon the vesting of and/or lapsing of any other restrictions (i.e., settlement) with respect to each Restricted Stock Unit, the Participant shall be entitled to receive from the Company one share of Common Stock or (if so provided in the applicable Award agreement) an amount of cash equal to the Fair Market Value of one share of Common Stock. The Board may, in its discretion, provide that settlement of Restricted Stock Units shall be deferred, on a mandatory basis or at the election of the Participant in a manner that complies with Section 409A of the Code.

(2) *Voting Rights.* A Participant shall have no voting rights with respect to any Restricted Stock Units.

(3) *Dividend Equivalents.* The Award agreement for Restricted Stock Units may provide Participants with the right to receive an amount equal to any dividends or other distributions declared and paid on an equal number of outstanding shares of Common Stock ("**Dividend Equivalents**"). Dividend Equivalents will be subject to the same restrictions on transfer and forfeitability as the Restricted Stock Units with respect to which such Dividend Equivalents were granted.

8. *Other Stock-Based Awards*

(a) *General.* Other Awards of shares of Common Stock, and other Awards that are valued in whole or in part by reference to, or are otherwise based on, shares of Common Stock or other property, may be granted hereunder to Participants ("**Other Stock-Based Awards**"). Such Other Stock-Based Awards shall also be available as a form of payment in the settlement of other Awards granted under the Plan or as payment in lieu of compensation to which a Participant is otherwise entitled. Other Stock-Based Awards may be paid in shares of Common Stock or cash, as the Board shall determine.

(b) *Terms and Conditions.* Subject to the provisions of the Plan, the Board shall determine the terms and conditions of each Other Stock-Based Award, including any purchase price applicable thereto.

(c) *Dividends.* Unless otherwise provided in the applicable Award agreement, any dividends (whether paid in cash, stock or property) declared and paid by the Company with respect to shares of Common Stock granted under an Other Stock-Based Award shall be paid to the Participant only if and when such shares become free from the restrictions on transferability and forfeitability that apply to

such shares. Each payment of any such accrued dividends will be made no later than the end of the calendar year in which the dividends are paid to stockholders of that class of stock or, if later, the 15th day of the third month following the lapsing of the restrictions on transferability and the forfeitability provisions applicable to the underlying Other Stock-Based Award.

(d) *Dividend Equivalents.* The Award agreement for Other Stock-Based Awards may provide Participants with the right to receive Dividend Equivalents. Dividend Equivalents will be subject to the same restrictions on transfer and forfeitability as the Other Stock-Based Awards with respect to which such Dividend Equivalents were granted.

9. *Adjustments for Changes in Common Stock and Certain Other Events*

(a) *Changes in Capitalization.* In the event of any stock split, reverse stock split, stock dividend, recapitalization, combination of shares, reclassification of shares, spin-off or other similar change in capitalization or event, or any dividend or distribution to holders of Common Stock other than an ordinary cash dividend, (i) the number and class of securities available under the Plan, (ii) the share counting rules and sublimits set forth in Sections 4(a) and 4(b), (iii) the number and class of securities and exercise price per share of each outstanding Option, (iv) the share and per-share provisions and the measurement price of each outstanding SAR, (v) the number of shares subject to and the repurchase price per share subject to each outstanding Restricted Stock Award and (vi) the share and per-share-related provisions and the purchase price, if any, of each outstanding Other Stock-Based Award, shall be equitably adjusted by the Company (or substituted Awards may be made, if applicable) in the manner determined by the Board. Without limiting the generality of the foregoing, in the event the Company effects a split of the Common Stock by means of a stock dividend and the exercise price of and the number of shares subject to an outstanding Option are adjusted as of the date of the distribution of the dividend (rather than as of the record date for such dividend), then an optionee who exercises an Option between the record date and the distribution date for such stock dividend shall be entitled to receive, on the distribution date, the stock dividend with respect to the shares of Common Stock acquired upon such Option exercise, notwithstanding the fact that such shares were not outstanding as of the close of business on the record date for such stock dividend.

(b) *Reorganization Events.*

(1) *Definition.* A "**Reorganization Event**" shall mean: (a) any merger or consolidation of the Company with or into another entity as a result of which all of the Common Stock of the Company is converted into or exchanged for the right to receive cash, securities or other property or is cancelled, (b) any transfer or disposition of all of the Common Stock of the Company for cash, securities or other property pursuant to a share exchange or other transaction or (c) any liquidation or dissolution of the Company.

(2) *Consequences of a Reorganization Event on Awards Other than Restricted Stock.*

(A) In connection with a Reorganization Event, the Board may take any one or more of the following actions as to all or any (or any portion of) outstanding Awards other than Restricted Stock on such terms as the Board determines (except to the extent specifically provided otherwise in an applicable Award agreement or another agreement between the Company and the Participant): (i) provide that such Awards shall be assumed, or substantially equivalent Awards shall be substituted, by the acquiring or succeeding corporation (or an affiliate thereof), (ii) upon written notice to a Participant, provide that all of the Participant's unexercised Awards will terminate immediately prior to the consummation of such Reorganization Event unless exercised by the Participant (to the extent then exercisable) within a specified period following the date of such notice, (iii) provide that outstanding Awards shall become exercisable, realizable, or deliverable, or restrictions applicable to an Award shall lapse, in whole or in part prior to or upon such Reorganization Event, (iv) in the

event of a Reorganization Event under the terms of which holders of Common Stock will receive upon consummation thereof a cash payment for each share surrendered in the Reorganization Event (the "**Acquisition Price**"), make or provide for a cash payment to Participants with respect to each Award held by a Participant equal to (A) the number of shares of Common Stock subject to the vested portion of the Award (after giving effect to any acceleration of vesting that occurs upon or immediately prior to such Reorganization Event) multiplied by (B) the excess, if any, of (I) the Acquisition Price over (II) the exercise, measurement or purchase price of such Award and any applicable tax withholdings, in exchange for the termination of such Award, (v) provide that, in connection with a liquidation or dissolution of the Company, Awards shall convert into the right to receive liquidation proceeds (if applicable, net of the exercise, measurement or purchase price thereof and any applicable tax withholdings) and (vi) any combination of the foregoing. In taking any of the actions permitted under this Section 9(b)(2), the Board shall not be obligated by the Plan to treat all Awards, all Awards held by a Participant, or all Awards of the same type, identically.

(B) Notwithstanding the terms of Section 9(b)(2)(A), in the case of outstanding Restricted Stock Units that are subject to Section 409A of the Code: (i) if the applicable Restricted Stock Unit agreement provides that the Restricted Stock Units shall be settled upon a "change in control event" within the meaning of Treasury Regulation Section 1.409A-3(i)(5)(i), and the Reorganization Event constitutes such a "change in control event", then no assumption or substitution shall be permitted pursuant to Section 9(b)(2)(A)(i) and the Restricted Stock Units shall instead be settled in accordance with the terms of the applicable Restricted Stock Unit agreement; and (ii) the Board may only undertake the actions set forth in clauses (iii), (iv) or (v) of Section 9(b)(2)(A) if the Reorganization Event constitutes a "change in control event" as defined under Treasury Regulation Section 1.409A-3(i)(5)(i) and such action is permitted or required by Section 409A of the Code; if the Reorganization Event is not a "change in control event" as so defined or such action is not permitted or required by Section 409A of the Code, and the acquiring or succeeding corporation does not assume or substitute the Restricted Stock Units pursuant to clause (i) of Section 9(b)(2)(A), then the unvested Restricted Stock Units shall terminate immediately prior to the consummation of the Reorganization Event without any payment in exchange therefor.

(C) For purposes of Section 9(b)(2)(A)(i), an Award (other than Restricted Stock) shall be considered assumed if, following consummation of the Reorganization Event, such Award confers the right to purchase or receive pursuant to the terms of such Award, for each share of Common Stock subject to the Award immediately prior to the consummation of the Reorganization Event, the consideration (whether cash, securities or other property) received as a result of the Reorganization Event by holders of Common Stock for each share of Common Stock held immediately prior to the consummation of the Reorganization Event (and if holders were offered a choice of consideration, the type of consideration chosen by the holders of a majority of the outstanding shares of Common Stock); provided, however, that if the consideration received as a result of the Reorganization Event is not solely common stock of the acquiring or succeeding corporation (or an affiliate thereof), the Company may, with the consent of the acquiring or succeeding corporation, provide for the consideration to be received upon the exercise or settlement of the Award to consist solely of such number of shares of common stock of the acquiring or succeeding corporation (or an affiliate thereof) that the Board determined to be equivalent in value (as of the date of such determination or another date specified by the Board) to the per share consideration received by holders of outstanding shares of Common Stock as a result of the Reorganization Event.

(3) *Consequences of a Reorganization Event on Restricted Stock.* Upon the occurrence of a Reorganization Event other than a liquidation or dissolution of the Company, the repurchase and other rights of the Company with respect to outstanding Restricted Stock shall inure to the benefit of the Company's successor and shall, unless the Board determines otherwise, apply to the cash, securities or other property which the Common Stock was converted into or exchanged for pursuant to such Reorganization Event in the same manner and to the same extent as they applied to such Restricted Stock; provided, however, that the Board may provide for termination or deemed satisfaction of such repurchase or other rights under the instrument evidencing any Restricted Stock or any other agreement between a Participant and the Company, either initially or by amendment. Upon the occurrence of a Reorganization Event involving the liquidation or dissolution of the Company, except to the extent specifically provided to the contrary in the instrument evidencing any Restricted Stock or any other agreement between a Participant and the Company, all restrictions and conditions on all Restricted Stock then outstanding shall automatically be deemed terminated or satisfied.

10. *General Provisions Applicable to Awards*

(a) *Transferability of Awards.* Awards shall not be sold, assigned, transferred, pledged or otherwise encumbered by the person to whom they are granted, either voluntarily or by operation of law, except by will or the laws of descent and distribution or, other than in the case of an Incentive Stock Option, pursuant to a qualified domestic relations order, and, during the life of the Participant, shall be exercisable only by the Participant; provided, however, that the Board may permit or provide in an Award for the gratuitous transfer of the Award by the Participant to or for the benefit of any immediate family member, family trust or other entity established for the benefit of the Participant and/or an immediate family member thereof if the Company would be eligible to use a Form S-8 under the Securities Act for the registration of the sale of the Common Stock subject to such Award to such proposed transferee; provided further, that the Company shall not be required to recognize any such permitted transfer until such time as such permitted transferee shall, as a condition to such transfer, deliver to the Company a written instrument in form and substance satisfactory to the Company confirming that such transferee shall be bound by all of the terms and conditions of the Award. References to a Participant, to the extent relevant in the context, shall include references to authorized transferees. For the avoidance of doubt, nothing contained in this Section 10(a) shall be deemed to restrict a transfer to the Company.

(b) *Documentation.* Each Award shall be evidenced in such form (written, electronic or otherwise) as the Board shall determine. Each Award may contain terms and conditions in addition to those set forth in the Plan.

(c) *Board Discretion.* Except as otherwise provided by the Plan, each Award may be made alone or in addition or in relation to any other Award. The terms of each Award need not be identical, and the Board need not treat Participants uniformly.

(d) *Termination of Status.* The Board shall determine the effect on an Award of the disability, death, retirement, termination or other cessation of employment, authorized leave of absence or other change in the employment or other status of a Participant and the extent to which, and the period during which, the Participant, or the Participant's legal representative, conservator, guardian or Designated Beneficiary, may exercise rights under the Award.

(e) *Withholding.* The Participant must satisfy all applicable federal, state, and local or other income and employment tax withholding obligations before the Company will deliver stock certificates or otherwise recognize ownership of Common Stock under an Award. The Company may decide to satisfy the withholding obligations through additional withholding on salary or wages. If the Company elects not to or cannot withhold from other compensation, the Participant must pay the Company the full amount, if any, required for withholding or have a broker tender to the Company cash equal to the

withholding obligations. Payment of withholding obligations is due before the Company will issue any shares on exercise, vesting or release from forfeiture of an Award or at the same time as payment of the exercise or purchase price, unless the Company determines otherwise. If provided for in an Award or approved by the Board in its sole discretion, a Participant may satisfy such tax obligations in whole or in part by delivery (either by actual delivery or attestation) of shares of Common Stock, including shares retained from the Award creating the tax obligation, valued at their Fair Market Value; provided, however, except as otherwise provided by the Board, that the total tax withholding where stock is being used to satisfy such tax obligations cannot exceed the Company's minimum statutory withholding obligations (based on minimum statutory withholding rates for federal and state tax purposes, including payroll taxes, that are applicable to such supplemental taxable income). Shares used to satisfy tax withholding requirements cannot be subject to any repurchase, forfeiture, unfulfilled vesting or other similar requirements.

(f) *Amendment of Award.* Except as otherwise provided in Section 5(g) with respect to repricings, Section 10(i) with respect to Performance Awards or Section 11(d) with respect to actions requiring stockholder approval, the Board may, subject to Section 10(h), amend, modify or terminate any outstanding Award, including but not limited to, substituting therefor another Award of the same or a different type, changing the date of exercise or realization, and converting an Incentive Stock Option to a Nonstatutory Stock Option. The Participant's consent to such action shall be required unless (i) the Board determines that the action, taking into account any related action, does not materially and adversely affect the Participant's rights under the Plan or (ii) the change is permitted under Section 9.

(g) *Conditions on Delivery of Stock.* The Company will not be obligated to deliver any shares of Common Stock pursuant to the Plan or to remove restrictions from shares previously issued or delivered under the Plan until (i) all conditions of the Award have been met or removed to the satisfaction of the Company, (ii) in the opinion of the Company's counsel, all other legal matters in connection with the issuance and delivery of such shares have been satisfied, including any applicable securities laws and regulations and any applicable stock exchange or stock market rules and regulations, and (iii) the Participant has executed and delivered to the Company such representations or agreements as the Company may consider appropriate to satisfy the requirements of any applicable laws, rules or regulations.

(h) *Acceleration.* The Board may, at any time, provide that (i) any Award granted on or prior to April 13, 2015 shall become immediately exercisable in whole or in part, free of some or all of the restrictions or conditions applicable to such Award or otherwise realizable in whole or in part, as the case may be, and (ii) any Award granted after April 13, 2015 (a "New Award") shall become immediately exercisable in whole or in part, free of some or all of the restrictions or conditions applicable to such New Award or otherwise realizable in whole or in part, as the case may be, solely (A) upon the death or disability of the Participant or (B) in connection with a change in control of the Company. Notwithstanding the foregoing, the Board may provide, at any time and for any reason, that any New Award shall become immediately exercisable in full or in part, free from some or all of the restrictions or conditions applicable to such New Award or otherwise realizable in full or in part, as the case may be, if required under any contractual obligation of the Company or other policy of the Company, in each case to the extent such obligation or policy is in effect on April 13, 2015.

(i) *Performance Awards.*

(1) *Grants.* Restricted Stock Awards and Other Stock-Based Awards under the Plan may be made subject to the achievement of performance goals pursuant to this Section 10(i) ("**Performance Awards**"). Performance Awards can also provide for cash payments of up to \$1,500,000 per fiscal year per individual.

(2) *Committee.* Grants of Performance Awards to any Covered Employee (as defined below) intended to qualify as "performance-based compensation" under Section 162(m) ("**Performance-Based Compensation**") shall be made only by a Committee (or a subcommittee of a Committee) comprised solely of two or more directors eligible to serve on a committee making Awards qualifying as "performance-based compensation" under Section 162(m). In the case of such Awards granted to Covered Employees, references to the Board or to a Committee shall be treated as referring to such Committee (or subcommittee). "**Covered Employee**" shall mean any person who is, or whom the Committee, in its discretion, determines may be, a "covered employee" under Section 162(m)(3) of the Code.

(3) *Performance Measures.* For any Award that is intended to qualify as Performance-Based Compensation, the Committee shall specify that the degree of granting, vesting and/or payout shall be subject to the achievement of one or more objective performance measures established by the Committee, which shall be based on the relative or absolute attainment of specified levels of one or any combination of the following, which may be determined pursuant to generally accepted accounting principles ("**GAAP**") or on a non-GAAP basis, as determined by the Committee: (a) earnings per share, (b) return on average equity or average assets with respect to a pre-determined peer group, (c) earnings, (d) earnings growth, (e) revenues, (f) expenses, (g) stock price, (h) market share, (i) return on sales, assets, equity or investment, (j) regulatory compliance, (k) achievement of balance sheet or income statement objectives, (l) total shareholder return, (m) net operating profit after tax, (n) pre-tax or after tax income, (o) cash flow, (p) achievement of research, development, clinical or regulatory milestones, (q) product sales, (r) business development activities, (s) the entry into an arrangement or agreement with a third party for the development, commercialization, marketing or distribution of products, services or technologies, or for conducting a research program to discover and develop a product, service or technology, and/or the achievement of milestones under such arrangement or agreement, including events that trigger an obligation or payment right, (t) achievement of domestic and international regulatory milestones, including the submission of filings required to advance products, services and technologies in clinical development and the achievement of approvals by regulatory authorities relating to the commercialization of products, services and technologies, (u) the achievement of discovery, preclinical and clinical stage scientific objectives, discoveries or inventions for products, services and technologies under research and development, (v) the entry into or completion of a phase of clinical development for any product, service or technology, such as the entry into or completion of phase 1, 2 and/or 3 clinical trials, (w) the consummation of debt or equity financing transactions, or acquisitions of business, technologies and assets, (x) new product or service releases, (y) specified levels of product sales, net income, earnings before or after discontinued operations, interest, taxes, depreciation and/or amortization, operating profit before or after discontinued operations and/or taxes, sales, sales growth, earnings growth, cash flow or cash position, gross margins, stock price, market share, return on sales, assets, equity or investment and (z) improvement of financial ratings. Such goals may reflect absolute entity or business unit performance or a relative comparison to the performance of a peer group of entities or other external measure of the selected performance criteria and may be absolute in their terms or measured against or in relationship to other companies comparably, similarly or otherwise situated. The Committee may specify that such performance measures shall be adjusted to exclude any one or more of (i) extraordinary items, (ii) gains or losses on the dispositions of discontinued operations, (iii) the cumulative effects of changes in accounting principles, (iv) the writedown of any asset, (v) fluctuation in foreign currency exchange rates, and (vi) charges for restructuring and rationalization programs. Such performance measures: (i) may vary by Participant and may be different for different Awards; (ii) may be particular to a Participant or the department, branch, line of business, subsidiary or other unit in which the Participant works and may cover such period as may be specified by the Committee; and (iii) shall be set by the Committee within the time

period prescribed by, and shall otherwise comply with the requirements of, Section 162(m). Awards that are not intended to qualify as Performance-Based Compensation may be based on these or such other performance measures as the Board may determine.

(4) *Adjustments.* Notwithstanding any provision of the Plan, with respect to any Performance Award that is intended to qualify as Performance-Based Compensation, the Committee may adjust downwards, but not upwards, the cash or number of shares payable pursuant to such Award, and the Committee may not waive the achievement of the applicable performance measures except in the case of the death or disability of the Participant or a change in control of the Company.

(5) *Other.* The Committee shall have the power to impose such other restrictions on Performance Awards as it may deem necessary or appropriate to ensure that such Awards satisfy all requirements for Performance-Based Compensation. Dividend Equivalents will be subject to the same restrictions on transfer and forfeitability as the Performance Awards with respect to which such Dividend Equivalents were granted.

(j) *Limitations on Vesting.* Subject to Section 10(h) and notwithstanding anything to the contrary in the Plan, no New Award shall vest earlier than the first anniversary of its date of grant. The foregoing sentence shall not apply to an aggregate of up to 5% of the maximum number of authorized shares set forth in Section 4(a)(1).

11. Miscellaneous

(a) *No Right To Employment or Other Status.* No person shall have any claim or right to be granted an Award by virtue of the adoption of the Plan, and the grant of an Award shall not be construed as giving a Participant the right to continued employment or any other relationship with the Company. The Company expressly reserves the right at any time to dismiss or otherwise terminate its relationship with a Participant free from any liability or claim under the Plan, except as expressly provided in the applicable Award.

(b) *No Rights As Stockholder.* Subject to the provisions of the applicable Award, no Participant or Designated Beneficiary shall have any rights as a stockholder with respect to any shares of Common Stock to be distributed with respect to an Award until becoming the record holder of such shares.

(c) *Effective Date and Term of Plan.* The Plan shall become effective on the date the Plan is approved by the Company's stockholders (the "**Effective Date**"). No Awards shall be granted under the Plan after the expiration of 10 years from the Effective Date, but Awards previously granted may extend beyond that date.

(d) *Amendment of Plan.* The Board may amend, suspend or terminate the Plan or any portion thereof at any time provided that (i) to the extent required by Section 162(m), no Award granted to a Participant that is intended to comply with Section 162(m) after the date of such amendment shall become exercisable, realizable or vested, as applicable to such Award, unless and until the Company's stockholders approve such amendment in the manner required by Section 162(m); (ii) no amendment that would require stockholder approval under the rules of NASDAQ may be made effective unless and until the Company's stockholders approve such amendment; and (iii) if the NASDAQ amends its corporate governance rules so that such rules no longer require stockholder approval of NASDAQ "material amendments" to equity compensation plans, then, from and after the effective date of such amendment to the NASDAQ rules, no amendment to the Plan (A) materially increasing the number of shares authorized under the Plan (other than pursuant to Section 4(c) or 9), (B) expanding the types of Awards that may be granted under the Plan, or (C) materially expanding the class of participants eligible to participate in the Plan shall be effective unless and until the Company's stockholders approve such amendment. In addition, if at any time the approval of the Company's stockholders is required as to any other modification or amendment under Section 422 of the Code or any successor

provision with respect to Incentive Stock Options, the Board may not effect such modification or amendment without such approval. Unless otherwise specified in the amendment, any amendment to the Plan adopted in accordance with this Section 11(d) shall apply to, and be binding on the holders of, all Awards outstanding under the Plan at the time the amendment is adopted, provided the Board determines that such amendment, taking into account any related action, does not materially and adversely affect the rights of Participants under the Plan.

(e) *Authorization of Sub-Plans (including for Grants to non-U.S. Employees).* The Board may from time to time establish one or more sub-plans under the Plan for purposes of satisfying applicable securities, tax or other laws of various jurisdictions. The Board shall establish such sub-plans by adopting supplements to the Plan containing (i) such limitations on the Board's discretion under the Plan as the Board deems necessary or desirable or (ii) such additional terms and conditions not otherwise inconsistent with the Plan as the Board shall deem necessary or desirable. All supplements adopted by the Board shall be deemed to be part of the Plan, but each supplement shall apply only to Participants within the affected jurisdiction and the Company shall not be required to provide copies of any supplement to Participants in any jurisdiction which is not the subject of such supplement.

(f) *Compliance with Section 409A of the Code.* Except as provided in individual Award agreements initially or by amendment, if and to the extent (i) any portion of any payment, compensation or other benefit provided to a Participant pursuant to the Plan in connection with his or her employment termination constitutes "nonqualified deferred compensation" within the meaning of Section 409A of the Code and (ii) the Participant is a specified employee as defined in Section 409A(a)(2)(B)(i) of the Code, in each case as determined by the Company in accordance with its procedures, by which determinations the Participant (through accepting the Award) agrees that he or she is bound, such portion of the payment, compensation or other benefit shall not be paid before the day that is six months plus one day after the date of "separation from service" (as determined under Section 409A of the Code) (the "**New Payment Date**"), except as Section 409A of the Code may then permit. The aggregate of any payments that otherwise would have been paid to the Participant during the period between the date of separation from service and the New Payment Date shall be paid to the Participant in a lump sum on such New Payment Date, and any remaining payments will be paid on their original schedule.

The Company makes no representations or warranty and shall have no liability to the Participant or any other person if any provisions of or payments, compensation or other benefits under the Plan are determined to constitute nonqualified deferred compensation subject to Section 409A of the Code but do not to satisfy the conditions of that section.

(g) *Limitations on Liability.* Notwithstanding any other provisions of the Plan, no individual acting as a director, officer, employee or agent of the Company will be liable to any Participant, former Participant, spouse, beneficiary, or any other person for any claim, loss, liability, or expense incurred in connection with the Plan, nor will such individual be personally liable with respect to the Plan because of any contract or other instrument he or she executes in his or her capacity as a director, officer, employee or agent of the Company. The Company will indemnify and hold harmless each director, officer, employee or agent of the Company to whom any duty or power relating to the administration or interpretation of the Plan has been or will be delegated, against any cost or expense (including attorneys' fees) or liability (including any sum paid in settlement of a claim with the Board's approval) arising out of any act or omission to act concerning the Plan unless arising out of such person's own fraud or bad faith.

(h) *Governing Law.* The provisions of the Plan and all Awards made hereunder shall be governed by and interpreted in accordance with the laws of the State of Delaware, excluding choice-of-law principles of the law of such state that would require the application of the laws of a jurisdiction other than the State of Delaware.

AMENDMENT TO THE

IDERA PHARMACEUTICALS, INC. 2017 EMPLOYEE STOCK PURCHASE PLAN

WHEREAS, Idera Pharmaceuticals, Inc. (the "Company") desires to amend the Idera Pharmaceuticals, Inc. 2017 Employee Stock Purchase Plan (the "ESPP"), in the manner set forth below (the "Amendment"); and

WHEREAS, on April [·], 2019, subject to stockholder approval, the Board of Directors of the Company approved the Amendment; and

NOW THEREFORE, in accordance with Section 16 of the ESPP, the ESPP is hereby amended as follows:

1. The first paragraph of the ESPP is hereby amended by such paragraph in its entirety and substituting the following in lieu thereof is hereby amended in its entirety to read as follows:

"The purpose of this Plan is to provide eligible employees of Idera Pharmaceuticals, Inc. (the "Company") and certain of its subsidiaries with opportunities to purchase shares of the Company's common stock, \$0.001 par value (the "Common Stock"). Eight hundred fifty thousand (850,000) shares of Common Stock in the aggregate have been approved for this purpose, subject to any adjustment pursuant to Section 15 hereof. This Plan is intended to qualify as an "employee stock purchase plan" as defined in Section 423 of the Internal Revenue Code of 1986, as amended (the "Code"), and the regulations issued thereunder, and shall be interpreted consistent therewith."

The Amendment shall be effective upon approval of the stockholders of the Company at the Company's 2019 annual meeting of stockholders and shall only be applicable with respect to Awards granted after such approval. If the Amendment is not so approved at such meeting, then the amendment to the ESPP set forth herein shall be void ab initio.

Except as herein above provided, the ESPP is hereby ratified, confirmed and approved in all respects.

For convenience, the following reflects the proposed changes to our 2017 Employee Stock Purchase Plan, as amended by the Amendment (Appendix C) and as more fully described in Proposal Four. The text indicated by underline shows additions, and the text indicated by strikethrough shows deletions.

IDERA PHARMACEUTICALS, INC.

2017 EMPLOYEE STOCK PURCHASE PLAN

The purpose of this Plan is to provide eligible employees of Idera Pharmaceuticals, Inc. (the "Company") and certain of its subsidiaries with opportunities to purchase shares of the Company's common stock, \$0.001 par value (the "Common Stock"). ~~Five hundred thousand (500,000)~~ Eight hundred fifty thousand (850,000) shares of Common Stock in the aggregate have been approved for this purpose, subject to any adjustment pursuant to Section 15 hereof. This Plan is intended to qualify as an "employee stock purchase plan" as defined in Section 423 of the Internal Revenue Code of 1986, as amended (the "Code"), and the regulations issued thereunder, and shall be interpreted consistent therewith.

1. Administration. The Plan will be administered by the Company's Board of Directors (the "Board") or by a Committee appointed by the Board (the "Committee"). The Board or the Committee has authority to make rules and regulations for the administration of the Plan and its interpretation and decisions with regard thereto shall be final and conclusive.

2. Eligibility. All employees of the Company and all employees of any subsidiary of the Company (as defined in Section 424(f) of the Code) designated by the Board or the Committee from time to time (a "Designated Subsidiary"), are eligible to participate in any one or more of the offerings of Options (as defined in Section 9) to purchase Common Stock under the Plan provided that:

- (a) they are customarily employed by the Company or a Designated Subsidiary for more than 20 hours a week and for more than five months in a calendar year;
- (b) they have been employed by the Company or a Designated Subsidiary for at least three months prior to enrolling in the Plan; and
- (c) they are employees of the Company or a Designated Subsidiary on the first day of the applicable Plan Period (as defined below).

No employee may be granted an Option hereunder if such employee, immediately after the Option is granted, owns 5% or more of the total combined voting power or value of the stock of the Company or any subsidiary. For purposes of the preceding sentence, the attribution rules of Section 424(d) of the Code shall apply in determining the stock ownership of an employee, and all stock that the employee has a contractual right to purchase shall be treated as stock owned by the employee.

The Company retains the discretion to determine which eligible employees may participate in an offering pursuant to and consistent with Treasury Regulation Sections 1.423-2(e) and (f).

3. Offerings. The Company will make one or more offerings ("Offerings") to employees to purchase stock under this Plan. Offerings will begin on the dates determined by the Board or the Committee or the first business day thereafter (the "Offering Commencement Dates"). Each Offering Commencement Date will begin a plan period (a "Plan Period") during which payroll deductions will be made and held for the purchase of Common Stock at the end of the Plan Period. The Board or the Committee may, at its discretion, choose a Plan Period of twelve (12) months or less for subsequent Offerings and/or choose a different commencement date for Offerings under the Plan.

4. **Participation.** An employee eligible on the Offering Commencement Date of any Offering may participate in such Offering by completing and forwarding either a written or electronic payroll deduction authorization form to the employee's appropriate payroll office at least 14 days prior to the applicable Offering Commencement Date. The form will authorize a regular payroll deduction from the Compensation received by the employee during the Plan Period. Unless an employee files a new form or withdraws from the Plan, his or her deductions and purchases will continue at the same rate for future Offerings under the Plan as long as the Plan remains in effect. The term "Compensation" means the amount of money reportable on the employee's Federal Income Tax Withholding Statement, excluding overtime, shift premium, incentive or bonus awards, allowances and reimbursements for expenses such as relocation allowances for travel expenses, income or gains associated with the grant or vesting of restricted stock, income or gains on the exercise of Company stock options or stock appreciation rights, and similar items, whether or not shown or separately identified on the employee's Federal Income Tax Withholding Statement, but including, in the case of salespersons, sales commissions to the extent determined by the Board or the Committee.

5. **Deductions.** The Company will maintain payroll deduction accounts for all participating employees. With respect to any Offering made under this Plan, an employee may authorize a payroll deduction in any dollar amount up to a maximum of 10% of the Compensation he or she receives during the Plan Period or such shorter period during which deductions from payroll are made. Payroll deductions may be at the rate of 1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9% or 10% of Compensation with any change in compensation during the Plan Period to result in an automatic corresponding change in the dollar amount withheld. The minimum payroll deduction is such percentage of Compensation as may be established from time to time by the Board or the Committee.

6. **Deduction Changes.** An employee may decrease or discontinue his or her payroll deduction once during any Plan Period, by filing either a written or electronic new payroll deduction authorization form. However, an employee may not increase his or her payroll deduction during a Plan Period. If an employee elects to discontinue his or her payroll deductions during a Plan Period, but does not elect to withdraw his or her funds pursuant to Section 8 hereof, funds deducted prior to his or her election to discontinue will be applied to the purchase of Common Stock on the Exercise Date (as defined below).

7. **Interest.** Interest will not be paid on any employee accounts, except to the extent that the Board or the Committee, in its sole discretion, elects to credit employee accounts with interest at such rate as it may from time to time determine.

8. **Withdrawal of Funds.** An employee may at any time prior to the close of business on the last business day in a Plan Period and for any reason permanently draw out the balance accumulated in the employee's account and thereby withdraw from participation in an Offering.

Partial withdrawals are not permitted. The employee may not begin participation again during the remainder of the Plan Period during which the employee withdrew his or her balance. The employee may participate in any subsequent Offering in accordance with terms and conditions established by the Board or the Committee.

9. **Purchase of Shares.**

(a) **Number of Shares.** On the Offering Commencement Date of each Plan Period, the Company will grant to each eligible employee who is then a participant in the Plan an option (an "Option") to purchase on the last business day of such Plan Period (the "Exercise Date") at the applicable purchase price (the "Option Price") up to a whole number of shares of Common Stock determined by multiplying \$2,083 by the number of full months in the Plan Period and dividing the result by the closing price (as determined below) on the Offering Commencement Date; provided, however, that no employee may be granted an Option which permits his or her rights to purchase Common Stock under this Plan and any other employee stock purchase plan (as defined in

Section 423(b) of the Code) of the Company and its subsidiaries, to accrue at a rate which exceeds \$25,000 of the fair market value of such Common Stock (determined at the date such Option is granted) for each calendar year in which the Option is outstanding at any time.

(b) Option Price. The Board or the Committee shall determine the Option Price for each Plan Period, including whether such Option Price shall be determined based on the lesser of the closing price of the Common Stock on (i) the first business day of the Plan Period or (ii) the Exercise Date, or shall be based solely on the closing price of the Common Stock on the Exercise Date; provided, however, that such Option Price shall be at least 85% of the applicable closing price. In the absence of a determination by the Board or the Committee, the Option Price will be 85% of the lesser of the closing price of the Common Stock on (i) the first business day of the Plan Period and (ii) the Exercise Date. The closing price shall be (a) the closing price (for the primary trading session) on any national securities exchange on which the Common Stock is listed or (b) the average of the closing bid and asked prices in the over-the-counter-market, whichever is applicable, as published in The Wall Street Journal or another source selected by the Board or the Committee. If no sales of Common Stock were made on such a day, the price of the Common Stock shall be the reported price for the next preceding day on which sales were made.

(c) Exercise of Option. Each employee who continues to be a participant in the Plan on the Exercise Date shall be deemed to have exercised his or her Option at the Option Price on such date and shall be deemed to have purchased from the Company the number of whole shares of Common Stock reserved for the purpose of the Plan that his or her accumulated payroll deductions on such date will pay for, but not in excess of the maximum numbers determined in the manner set forth above.

(d) Return of Unused Payroll Deductions. Any balance remaining in an employee's payroll deduction account at the end of a Plan Period will be automatically refunded to the employee, except that any balance that is less than the purchase price of one share of Common Stock will be carried forward into the employee's payroll deduction account for the following Offering, unless the employee elects not to participate in the following Offering under the Plan, in which case the balance in the employee's account shall be refunded.

10. Issuance of Certificates. Certificates representing shares of Common Stock purchased under the Plan may be issued only in the name of the employee, in the name of the employee and another person of legal age as joint tenants with rights of survivorship, or (in the Company's sole discretion) in the name of a brokerage firm, bank, or other nominee holder designated by the employee. The Company may, in its sole discretion and in compliance with applicable laws, authorize the use of book entry registration of shares in lieu of issuing stock certificates.

11. Rights on Retirement, Death or Termination of Employment. If a participating employee's employment ends before the last business day of a Plan Period, no payroll deduction shall be taken from any pay then due and owing to the employee and the balance in the employee's account shall be paid to the employee. In the event of the employee's death before the last business day of a Plan Period, the Company shall, upon notification of such death, pay the balance of the employee's account (a) to the executor or administrator of the employee's estate or (b) if no such executor or administrator has been appointed to the knowledge of the Company, to such other person(s) as the Company may, in its discretion, designate. If, before the last business day of the Plan Period, the Designated Subsidiary by which an employee is employed ceases to be a subsidiary of the Company, or if the employee is transferred to a subsidiary of the Company that is not a Designated Subsidiary, the employee shall be deemed to have terminated employment for the purposes of this Plan.

12. Optionees Not Stockholders. Neither the granting of an Option to an employee nor the deductions from his or her pay shall make such employee a stockholder of the shares of Common Stock covered by an Option under this Plan until he or she has purchased and received such shares.

13. Options Not Transferable. Options under this Plan are not transferable by a participating employee other than by will or the laws of descent and distribution, and are exercisable during the employee's lifetime only by the employee.

14. Application of Funds. All funds received or held by the Company under this Plan may be combined with other corporate funds and may be used for any corporate purpose.

15. Adjustment for Changes in Common Stock and Certain Other Events.

(a) Changes in Capitalization. In the event of any stock split, reverse stock split, stock dividend, recapitalization, combination of shares, reclassification of shares, spin-off or other similar change in capitalization or event, or any dividend or distribution to holders of Common Stock other than an ordinary cash dividend, (i) the number and class of securities available under this Plan, (ii) the share limitations set forth in Section 9, and (iii) the Option Price shall be equitably adjusted to the extent determined by the Board or the Committee.

(b) Reorganization Events.

(1) Definition. A "Reorganization Event" shall mean: (a) any merger or consolidation of the Company with or into another entity as a result of which all of the Common Stock of the Company is converted into or exchanged for the right to receive cash, securities or other property or is cancelled, (b) any transfer or disposition of all of the Common Stock of the Company for cash, securities or other property pursuant to a share exchange or other transaction or (c) any liquidation or dissolution of the Company.

(2) Consequences of a Reorganization Event on Options. In connection with a Reorganization Event, the Board or the Committee may take any one or more of the following actions as to outstanding Options on such terms as the Board or the Committee determines: (i) provide that Options shall be assumed, or substantially equivalent Options shall be substituted, by the acquiring or succeeding corporation (or an affiliate thereof), (ii) upon written notice to employees, provide that all outstanding Options will be terminated immediately prior to the consummation of such Reorganization Event and that all such outstanding Options will become exercisable to the extent of accumulated payroll deductions as of a date specified by the Board or the Committee in such notice, which date shall not be less than ten (10) days preceding the effective date of the Reorganization Event, (iii) upon written notice to employees, provide that all outstanding Options will be cancelled as of a date prior to the effective date of the Reorganization Event and that all accumulated payroll deductions will be returned to participating employees on such date, (iv) in the event of a Reorganization Event under the terms of which holders of Common Stock will receive upon consummation thereof a cash payment for each share surrendered in the Reorganization Event (the "Acquisition Price"), change the last day of the Plan Period to be the date of the consummation of the Reorganization Event and make or provide for a cash payment to each employee equal to (A) (i) the Acquisition Price times (ii) the number of shares of Common Stock that the employee's accumulated payroll deductions as of immediately prior to the Reorganization Event could purchase at the Option Price, where the Acquisition Price is treated as the fair market value of the Common Stock on the last day of the applicable Plan Period for purposes of determining the Option Price under Section 9(b) hereof, and where the number of shares that could be purchased is subject to the limitations set forth in Section 9(a), minus (B) the result of multiplying such number of shares by such Option Price, (v) provide that, in connection with a liquidation or dissolution of the Company, Options shall convert into the right to receive liquidation proceeds (net of the Option Price thereof) and (vi) any combination of the foregoing.

For purposes of clause (i) above, an Option shall be considered assumed if, following consummation of the Reorganization Event, the Option confers the right to purchase, for each share of Common Stock subject to the Option immediately prior to the consummation of the Reorganization Event, the consideration (whether cash, securities or other property) received as a result of the Reorganization Event by holders of Common Stock for each share of Common Stock held immediately prior to the consummation of the Reorganization Event (and if holders were offered a choice of consideration, the type of consideration chosen by the holders of a majority of the outstanding shares of Common Stock); provided, however, that if the consideration received as a result of the Reorganization Event is not solely common stock of the acquiring or succeeding corporation (or an affiliate thereof), the Company may, with the consent of the acquiring or succeeding corporation, provide for the consideration to be received upon the exercise of Options to consist solely of such number of shares of common stock of the acquiring or succeeding corporation (or an affiliate thereof) that the Board determines to be equivalent in value (as of the date of such determination or another date specified by the Board) to the per share consideration received by holders of outstanding shares of Common Stock as a result of the Reorganization Event.

16. Amendment of the Plan. The Board may at any time, and from time to time, amend or suspend this Plan or any portion thereof, except that (a) if the approval of any such amendment by the shareholders of the Company is required by Section 423 of the Code, such amendment shall not be effected without such approval, and (b) in no event may any amendment be made that would cause the Plan to fail to comply with Section 423 of the Code.

17. Insufficient Shares. If the total number of shares of Common Stock specified in elections to be purchased under any Offering plus the number of shares purchased under previous Offerings under this Plan exceeds the maximum number of shares issuable under this Plan, the Board or the Committee will allot the shares then available on a pro-rata basis.

18. Termination of the Plan. This Plan may be terminated at any time by the Board. Upon termination of this Plan all amounts in the accounts of participating employees shall be promptly refunded.

19. Governmental Regulations. The Company's obligation to sell and deliver Common Stock under this Plan is subject to listing on a national stock exchange (to the extent the Common Stock is then so listed or quoted) and the approval of all governmental authorities required in connection with the authorization, issuance or sale of such stock.

20. Governing Law. The Plan shall be governed by Delaware law except to the extent that such law is preempted by federal law.

21. Issuance of Shares. Shares may be issued upon exercise of an Option from authorized but unissued Common Stock, from shares held in the treasury of the Company, or from any other proper source.

22. Notification upon Sale of Shares. Each employee agrees, by entering the Plan, to promptly give the Company notice of any disposition of shares purchased under the Plan where such disposition occurs within two years after the date of grant of the Option pursuant to which such shares were purchased.

23. Grants to Employees in Foreign Jurisdictions. The Company may, to comply with the laws of a foreign jurisdiction, grant Options to employees of the Company or a Designated Subsidiary who are citizens or residents of such foreign jurisdiction (without regard to whether they are also citizens of the United States or resident aliens (within the meaning of Section 7701(b)(1)(A) of the Code)) with terms that are less favorable (but not more favorable) than the terms of Options granted under the Plan to employees of the Company or a Designated Subsidiary who are resident in the United States. Notwithstanding the preceding provisions of this Plan, employees of the Company or a Designated

Subsidiary who are citizens or residents of a foreign jurisdiction (without regard to whether they are also citizens of the United States or resident aliens (within the meaning of Section 7701(b)(1)(A) of the Code)) may be excluded from eligibility under the Plan if (a) the grant of an Option under the Plan to a citizen or resident of the foreign jurisdiction is prohibited under the laws of such jurisdiction or (b) compliance with the laws of the foreign jurisdiction would cause the Plan to violate the requirements of Section 423 of the Code. The Company may add one or more appendices to this Plan describing the operation of the Plan in those foreign jurisdictions in which employees are excluded from participation or granted less favorable Options.

25. Authorization of Sub-Plans. The Board may from time to time establish one or more sub-plans under the Plan with respect to one or more Designated Subsidiaries, provided that such sub-plan complies with Section 423 of the Code.

26. Withholding. If applicable tax laws impose a tax withholding obligation, each affected employee shall, no later than the date of the event creating the tax liability, make provision satisfactory to the Board for payment of any taxes required by law to be withheld in connection with any transaction related to Options granted to or shares acquired by such employee pursuant to the Plan. The Company may, to the extent permitted by law, deduct any such taxes from any payment of any kind otherwise due to an employee.

27. Effective Date and Approval of Shareholders. The Plan shall take effect on June 7, 2017 subject to approval by the shareholders of the Company as required by Section 423 of the Code, which approval must occur within twelve months of the adoption of the Plan by the Board.

IDERA PHARMACEUTICALS, INC.

ANNUAL MEETING OF STOCKHOLDERS

Tuesday, June 4, 2019
8:30 a.m.

Idera Pharmaceuticals, Inc.
505 Eagleview Boulevard
Suite 212
Exton, PA 19341



Small steps make an impact.

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▼ IF VOTING BY MAIL, SIGN, DETACH AND RETURN THE BOTTOM PORTION IN THE ENCLOSED ENVELOPE. ▼

Proxy – Idera Pharmaceuticals, Inc.



Idera Pharmaceuticals, Inc.
505 Eagleview Boulevard
Suite 212
Exton, PA 19341

This proxy is solicited by the Board of Directors for use at the Annual Meeting of Stockholders on June 4, 2019.

The undersigned hereby appoints Mr. Vincent J. Milano and Mr. Bryant D. Lim, and each of them, with full power of substitution, to vote, as designated below, all the shares of Idera Pharmaceuticals, Inc. common stock held of record by the undersigned at the close of business on April 18, 2019, at the 2019 annual meeting of stockholders, to be held June 4, 2019, and at any and all adjournments or postponements thereof. The undersigned hereby revokes any and all earlier dated proxies with respect to the annual meeting. This proxy, when properly executed, will be voted in the manner directed herein by the undersigned. If no direction is made, this proxy will be voted FOR each of the nominees for election as a Class III member of the Board of Directors, FOR the approval of the advisory vote on executive compensation, FOR approval of an amendment to the 2013 Share Incentive Plan, FOR approval of an amendment to the 2017 Employee Stock Purchase Plan, and FOR ratification of the selection of Ernst & Young LLP as our independent registered public accounting firm for the fiscal year ending December 31, 2019.

If any other business is presented at the annual meeting, including matters incidental to the conduct of the meeting or otherwise, this proxy will be voted by those named in this proxy in their best judgment. At the present time, the board of directors knows of no other business to be presented at the meeting.

THIS PROXY WHEN PROPERLY EXECUTED WILL BE VOTED AS DIRECTED OR, IF NO DIRECTION IS GIVEN, WILL BE VOTED AS THE BOARD RECOMMENDS.

See reverse for voting instructions.

C Non-Voting Items

Change of Address – Please print new address below.

Meeting Attendance
Mark box to the right if
you plan to attend the
Annual Meeting.

