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# SCHEDULE 14A INFORMATION

## 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 Pursuant to § 240.14a-12

## X4 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.

Title of each class of securities to which transaction applies:

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Aggregate number of securities to which transaction applies:

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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):

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Proposed maximum aggregate value of transaction:

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Total fee paid:

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- 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.

Amount Previously Paid:

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Form, Schedule or Registration Statement No.:

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Filing Party:

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Date Filed:

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**X4 PHARMACEUTICALS, INC.**  
**955 Massachusetts Avenue, 4<sup>th</sup> Floor**  
**Cambridge, Massachusetts 02139**

**NOTICE OF ANNUAL MEETING OF STOCKHOLDERS**

**To Be Held On June 10, 2020**

Dear Stockholder:

You are cordially invited to attend the Annual Meeting of Stockholders of X4 Pharmaceuticals, Inc., a Delaware corporation (the “Company”). The Annual Meeting will be held on Wednesday, June 10, 2020 at 11:00 a.m. local time at the offices of Cooley LLP, 500 Boylston Street, 14<sup>th</sup> Floor, Boston, Massachusetts 02116 for the following purposes:

1. To elect the Board’s nominees, Gary J. Bridger, Ph.D. and Murray Stewart, M.D., to the Board of Directors to hold office until the 2023 Annual Meeting of Stockholders.
2. To approve the Company’s Amended and Restated 2017 Equity Incentive Plan.
3. To approve an amendment to the Company’s Certificate of Incorporation to increase the authorized number of shares of common stock from 33,333,333 shares to 125,000,000 shares.
4. To ratify the selection by the Audit Committee of the Board of Directors of PricewaterhouseCoopers LLP as the independent registered public accounting firm of the Company for its fiscal year ending December 31, 2020.
5. To conduct any other business properly brought before the Annual Meeting.

These items of business are more fully described in the Proxy Statement accompanying this Notice.

The record date for the Annual Meeting is April 15, 2020. Only stockholders of record at the close of business on that date may vote at the Annual Meeting or any adjournment or postponement thereof.

*The Company is closely monitoring developments related to the coronavirus pandemic (COVID-19). It could become necessary to change the date, time, location and/or means of holding the Annual Meeting (including by means of remote communication). If such a change is made, the Company will announce the change in advance, and details on how to participate will be issued by press release, posted on the Company’s website and filed as additional proxy materials with the Securities and Exchange Commission.*

**Important Notice Regarding the Availability of Proxy Materials for the Annual Meeting to Be Held on June 10, 2020 at the offices of Cooley LLP, 500 Boylston Street, 14<sup>th</sup> Floor, Boston, Massachusetts 02116**

The proxy statement and annual report to stockholders are available at <http://www.proxypush.com/XFOR>.

By Order of the Board of Directors,



Paula Ragan, Ph.D.  
President, Chief Executive Officer, Corporate Secretary and  
Director

Cambridge, Massachusetts  
April , 2020

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**You are cordially invited to attend the Annual Meeting in person. Whether or not you expect to attend the Annual Meeting, please vote by telephone or through the Internet, or, if you receive a paper proxy card by mail, by completing and returning the proxy card mailed to you, as promptly as possible in order to ensure your representation at the Annual Meeting. Voting instructions are provided in the Notice of Internet Availability of Proxy Materials, or, if you receive a paper proxy card by mail, the instructions are printed on your proxy card and included in the accompanying proxy statement. Even if you have voted by proxy, you may still vote in person if you attend the Annual Meeting. Please note, however, that if your shares are held of record by a brokerage firm, bank or other agent and you wish to vote at the Annual Meeting, you must obtain a proxy issued in your name from that agent in order to vote your shares that are held in such agent's name and account.**

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**X4 PHARMACEUTICALS, INC.**  
**955 Massachusetts Avenue, 4<sup>th</sup> Floor**  
**Cambridge, Massachusetts 02139**

**PROXY STATEMENT**  
**FOR THE 2020 ANNUAL MEETING OF SHAREHOLDERS**

**June 10, 2020**

**QUESTIONS AND ANSWERS ABOUT THESE PROXY MATERIALS AND VOTING**

**Why did I receive a notice regarding the availability of proxy materials on the Internet?**

Pursuant to rules adopted by the Securities and Exchange Commission (the “SEC”), we have elected to provide access to our proxy materials over the Internet. Accordingly, we have sent you a Notice of Internet Availability of Proxy Materials (the “Notice”) because the Board of Directors (the “Board”) of X4 Pharmaceuticals, Inc. (sometimes referred to as the “Company” or “X4”) is soliciting your proxy to vote at the 2020 Annual Meeting of Stockholders (the “Annual Meeting”), including at any adjournments or postponements of the Annual Meeting. All stockholders will have the ability to access the proxy materials on the website referred to in the Notice or request to receive a printed set of the proxy materials. Instructions on how to access the proxy materials over the internet or to request a printed copy may be found in the Notice.

We intend to mail the Notice on or about April , 2020 to all stockholders of record entitled to vote at the Annual Meeting.

**Will I receive any other proxy materials by mail?**

We may send you a proxy card, along with a second Notice, on or after May , 2020.

**How do I attend the Annual Meeting?**

The Annual Meeting will be held on Wednesday, June 10, 2020 at 11:00 a.m. local time at the offices Cooley LLP, 500 Boylston Street, 14<sup>th</sup> Floor, Boston, Massachusetts 02116. Directions to the Annual Meeting may be found at <http://www.proxypush.com/XFOR>. Information on how to vote in person at the Annual Meeting is discussed below.

Please note that while we intend to hold the Annual Meeting in person at the location set forth above, we are sensitive to the public health and travel concerns that our management, directors and stockholders may have regarding the evolving COVID-19 pandemic and the related protocols that federal, state and local governments may impose. As a result, we may decide to hold the Annual Meeting in a different location or solely by means of remote communication (i.e., a virtual-only meeting). Please retain the control numbers from your proxy card so that you can access the Annual Meeting if it is converted to a virtual-only meeting. Any such change will be announced via a press release that will be filed on our website and as additional soliciting material with the SEC as soon as reasonably practicable before the Annual Meeting.

**Who can vote at the Annual Meeting?**

Only stockholders of record at the close of business on April 15, 2020 will be entitled to vote at the Annual Meeting. On this record date, there were 16,142,275 shares of common stock outstanding and entitled to vote. A list of stockholders entitled to vote at the Annual Meeting will be available for examination during normal business hours by any stockholder for any purpose germane to the meeting for ten days prior to the Annual Meeting, and during the Annual Meeting such list will be available for examination.

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### *Stockholder of Record: Shares Registered in Your Name*

If on April 15, 2020, your shares were registered directly in your name with our transfer agent, Computershare Trust Company, N.A., then you are a stockholder of record. As a stockholder of record, you may vote in person at the Annual Meeting or vote by proxy. Whether or not you plan to attend the Annual Meeting, we urge you to vote by proxy electronically through the Internet, over the telephone or by completing and returning a printed proxy card that you may request or that we may elect to deliver at a later time to ensure your vote is counted.

### *Beneficial Owner: Shares Registered in the Name of a Broker or Bank*

If on April 15, 2020, your shares were held not in your name but rather in an account at a brokerage firm, bank or other similar organization, then you are the beneficial owner of shares held in “street name” and the Notice is being forwarded to you by that organization. The organization holding your account is considered to be the stockholder of record for purposes of voting at the Annual Meeting. As a beneficial owner, you have the right to direct your broker, bank or other agent regarding how to vote the shares in your account. You are also invited to attend the Annual Meeting. However, since you are not the stockholder of record, you may not vote your shares in person at the Annual Meeting unless you request and obtain a valid proxy from your broker, bank or other agent.

### **What am I voting on?**

#### **There are four matters scheduled for a vote:**

- Election of two (2) directors to hold office until the 2023 Annual Meeting of Stockholders (Proposal 1);
- Approval of our Amended and Restated 2017 Equity Incentive Plan (Proposal 2);
- Approval of a proposed amendment to our Restated Certificate of Incorporation, as amended (the “Restated Certificate of Incorporation”) to increase the authorized number of shares of common stock from 33,333,333 shares to 125,000,000 shares (Proposal 3); and
- Ratification of selection by the Audit Committee of the Board of Directors of PricewaterhouseCoopers LLP as our independent registered public accounting firm for our fiscal year ending December 31, 2020 (Proposal 4).

### **What if another matter is properly brought before the Annual Meeting?**

The Board knows of no other matters that will be presented for consideration at the Annual Meeting. If any other matters are properly brought before the meeting, it is the intention of the persons named in the accompanying proxy to vote on those matters in accordance with their best judgment.

### **How do I vote?**

You may either vote “FOR” all the nominees to the Board or you may “WITHHOLD” your vote for any nominee you specify. For each of the other matters to be voted on, you may vote “FOR” or “AGAINST” or abstain from voting.

The procedures for voting are fairly simple:

### *Stockholder of Record: Shares Registered in Your Name*

If you are a stockholder of record, you may vote in person at the Annual Meeting, vote by proxy through the Internet, vote by proxy over the telephone, or vote by proxy using a proxy card that you may request or that we

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may elect to deliver at a later time. Whether or not you plan to attend the Annual Meeting, we urge you to vote by proxy to ensure your vote is counted. You may still attend the Annual Meeting and vote in person even if you have already voted by proxy.

- To vote in person, come to the Annual Meeting and we will give you a ballot when you arrive; however, due to the evolving COVID-19 pandemic and related government guidelines, we urge our stockholders to monitor the applicable government guidelines and to not attend the Annual Meeting in person if the Massachusetts “stay-at-home” advisory remains in place on the date of the Annual Meeting, or if other applicable government guidelines continue to encourage people not to attend public gatherings.
- To vote through the Internet, go to <http://www.proxypush.com/XFOR> to complete an electronic proxy card. You will be asked to provide the control number from the Notice. Your Internet vote must be received by 11:59 p.m., Eastern Daylight Time, on June 9, 2020 to be counted.
- To vote over the telephone, dial toll-free (866) 474-8637 using a touch-tone phone and follow the recorded instructions. You will be asked to provide the control number from the Notice. Your telephone vote must be received by 11:59 p.m., Eastern Daylight Time, on June 9, 2020 to be counted.
- To vote by using a printed proxy card that may be delivered to you, simply complete, sign and date the proxy card and return it promptly in the envelope provided. If you return your signed proxy card to us before the Annual Meeting, we will vote your shares as you direct.

### *Beneficial Owner: Shares Registered in the Name of Broker or Bank*

If you are a beneficial owner of shares registered in the name of your broker, bank or other agent, you should have received a Notice containing voting instructions from that organization rather than from us. Simply follow the voting instructions in the Notice to ensure that your vote is counted. To vote in person at the Annual Meeting, you must obtain a valid proxy from your broker, bank or other agent. Follow the instructions from your broker, bank or other agent included with these proxy materials, or contact that organization to request a proxy form.

**We provide Internet proxy voting to allow you to vote your shares online, with procedures designed to ensure the authenticity and correctness of your proxy vote instructions. However, please be aware that you must bear any costs associated with your Internet access, such as usage charges from internet access providers and telephone companies.**

### **How many votes do I have?**

On each matter to be voted upon, you have one vote for each share of common stock you own as of April 15, 2020.

### **If I am a stockholder of record and I do not vote, or if I return a proxy card or otherwise vote without giving specific voting instructions, what happens?**

If you are a stockholder of record and do not vote by completing a proxy card, by telephone, through the Internet or in person at the Annual Meeting, your shares will not be voted.

If you return a signed and dated proxy card or otherwise vote without marking voting selections, your shares will be voted, as applicable, “FOR” the election of both nominees for director, “FOR” the approval of the Amended and Restated 2017 Equity Incentive Plan, “FOR” the amendment to our Restated Certificate of Incorporation and “FOR” the ratification of the selection of our independent registered public accounting firm. If any other matter is properly presented at the Annual Meeting, your proxyholder (one of the individuals named on your proxy card) will vote your shares using his or her best judgment.

### **If I am a beneficial owner of shares held in street name and I do not provide my broker or bank with voting instructions, what happens?**

If you are a beneficial owner of shares held in street name and you do not instruct your broker, bank or other agent how to vote your shares, your broker, bank or other agent may still be able to vote your shares in its

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discretion. In this regard, under the rules of the New York Stock Exchange (“NYSE”), brokers, banks and other securities intermediaries that are subject to NYSE rules may use their discretion to vote your “uninstructed” shares with respect to matters considered to be “routine” under NYSE rules, but not with respect to “non-routine” matters. In this regard, the NYSE has advised us that Proposals 1 and 2 are considered to be “non-routine” under NYSE rules meaning that your broker may not vote your shares on those proposals in the absence of your voting instructions. However, Proposals 3 and 4 are considered to be “routine” matters under NYSE rules, meaning that if you do not return voting instructions to your broker by its deadline, your shares may be voted by your broker in its discretion on Proposals 3 and 4.

***If you a beneficial owner of shares held in street name, in order to ensure your shares are voted in the way you would prefer, you must provide voting instructions to your broker, bank or other agent by the deadline provided in the materials you receive from your broker, bank or other agent.***

### **Who is paying for this proxy solicitation?**

We will pay for the entire cost of soliciting proxies. In addition to these proxy materials, our directors and employees may also solicit proxies in person, by telephone, or by other means of communication. Directors and employees will not be paid any additional compensation for soliciting proxies. We may also reimburse brokerage firms, banks and other agents for the cost of forwarding proxy materials to beneficial owners.

### **What does it mean if I receive more than one Notice?**

If you receive more than one Notice, your shares may be registered in more than one name or in different accounts. Please follow the voting instructions on each of the Notices to ensure that all of your shares are voted.

### **Can I change my vote after submitting my proxy?**

#### *Stockholder of Record: Shares Registered in Your Name*

Yes. You can revoke your proxy at any time before the final vote at the Annual Meeting. If you are the record holder of your shares, you may revoke your proxy in any one of the following ways:

- You may submit another properly completed proxy card with a later date.
- You may grant a subsequent proxy by telephone or through the Internet.
- You may send a timely written notice that you are revoking your proxy to our Corporate Secretary at 955 Massachusetts Avenue, 4<sup>th</sup> Floor, Cambridge, Massachusetts 02139.
- You may attend the Annual Meeting and vote in person. Simply attending the Annual Meeting will not, by itself, revoke your proxy.

Your most current proxy card or telephone or Internet proxy is the one that is counted.

#### *Beneficial Owner: Shares Registered in the Name of Broker or Bank*

If your shares are held by your broker, bank or other agent, you should follow the instructions provided by your broker, bank or other agent.

### **When are stockholder proposals and director nominations due for next year’s annual meeting?**

To be considered for inclusion in next year’s proxy materials, your proposal must be submitted in writing by December 29, 2020, to our Company Secretary, c/o X4 Pharmaceuticals, Inc., 955 Massachusetts Avenue, 4<sup>th</sup> Floor, Cambridge, Massachusetts 02139.



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Our bylaws also establish an advance notice procedure if you wish to present a proposal (including a director nomination) before an annual meeting of stockholders but you are not requesting that your proposal or nomination be included in next year's proxy materials. To be timely for our 2021 Annual Meeting of Stockholders, our Corporate Secretary must receive the written notice at our principal executive offices not later than the close of business on March 12, 2021 nor earlier than the close of business on February 10, 2021. However, if we hold our 2021 Annual Meeting of Stockholders more than 30 days before or after June 10, 2021 (the one-year anniversary date of the 2020 Annual Meeting of Stockholders), then timely notice of a stockholder proposal that is not intended to be included in our proxy statement must be received not earlier than the close of business on the 120th day prior to the 2021 Annual Meeting of Stockholders and not later than the close of business on the later of (a) the 90th day prior to the 2021 Annual Meeting of Stockholders and (b) the 10th day following the day on which the one of the following first occurs: (i) mailing of notice of the date of the 2021 Annual Meeting of Stockholders and (ii) the first public announcement of the date of the 2021 Annual Meeting of Stockholders. You are also advised to review our bylaws, which contain additional requirements about advance notice of stockholder proposals and director nominations.

### **How are votes counted?**

Votes will be counted by the inspector of election appointed for the Annual Meeting, who will separately count, for the proposal to elect directors, votes "For," "Withhold" and broker non-vote, and, with respect to the other proposals, votes "For" and "Against," abstentions and, if applicable, broker non-votes. Abstentions will be counted towards the vote total for each of Proposals 2, 3 and 4, and will have the same effect as "Against" votes. Broker non-votes on Proposals 1 and 2 will have no effect and will not be counted towards the vote total for any of those proposals.

### **What are "broker non-votes"?**

As discussed above, when a beneficial owner of shares held in street name does not give voting instructions to his or her broker, bank or other securities intermediary holding his or her shares as to how to vote on matters deemed to be "non-routine" under NYSE rules, the broker, bank or other such agent cannot vote the shares. These un-voted shares are counted as "broker non-votes." The NYSE has advised us that Proposals 1 and 2 are considered to be "non-routine" under NYSE rules and we therefore expect broker non-votes to exist in connection with those proposals.

***As a reminder, if you are a beneficial owner of shares held in street name, in order to ensure your shares are voted in the way you would prefer, you must provide voting instructions to your broker, bank or other agent by the deadline provided in the materials you receive from your broker, bank or other agent.***

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### How many votes are needed to approve each proposal?

The following table summarizes the minimum vote needed to approve each proposal and the effect of abstentions and broker non-votes.

Proposal Number	Proposal Description	Vote Required for Approval	Effect of Abstentions	Effect of Broker Non-Votes
1	Election of Directors	The two nominees receiving the most "For" votes; withheld votes will have no effect.	No effect	No effect
2	Approval of the Amended and Restated 2017 Equity Incentive Plan	The affirmative vote of a majority of the votes cast by the holders of shares present in person or by proxy and entitled to vote at the Annual Meeting.	Against	No effect
3	Approval of an amendment to the Restated Certificate of Incorporation to increase the number of authorized shares of common stock from 33,333,333 shares to 125,000,000 shares	The affirmative vote of holders of a majority of the shares of our common stock outstanding on the record date and entitled to vote at the Annual Meeting.	Against	Not applicable <sup>(1)</sup>
4	Ratification of the selection of PricewaterhouseCoopers LLP as the Company's independent registered public accounting firm for the year ending December 31, 2020	The affirmative vote of a majority of the votes cast by the holders of shares present in person or by proxy and entitled to vote at the Annual Meeting.	Against	Not applicable <sup>(1)</sup>

- (1) The NYSE has advised us that Proposals 3 and 4 are considered to be a "routine" matter under NYSE rules. Accordingly, if you hold your shares in street name and do not provide voting instructions to your broker, bank or other agent that holds your shares, your broker, bank or other agent has discretionary authority under NYSE rules to vote your shares on this proposal.

### What is the quorum requirement?

A quorum of stockholders is necessary to hold a valid meeting. A quorum will be present if stockholders holding at least a majority in voting power of the outstanding shares entitled to vote are present at the Annual Meeting in person or represented by proxy. On the record date, there were 16,142,275 shares outstanding and entitled to vote. **Thus, the holders of 8,071,138 shares must be present in person or represented by proxy at the Annual Meeting to have a quorum.**

Your shares will be counted towards the quorum only if you submit a valid proxy (or one is submitted on your behalf by your broker, bank or other nominee) or if you vote in person at the Annual Meeting. Abstentions and broker non-votes will be counted towards the quorum requirement. If there is no quorum, the holders of a majority of shares present at the Annual Meeting in person or represented by proxy may adjourn the Annual Meeting to another date.

### How can I find out the results of the voting at the Annual Meeting?

Preliminary voting results will be announced at the Annual Meeting. In addition, final voting results will be published in a current report on Form 8-K that we expect to file within four business days after the Annual

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Meeting. If final voting results are not available to us in time to file a Form 8-K within four business days after the Annual Meeting, we intend to file a Form 8-K to publish preliminary results and, within four business days after the final results are known to us, file an additional Form 8-K to publish the final results.

### **How does the March 2019 merger affect the disclosures in this proxy statement?**

On March 13, 2019, X4 (formerly Arsanis, Inc.) completed its business combination in accordance with the terms of the Agreement and Plan of Merger, dated as of November 26, 2018, as amended on December 20, 2018 and March 8, 2019, or the Merger Agreement, by and among X4, X4 Therapeutics, Inc. (formerly X4 Pharmaceuticals, Inc., or “Private X4”) and Artemis AC Corp., a Delaware corporation and a wholly-owned subsidiary of the Company (the “Merger Sub”), pursuant to which, among other matters, Merger Sub merged with and into Private X4, with Private X4 continuing as a wholly-owned subsidiary of X4 and the surviving corporation of the merger (the “Merger”). Following the Merger, on March 13, 2019, X4 effected a 1-for-6 reverse stock split of its common stock (the “Reverse Stock Split”), and changed its name to “X4 Pharmaceuticals, Inc.” Following the completion of the Merger, the business conducted by X4 became primarily the business conducted by Private X4, a clinical-stage biopharmaceutical company focused on the research, development and commercialization of novel therapeutics for the treatment of rare diseases. All references to common stock shares and per share amounts in this Proxy Statement have been retroactively adjusted to reflect, where applicable, the Reverse Stock Split, as indicated.

## PROPOSAL 1

### ELECTION OF DIRECTORS

Our Board of Directors is divided into three classes. Each class consists, as nearly as possible, of one-third of the total number of directors, and each class has a three-year term. Vacancies on the Board may be filled only by persons elected by a majority of the remaining directors. A director elected by the Board to fill a vacancy in a class, including vacancies created by an increase in the number of directors, shall serve for the remainder of the full term of that class and until the director's successor is duly elected and qualified.

The Board of Directors presently has seven members. There are two directors in the class whose term of office expires at our Annual Meeting: Gary J. Bridger, Ph.D. was appointed to our Board in connection with the Merger in March 2019, and Murray Stewart, M.D. was appointed to our Board in March 2019 to fill a vacancy on the Board. If elected at the Annual Meeting, each of these nominees would serve until the 2023 annual meeting and until his successor has been duly elected and qualified, or, if sooner, until the director's death, resignation or removal. It is our policy that all directors and nominees for director make every effort to attend the Annual Meeting. All of the then-serving directors attended the 2019 annual meeting of stockholders.

#### Vote Required

Directors are elected by a plurality of the votes of the holders of shares present in person or represented by proxy and entitled to vote on the election of directors. Accordingly, the two nominees receiving the highest number of affirmative votes will be elected. Shares represented by executed proxies will be voted, if authority to do so is not withheld, for the election of the two nominees named below. If any nominee becomes unavailable for election as a result of an unexpected occurrence, shares that would have been voted for that nominee will instead will be voted for the election of a substitute nominee proposed by us. Each person nominated for election has agreed to serve if elected. We have no reason to believe that any nominee will be unable to serve.

#### Director Nominees and Continuing Directors

The following is a brief biography and the ages of each nominee and each director whose term will continue after the Annual Meeting, and a discussion of the specific experience, qualifications, attributes or skills of each nominee that led the Nominating and Corporate Governance Committee to recommend that person as a nominee for director, as of the date of this Proxy Statement.

There are no family relationships between or among any of our directors or nominees. There is no arrangement or understanding between any of our directors or nominees and any other person or persons pursuant to which he or she is to be selected as a director or nominee.

There are no legal proceedings to which any of our directors is a party adverse to us or any of our subsidiaries or in which any such person has a material interest adverse to us or any of our subsidiaries.

#### Nominees for Election as a Class III Director for a Three-Year Term Expiring at the 2023 Annual Meeting of Stockholders

**Gary J. Bridger, Ph.D.**, age 57, became a member of the board of directors of X4 Pharmaceuticals, Inc., a private company, in October 2018 and continues to serve as a member of our Board following the completion of the Merger in March 2019. From February 2015 to December 2017, Dr. Bridger served as a consultant to Xenon Pharmaceuticals Inc., a biopharmaceutical company, where he previously served as the Executive Vice President of Research and Development from January 2013 to February 2015. From October 2013 to October 2015, Dr. Bridger served as a Managing Director at Five Corners Capital Inc. From June 2010 to June 2012, Dr. Bridger served as a venture partner at Venture West Capital Management, a venture capital firm. From November 2006 to December 2007, Dr. Bridger served as Senior Vice President of Research and Development of Genzyme Corporation, a biotechnology company, which was acquired by Sanofi, S.A. In June 1996, Dr. Bridger

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co-founded AnorMED Inc., a biopharmaceutical company, and was its Vice President of Research and Development and Chief Scientific Officer from 2000 until its acquisition by Genzyme in November 2006. Dr. Bridger has served on the board of directors of Aquinox Pharmaceuticals, Inc., a pharmaceutical company, since 2013, has served on the board of directors of Liminal BioSciences Inc., a biotechnology company, since May 2019, and previously served on the board of directors of Alder BioPharmaceuticals, Inc., a biopharmaceutical company, from 2013 to 2016. Dr. Bridger serves on the scientific advisory board of Alectos Therapeutics Inc., a biopharmaceutical company. Dr. Bridger holds a Ph.D. in Organic Chemistry from the University of Manchester Institute of Science and Technology. We believe that Dr. Bridger's experience as an executive officer or director of several public and private life sciences companies provides him with the qualifications and skills to serve on our Board.

**Murray W. Stewart, M.D.**, age 59, has served as a member of our Board since March 2019. Dr. Stewart has served as Chief Medical Officer of Rhythm Pharmaceuticals, Inc., a biopharmaceutical company focused on developing and commercializing therapies for the treatment of rare genetic disorders of obesity, since October 2018. He previously served as Head of Research and Development for Novelion Therapeutics Inc., a biopharmaceutical company focused on developing new standards of care for individuals living with rare disease, from November 2017 to October 2018. Prior to that, Dr. Stewart held various positions of increasing responsibility at GlaxoSmithKline, including serving as Chief Medical Officer from April 2014 to November 2017, with global responsibility for patient well-being across the vaccine, pharmaceutical, and consumer business units. He also held multiple research and development leadership roles, including Chief Medical Officer for the pharmaceutical business, Clinical Head of the Biopharma Unit, and Therapy Area Head for metabolic and cardiovascular diseases. Prior to his tenure to joining GlaxoSmithKline, he worked as a consultant physician and honorary senior lecturer at the Diabetes Center in Newcastle upon Tyne in the United Kingdom. Dr. Stewart holds an M.D. from Southampton Medical School and is a Fellow of the Royal College of Physicians. We believe that Dr. Stewart's extensive biopharmaceutical leadership experience, including experience in research, clinical development and regulatory strategy, provide him with the qualifications and skills to serve on our Board.

### **THE BOARD OF DIRECTORS RECOMMENDS A VOTE IN FAVOR OF EACH NAMED NOMINEE.**

#### **Class II Directors Continuing in Office Until the 2022 Annual Meeting of Stockholders**

**William E. Aliski, MPA**, age 72, has served as a member of our Board since September 2019. Since 2011, Mr. Aliski has served as an independent consultant to life sciences companies focused on orphan diseases. Prior to 2011, he served as Chief Commercial Officer for FoldRX Pharmaceuticals, an early stage company purchased by Pfizer in 2011, served as General Manager for Biomarin Europe, a biopharmaceutical company focused on rare diseases with genetic causes, and held executive level positions at Transkaryotic Therapies (TKT)/Shire and Genzyme Corp., both biopharmaceutical companies. Currently, Mr. Aliski serves as a member of the boards of directors of Ultragenyx Pharmaceutical Inc. and Applied Genetic Therapies Corporation. Mr. Aliski holds a M.P.A. from Harvard University and a Master of Social Planning from Boston College. We believe that Mr. Aliski's experience, in both consulting and operational roles, with life sciences companies focused on orphan diseases, as well as his public company board experience, qualify him to serve on our Board.

**René Russo, Pharm.D.**, age 45, became a member of the board of directors of Arsanis, Inc. in April 2016 and continues to serve as a member of our Board following the completion of the Merger in March 2019. Since May 2019, Dr. Russo has served as the Chief Executive Officer of Xilio Therapeutics (formerly Akreva Therapeutics), a privately held biopharmaceutical company focused on developing tumor-selective, immuno-oncology therapeutics. Prior to then, she served as President and Chief Executive Officer of Arsanis, Inc. from April 2016 to November 2018, and as its Chief Development Officer from July 2015 until April 2016. Prior to joining Arsanis, Dr. Russo served in various roles of increasing responsibility over an 11-year period at Cubist

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Pharmaceuticals, Inc., a public pharmaceutical development company, focused on the development and commercialization of infectious disease therapeutics, from 2003 until its acquisition by Merck in May 2015, most recently as its Vice President, Global Medical Affairs. From 1999 to 2004, she held roles of increasing responsibility at Bristol-Myers Squibb following a Postdoctoral Fellow in Industrial Pharmacy Infectious Diseases. Prior to joining the biotechnology industry, Dr. Russo held clinical positions at Robert Wood Johnson University Hospital and Princeton Hospital. Dr. Russo received her Pharm.D. and B.S. from Rutgers University. We believe that Dr. Russo's expertise and experience as an executive at public and private pharmaceutical companies and her expertise in clinical development and commercialization of therapeutics targeting infectious diseases, provide her with the qualifications and skills to serve on our Board.

### **Class I Directors Continuing in Office Until the 2021 Annual Meeting of Stockholders**

**David McGirr, M.B.A.**, age 65, became a member of the board of directors of Arsanis, Inc. in September 2017 and continues to serve as a member of our Board following the completion of the Merger in March 2019. From March 2013 until June 2014, Mr. McGirr was Senior Advisor to the chief executive officer of Cubist Pharmaceuticals, Inc., a biopharmaceutical company where he also served as Senior Vice President and Chief Financial Officer from November 2002 to March 2013. Prior to joining Cubist in 2002, Mr. McGirr was the President and Chief Operating Officer of hippo inc., a venture-financed internet technology company. From 1996 to 1999, he was the President of GAB Robins North America, Inc., a risk management company, serving also as Chief Executive Officer from 1997 to 1999. Mr. McGirr was a private equity investor from 1995 to 1996. From 1978 to 1995, Mr. McGirr served in various positions within the S.G. Warburg Group, ultimately as Chief Financial Officer, Chief Administrative Officer and Managing Director of S.G. Warburg & Co., Inc., a position held from 1992 to 1995. Mr. McGirr is currently a member of the board of directors of Insmed Incorporated, a publicly traded biopharmaceutical company, where he has served since October 2013, and Rhythm Pharmaceuticals, Inc., a publicly traded biopharmaceutical company, where he has served since November 2015. Mr. McGirr previously served on the board of directors of Roka Bioscience, Inc., a molecular diagnostics company, from December 2013 to January 2018 and Menlo Therapeutics, Inc., a publicly traded biopharmaceutical company, from November 2017 until its merger with Foamix Pharmaceuticals, Ltd., another publicly traded biopharmaceutical company, in March 2019. Mr. McGirr received a B.Sc. in Civil Engineering from the University of Glasgow and received an M.B.A. from The Wharton School at the University of Pennsylvania. We believe that Mr. McGirr's extensive experience with public and private pharmaceutical companies provide him with the qualifications and skills to serve on our Board.

**Paula Ragan, Ph.D.**, age 50, has served as our President, Chief Executive Officer, Secretary and a member of our board of directors since July 2014. Prior to joining us, from August 2012 to September 2014, Dr. Ragan consulted as Chief Business Officer at Lysosomal Therapeutics Inc., a private biopharmaceutical company, where she led the company's business development activities. Prior to then, from January 2007 to August 2012, Dr. Ragan held leadership roles in corporate development and operations at Genzyme Corporation, a Sanofi company, where she led strategic partnering efforts for Genzyme's Rare Disease business and headed the supply chain planning for Genzyme's flagship commercial products. Other professional roles include business roles at Hydra Biosciences, Oscient Corporation and Celera Corporation. Dr. Ragan received her B.S. from Tufts University and her Ph.D. from Massachusetts Institute of Technology and completed post-doctoral studies at Harvard Medical School. We believe that Dr. Ragan's perspective and experience as our President and Chief Executive Officer, which provides the Board with historic knowledge, operational expertise and continuity, provides her with the qualifications and skills to serve on our Board.

**Michael S. Wyzga**, age 65, became a member of the board of directors of X4 Pharmaceuticals, Inc., a private company, in July 2018 and continues to serve as a member of our Board and our Chairman following the completion of the Merger in March 2019. Mr. Wyzga is currently the President of MSW Consulting Inc., a strategic consulting group focused in the life sciences area. From December 2011 until November 2013, Mr. Wyzga served as President and Chief Executive Officer and a member of the board of directors of Radius Health, Inc., a publicly traded biopharmaceutical company. Prior to that, Mr. Wyzga served in various senior

management positions at Genzyme Corporation, a publicly traded global biotechnology company. Mr. Wyzga joined Genzyme in February 1998 and most recently served as Executive Vice President, Finance from May 2003 until November 2011 and as chief financial officer from July 1999 until November 2011. Mr. Wyzga is also a member of the boards of directors of Exact Sciences Corporation, a publicly traded medical technology company, where he has served since February 2015; LogicBio Therapeutics, Inc., a publicly traded genetic medicines company, where he has served since September 2018; GenSight Biologics S.A., a Euronext traded biopharmaceutical company, where he has served since February 2016 and currently holds the position as chairman of the board of directors; and Mereo BioPharma Group plc (formerly Oncomed Pharmaceuticals, Inc.), where has served since October 2013 through the business combination in April 2019. Mr. Wyzga previously served as a member of the boards of directors of Akebia Therapeutics, Inc., a publicly traded biopharmaceutical company, from February 2014 to December 2018, and Idenix Pharmaceuticals, Inc., a publicly traded biotechnology company that was acquired by Merck in August 2014, and as a member of the supervisory board of Prosensa Holding B.V., a publicly traded biopharmaceutical company, from June 2014 until the Prosensa acquisition by BioMarin Falcon B.V. in December 2014. He received an M.B.A. from Providence College and a B.S. from Suffolk University. We believe that Mr. Wyzga's senior management experience at biopharmaceutical and biotechnology companies, his current and past experience on boards of directors of public companies, and his financial expertise qualify him to serve as a member of our Board.

## INFORMATION REGARDING THE BOARD OF DIRECTORS AND CORPORATE GOVERNANCE

### INDEPENDENCE OF THE BOARD OF DIRECTORS

As required under the Nasdaq Stock Market (“Nasdaq”) listing standards, a majority of the members of a listed company’s Board of Directors must qualify as “independent,” as affirmatively determined by the Board of Directors. The Board consults with its counsel to ensure that the Board’s determinations are consistent with relevant securities and other laws and regulations regarding the definition of “independent,” including those set forth in pertinent listing standards of Nasdaq, as in effect from time to time.

Consistent with these considerations, after review of all relevant identified transactions or relationships between each director, or any of his or her family members, and the Company, its senior management and its independent auditors, the Board has affirmatively determined that the following five directors are independent directors within the meaning of the applicable Nasdaq listing standards: Mr. Aliski, Dr. Bridger, Mr. McGirr, Dr. Stewart and Mr. Wyzga. In making this determination, the Board found that none of these directors or nominees for director had a material or other disqualifying relationship with the Company. Dr. Ragan is employed by us and is therefore not independent under Nasdaq listing standards, and Dr. Russo was employed by us during the past three years and is therefore not independent under Nasdaq listing standards.

### BOARD LEADERSHIP STRUCTURE

The Board has an independent Chairman, Mr. Wyzga, who has authority, among other things, to call and preside over Board meetings, including meetings of the independent directors, to set meeting agendas and to determine materials to be distributed to the Board. Accordingly, the Chairman has substantial ability to shape the work of the Board. We believe that separation of the positions of Chairman and Chief Executive Officer reinforces the independence of the Board in its oversight of our business and affairs. Our Board also recognizes the time, effort and energy that our Chief Executive Officer must devote to her position in the current business environment, as well as the commitment required to serve as our Chairman, particularly as the board of directors’ oversight responsibilities continue to grow. In addition, we believe that having an independent Chairman creates an environment that is more conducive to objective evaluation and oversight of management’s performance, increasing management accountability and improving the ability of the Board to monitor whether management’s actions are in the best interests of our Company and our stockholders. As a result, we believe that having an independent Chairman can enhance the effectiveness of the Board as a whole.

### ROLE OF THE BOARD IN RISK OVERSIGHT

One of the Board’s key functions is informed oversight of our risk management process. The Board does not have a standing risk management committee, but rather administers this oversight function directly through the Board as a whole, as well as through various Board standing committees that address risks inherent in their respective areas of oversight. For example, in determining whether and under what circumstances we will engage in financing transactions or enter into licensing, collaboration or similar arrangements, the Board is involved in our management of risks related to our financial condition or of the risks inherent in drug development and commercialization. As part of its oversight, our Board receives reports by each committee chair regarding the committee’s considerations and actions. In particular, the Audit Committee is responsible for discussing the adequacy of our risk management activities with management and our independent registered public accounting firm. The Audit Committee’s primary emphasis is managing our financial risk exposures, including our internal control over financial reporting. The Audit Committee also monitors compliance with legal and regulatory requirements and considers and approves or disapproves any related person transactions. In addition, the Compensation Committee is responsible for considering whether our compensation programs and practices are reasonably likely to have a material adverse effect on us.

At each of its meetings, the Board receives business updates from various members of management. These updates may identify matters that have emerged within that member of management’s scope of responsibility that



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involve operational, financial, legal or regulatory risks and, in these cases, the Board provides guidance to management. Our Board believes that full and open communication between management and the Board is essential for effective risk management and oversight.

In carrying out their risk oversight functions, the Board of Directors and its committees routinely request and review management updates, reports from the independent auditors and legal and regulatory advice from outside experts, as appropriate, to assist in discerning and managing important risks that may be faced by us. The Board of Directors is committed to continuing to ensure and evolve its risk oversight practices as appropriate given the stage of our evolution as a late-stage clinical biopharmaceutical company and the fast-paced changes of the life sciences industry. Regarding the COVID-19 pandemic, our management is meeting regularly to address concerns of our employees and business, as well as updating and communicating with the full Board regularly. The full Board has oversight and has been engaged concerning the monitoring and identification of risks to our Company, and actions we are taking to mitigate risks related to this pandemic.

### **MEETINGS OF THE BOARD OF DIRECTORS**

The Board of Directors met seven times during the last fiscal year. Each of our incumbent Board members, other than Dr. Russo, attended 75% or more of the aggregate number of meetings of the Board and of the committees on which he or she served, held during the portion of the last fiscal year for which he or she was a director or committee member.

### **INFORMATION REGARDING COMMITTEES OF THE BOARD OF DIRECTORS**

The Board has three standing committees: an Audit Committee, a Compensation Committee and a Nominating and Corporate Governance Committee. Each of the committees has authority to engage legal counsel or other experts or consultants, as it deems appropriate to carry out its responsibilities. The composition and function of each of these committees are described below.

#### **Audit Committee**

The Audit Committee is currently composed of three members: Mr. McGirr (chair), Dr. Stewart and Mr. Wyzga. The Audit Committee met six times during 2019. The Board has adopted a written Audit Committee charter that is available to stockholders on our website at <http://investors.x4pharma.com/>.

The Audit Committee established by the Board in accordance with Section 3(a)(58)(A) of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), to oversee our corporate accounting and financial reporting processes and audits of our financial statements. For this purpose, the Audit Committee performs several functions. The Audit Committee:

- appoints, evaluates, retains, and when necessary, terminates the engagement of the independent auditors;
- oversees the independent auditors and sets the compensation of the independence auditor;
- reviews and approves the retention of the independent auditors to perform any proposed permissible non-audit services;
- oversees the work of the independent auditor, including resolution of disagreements between our management and the independent auditor regarding financial reporting;
- reviews our annual audited financial statements and quarterly financial statements with management and the independent auditor, including our disclosures under "Management's Discussion and Analysis of Financial Condition and Results of Operations;"
- discusses the type and presentation of information to be disclosed in our earnings releases;
- coordinates the Board's oversight of our internal control over financial reporting, disclosure procedures, and code of business conduct and ethics;
- discusses our policies with respect to risk assessment and risk management, including guidelines and policies to govern the process by which our exposure to risk is handled;

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- establishes procedures, as required under applicable law, for the receipt, retention and treatment of complaints received by us regarding accounting, internal accounting controls or auditing matters and the confidential and anonymous submission by employees of concerns regarding questionable accounting or auditing matters; and
- reviews our policies and procedures for reviewing and approving related person transactions.

The Board of Directors reviews the Nasdaq listing standards definition of independence for Audit Committee members on an annual basis and has determined that all members of the Company's Audit Committee are independent (as independence is currently defined in Rule 5605(c)(2)(A)(i) and (ii) of the Nasdaq listing standards).

The Board of Directors has also determined that each of Mr. McGirr and Mr. Wyzga qualifies as an "audit committee financial expert," as defined in applicable SEC rules.

### **Report of the Audit Committee of the Board of Directors**

*The material in this report is not "soliciting material," is not deemed "filed" with the SEC and is not to be incorporated by reference in any filing of the Company under the Securities Act of 1933, as amended (the "Securities Act") or the Exchange Act, whether made before or after the date hereof and irrespective of any general incorporation language in any such filing.*

The Audit Committee has reviewed and discussed the audited financial statements for the fiscal year ended December 31, 2019 with management of the Company. The Audit Committee has discussed with the independent registered public accounting firm the matters required to be discussed by the applicable requirements of the Public Company Accounting Oversight Board ("PCAOB") and the SEC. The Audit Committee has also received the written disclosures and the letter from the independent registered public accounting firm required by applicable requirements of the PCAOB regarding the independent accountants' communications with the Audit Committee concerning independence, and has discussed with the independent registered public accounting firm the accounting firm's independence. Based on the foregoing, the Audit Committee has recommended to the Board of Directors that the audited financial statements be included in the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2019.

Respectfully submitted,

David McGirr, M.B.A (Chairman)  
Murray W. Stewart, M.D.  
Michael S. Wyzga

### **Compensation Committee**

The Compensation Committee is currently composed of three directors: Dr. Stewart (chair), Mr. Aliski and Dr. Bridger. All members of our Compensation Committee are independent (as independence is currently defined in Rule 5605(d)(2) of the Nasdaq Listing Rules.) The Compensation Committee met four times during 2019. The Board has adopted a written Compensation Committee charter that is available to stockholders on our website at <http://investors.x4pharma.com/>.

The Compensation Committee acts on behalf of the Board to review, approve or recommend for approval by the Board and oversee our compensation strategy, policies, plans and programs, including:

- review and approval, or review and recommendation to the Board for approval, the compensation and other terms of employment or service, including salary, bonus and incentive compensation levels, deferred compensation, executive perquisites, equity compensation, severance arrangements and change-in-control benefits, of our Chief Executive Officer and the other executive officers;
- oversight of the evaluation of our senior executives, including determining the nature and frequency of the evaluation and the persons subject to the evaluation, supervising the conduct of the evaluation, and preparing assessments of the senior executives' performance;

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- review and approval or review and recommendation to the Board of our incentive-compensation and equity-based plans and approval of any tax-qualified, non-discriminatory employee benefit plans for which stockholder approval is not sought and pursuant to which options or stock may be acquired by our officers, directors, employees or consultants;
- administration of our equity compensation plans; and
- review and recommendation to the Board with respect to director compensation.

### *Compensation Committee Processes and Procedure*

In setting base salaries and bonuses and granting equity incentive awards for our executive officers, our Compensation Committee considers compensation for comparable positions in the market, the historical compensation levels of our executives, individual and corporate performance as compared to our expectations and objectives, our desire to motivate our employees to achieve short- and long-term results that are in the best interests of our stockholders, and a long-term commitment to our company. As part of this process, Dr. Ragan, as our president and chief executive officer, prepares performance evaluations for the other executive officers and recommends annual salary increases, annual stock option awards and cash bonuses to the Compensation Committee. The Compensation Committee conducts a performance evaluation of Dr. Ragan. As necessary, the Compensation Committee consults with the Board as to the achievement of corporate objectives that drive contingent compensation awards.

We have utilized a compensation consultant, Arnosti Consulting, with expertise in the local biotechnology market to help assess executive and employee compensation and to help inform our compensation strategy, and we expect to engage a compensation consultant in the future.

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

The Nominating and Corporate Governance Committee is currently composed of three directors: Dr. Bridger (chair), Mr. McGirr, and Mr. Wyzga. All members of the Nominating and Corporate Governance Committee are independent (as independence is currently defined in Rule 5605(a)(2) of the Nasdaq Listing Rules). The Nominating and Corporate Governance Committee met two times during 2019. The Board has adopted a written Nominating and Corporate Governance Committee charter that is available to our stockholders on our website at <http://investors.x4pharma.com/>.

The Nominating and Corporate Governance Committee of the Board is responsible for identifying, reviewing and evaluating candidates to serve as directors of the Company (consistent with criteria approved by the Board), reviewing and evaluating incumbent directors, recommending to the Board candidates for election to the Board, making recommendations to the Board regarding the membership of the committees of the Board (including with respect to making changes or rotation of members, the creation of additional Board committees, or changes in Committee charters), overseeing an annual self-assessment of the Board, overseeing succession planning for senior executives of the Company, and developing and recommending to the Board a set of corporate governance principles for the Company.

The Nominating and Corporate Governance Committee believes that candidates for director should have certain minimum qualifications, including a reputation for integrity, honesty and adherence to high ethical standards; demonstrated business acumen, experience and the ability to exercise sound judgements in matters that relate to the current and long-term objectives of the Company and a willingness and ability to contribute positively to the decision-making process of the Company; a commitment to understand the Company and its industry and to regularly attend and participate in meetings of the Board and its committees; the interest and ability to understand the sometimes conflicting interests of the various constituencies of the Company, which include stockholders, employees, customers, governmental units, creditors and the general public, and to act in the interests of all stockholders; and the ability to serve for at least three years before reaching the age of 75. The Nominating and Corporate Governance Committee also believes that candidates for director should not have, nor appear to have,

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a conflict of interest that would impair the candidate's ability to represent the interests of all the Company's stockholders and to fulfill the responsibilities of a director. However, the Nominating and Corporate Governance Committee retains the right to modify these qualifications from time to time. Candidates for director nominees are reviewed in the context of the current composition of the Board, the operating requirements of the Company and the long-term interests of stockholders, and the Nominating and Corporate Governance Committee has direct input from the Chairman of the Board and the Chief Executive Officer.

Our Nominating and Corporate Governance Committee has not adopted a formal diversity policy in connection with the consideration of director nominations or the selection of nominees but believes that our Board, taken as a whole, should embody a diverse set of skills, experiences and backgrounds. In this regard, the Nominating and Corporate Governance Committee will consider issues of diversity among its members in identifying and considering nominees for director, and strive where appropriate to achieve a diverse balance of backgrounds, perspectives, experience, age, gender, ethnicity and country of citizenship on our board of directors and its committees. The Nominating and Corporate Governance Committee does not make any particular weighting of diversity or any other characteristic in evaluating nominees and directors.

The Nominating and Corporate Governance Committee appreciates the value of thoughtful Board refreshment, and regularly identifies and considers qualities, skills and other director attributes that would enhance the composition of the Board. In the case of incumbent directors whose terms of office are set to expire, the Committee reviews these directors' overall service to the Company during their terms, including the number of meetings attended, level of participation, quality of performance and any other relationships and transactions that might impair the directors' independence. The Nominating and Corporate Governance Committee also takes into account the results of the Board's self-evaluation, conducted annually on a group and individual basis. In the case of new director candidates, the Nominating and Corporate Governance Committee also determines whether the nominee is independent for Nasdaq purposes, which determination is based upon applicable Nasdaq listing standards, applicable SEC rules and regulations and the advice of counsel, if necessary. The Nominating and Corporate Governance Committee then uses its network of contacts to compile a list of potential candidates, but may also engage, if it deems appropriate, a professional search firm. The Nominating and Corporate Governance Committee conducts any appropriate and necessary inquiries into the backgrounds and qualifications of possible candidates after considering the function and needs of the Board. The Nominating and Corporate Governance Committee meets to discuss and consider the candidates' qualifications and then selects a nominee for recommendation to the Board by majority vote.

The Nominating and Corporate Governance Committee will consider director candidates recommended by stockholders.<sup>7</sup> The Nominating and Corporate Governance Committee does not intend to alter the manner in which it evaluates candidates, including the minimum criteria set forth above, based on whether or not the candidate was recommended by a stockholder. Stockholders who wish to recommend individuals for consideration by the Nominating and Corporate Governance Committee to become nominees for election to the Board may do so by delivering a written recommendation to the Nominating and Corporate Governance Committee at the following address: c/o X4 Pharmaceuticals, Inc., 955 Massachusetts Avenue, 4<sup>th</sup> Floor, Cambridge, Massachusetts 02139 at least 120 days prior to the anniversary date of the mailing of our proxy statement for the last Annual Meeting of Stockholders. Submissions must include the full name of the proposed nominee, a description of the proposed nominee's business experience for at least the previous five years, complete biographical information, a description of the proposed nominee's qualifications as a director and a representation that the nominating stockholder is a beneficial or record holder of our common stock and has been a holder for at least one year. Any such submission must be accompanied by the written consent of the proposed nominee to be named as a nominee and to serve as a director if elected.

### **STOCKHOLDER COMMUNICATIONS WITH THE BOARD OF DIRECTORS**

These communications will be reviewed by one or more employees of the Company designated by the Board, who will determine whether the communication should be presented to the Board. Stockholders who wish to communicate with our Board of Directors, or any individual director, may do so by sending written

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communications addressed to our Corporate Secretary at 955 Massachusetts Avenue, 4th Floor, Cambridge, Massachusetts 02139.

Communications will be distributed to Board of Directors, or to any individual director or directors as appropriate, depending on the facts and circumstances outlined in the communications. Items that are unrelated to the duties and responsibilities of our Board of Directors may be excluded, such as:

- junk mail and mass mailings;
- resumes and other forms of job inquiries;
- surveys; and
- solicitations or advertisements.

In addition, any material that is unduly hostile, threatening, or illegal in nature may be excluded, in which case it will be made available to any outside director upon request.

### **CODE OF ETHICS**

We have adopted a Code of Business Conduct and Ethics that applies to all of our officers, directors and employees. The Code of Business Conduct and Ethics is available on our website at <http://investors.x4pharma.com>. If the Company makes any substantive amendments to the Code of Business Conduct and Ethics or grants any waiver from a provision of the Code to any executive officer or director, the Company will promptly disclose the nature of the amendment or waiver on its website.

**PROPOSAL 2**  
**APPROVAL OF THE AMENDED AND RESTATED 2017 EQUITY INCENTIVE PLAN**

The X4 Pharmaceuticals, Inc. 2017 Equity Incentive Plan (the “2017 Plan”) was originally approved by Arsanis’ board of directors and its stockholders prior to the effectiveness of Arsanis’ initial public offering in 2017. On March 25, 2020, our Board approved the amendment and restatement of the 2017 Plan, subject to stockholder approval, including following three amendments:

1. Increase the number of shares of common stock reserved for issuance under the 2017 Plan by an additional 474,465 shares (which amount is subject to adjustment in the event of stock splits and other similar events);
2. Establish 3,146,241 as the maximum number of shares that may be subject to awards granted in the form of “incentives stock options” as defined in Section 422 of the Code (“ISOs”); and
3. Amend the “evergreen provision” of the 2017 Plan to eliminate the fixed number of new shares that may be added to the plan’s share reserve each year pursuant to the evergreen provision, such that the amended evergreen provision will provide for an automatic increase in the shares reserve on the first day of each year, beginning on January 1, 2021 and ending on January 1, 2027, by an amount equal to the lesser of (a) 4% of our outstanding shares on such date and (b) the number of shares determined by our Board of Directors.

Our Board did not approve any other changes to the 2017 Plan. We are seeking stockholder approval of the 2017 Plan, as amended and restated (the “Amended and Restated 2017 Plan”).

Our Board approved the Amended and Restated 2017 Plan, subject to stockholder approval, primarily to replenish the shares available to X4 for the grant of equity awards. Our Board believes that the effective use of long-term equity compensation is vital to our ability to achieve strong performance in the future and that our continued growth and success depends, in large part, on our ability to attract, retain and motivate key employees with relevant experience and critical skills, particularly as we grow and in light of the highly-competitive market for employee talent in which we operate.

Our Board has determined that it is in the best interests of X4 and its stockholders to approve this proposal. Our Board has approved the Amended and Restated 2017 Plan, subject to stockholder approval, and recommends that stockholders vote in favor of this proposal at the Annual Meeting. Stockholder approval of this proposal requires the affirmative vote of a majority of the votes cast by the holders of shares present in person or by proxy and entitled to vote at the Annual Meeting.

If our stockholders approve this proposal, the Amended and Restated 2017 Plan will become effective as of the date of stockholder approval. If our stockholders do not approve this proposal, the Amended and Restated 2017 Plan will not become effective and the 2017 Plan will continue to be administered in its current form.

**Background**

The 2017 Plan was initially adopted by Arsanis’ board of directors and approved by its stockholders prior to the effectiveness of Arsanis’ initial public offering. The 2017 Plan had an initial share reserve, as of the IPO, equal to the sum of (1) 585,994 shares (not reflecting the Reverse Stock Split that occurred in connection with the Merger in 2019, as described below) and (2) such additional number of shares up to 1,368,918 shares (not reflecting the Reverse Stock Split) as is equal to the sum of (a) the number of shares reserved for issuance under our 2010 Special Stock Incentive Plan, as amended (the “2010 Plan”) and our 2011 Stock Incentive Plan (the “2011 Plan” and, together with the 2010 Plan, the “Prior Plans”), and (b) the number of shares subject to awards granted under the Prior Plans which expire, terminate or are otherwise surrendered, canceled, forfeited or repurchased. As mentioned above, the 2017 Plan’s share reserve also includes an evergreen provision that automatically increases

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the share reserve on the first day of each year beginning with the year ending December 31, 2018 and continuing until, and including, the year ending December 31, 2027, in an amount equal to the least of (a) 4% of outstanding shares on such date, (b) 1,025,490 (not reflecting the Reverse Stock Split) or (c) the number of shares determined by our Board of Directors. In addition, any shares subject outstanding awards under the 2017 Plan that expire or are otherwise forfeited to, or repurchased by, the Company become available again for future awards under the 2017 Plan. For information on how shares are counted for purposes of the 2017 Plan, please refer to “Authorized Shares” below.

In connection with the 6-for-1 Reverse Stock Split that occurred in connection with the Merger in March 2019, the total share reserve was reduced to the sum of (1) 97,665 shares and (2) such additional number of shares up to 228,153 shares as is equal to the sum of (a) the number of shares reserved for issuance the Prior Plans and (b) the number of shares subject to awards granted under the Prior Plans which expire, terminate or are otherwise surrendered, canceled, forfeited or repurchased. The fixed cap in our evergreen provision was reduced from 1,025,490 to 170,915, which represented approximately 1.1 % of our shares outstanding as of December 31, 2019.

As of April 15, 2020, 114,022 shares remain available for grant under the 2017 Plan, excluding the April 2020 grants of awards discussed below, which are subject to stockholder approval of this Proposal 2. The table below includes aggregate information regarding number of shares subject to outstanding equity awards granted under the 2017 Plan, as of April 15, 2020; the number of shares available for future awards under the 2017 Plan, as of April 15, 2020; and the proposed number of shares that would be available for issuance of future awards under the Amended and Restated 2017 Plan if this proposal is approved by our stockholders. The table below does not include either the future effect, in 2021 and beyond, of the evergreen provisions of the 2017 Plan, which would also be modified if stockholders approve this proposal, or the April 2020 grant of awards discussed below, which will be granted if stockholders approve this proposal.

	<u>Number of shares</u>	<u>As a percentage of stock outstanding</u>
Total shares subject to outstanding awards (1)	517,387	3.2%
Total shares available for future awards (2)	114,022	0.7%
Proposed additional shares to be available for future awards under the Amended and Restated 2017 Plan (3)	474,465	2.9%
Total shares outstanding under existing equity awards and proposed to be available for issuance under the Amended and Restated 2017 Plan (3)	<u>1,105,874</u>	6.8%

- (1) Includes awards granted under the 2017 Plan.
- (2) Includes shares available for future awards under the 2017 Plan. Does not include the future effect, in 2021 and beyond, of the evergreen provision of the 2017 Plan.
- (3) Does not include the future effect, in 2021 and beyond, of the evergreen provision of the 2017 Plan. Share counting provisions, including adjustments to the number of shares available under the Amended and Restated 2017 Plan, are described below under “Authorized Shares” and “Certain Transactions; Certain Adjustments”.

Our Board believes that additional shares are necessary to meet our anticipated equity compensation needs. Our Board believes we can meet these anticipated needs for approximately the next seven years after the Annual Meeting if this Proposal 2 is approved by stockholders. This estimate is based on a forecast that takes into account our anticipated rate of growth in hiring, an estimated range of our stock price over time and our historical forfeiture rates.

## **Reasons for Voting for the Proposal**

### *Long-Term Equity is a Key Component of our Compensation Programs*

- Delivering competitive equity compensation to our management team is essential to attracting and retaining the quality of talent required for us to achieve our operating and strategic objectives. We compete for this talent with a significant number of biotechnology, pharmaceutical and other life sciences companies in Massachusetts and elsewhere that offer generous equity compensation programs. Attracting and retaining key talent is very much in the interest of our stockholders.
- Equity awards incentivize our employees to manage our business as owners, aligning their interests with those of our stockholders. Equity awards, the value of which depends on our stock performance and which generally require continued service over time before any value can be realized, help achieve these objectives and are a key element of our compensation programs.
- Equity awards allow us to provide market competitive compensation while preserving our cash resources. We believe that, for investors, a combination of equity and cash compensation optimizes our valuation and properly incentivizes executives and key employees by linking their pay to Company performance.

### *Additional Shares are Required for Future Grants and Retention of Key Employees*

- If we do not obtain approval to increase the available pool, it will negatively impact our ability to attract and retain quality talent, reward performance and provide market competitive compensation, all at a critical juncture in our existence.

### *Consider Unique Factors to X4*

- The weighted average exercise price of our outstanding options issued under the 2017 Plan as of April 15, 2020 was \$29.67, which is significantly higher than the \$9.49 closing market price of the Company's common stock on Nasdaq on April 15, 2020. Because our outstanding options are significantly underwater, additional equity awards are necessary to properly incentivize and deliver competitive equity compensation to our management team and other key employees.
- The fixed limitation in the evergreen increase provision was negatively impacted by the Reverse Stock Split in connection with the Merger, such that the fixed limitation effectively limits the potential annual impact to 1.0% of the outstanding shares of common stock. If our outstanding warrants are exercised, or if we issue additional shares of common stock, this limitation will become even more constrictive, exacerbating the strain on our ability to provide competitive grants.

### *Our Company is Committed to the Effective Utilization of Shares*

- The Compensation Committee has engaged Arnosti Consulting, an independent compensation consulting firm, to assist it in evaluating matters associated with competitive equity compensation practices, underwater stock options, the reduced value of prior awards and structuring a compensation program designed to optimize our share utilization.
- The Company has maintained an annual burn rate in the two full fiscal years since Arsanis' initial public offering of 6.1% and 7.5% in 2019 and 2018, respectively, and plans to continue granting market competitive equity awards in future years.
- The Company's overhang (outstanding awards and shares available for future grant, excluding the proposed share increase of 474,465 shares and the contingent RSU awards discussed below), as of April 15, 2020, was 12% of stock outstanding.

### *The 2017 Plan Requires Additional Shares to Meet our Forecasted Needs*

We have granted equity awards in the form of RSUs representing 592,248 shares in April 2020 (roughly 3.7% of our outstanding shares as of April 15, 2020), all of which are subject to stockholder approval of this Proposal 2. We anticipate granting additional awards in 2020 to incentivize and retain employees and as our Company grows.



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As a result, our Board of Directors, based on the recommendation of the Compensation Committee, concluded that increasing the number of shares available for issuance under our 2017 Plan would provide the Company with the ability to provide market competitive compensation while preserving our cash reserves to help us retain and motivate employees who hold underwater stock options, which are not permitted to be repriced without stockholder approval.

The Board of Directors, based on the recommendation of the Compensation Committee, concluded that fixing the maximum number of shares that may be subject to awards granted in the form of ISOs at 3,146,241 was appropriate in order to allow us to continue granting ISOs following the approval of the Amended and Restated 2017 Plan.

In addition, our Board of Directors, based on the recommendation of the Compensation Committee, concluded that amending the evergreen provision was appropriate due to the constraints imposed by the fixed share limitation in the evergreen provision. As a result, our Board of Directors, based on the recommendation of the Compensation Committee, approved an amendment to the evergreen provision of the 2017 Plan to eliminate its fixed share limitation. As proposed to be amended, the annual evergreen amount will be the lesser of (a) 4% of the shares outstanding on the first day of the year and (b) a number of shares determined by the Board of Directors.

The other material features of the 2017 Plan remain the same as under the terms of the 2017 Plan previously approved by our stockholders. A summary of the Amended and Restated 2017 Plan are described below. The following summary is qualified in its entirety by reference to the Amended and Restated 2017 Plan, a copy of which is set forth as Appendix A.

### **Material Features of the Amended and Restated 2017 Plan**

The material terms of the Amended and Restated 2017 Plan are summarized below. The following description of the Amended and Restated 2017 Plan is a summary only and is qualified in its entirety by reference to the complete text of the Amended and Restated 2017 Plan. Shareholders are urged to read the actual text of the Amended and Restated 2017 Plan in its entirety, a copy of which is attached to this proxy statement as *Annex A*.

### ***Administration***

The Amended and Restated 2017 Plan will continue to be administered by our Board of Directors. Our Board of Directors has the authority to, among other things, interpret the Amended and Restated 2017 Plan, determine eligibility for and grant awards, determine, modify or waive the terms and conditions of any awards, determine the form of settlement of awards (whether in cash, shares of our common stock or other property), and do all things necessary or appropriate to carry out the purposes of the Amended and Restated 2017 Plan. Our Board of Director's determinations under the Amended and Restated 2017 Plan are conclusive and binding. Our Board of Directors may delegate its authority under the Amended and Restated 2017 Plan to one or more committees of the Board of Directors or certain officers of the Company and has, in fact, delegated such authority to the Compensation Committee. References in this summary to our Board of Directors refer to our Board of Directors and its applicable delegates, including the Compensation Committee.

### ***Eligibility***

Our employees, officers, directors, consultants and advisors are eligible to participate in the Amended and Restated 2017 Plan. As of April 15, 2020, we estimate that approximately 60 employees (excluding officers), two officers, seven directors, and approximately 20 consultants and advisors were eligible to participate. Incentive stock options may be granted under the Amended and Restated 2017 Plan only to our employees, including our executive officers.

### ***Authorized Shares***

Subject to adjustment, as described below, and excluding the future effect of the evergreen provision, the maximum number of shares of our common stock that may be delivered in satisfaction of awards under the 2017 Plan as of April 15, 2020 was equal to the sum of (1) 97,665 shares and (2) such additional number of shares up to 228,153 shares as is equal to the sum of (a) the number of shares reserved for issuance under the Prior Plans and (b) the number of shares subject to awards granted under the Prior Plans which expire, terminate or are otherwise surrendered, canceled, forfeited or repurchased. A total of 114,022 shares remained available for grant as of April 15, 2020, not including the April 2020 grants that are subject to stockholder approval of the Amended and Restated 2017 Plan. If this proposal is approved by stockholders, an additional 474,465 shares will become available under the Amended and Restated 2017 Plan, subject to adjustment, as described below, and excluding the future effect of the evergreen provision.

In addition, if this proposal is approved by our stockholders, the number of shares of our common stock available for issuance under the Amended and Restated 2017 Plan will be automatically increased pursuant to the evergreen provision on the first day of each fiscal year until, and including the fiscal year ending December 31, 2027, in an amount equal to the lesser of (1) 4% of outstanding shares as of such date and (2) the number of shares determined by our Board of Directors.

In addition to the 474,465 shares that will be available for future grants if this proposal is approved and the shares that will become available for future grants as a result of the amended evergreen provision, any shares subject to outstanding awards under the 2017 Plan that (1) expire, terminate, or are surrendered or are canceled without having been fully exercised, or are forfeited in whole or in part (including as the result of shares of common stock subject to such award being repurchased by us) or (2) are not issued will again be available for issuance under the Amended and Restated 2017 Plan. Further, if any shares are delivered (by actual delivery, attestation, or net exercise) to us by a participant to (i) purchase shares of common stock upon the exercise of an award or (ii) satisfy tax withholding obligations with respect to awards, then such shares will be added back to the number of shares available for issuance under the Amended and Restated 2017 Plan.

If this proposal is approved by our stockholders, subject to adjustment, as described below, no more than 3,146,241 shares of our common stock may be delivered in satisfaction of ISOs awarded under the Amended and Restated 2017 Plan.

The shares of our common stock to be issued under the Amended and Restated 2017 Plan may be authorized but unissued shares of our common stock or treasury shares. The closing price of our common stock as reported on Nasdaq on April 15, 2020 was \$9.49 per share.

### ***Types of Awards***

The Amended and Restated 2017 Plan provides for awards of stock options, stock appreciation rights (“SARs”), restricted stock, restricted stock units, and other stock-based awards convertible into or otherwise based on shares of our common stock.

*Stock options and SARs.* The exercise price of a stock option, and the base value against which a SAR, is to be measured, may not be less than the fair market value (or, in the case of an ISO granted to a ten percent shareholder, 110% of the fair market value) of shares of our common stock on the date of grant. Our Board of Directors will determine the time or times at which stock options or SARs become exercisable and the terms on which such awards remain exercisable, except no stock option or SAR may have a term in excess of ten years.

*Restricted stock.* A restricted stock award is an award of shares of our common stock subject to forfeiture restrictions. Restricted stock awards are 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

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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 or periods established by the Board of Directors for such award. Dividend rights may be provided in connection with a restricted stock award. Our Board of Directors will 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.

*Restricted stock units.* A restricted stock unit award is an award denominated in shares of our common stock that entitles the participant to receive shares of our common stock or cash measured by the value of the shares of our common stock in the future. The delivery of shares of our common stock or cash under a restricted stock unit may be subject to the satisfaction of performance conditions or other vesting conditions. Dividend equivalent rights may be provided in connection with a restricted stock unit award. Our Board of Directors will determine the terms and conditions of a restricted stock unit award, including the conditions for vesting and repurchase (or forfeiture) and the issue price, if any.

*Other stock-based awards.* Other stock-based awards are awards that are valued in whole or in part by reference to, or are otherwise based on, shares of our common stock or other property. Our Board of Directors will determine the terms and conditions of other stock-based awards, including any purchase price applicable thereto.

### ***Limitation on Repricing of Stock Options and SARs***

Unless such action is approved by the Company's stockholders, the Company may not: (1) amend any outstanding stock option or SAR granted under the Amended and Restated 2017 Plan to provide an exercise price per share that is lower than the then-current exercise price per share of such outstanding stock option or SAR, (2) cancel any outstanding option or SAR (whether or not granted under the Amended and Restated 2017 Plan) and grant in substitution therefor new awards under the Amended and Restated 2017 Plan (other than substitute awards granted in connection with a merger, consolidation or other acquisition) covering the same or a different number of shares and having an exercise price per share lower than the then-current exercise price per share of the cancelled option or SAR, (3) cancel in exchange for a cash payment any outstanding option or SAR with an exercise price per share above the then-current fair market value of our common stock or (4) take any other action under the Plan that constitutes a "repricing" within the meaning of the rules of Nasdaq.

### ***Vesting; Change in Status***

Our Board of Directors has the authority to determine the vesting schedule applicable to each award, and to accelerate the vesting or exercisability of any award. Our Board of Directors also has the authority to determine the effect of a change in employment or other status on an award.

### ***Non-Transferability of Awards***

Awards under the Amended and Restated 2017 Equity Plan may not be transferred, other than by will or the laws of descent and distribution, or other than in the case of ISOs, pursuant to a qualified domestic relations order, unless otherwise provided by our Board of Directors.

### ***Certain Transactions; Certain Adjustments***

In the event of (1) a merger or consolidation 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, (2) any transfer or disposition of all of our common stock, or (3) our dissolution or liquidation (any of the foregoing, a "covered transaction"), our Board of Directors may, with respect to awards (other than restricted stock awards), (a) provide that such awards will be assumed, or substantially equivalent awards will 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 unvested awards will be forfeited immediately prior to the consummation of such covered transaction and/or

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unexercised awards will terminate immediately prior to the consummation of such covered transaction 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 will become exercisable, realizable or deliverable, or restrictions applicable to an award will lapse, in whole or in part prior to or upon such covered transaction, (d) in the event of a covered transaction under the terms of which holders of our common stock will receive upon consummation thereof a cash payment for each share surrendered in the covered transaction (the “acquisition price”), make or provide for a cash payment to participants with respect to each award held by a participant equal to (i) the number of shares of our 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 covered transaction) multiplied by (ii) the excess, if any, of (A) the acquisition price over (B) 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 a liquidation or dissolution of the Company, awards will 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.

Upon the occurrence of a covered transaction other than a liquidation or dissolution of the Company, the repurchase and other rights of the Company with respect to outstanding restricted stock awards will inure to the benefit of the Company’s successor and will, unless the Board of Directors determines otherwise, apply to the cash, securities or other property which our common stock was converted into or exchanged for pursuant to such covered transaction in the same manner and to the same extent as they applied to such restricted stock award. The Board of Directors may provide for termination or deemed satisfaction of such repurchase or other rights under the instrument evidencing any restricted stock award or any other agreement between a participant and the Company, either initially or by amendment. Upon the occurrence of a covered transaction involving the liquidation or dissolution of the Company, except to the extent specifically provided to the contrary in the instrument evidencing any restricted stock award or any other agreement between a participant and the Company, all restrictions and conditions on all restricted stock awards then outstanding will automatically be deemed terminated or satisfied.

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 our common stock other than an ordinary cash dividend, (1) the number and class of securities available under the Amended and Restated 2017 Plan, (2) the share counting rules of the Amended and Restated 2017 Plan, (3) the number and class of securities and exercise price per share of each outstanding stock option, (4) the share and per-share provisions and the measurement price of each outstanding SAR, (5) the number of shares subject to and the repurchase price per share subject to each outstanding restricted stock and restricted stock unit awards and (6) the share and per-share-related provisions and the purchase price, if any, of each outstanding other stock-based award, will be equitably adjusted by the Company (or substituted awards may be made, if applicable) in the manner determined by the Board of Directors.

### ***Amendment; Termination***

Our Board of Directors may amend the Amended and Restated 2017 Plan or outstanding awards, or terminate the Amended and Restated 2017 Plan as to future grants of awards, except that our Board of Directors will not be able to alter the terms of an award if it would affect materially and adversely a participant’s rights under the award without the participant’s consent. Stockholder approval will be required for any amendment to the Amended and Restated 2017 Plan to the extent such approval is required by law, including applicable stock exchange requirements.

### **Certain U.S. Federal Income Tax Consequences**

The following is a summary of the principal U.S. federal income tax consequences to participants and us with respect to awards granted under the Amended and Restated 2017 Plan. This summary is not intended to be

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exhaustive and does not discuss the income tax laws of any local, state or foreign jurisdiction in which a participant may reside. The information is based upon current U.S. federal income tax rules and therefore is subject to change when those rules change. Because the tax consequences to any participant may depend on his or her personal circumstances, each participant should consult the participant's tax adviser regarding the federal, state, local and other tax consequences of the grant or exercise of an award or the disposition of shares acquired under the Amended and Restated 2017 Plan. The Amended and Restated 2017 Plan is not qualified under the provisions of Section 401(a) of the Code and is not subject to any of the provisions of the Employee Retirement Income Security Act of 1974, as amended. Our ability to realize the benefit of any tax deductions described below depends on our generation of taxable income as well as the requirement of reasonableness and the satisfaction of our tax reporting obligations.

### ***Stock Options (other than ISOs)***

In general, a participant has no taxable income upon the grant of a stock option that is not intended to be an ISO (an "NSO") but realizes ordinary income in connection with the exercise of the NSO in an amount equal to the excess (at the time of exercise) of the fair market value of the shares acquired upon exercise over the exercise price. Upon a subsequent sale or exchange of the shares, any recognized gain or loss is treated as a capital gain or loss for which the Company is not entitled to a deduction.

Subject to the requirement of reasonableness, the provisions of Section 162(m) of the Code, and the satisfaction of a tax reporting obligation, we will generally be entitled to a tax deduction equal to the taxable ordinary income realized by the participant.

### ***ISOs***

A participant generally is not subject to ordinary income tax upon the grant or exercise of an ISO. If the participant holds a share received upon exercise of an ISO for more than two years from the date the stock option was granted and more than one year from the date the stock option was exercised, which is referred to as the required holding period, the difference, if any, between the amount realized on a sale or other taxable disposition of that share and the participant's tax basis in that share will be long-term capital gain or loss.

If, however, a participant disposes of a share acquired upon exercise of an ISO before the end of the required holding period, which is referred to as a disqualifying disposition, the participant generally will recognize ordinary income in the year of the disqualifying disposition equal to the excess, if any, of the fair market value of the share on the date of exercise of the stock option over the exercise price. However, if the sales proceeds are less than the fair market value of the share on the date of exercise of the stock option, the amount of ordinary income recognized by the participant will not exceed the gain, if any, realized on the sale. If the amount realized on a disqualifying disposition exceeds the fair market value of the share on the date of exercise of the stock option, that excess will be short-term or long-term capital gain, depending on whether the holding period for the share exceeds one year.

For purposes of the alternative minimum tax, the amount by which the fair market value of a share of stock acquired upon exercise of an ISO exceeds the exercise price of the stock option generally will be an adjustment included in the participant's alternative minimum taxable income for the year in which the stock option is exercised. If, however, there is a disqualifying disposition of the share in the year in which the stock option is exercised, there will be no adjustment for alternative minimum tax purposes with respect to that share. In computing alternative minimum taxable income, the tax basis of a share acquired upon exercise of an ISO is increased by the amount of the adjustment taken into account with respect to that share for alternative minimum tax purposes in the year the stock option is exercised.

We are not allowed a tax deduction with respect to the grant or exercise of an ISO or the disposition of a share acquired upon exercise of an ISO after the required holding period. If there is a disqualifying disposition of a

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share, however, we will generally be entitled to a tax deduction equal to the taxable ordinary income realized by the participant, subject to the requirement of reasonableness, the provisions of Section 162(m) of the Code, and provided that either the employee includes that amount in income or we timely satisfy our reporting requirements with respect to that amount.

### **SARs**

The grant of a SAR does not itself result in taxable income, nor does taxable income result merely because a SAR becomes exercisable. In general, a participant who exercises a SAR for shares of stock or receives payment in cancellation of a SAR will have ordinary income equal to the amount of any cash and the fair market value of any stock received. A corresponding deduction is generally available to the Company, subject to the requirement of reasonableness, the provisions of Section 162(m) of the Code, and the satisfaction of a tax reporting obligation.

### **Restricted Stock Awards**

A participant who is awarded or purchases shares subject to a substantial risk of forfeiture generally does not have income until the risk of forfeiture lapses. When the risk of forfeiture lapses, the participant has ordinary income equal to the excess of the fair market value of the shares at that time over the purchase price, if any, and a corresponding deduction is generally available to the Company, subject to the requirement of reasonableness, the provisions of Section 162(m) of the Code, and the satisfaction of a tax reporting obligation. However, a participant may make an election under Section 83(b) of the Code to be taxed on restricted stock when it is acquired rather than later, when the substantial risk of forfeiture lapses. A participant who makes an effective 83(b) election will realize ordinary income equal to the fair market value of the shares as of the time of acquisition less any price paid for the shares. A corresponding deduction will generally be available to the Company, subject to the requirement of reasonableness, the provisions of Section 162(m) of the Code, and the satisfaction of a tax reporting obligation. If a participant makes an effective 83(b) election, no additional income results by reason of the lapsing of the restrictions.

For purposes of determining capital gain or loss on a sale of shares awarded under the Amended and Restated 2017 Plan, the holding period in the shares begins when the participant recognizes taxable income with respect to the transfer. The participant's tax basis in the shares equals the amount paid for the shares plus any income realized with respect to the transfer. However, if a participant makes an effective 83(b) election and later forfeits the shares, the tax loss realized as a result of the forfeiture is limited to the excess of what the participant paid for the shares (if anything) over the amount (if any) realized in connection with the forfeiture.

### **Restricted Stock Units**

Generally, the recipient of a restricted stock unit award structured to comply with the requirements of Section 409A of the Code or an exception to Section 409A of the Code will recognize ordinary income at the time the stock is delivered equal to the excess, if any, of the fair market value of the stock received over any amount paid by the recipient in exchange for the stock. To comply with the requirements of Section 409A of the Code, the stock subject to a restricted stock unit award may generally only be delivered upon one of the following events: a fixed calendar date (or dates), separation from service, death, disability or a change in control. If delivery occurs on another date, unless the restricted stock unit award otherwise complies with or qualifies for an exception to the requirements of Section 409A of the Code (including delivery upon achievement of a performance goal), in addition to the tax treatment described above, the recipient will owe an additional 20% federal tax and interest on any taxes owed.

The recipient's basis for the determination of gain or loss upon the subsequent disposition of shares acquired from a restricted stock unit award will be the amount paid for such shares plus any ordinary income recognized when the stock is delivered.

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Subject to the requirement of reasonableness, the provisions of Section 162(m) of the Code, and the satisfaction of a tax reporting obligation, we will generally be entitled to a tax deduction equal to the taxable ordinary income realized by the recipient of the restricted stock unit award.

### **Section 162(m) Limitations**

Section 162(m) of the Code generally disallows a tax deduction to public companies for compensation in excess of \$1 million paid to each of the company's chief executive officer and the three most highly compensated executive officers (other than the chief executive officer and chief financial officer). Pursuant to tax legislation signed into law on December 22, 2017 (the "Tax Act"), for taxable years beginning after December 31, 2017, the Section 162(m) deduction limitation is expanded so that it also applies to compensation in excess of \$1 million paid to a public company's chief financial officer. Historically, compensation that qualified under Section 162(m) as performance-based compensation was exempt from the deduction limitation. However, subject to certain transition rules, the Tax Act eliminated the qualified performance-based compensation exception. As a result, for taxable years beginning after December 31, 2017, all compensation in excess of \$1 million paid to each of the executives described above (other than certain grandfathered compensation or compensation paid pursuant to certain equity awards granted before or during a transition period following Arsanis' IPO) will not be deductible by us.

### **New Plan Benefits**

The following table sets forth certain information regarding future benefits under the Amended and Restated 2017 Plan:

<u>Name and Position</u>	<u>Dollar Amount (\$)</u>	<u>Number of Shares</u>
Paula Ragan, Ph.D. <i>President, Chief Executive Officer, Corporate Secretary and Director</i>	(1)	179,303 (1)
Michael Gray, M.B.A., C.P.A. <i>Former President, Chief Executive Officer and Chief Financial Officer</i>	(2)	(2)
Adam S. Mostafa <i>Chief Financial Officer and Treasurer</i>	(1)	65,000(1)
E. Lynne Kelley, M.D., FACS <i>Former Chief Medical Officer</i>	(2)	(2)
All current executive officers as a group	(1)	244,303(1)
All current directors who are not executive officers as a group	(3)	(3)
All current employees, including all current officers who are not executive officers	(1)	592,248(1)

- (1) Awards granted under the Amended and Restated 2017 Plan to our executive officers and other employees are discretionary and are not subject to set benefits or amounts under the terms of the Amended and Restated 2017 Plan. However, in April 2020, our Board conditionally approved performance-based vesting restricted stock unit awards to certain employees (including our executive officers) under the Amended and Restated 2017 Plan, subject to stockholder approval of this Proposal 2, and the maximum number of shares subject to each award is indicated in this table.
- (2) Michael Gray, our former President, Chief Executive Officer and Chief Financial Officer, and E. Lynne Kelley, our former Chief Medical Officer, will not be eligible to receive future benefits under the Amended and Restated 2017 Plan.
- (3) As described below in this proxy statement under "Director Compensation," pursuant to our director compensation policy, on the date of each annual meeting of our stockholders, including this Annual Meeting, each current non-employee director who has served on our Board of Directors for at least six months will automatically receive an option to purchase 3,427 shares of our common stock (the "Annual

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Grant”). The aggregate number of shares subject to such Annual Grants that will automatically be granted to all of our current directors who are not executive officers as a group will be 23,989 shares in 2020.

### 2017 Plan Benefits

The following table presents certain information with respect to awards that have been granted (even if not currently outstanding) under the 2017 Plan as of April 15, 2020:

<u>Name and Position</u>	<u>Cumulative Number of Shares Subject to Awards Under the 2017 Plan</u>
Paula Ragan, Ph.D. <i>President, Chief Executive Officer, Corporate Secretary and Director</i>	235,231
Michael Gray, M.B.A., C.P.A. <i>Former President, Chief Executive Officer and Chief Financial Officer</i>	16,277
Adam S. Mostafa <i>Chief Financial Officer and Treasurer</i>	75,564
E. Lynne Kelley, M.D., FACS <i>Former Chief Medical Officer</i>	37,170
All current executive officers as a group	364,242
All current directors who are not executive officers as a group	120,763
Each nominee for election as a director:	
Gary J. Bridger, Ph.D.	6,854
Murray W. Stewart, M.D.	6,854
Each associate of any current executive officers, current directors or director nominees	—
Each other person who received or is to receive 5% of awards	—
All current employees, including all current officers who are not executive officers, as a group	860,414

### Equity Compensation Plan Information

The following table provides certain information with respect to all of our equity compensation plans in effect as of December 31, 2019.

<u>Plan Category</u>	<u>Number of securities to be issued upon exercise of outstanding options, warrants and rights (a)</u>	<u>Weighted-average exercise price of outstanding options, warrants and rights (b)</u>	<u>Number of securities remaining available for issuance under equity compensation plans (excluding securities reflected in column (a)) (c)</u>
Equity compensation plans approved by security holders	362,901(1)	\$ 34.36(2)	105,863(3)
Equity compensation plans not approved by security holders	934,128(4)	\$ 10.28(5)	349,909(6)
<b>Total</b>	<b>1,297,029</b>	<b>\$ 17.05</b>	<b>455,772(7)</b>

(1) Consists of (i) 98,793 shares to be issued upon exercise of outstanding options under the 2011 Plan, as of December 31, 2019, and (ii) 264,108 shares to be issued upon exercise of outstanding options under the 2017 Plan, as of December 31, 2019.



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- (2) Consists of the weighted-average exercise price of the 362,901 stock options outstanding on December 31, 2019.
- (3) Consists of (i) 20,770 shares that remained available for future issuance under the 2017 Plan as of December 31, 2019 and (ii) 85,093 shares that remained available for future issuance under our 2017 Employee Stock Purchase Plan, or the 2017 ESPP, as of December 31, 2019. No shares remained available for future issuance under the 2010 Plan or the 2011 Plan, as of December 31, 2019.
- (4) Consists of (i) 784,328 shares to be issued upon exercise of outstanding options under the 2015 Plan, as of December 31, 2019 and (ii) 149,800 shares to be issued upon exercise of outstanding options under our 2019 Inducement Equity Incentive Plan, as of December 31, 2019 (the “Inducement Plan”). Descriptions of the 2015 Plan and the Inducement Plan are contained in Note 13 of the notes to our consolidated financial statements contained in our Annual Report on Form 10-K for the year ended December 31, 2019, filed with the SEC on March 12, 2020.
- (5) Consists of the weighted-average exercise price of the 934,128 stock options outstanding on December 31, 2019.
- (6) Consists of (i) 99,709 shares that remained available for future issuance under our 2015 Plan, as of December 31, 2019, (ii) 250,200 shares that remained available for future issuance under the Inducement Plan, as of December 31, 2019.
- (7) The 2017 Plan has an evergreen provision that allows for an annual increase in the number of shares available for issuance under the 2017 Plan to be added on the first day of each fiscal year, beginning with the fiscal year ended December 31, 2018 and continuing for each fiscal year until, and including, the fiscal year ending December 31, 2027, equal to the least of (i) 170,915 shares of our common stock, (ii) 4% of the number of outstanding such date and (iii) an amount determined by our Board of Directors. The 2017 ESPP has an evergreen provision that allows for an annual increase in the number of shares available for issuance under the 2017 ESPP to be added on the first day of each fiscal year, beginning on January 1, 2019 and ending on December 31, 2029, in an amount equal to the least of (i) 85,457 shares of our common stock, (ii) 2% of the total number of outstanding shares as of such date and (iii) an amount determined by our Board of Directors.

### **Vote Required**

The affirmative vote of a majority of the votes cast by the holders of shares present in person or by proxy and entitled to vote at the Annual Meeting will be required to approve Proposal 2.

**THE BOARD OF DIRECTORS RECOMMENDS  
A VOTE IN FAVOR OF PROPOSAL 2.**

## PROPOSAL 3

### APPROVAL OF INCREASE IN NUMBER OF AUTHORIZED SHARES OF COMMON STOCK

The Board is requesting stockholder approval of an amendment to our Restated Certificate of Incorporation to increase our authorized number of shares of common stock from 33,333,333 shares to 125,000,000 shares.

The additional common stock to be authorized by adoption of the amendment would have rights identical to our currently outstanding common stock. Adoption of the proposed amendment and issuance of the common stock would not affect the rights of the holders of our currently outstanding common stock, except for effects incidental to increasing the number of shares of our common stock outstanding, such as dilution of the earnings per share and voting rights of current holders of common stock. If the amendment is adopted, it will become effective upon filing of a Certificate of Amendment of our Restated Certificate of Incorporation with the Secretary of State of the State of Delaware.

In addition to the 16,134,495 shares of common stock outstanding on December 31, 2019, the Board has reserved 1,928,948 shares for grants of restricted stock, issuance upon exercise of options and rights and other equity awards granted under our incentive stock and stock purchase plans (not including the any additional shares to be added if the stockholders approval Proposal 2), and up to approximately 13,162,821 shares of common stock which may be issued upon exercise of warrants and prefunded warrants issued in public offerings in April and November 2019.

Although, at present, the Board has no other plans to issue the additional shares of common stock, beyond those to be added to the 2017 Plan if the stockholders approve Proposal 2, the Board desires to have the shares available to provide additional flexibility to use its capital stock for business and financial purposes in the future. The additional shares may be used for various purposes without further stockholder approval. These purposes may include raising capital; providing equity incentives to employees, officers or directors; establishing strategic relationships or collaborations with other companies; issuing shares in connection with a joint venture or other strategic commercial transaction; and expanding our business or pipeline through the acquisition of other businesses, property or other assets.

The additional shares of common stock that would become available for issuance if the proposal were adopted could also be used by us to oppose a hostile takeover attempt or to delay or prevent changes in control or management of our Company. For example, without further stockholder approval, the Board could strategically sell shares of common stock in a private transaction to purchasers who would oppose a takeover or favor the current Board. Although this proposal to increase the authorized common stock has been prompted by business and financial considerations and not by the threat of any hostile takeover attempt (nor is the Board currently aware of any such attempts directed at us), nevertheless, stockholders should be aware that approval of proposal could facilitate future efforts by us to deter or prevent changes in control of our Company, including transactions in which the stockholders might otherwise receive a premium for their shares over then current market prices.

#### Vote Required

The affirmative vote of the holders of a majority of the outstanding shares of the common stock will be required to approve this amendment to our Restated Certificate of Incorporation.

**THE BOARD OF DIRECTORS RECOMMENDS  
A VOTE IN FAVOR OF PROPOSAL 3.**

**PROPOSAL 4****RATIFICATION OF SELECTION OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM**

The Audit Committee of the Board has selected PricewaterhouseCoopers LLP as our independent registered public accounting firm for the fiscal year ending December 31, 2020 and has further directed that management submit the selection of its independent registered public accounting firm for ratification by the stockholders at the Annual Meeting. PricewaterhouseCoopers LLP has audited our financial statements since 2016 and also served as our auditor when we were a private company since 2016. Representatives of PricewaterhouseCoopers LLP are expected to be present at the Annual Meeting. They will have an opportunity to make a statement if they so desire and will be available to respond to appropriate questions.

Neither our Bylaws nor other governing documents or law require stockholder ratification of the selection of PricewaterhouseCoopers LLP as our independent registered public accounting firm. However, the Audit Committee of the Board is submitting the selection of PricewaterhouseCoopers LLP to the stockholders for ratification as a matter of good corporate practice. If the stockholders fail to ratify the selection, the Audit Committee of the Board will reconsider whether or not to retain that firm. Even if the selection is ratified, the Audit Committee of the Board in its discretion may direct the appointment of different independent auditors at any time during the year if they determine that such a change would be in our best interests and our stockholders.

**PRINCIPAL ACCOUNTANT FEES AND SERVICES**

The following table represents aggregate fees billed to us for the fiscal years ended December 31, 2018 and December 31, 2019 by PricewaterhouseCoopers LLP, our principal accountant.

	Fiscal Year Ended	
	2019	2018
Audit Fees(1)	\$ 1,422,363	\$ 731,372
Audit-related Fees(2)	—	—
Tax Fees(3)	10,000	—
All Other Fees (4)	2,400	1,800
Total Fees	\$ 1,434,763	\$ 733,172

- (1) Consists of fees billed for professional services provided to us in connection with the annual audit of our consolidated financial statements, the review of our quarterly condensed consolidated financial statements, as well as audit services that are normally provided by an independent registered public accounting firm in connection with statutory and regulatory filings or engagements for those fiscal years, such as statutory audits. Included in 2018 Audit Fees are fees of \$188,372 in connection with the filing of registration statements. Included in 2019 Audit Fees are fees of \$762,363 in connection with filing of registration statements.
- (2) Consist of fees billed by an independent registered public accounting firm for assurance and related services that are reasonably related to the performance of the audit or review of financial statements and which are not reported under "Audit Fees." There were no such fees incurred in 2019 or 2018.
- (3) Consists of fees billed for tax compliance, tax advice and tax planning services, including the review and preparation of federal and state income tax returns.
- (4) Consists of subscription fees paid for access to online accounting research software applications and data.

All fees described above were pre-approved by the Audit Committee. There were no services that were approved by the Audit Committee pursuant to Rule 2-01(c)(7)(i)(C) (relating to the approval of a *de minimis* amount of non-audit services after the fact but before completion of the audit).

The Audit Committee has adopted a policy and procedures for the pre-approval of audit and non-audit services rendered by our independent registered public accounting firm, PricewaterhouseCoopers LLP. Prior to

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engagement of an independent registered public accounting firm for the next year's audit, management will submit an aggregate of services expected to be rendered during that year for each of four categories of services (audit services, audit-related services, tax services and other fees) to the Audit Committee for approval. Prior to engagement, the Audit Committee pre-approves these services by category of service. The fees are budgeted, and the Audit Committee requires our independent registered public accounting firm and management to report actual fees versus the budget periodically throughout the year by category of service. During the year, circumstances may arise when it may become necessary to engage our independent registered public accounting firm for additional services not contemplated in the original pre-approval. In those instances, the Audit Committee requires specific pre-approval before engaging our independent registered public accounting firm. The pre-approval of services may be delegated to one or more of the Audit Committee's members, but the decision must be reported to the full Audit Committee at its next scheduled meeting.

The Audit Committee has determined that the rendering of services other than audit services by PricewaterhouseCoopers LLP is compatible with maintaining the principal accountant's independence.

**Vote Required**

The affirmative vote of a majority of the votes cast by the holders of shares present in person or by proxy and entitled to vote at the Annual Meeting will be required to ratify the selection of PricewaterhouseCoopers LLP.

**THE BOARD OF DIRECTORS RECOMMENDS  
A VOTE IN FAVOR OF PROPOSAL 4**

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### EXECUTIVE OFFICERS

The following table sets forth information with respect to our executive officers and their ages as of the date of this Proxy Statement. There are no family relationships between any of our executive officers, and there is no arrangement or understanding between any executive officer and any other person pursuant to which the executive officer was selected.

<u>Name</u>	<u>Age</u>	<u>Position</u>
Paula Ragan, Ph.D.	50	President, Chief Executive Officer, Corporate Secretary and Director
Adam S. Mostafa	40	Chief Financial Officer and Treasurer
Derek Meisner, J.D.	49	General Counsel

**Paula Ragan, Ph.D.** Biographical information for Dr. Ragan is presented above under the caption “Class II Directors Continuing in Office Until the 2021 Annual Meeting of Stockholders.”

**Adam S. Mostafa.** Mr. Mostafa has served as our Chief Financial Officer and Treasurer since the Merger in March 2019. Prior to the Merger, Mr. Mostafa served as Private X4’s Chief Financial Officer since September 2018. Prior to joining Private X4, Mr. Mostafa served as chief financial officer of Abpro Corporation, a biotechnology company focused on antibody therapeutics, from June 2016 to August 2018. Prior to that, Mr. Mostafa was a managing director in the healthcare investment banking group at Cantor Fitzgerald from January 2015 to May 2016, and from June 2011 to January 2015, Mr. Mostafa was a senior banker in the healthcare investment banking group at Needham & Company. Prior to that, Mr. Mostafa was a vice president in the investment banking group at CRT Capital Group from March 2007 to May 2011, and from September 2003 to March 2007, Mr. Mostafa was a portfolio management associate in the global stock selection group at AQR Capital. Mr. Mostafa began his career as an analyst in the healthcare investment banking group at Salomon Smith Barney. Mr. Mostafa earned an A.B. in Economics from Brown University.

**Derek Meisner, J.D.** Mr. Meisner has served as our General Counsel since November 2019. From September 2018 until October 2019, Mr. Meisner held the role of General Counsel at Genocera Biosciences, a publicly traded, clinical-stage biopharmaceutical company. Prior to Genocera, he served as General Counsel of multiple Boston-based financial services firms, including Quantopian, Inc., a venture-backed start-up, from April 2016 until September 2018, and life science investor RA Capital Management from January 2015 to April 2016. Mr. Meisner was also previously a partner at the international law firm K&L Gates and Branch Chief in the Division of Enforcement of the U.S. Securities and Exchange Commission. Mr. Meisner holds a B.A. from the University of Michigan and a J.D. from the Washington College of Law at American University.

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

The following table sets forth certain information regarding the ownership of the Company’s common stock as of April 15, 2020 by: (i) each director and nominee for director; (ii) each of the executive officers named in the Summary Compensation Table; (iii) all current executive officers and directors of the Company as a group; and (iv) all those known by the Company to be beneficial owners of more than five percent of its common stock. Applicable percentages are based on 16,142,275 shares outstanding on April 15, 2020, adjusted as required by rules promulgated by the SEC. Unless otherwise noted below, the address of each stockholder below is c/o X4 Pharmaceuticals, Inc., 955 Massachusetts Avenue, 4th Floor, Cambridge, Massachusetts 02139.

<b>Beneficial Owner</b>	<b>Beneficial Ownership (1)</b>	
	<b>Number of Shares</b>	<b>Percent of Total</b>
<b>5% Stockholders</b>		
Entities affiliated with Biotechnology Value Fund, L.P. (1)	1,664,034	9.99%
Entities affiliated with Bain Capital Life Sciences Fund, L.P. (2)	1,653,000	9.99%
Entities affiliated with RA Capital Management, L.P. (3)	1,761,419	9.99%
FMR LLC (4)	1,350,000	8.4%
Entities affiliated with OrbiMed Advisors LLC (5)	1,248,993	7.6%
Entities affiliated with EcoR1 Capital, LLC (6)	1,015,400	6.3%
Entities affiliated with Deerfield Management Company, L.P. (7)	906,937	5.5%
<b>Named Executive Officers, Directors and Director Nominees</b>		
Paula Ragan, Ph.D. (8)	395,902	2.4%
Michael Gray, M.B.A., CPA (9)	57,943	*
Adam S. Mostafa (10)	28,707	*
E. Lynne Kelley, M.D., FACS (10)	9,292	*
William E. Aliski	—	-
Gary J. Bridger, Ph.D (10)	13,637	*
David McGirr, M.B.A (10)	8,973	*
René Russo, Pharm.D. (10)	83,231	*
Murray W. Stewart, M.D. (10)	2,665	*
Michael S. Wyzga (10)	43,878	*
All directors and current executive officers as a group (9 people) (11)	634,936	3.8%

\* Less than one percent.

(1) Based in part on information provided in a Schedule 13G/A filed by Biotechnology Value Fund, L.P. (“BVF”) on February 14, 2020. Consists of (i) 1,096,993 shares of common stock, including 522,000 shares of common stock issuable upon the exercise of pre-funded warrants issued in April 2019 (“April Pre-Funded Warrants”) held by BVF, (ii) 441,427 shares of common stock held by Biotechnology Value Fund II, L.P. (“BVF II”), (iii) 75,803 shares of common stock held by Biotechnology Value Trading Fund OS LP (“Trading Fund OS”), and (iv) 49,811 shares of common stock held by a certain BVF Partners L.P. (“Partners”) managed account (the “Partners Managed Account”). BVF, BVF II, Trading Fund OS and the Partners Managed Account hold Class A warrants, Class B warrants, April Pre-Funded Warrants and pre-funded warrants issued in November 2019 (“November Pre-Funded Warrants”) which restrict the exercise of such securities to the extent that such exercises would, (i) in the case of the Class A warrants, Class B warrants, the April Pre-Funded Warrants and the November Pre-Funded warrants, cause the number of shares then beneficially owned by the holder, together with its affiliates and other attribution parties, to exceed 9.99% of the total number of shares of common stock then outstanding, or (ii) in the case of the April Pre-Funded Warrants and the November Pre-Funded Warrants, cause the combined voting power of our securities beneficially owned by the holder, together with its affiliates, to exceed 9.99% of the combined voting power of all of our securities then outstanding immediately after giving effect to the exercise (together, the “Ownership Caps”). As a result of the Ownership Caps, the following have been excluded from the amounts reported above as beneficially owned: (a) 8,425 shares of common stock issuable upon the

exercise of April Pre-Funded warrants, 450,314 shares of common stock issuable upon the exercise of Class A Warrants, 259,739 shares of common stock issuable upon the exercise of November Pre-Funded warrants, and 518,856 shares of common stock issuable upon the exercise of Class B warrants held by BVF (b) 428,704 shares of common stock issuable upon the exercise of the April Pre-Funded Warrants, 363,810 shares of common stock issuable upon the exercise of Class A warrants, 204,465 shares of common stock issuable upon the exercise of November Pre-Funded warrants, and 385,449 shares of common stock issuable upon the exercise of Class B warrants held by BVF II, (c) 76,534 shares of common stock issuable upon the exercise of April Pre-Funded Warrants, 64,996 shares of common stock issuable upon the exercise of Class A warrants, 35,796 shares of common stock issuable upon the exercise of November Pre-Funded warrants, and 66,236 shares of common stock issuable upon the exercise of Class B warrants held by Trading Fund OS, and (d) 37,337 shares of common stock issuable upon the exercise of April Pre-Funded Warrants, 31,630 shares of common stock issuable upon the exercise of Class A warrants held, and 29,459 shares of common stock issuable upon the exercise of Class B warrants by the Partners Managed Account. BVF Partners OS Ltd. (“Partners OS”), as the general partner of Trading Fund OS, may be deemed to beneficially own the securities beneficially owned by Trading Fund OS. Partners, as the general partner of BVF, BVF II, the investment manager of Trading Fund OS, and the sole member of Partners OS, may be deemed to beneficially own the securities beneficially owned by BVF, BVF II, Trading Fund OS, and the Partners Managed Account. BVF Inc., as the general partner of Partners, may be deemed to beneficially own the securities beneficially owned by Partners. Mark N. Lampert, as a director and officer of BVF Inc., may be deemed to beneficially own the securities beneficially owned by BVF Inc. Partners OS disclaims beneficial ownership of the securities beneficially owned by Trading Fund OS. Each of Partners, BVF Inc. and Mr. Lampert disclaims beneficial ownership of the securities beneficially owned by BVF, BVF II, Trading Fund OS, and the Partners Managed Account. The address of BVF, BVF II, Partners, BVF, Inc. and Mr. Lampert is 44 Montgomery St., 40th Floor, San Francisco, California 94104 and the address of Trading Fund OS and Partners OS is P.O. Box 309 Uglund House, Grand Cayman, KY1-1104, Cayman Islands.

- (2) Based in part of a Schedule 13G filed by Bain Capital Life Sciences Fund, L.P., a Cayman exempted limited partnership (“BCLS”), Bain Capital Life Sciences Fund II, L.P., a Cayman exempted limited partnership (“BCLS II”), and BCIP Life Sciences Associates, LP, a Delaware limited partnership (“BCIP LS” and, together with BCLS and BCLS II, the “Bain Capital Holders”) on December 9, 2019. Consists of (i) 566,966 shares of common stock and 403,000 shares of common stock issuable upon exercise of November Pre-Funded Warrants held by BCLS, (ii) 557,143 shares of common stock held by BCLS II, and (iii) 125,891 shares of common stock held by BCIP LS. As a result of the Ownership Caps, the following have been excluded from the amounts reported above as beneficially owned: (a) 163,966 shares of common stock issuable upon exercise of November Pre-Funded Warrants and 1,133,932 shares of common stock issuable upon exercise of Class B Warrants held by BCLS, (b) 557,143 shares of common stock issuable upon exercise of November Pre-Funded Warrants and 1,114,285 shares of common stock issuable upon exercise of Class B Warrants held by BCLS II, and (c) 125,891 shares of common stock issuable upon exercise of November Pre-Funded Warrants and 251,782 shares of common stock issuable upon exercise of Class B Warrants held by BCIP LS. Bain Capital Life Sciences Investors, LLC, a Delaware limited liability company (“BCLSI”), whose managers are Jeffrey Schwartz and Adam Koppel, is (i) the general partner of Bain Capital Life Sciences Partners, LP, a Cayman exempted limited partnership (“BCLSP”), which is the general partner of BCLS and (ii) the manager of Bain Capital Life Sciences Investors II, LLC, a Cayman limited liability company (“BCLSI II”), which is the general partner of BCLS II. Boylston Coinvestors, LLC, a Delaware limited liability company (“Boylston”), is the general partner of BCIP LS. BCLSI governs the investment strategy and decision-making process with respect to investments held by BCIP LS. As a result, each of BCLSI, Mr. Schwartz and Dr. Koppel may be deemed to share voting and dispositive power with respect to the securities held by the Bain Capital Holders. The address of each of the Bain Capital Holders, BCLSI, BCLSP, BCLSI II, Boylston, Mr. Schwartz and Dr. Koppel is 200 Clarendon Street, Boston, MA 02116.
- (3) Based in part on a Schedule 13G filed by RA Capital Management, L.P. (“RA Capital”), Peter Kolchinsky, and Rajeev Shah on February 14, 2020. Consists of (i) 270,292 shares of common stock held by RA Capital Healthcare Fund, L.P. (the “Fund”) and/or a separately managed account (the “Account”), (ii) 1,136,000

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shares of common stock issuable upon the exercise of Class A warrants to purchase common stock held by the Fund and the Account, (iii) 197,000 shares of common stock issuable upon the exercise of April Pre-Funded Warrants held by the Fund and (iv) 158,127 shares of common stock issuable upon the exercise of April Pre-Funded Warrants held by the Account. As a result of the Ownership Caps, 701,873 shares of common stock issuable upon the exercise of April Pre-Funded Warrants held by the Fund have been excluded from amounts reported above as beneficially owned. RA Capital Healthcare Fund GP, LLC is the general partner of the Fund. The general partner of RA Capital is RA Capital Management GP, LLC, of which Dr. Kolchinsky and Mr. Shah are the controlling persons. RA Capital serves as investment adviser for the Fund and the Account and may be deemed a beneficial owner of any securities held by the Fund and the Account. The Fund has delegated to RA Capital the sole power to vote and the sole power to dispose of all securities held in the Fund's portfolio, including the shares of our common stock. Because the Fund has divested voting and investment power over the shares of our securities it holds and may not revoke that delegation on less than 61 days' notice, the Fund disclaims beneficial ownership of our securities it holds. As managers of RA Capital, Dr. Kolchinsky and Mr. Shah may be deemed beneficial owners of our securities beneficially owned by RA Capital. RA Capital, Dr. Kolchinsky, and Mr. Shah disclaim beneficial ownership of our securities. The address of the Fund, RA Capital and Dr. Kolchinsky is c/o RA Capital Management, LLC, 200 Berkley Street, 18th Floor, Boston, MA 02116.

- (4) Based on information provided in a Schedule 13G filed by FMR LLC on May 10, 2019. Consists of 1,350,000 shares of common stock. Abigail P. Johnson is a Director, the Chairman and the Chief Executive Officer of FMR LLC. Members of the Johnson family, including Abigail P. Johnson, are the predominant owners, directly or through trusts, of Series B voting common shares of FMR LLC, representing 49% of the voting power of FMR LLC. The Johnson family group and all other Series B shareholders have entered into a shareholders' voting agreement under which all Series B voting common shares will be voted in accordance with the majority vote of Series B voting common shares. Accordingly, through their ownership of voting common shares and the execution of the shareholders' voting agreement, members of the Johnson family may be deemed, under the Investment Company Act of 1940, to form a controlling group with respect to FMR LLC. Neither FMR LLC nor Abigail P. Johnson has the sole power to vote or direct the voting of the shares owned directly by the various investment companies registered under the Investment Company Act ("Fidelity Funds") advised by Fidelity Management & Research Company ("FMR Co"), a wholly owned subsidiary of FMR LLC, which power resides with the Fidelity Funds' Boards of Trustees. FMR Co carries out the voting of the shares under written guidelines established by the Fidelity Funds' Boards of Trustees. The address of FMR LLC is 245 Summer Street, Boston, MA 02210.
- (5) Based on a Schedule 13G filed by OrbiMed Advisors LLC ("Advisors") on April 19, 2019. Consists of 936,493 shares of common stock held by OrbiMed Private Investments IV, LP ("OPI IV"), and 312,500 shares of common stock issuable upon the exercise of Class A warrants to purchase common stock held by OPI IV. Advisors is an investment advisor and is the Managing Member of OrbiMed Capital GP IV LLC ("GP IV"). GP IV is the sole general partner of OPI IV. As a result, Advisors and GP IV share the power to direct the vote and the disposition of the securities held by OPI IV. Advisors exercises this investment and voting power through a management committee comprised of Carl L. Gordon, Sven H. Borho and Jonathan T. Silverstein. On the basis of these relationships, GP IV and Advisors may be deemed to share beneficial ownership of the securities held by OPI IV. The address of Advisors, OPI IV, GP IV, Carl L. Gordon, Sven H. Borho and Jonathan T. Silverstein is 601 Lexington Avenue, 54th Floor, New York, NY 10022.
- (6) Based on a Schedule 13 G/A filed by EcoR1 Capital Fund Qualified, L.P., ("Qualified Fund"); EcoR1 Capital, LLC ("EcoR1") and Oleg Nodelman ("Nodelman") on February 14, 2020. EcoR1 and Nodelman report shared voting power as to 1,015,400 shares of common stock, and Qualified reports shared voting power as to 845,256 shares of common stock. Each of Qualified Fund, EcoR1 and Nodelman disclaims beneficial ownership of the shares except to the extent of that person's pecuniary interest therein. The address of Qualified, EcoR1 and Nodelman is 357 Tehama Street #3, San Francisco, CA.
- (7) Based in part on information provided in a Schedule 13G/A filed by James E. Flynn on February 13, 2020. Consists of an aggregate of (i) 344,615 shares of common stock and warrants to purchase an aggregate of 282,500 shares of common stock held by Deerfield Special Situations Fund, L.P., (ii) 104,822 shares of common stock and warrants to purchase an aggregate of 175,000 shares of common stock held by Deerfield



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Partners, L.P. Deerfield Mgmt, L.P. is the general partner of each of Deerfield Special Situations Fund, L.P. and Deerfield Partners, L.P., and Deerfield Management Company, L.P. is the investment advisor of each of Deerfield Special Situations Fund, L.P. and Deerfield Partners, L.P. James E. Flynn also shares voting and investment control over the securities held by Deerfield Special Situations Fund, L.P. and Deerfield Partners, L.P. Notwithstanding the number of shares reported, Deerfield Special Situations Fund, L.P., Deerfield Partners, L.P., Deerfield Management Company, L.P., Deerfield Mgmt, L.P. and James E. Flynn disclaim beneficial ownership of the shares of common stock issuable upon exercise of such warrants to the extent that upon such exercise the number of shares beneficially owned by Deerfield Special Situations Fund, L.P. and its affiliates, in the aggregate, would exceed the Ownership Cap. The address of Deerfield Special Situations Fund, L.P., Deerfield Partners, L.P. Deerfield Management Company, L.P., Deerfield Mgmt, L.P. and James E. Flynn is 780 Third Avenue, 37th Floor, New York, NY 10017.

- (8) Consists of 176,566 shares of common stock, 197,618 shares of common stock underlying options that were exercisable as of April 15, 2020 or will become exercisable within 60 days after such date, and 13,982 shares of common stock underlying restricted stock units that were vested as of April 15, 2020 or will become exercisable within 60 days after such date.
- (9) Mr. Gray is the former President, Chief Executive Officer and Chief Financial Officer of Arsanis. Consists of 41,666 shares of common stock and 43,155 shares of common stock underlying options that were exercisable as of April 15, 2020 or will become exercisable within 60 days after such date.
- (10) Consists of shares of common stock underlying options that were exercisable as of April 15, 2020 or will become exercisable within 60 days after such date.
- (11) Consists of 218,232 shares of common stock, 402,722 shares of common stock underlying options that were exercisable as of April 15, 2020 or will become exercisable within 60 days after such date, and 13,982 shares of common stock underlying restricted stock units that were vested as of April 15, 2020 or will become exercisable within 60 days after such date.

## EXECUTIVE COMPENSATION

### SUMMARY COMPENSATION TABLE

The following table shows the total compensation paid or accrued during the fiscal years ended December 31, 2018 and December 31, 2019 to (1) the individuals who served as our Chief Executive Officer during the fiscal year ended December 31, 2019 and (2) our two next most highly compensated executive officers who earned more than \$100,000 during the fiscal year ended December 31, 2019 and were serving as executive officers as of such date. We refer to these individuals in this Proxy Statement as our Named Executive Officers.

Our Named Executive Officers for 2019 who appear in the Summary Compensation Table are:

- Paula Ragan, our President, Chief Executive Officer, Corporate Secretary and Director;
- Michael Gray, M.B.A., C.P.A., our former President, Chief Executive Officer and Chief Financial Officer;
- Adam S. Mostafa, our Chief Financial Officer and Treasurer; and
- E. Lynne Kelley, M.D., FACS, our former Chief Medical Officer.

### SUMMARY COMPENSATION TABLE

<u>Name and Principal Position(1)</u>	<u>Year</u>	<u>Salary (\$)</u>	<u>Bonus (\$)(2)</u>	<u>Stock Awards (\$)(3)</u>	<u>Option Awards (\$)(3)</u>	<u>Non-Equity Incentive Plan Compensation (\$)(4)</u>	<u>All Other Compensation (\$)</u>	<u>Total (\$)</u>
<b>Paula Ragan, Ph.D.</b> <i>President, Chief Executive Officer, Corporate Secretary and Director</i>	2019	492,276	—	824,938	893,400	286,000	1,177(8)	2,497,851
	2018	380,000	—	—	407,577	133,000	450	921,027
<b>Michael Gray, M.B.A., C.P.A.</b> <i>Former President, Chief Executive Officer and Chief Financial Officer</i>	2019	91,250(5)	—	—	—	—	1,048,572(9)	1,139,822
	2018	405,193	181,136	1,030,000	1,310,947	—	—	2,927,276
<b>Adam S. Mostafa</b> <i>Chief Financial Officer and Treasurer</i>	2019	372,275	—	155,819	168,771	168,341	1,025(10)	866,231
	2018	109,285(6)	—	—	480,789	38,250	90	628,414
<b>E. Lynne Kelley, M.D., FACS (7)</b> <i>Former Chief Medical Officer</i>	2019	280,968	—	—	566,374	121,005	1,604(11)	969,951

- (1) The amounts reported in this table for 2018 for Dr. Ragan and Mr. Mostafa represent amounts earned for service as an executive officer of Private X4.
- (2) The amount reported in the “Bonus” column reflects a discretionary annual cash bonus paid to Mr. Gray in 2018 for his performance when he was an executive officer of Arsanis prior to the Merger.
- (3) The amounts reported in the “Stock Awards” column and “Option Awards” column reflect the aggregate fair value of stock-based compensation awarded during the year computed in accordance with the provisions of Financial Accounting Standards Board, Accounting Standards Codification Topic 718, or ASC 718. For Dr. Ragan and Mr. Mostafa, see Note 13 to the X4 Annual Report on Form 10-K for the year ended December 31, 2019 filed with the SEC on March 12, 2020, and for Mr. Gray, see Note 12 to the Arsanis consolidated financial statements in Arsanis’ Annual Report on Form 10-K for the year ended December 31, 2018 filed with the SEC on March 11, 2019, regarding assumptions underlying the valuation of equity awards.
- (4) For 2019, represents amounts earned for the 12-month period from January 1, 2019 to December 31, 2019 and paid in 2020, and excludes payments made in 2019 that were earned in 2018. For 2018, represents amounts earned for the 12-month period from January 1, 2018 to December 31, 2018 and paid in 2019, and excludes payments made in 2019 that were earned in 2018.

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- (5) Mr. Gray resigned immediately prior to and effective upon the closing of the Merger on March 13, 2019. Accordingly, his salary for 2019 reflects the amount he earned through his termination date.
- (6) Mr. Mostafa's employment with X4 began on September 5, 2018. Accordingly, his salary for 2018 reflects the amount he earned from September 5, 2018 through the end of the calendar year.
- (7) Dr. Kelley's employment with X4 began on April 24, 2019. Accordingly, her salary for 2019 reflects the amount she earned from April 24, 2019 through the end of the calendar year. Because Dr. Kelley was not a Named Executive Officer in 2018, SEC rules do not require her compensation for that year to be reported. Dr. Kelley resigned as our Chief Medical Officer, effective April 3, 2020.
- (8) Reflects \$457 in life insurance premiums the Company paid for a term life insurance policy to benefit Dr. Ragan, with a face value of \$300,000, and \$720 for commuting expenses.
- (9) Reflects \$75 in life insurance premiums the Company paid for a term life insurance policy to benefit Mr. Gray, with a face value of \$300,000, \$2,172 in COBRA premium benefits and \$1,046,325 in severance paid to Mr. Gray in connection with his separation as Arsanis' President and CEO following the Merger.
- (10) Reflects \$305 in life insurance premiums the Company paid for a term life insurance policy to benefit Mr. Mostafa, with a face value of \$300,000, and \$720 for commuting expenses.
- (11) Reflects \$1,111 in life insurance premiums the Company paid for a term life insurance policy to benefit Dr. Kelley, with a face value of \$300,000, and \$493 for commuting expenses.

### OUTSTANDING EQUITY AWARDS AT FISCAL YEAR END

The following table shows for the fiscal year ended December 31, 2019, certain information regarding outstanding equity awards at fiscal year end for the Named Executive Officers.

#### OUTSTANDING EQUITY AWARDS AT DECEMBER 31, 2019

Name	Grant Date	Option Awards				Stock Awards	
		Number of Securities Underlying Unexercised Options (#) Exercisable	Number of Securities Underlying Unexercised Options (#) Unexercisable	Option Exercise Price (\$)	Option Expiration Date	Equity incentive plan awards: number of unearned shares, units or other rights that have not vested (#)	Equity incentive plan awards: market or payout value of unearned shares, units or other rights that have not vested (\$)
Paula Ragan, Ph.D.	1/19/2016(1)	100,729(2)	— (2)	6.84	1/18/2026		
	1/24/2017(1)	47,709(3)	17,721(3)	6.84	1/23/2027		
	1/31/2018(1)	40,080(4)	40,080(4)	7.08	1/30/2028		
	6/17/2019(5)	— (6)	83,893(6)	14.75	6/16/2029		
	6/17/2019(5)					55,928(7)	598,430
Michael Gray, M.B.A., C.P.A.	6/19/2017(5)	16,277		24.00	3/12/2021(8)		
Adam S. Mostafa	10/4/2018(1)	18,266(9)	44,367	10.44			
	6/17/2019(5)	—	15,847(6)	14.75			
	6/17/2019(5)					10,564(7)	113,035
E. Lynne Kelley, M.D., FACS	4/24/2019(5)	—	37,170(10)	20.30	4/23/2019		

- (1) This award was granted pursuant to the 2015 Plan.
- (2) As of the date of grant, 33.33% of the shares underlying the option had vested and 2.0833% of the shares underlying the option vested, subject to continued service, on the 15th day of each month thereafter until September 15, 2018.

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- (3) The shares underlying this option vest, subject to continued service, as follows: 25% of the shares vested on January 24, 2018 with the remainder vesting over the next three years in equal monthly installments thereafter.
- (4) The shares underlying this option vest, subject to continued service, as follows: The shares underlying this option vest, subject to continued service, as follows: 25% of the shares vested on January 1, 2019 with the remainder vesting over the next three years in equal monthly installments on the 24th day of each month thereafter.
- (5) This award was granted pursuant to the 2017 Plan, as amended.
- (6) 25% of the shares subject to the option shall vest on June 17, 2020, with the remainder vesting in equal installments of 2.0833% of the shares subject to the option on the last day of each month thereafter for a period of 36 months, subject to continued service through each such date.
- (7) Represents restricted stock units, with each restricted stock unit representing the contingent right to receive one share of common stock on the applicable vesting date. No amount was paid upon grant of the restricted stock units. The restricted stock units vest, subject to continued service, in four equal annual installments on May 31, 2020, 2021, 2022 and 2023.
- (8) Pursuant to the terms Mr. Gray's employment agreement, this option vested in full in connection with his resignation in connection with the Merger, and he may exercise such option for up to two years following his separation date.
- (9) The shares underlying this option vest, subject to continued service, as follows: 25% of the shares vest on September 5, 2019, with the remainder vesting over the next three years in equal monthly installments on 5th day of each month thereafter.
- (10) The shares underlying this option were scheduled to vest, subject to continued service, as follows: 25% of the shares subject to the option were to vest on April 24, 2020, with the remainder vesting in equal installments of 2.083% of the shares subject to the option on the last day of each month thereafter for a period of 36 months. In connection with Dr. Kelley's resignation, 9,292 of the shares subject to this option vested on April 2, 2020, and the vested portion of this option will be exercisable until April 3, 2021. The remaining shares subject to this option were forfeited on April 3, 2020.

### **NARRATIVE TO SUMMARY COMPENSATION TABLE**

The material terms of the elements of our executive compensation program are described below.

#### ***Base Salary***

Each Named Executive Officer's base salary is a fixed component of annual compensation for performing specific duties and functions, and has been established by our Board taking into account each individual's role, responsibilities, skills, and experience.

#### ***Non-Equity Incentive Plan Compensation***

Our annual bonus program is intended to reward our Named Executive Officers for meeting objective or subjective individual and/or company-wide performance goals for a fiscal year. For 2019 and 2018, our Named Executive Officers, other than Mr. Gray, received incentive compensation based upon the Board or Compensation Committee's determination of their respective achievement of and performance with respect to corporate objectives.

#### ***Long-Term Equity Incentives***

Our equity grant program is intended to align the interests of our Named Executive Officers with those of our stockholders and to motivate them to make important contributions to our performance.

***Employment and Change in Control Arrangements***

*Paula Ragan, Ph.D.*

On June 23, 2015, Private X4 entered into an executive employment agreement with Dr. Ragan. Pursuant to the executive employment agreement, Dr. Ragan's compensation consisted of base salary, annual bonus as determined by the Private X4 board of directors, equity grants as determined by the Private X4 board of directors, fringe benefits, vacation and reimbursement of ordinary and reasonable out-of-pocket expenses. In March 2018, Dr. Ragan's base salary was increased to \$380,000. Dr. Ragan had an annual target bonus for 2018 set at 35% of base salary.

On March 13, 2019, in connection with the closing of the Merger, we entered into an amended and restated executive employment agreement with Dr. Ragan, pursuant to which Dr. Ragan agreed to continue serving as our Chief Executive Officer. Pursuant to the agreement, Dr. Ragan's compensation consists of base salary at an annual rate approved by our Board or an appropriate committee thereof, a bonus as determined by our Board (provided that the target for such bonus shall be not less than 25% of Dr. Ragan's annual base salary), fringe benefits, vacation, reimbursement of ordinary and reasonable out-of-pocket expenses and coverage under our Directors' and Officers', or D&O, insurance policies, subject to the terms and conditions of such policies. Dr. Ragan's 2019 base salary was \$520,000, with an annual target bonus set at 50% of her annual base salary, subject to review and adjustment each year by the board of directors.

In June 2019, the Board granted Dr. Ragan two equity awards at the time the Board made annual grants to its employees, including its executive officers.

In February 2020, the Compensation Committee of the Board of Directors determined that Dr. Ragan had earned 110% of her target bonus for 2019, equal to a bonus of \$286,000. At the same time, the Compensation Committee increased Dr. Ragan's base salary for 2020 to \$543,400.

Pursuant to her amended and restated executive employment agreement, as amended in February 2020, if Dr. Ragan's employment is terminated for any reason, Dr. Ragan will be entitled to receive her accrued but unpaid salary, accrued but unused vacation days, the amount of any properly incurred expenses prior to termination not yet reimbursed and other benefits. In addition to the foregoing, if Dr. Ragan's employment is terminated by us without cause or if Dr. Ragan resigns for good reason, each term as defined in the agreement, Dr. Ragan will be entitled to the following: (a) a continuation of base salary for 12 months, (b) a pro-rated portion of her at-target annual bonus for the calendar year in which the termination occurs, (c) so long as Dr. Ragan is eligible for coverage under our health insurance plan, elects coverage, was covered prior to termination, and elects to exercise her rights under COBRA to continue participation in such plan, we will pay the normal share of costs we pay for current employees under such plan until the earlier of 12 months from the date of Dr. Ragan's termination, or the date Dr. Ragan is eligible to receive health benefits through another employer, and (d) Dr. Ragan will become vested in the additional number of outstanding time-based equity awards granted to Dr. Ragan by us that would have otherwise vested had Dr. Ragan remained employed for an additional 12 months after her termination date. In addition, if Dr. Ragan's employment is terminated without cause or if Dr. Ragan resigns for good reason within the one-year period following a change of control, as that term is defined in the agreement, Dr. Ragan will be entitled to the following: (a) a continuation of base salary for 18 months, (b) her full annual bonus for the calendar year in which the termination occurs, (c) so long as Dr. Ragan is eligible for coverage under our health insurance plan, elects coverage, was covered prior to termination, and elects to exercise her rights under COBRA to continue participation in such plan, we will pay the normal share of costs we pay for current employees under such plan until the earlier of 12 months from the date of Dr. Ragan's termination, or the date Dr. Ragan is eligible to receive health benefits through another employer, and (d) automatic vesting in all outstanding time-based equity awards granted to Dr. Ragan by us, subject to the terms and conditions of the agreement. As a condition to receiving the foregoing severance benefits, Dr. Ragan must execute and not revoke a separation agreement in a form acceptable to us and which will include a complete release of claims and terms related to non-disparagement, non-competition, confidentiality and cooperation.

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In connection with the execution of her amended and restated employment agreement, Dr. Ragan also agreed to continue to abide by the terms of her non-competition, non-solicitation, non-disclosure and intellectual property agreement.

### *Michael P. Gray*

In connection with the appointment of Michael P. Gray as Arsanis' President and Chief Executive Officer on November 26, 2018, Arsanis entered into an amended and restated employment agreement with Mr. Gray, which agreement became effective as of November 27, 2018 and replaced his October 10, 2017 amended and restated letter agreement (the "Gray 2018 Agreement"). Under the Gray 2018 Agreement, Mr. Gray's base salary was \$450,000 per annum and he was entitled to participate in Arsanis' medical and other benefits programs, and he was entitled to receive an annual bonus based on his individual performance and the company's performance during the applicable year, all as determined by Arsanis' Board of Directors in its sole discretion, at a target bonus rate of 55% of his annualized base salary.

On March 13, 2019, immediately prior to and effective upon the closing of the Merger, Mr. Gray resigned for good reason for purposes of the Gray 2018 Agreement. In accordance with the terms of the Gray 2018 Agreement, in connection with such resignation, Mr. Gray became entitled to the following severance benefits: (i) an amount equal to the sum of (x) 1.5 times his then-current base salary and (y) 1.5 times his target bonus for 2019, and (ii) COBRA premium benefits for up to 12 months. In addition, pursuant to the terms of the Gray 2018 Agreement, Mr. Gray's outstanding equity awards vested in full, and the option award granted to Mr. Gray in June 2017 may be exercised for up to two years following his separation date.

### *Adam S. Mostafa*

On July 23, 2018, Private X4 entered into an executive employment agreement with Mr. Mostafa, pursuant to which Mr. Mostafa agreed to serve as Private X4's Chief Financial Officer effective as of September 5, 2018. Pursuant to the executive employment agreement, Mr. Mostafa's compensation consisted of base salary, potential annual bonus as determined by the Private X4 board of directors, a potential equity grant subject to approval by the Private X4 board of directors, fringe benefits, vacation and reimbursement of ordinary and reasonable out-of-pocket expenses. Mr. Mostafa's initial base salary, which was subject to review and adjustment, was \$340,000. The agreement provided for Private X4 to pay annual bonuses at Private X4's sole discretion, as determined by the Private X4 board of directors, with an annual target bonus set at 35% of annual base salary. Private X4 also agreed to grant Mr. Mostafa an option to purchase 659,067 shares of Private X4 common stock, subject to approval by the X4 board of directors and subject to certain vesting conditions, which option was granted on October 19, 2018. In connection with the Merger, this option became an option to purchase 62,633 shares of our common stock.

On March 13, 2019, in connection with the closing of the Merger, we entered into an amended and restated executive employment agreement with Mr. Mostafa, pursuant to which Mr. Mostafa agreed to continue serving as our Chief Financial Officer. Pursuant to the agreement, Mr. Mostafa's compensation consists of base salary at an annual rate approved by our Board or an appropriate committee thereof, an annual bonus as determined by our Board (provided that the target for such bonus shall not be less than 25% of Mr. Mostafa's annual base salary), fringe benefits, vacation, reimbursement of ordinary and reasonable out-of-pocket expenses and coverage under our D&O insurance policies, subject to the terms and conditions of such policies. Mr. Mostafa's base salary in 2019 was \$380,000, with an annual target bonus set at 40% of his annual base salary, subject to review and adjustment each year by the Board of Directors.

In June 2019, the Board of Directors granted Mr. Mostafa two equity awards at the time the Board made annual grants to its employees, including its executive officers.

In February 2020, the Compensation Committee of the Board of Directors determined that Mr. Mostafa had earned 111% of his target bonus for 2019, equal to a bonus of \$168,341. At the same time, the Compensation Committee increased Mr. Mostafa's base salary for 2020 to \$400,000.

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Pursuant to his amended and restated executive employment agreement, as amended in February 2020, if Mr. Mostafa's employment is terminated for any reason, Mr. Mostafa is entitled to receive his accrued but unpaid salary, accrued but unused vacation days, the amount of any properly incurred expenses prior to termination not yet reimbursed and other benefits. In addition to the foregoing, if Mr. Mostafa's employment is terminated by us without cause or if Mr. Mostafa resigns for good reason, each term as defined in the agreement, Mr. Mostafa will be entitled to the following: (a) a continuation of base salary for six months, (b) a pro-rated portion of Mr. Mostafa's at-target annual bonus for the calendar year in which the termination occurs based on the period worked by Mr. Mostafa during such calendar year prior to termination, (c) so long as Mr. Mostafa is eligible for coverage under our health insurance plan, elects coverage, was covered prior to termination, and elects to exercise his rights under COBRA to continue participation in such plan, we will pay the normal share of costs we pay for current employees under such plan until the earlier of six months from the date of Mr. Mostafa's termination or the date Mr. Mostafa is eligible to receive health benefits through another employer, and (d) Mr. Mostafa will become vested in the additional number of outstanding time-based equity awards granted to Mr. Mostafa by us that would have otherwise vested had Mr. Mostafa remained employed for an additional six months after his termination date. In addition, if Mr. Mostafa's employment is terminated without cause or if Mr. Mostafa resigns for good reason within the one-year period following a change of control, as that term is defined in the agreement, Mr. Mostafa will be entitled to the following: (a) a continuation of base salary for 12 months, (b) Mr. Mostafa's full annual bonus for the calendar year in which the termination occurs, (c) so long as Mr. Mostafa is eligible for coverage under our health insurance plan, elects coverage, was covered prior to termination, and elects to exercise his rights under COBRA to continue participation in such plan, we will pay the normal share of costs we pay for current employees under such plan until the earlier of six months from the date of Mr. Mostafa's termination or the date Mr. Mostafa is eligible to receive health benefits through another employer, and (d) automatic vesting in all outstanding time-based equity awards granted to Mr. Mostafa by us, subject to the terms and conditions of the agreement. As a condition to receiving the foregoing severance benefits, Mr. Mostafa must execute and not revoke a separation agreement in a form acceptable to us and which will include a complete release of claims and terms related to non-disparagement, non-competition, confidentiality and cooperation.

In connection with the execution of his amended and restated employment agreement, Mr. Mostafa agreed to continue to abide by the terms of his non-competition, non-solicitation, non-disclosure and intellectual property agreement.

### *E. Lynne Kelley, M.D.*

On April 22, 2019, we entered into an executive employment agreement with E. Lynne Kelley, M.D., pursuant to which Dr. Kelley agreed to serve as our Chief Medical Officer commencing on April 24, 2019. Pursuant to the executive employment agreement, Dr. Kelley's compensation consists of base salary, potential annual bonus as determined by the Board, a potential equity grant subject to approval by the Board, fringe benefits, vacation and reimbursement of ordinary and reasonable out-of-pocket expenses. Dr. Kelley's initial base salary, which is subject to review and adjustment, was \$410,000. The agreement provides for the payment of annual bonuses of up to 40% of her annual base salary, as determined at our sole discretion. We also agreed to grant Dr. Kelley an option to purchase 37,170 shares of common stock, subject to approval by the Board and subject to certain vesting conditions, which option was granted on April 24, 2019. In February 2020, the Compensation Committee of the Board determined that Dr. Kelley had earned 29.5% of her target bonus for 2019, equal to a bonus of \$121,005. At the same time, the Compensation Committee increased Dr. Kelley's base salary for 2020 to \$418,200.

Dr. Kelley resigned as our Chief Medical Officer effective April 3, 2020. In connection with Dr. Kelley's resignation, we and Dr. Kelley entered into a Resignation Agreement and Release (the "Kelley Separation Agreement"). Under the terms of the Kelley Separation Agreement, we will pay Dr. Kelley severance in the amount of \$34,850.10 per month, less applicable withholdings, for twelve (12) months from the first regular payroll date following April 3, 2020. We also agreed to vest options to purchase 9,292 shares of our common

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stock previously granted to Dr. Kelley to vest as of April 2, 2020, with such stock options to be exercisable until April 3, 2021. Under the terms of the Kelley Separation Agreement, Dr. Kelley is entitled to payment of her accrued and unpaid base salary through the April 3, 2020, any unreimbursed expenses, any accrued but unused vacation pay and all other payments to which she is entitled under any applicable Company employee benefit plan. We also agreed to pay up to 12 months of continued medical, dental or vision coverage for Dr. Kelley pursuant to COBRA, if she elects such coverage. As consideration for the severance benefits, Dr. Kelley has agreed to customary non-disclosure and non-solicitation provisions and to a general release of all claims against X4 and its affiliates. We and Dr. Kelley have also agreed to a mutual customary non-disparagement provision.

### **401(k) Plan**

We maintain a defined contribution retirement plan that provides eligible U.S. employees with an opportunity to save for retirement on a tax-advantaged basis. Eligible employees may defer eligible compensation on a pre-tax basis, up to the statutorily prescribed annual limits on contributions under the Internal Revenue Code of 1986, as amended, or the Code. Contributions are allocated to each participant's individual account and are then invested in selected investment alternatives according to the participants' directions. Employees are immediately and fully vested in their contributions. The 401(k) plan is intended to be qualified under Section 401(a) of the Code with the 401(k) plan's related trust intended to be tax exempt under Section 501(a) of the Code. As a tax-qualified retirement plan, contributions to the 401(k) plan and earnings on those contributions are not taxable to the employees until distributed from the 401(k) plan.

### **Health and Welfare Benefits**

All of our full-time employees and certain of our part-time employees are eligible to participate in our health and welfare benefit plans, including our medical, dental, life and long-term disability insurance plans. Our health and welfare benefit plans do not discriminate in scope, terms or operation in favor of our executive officers.

### **DIRECTOR COMPENSATION**

The following table shows for the fiscal year ended December 31, 2019 certain information with respect to the compensation of all non-employee directors of the Company during fiscal 2019.

#### **DIRECTOR COMPENSATION FOR FISCAL 2019**

<b>Name(1)</b>	<b>Fees Earned or Paid in Cash (\$)</b>	<b>Option Awards \$(2)(3)</b>	<b>Total (\$)</b>
William E. Aliski, MPA	11,429	68,197	79,626
Gary J. Bridger, Ph.D.	38,533	93,900	132,433
David McGirr, M.B.A.	53,211	34,716	87,927
René Russo., Pharm.D.	35,000	34,716	69,716
Murray W. Stewart, M.D.	39,813	89,239	129,052
Michael S. Wyzga	69,440	93,900	163,340
Isaac Blech	14,021	93,900	107,921
William Clark, M.B.A.	8,382	—	8,382
Tillman U. Gerngross, Ph.D.	16,567	—	16,567
Carl Gordon, Ph.D., C.F.A.	8,382	—	8,382
Terrence McGuire	8,481	—	8,481
Claudio Nessi, Ph.D., M.B.A.	6,903	—	6,903
Michael Ross, Ph.D.	7,889	—	7,889
Amy Schulman, J.D.	12,622	—	12,622



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- (1) Dr. Ragan, one of our directors who also serves as our Chief Executive Officer, President and Secretary, and Mr. Gray, one of Arsanis' former directors who served as Arsanis' President and Chief Executive Officer and Chief Financial Officer until the closing of the Merger, did not receive any additional compensation for their service directors. Each of Dr. Ragan and Mr. Gray is a Named Executive Officer and, accordingly, the compensation that we pay to Dr. Ragan and to Mr. Gray is described under "—Summary Compensation Table" and "—Narrative Disclosure to Summary Compensation Table."
- (2) The amounts reported in the "Option Awards" column reflect the aggregate fair value of stock-based compensation awarded during the year computed in accordance with the provisions of ASC 718. See Note 13 to our consolidated financial statements appearing in our Annual Report on Form 10-K for the year ended December 31, 2019 filed with the SEC on March 12, 2020, regarding assumptions underlying the valuation of equity awards.
- (3) The aggregate number of shares subject to outstanding stock options held by each director listed in the table above as of December 31, 2019 was as follows: 6,854 shares for Mr. Aliski; 28,424 shares for Dr. Bridger; 9,259 shares for Mr. McGirr; 30,093 shares for Dr. Russo; 6,854 shares for Dr. Stewart; 77,178 shares for Mr. Wyzga, and no shares for Mr. Blech, Mr. Clark, Dr. Gerngross, Dr. Gordon, Mr. McGuire, Dr. Nessi, Dr. Ross or Ms. Schulman.

### **NARRATIVE TO DIRECTOR COMPENSATION TABLE**

#### *Current Non-Employee Director Compensation Policy*

On March 13, 2019, following the Merger, we adopted a director compensation policy based on the Arsanis director compensation policy. We subsequently amended the director compensation policy to alter the equity grants we make to our directors. The cash fees payable to our non-employee directors were not changed from those described above. We grant to new non-employee directors, upon their initial election to the board of directors, an option to purchase 6,854 shares of our common stock at an exercise price equal to the closing price of our common stock on the date of grant. Each of these options has a term of 10 years from the date of the award and vests as to 33.3333% of the shares of common stock underlying such option on the first anniversary of the date of grant, with the remainder vesting in equal monthly installments of 2.7777% of the shares of common stock underlying such option until the 36-month anniversary of the date of grant, subject to the non-employee director's continued service as a director. This vesting accelerates as to 100% of the shares upon a change in control of the Company.

Further, on the dates of each of our annual meetings of stockholders, each non-employee director that has served on our board of directors for at least six months will automatically receive an option to purchase 3,427 shares of our common stock at an exercise price equal to the closing price of our common stock on the date of the grant. Each of these options has a term of 10 years from the date of the award and vests in equal monthly installments of 8.3333% of the shares of our common stock underlying such option until the 12-month anniversary of the date of grant (or, if earlier, the date of our next annual meeting of stockholders following the date of grant) unless otherwise provided at the time of grant, subject to the non-employee director's continued service as a director, with 100% acceleration of vesting upon a change in control of the Company.

#### *Former Director Compensation Policy of Arsanis*

Under Arsanis' director compensation program in effect until the closing of the Merger on March 13, 2019, Arsanis paid its non-employee directors a cash retainer for service on the Board of Directors and for service on each committee on which the director was a member. The Chairman of the Board, the Lead Independent Director and the Chair of each committee received higher retainers for such service. These fees were payable in arrears in four equal quarterly installments on the last day of each quarter, provided that the amount of such payment would be prorated for any portion of such quarter that the director was not serving on the Board of Directors, on such committee or in such position. The fees paid to non-employee directors for service on the Board of Directors, for

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service as a Lead Independent Director and for service on each committee of the Board of Directors on which the director was a member were as follows.

	<u>Member Annual Fee</u>	<u>Chairman Annual Fee</u>	<u>Lead Independent Director Annual Fee</u>
Board of Directors	\$ 35,000	\$ 75,000	\$ 50,000
Audit Committee	\$ 7,500	\$ 15,000	—
Compensation Committee	\$ 5,000	\$ 10,000	—
Nominating and Corporate Governance Committee	\$ 4,000	\$ 8,000	—

Arsanis also reimbursed its non-employee directors for reasonable travel and other expenses incurred in connection with attending meetings of the Board of Directors and any committee of the Board of Directors on which they served.

In addition, under Arsanis' director compensation program, Arsanis granted the directors who were in office at the time of the closing of Arsanis' initial public offering, and would grant to new non-employee directors upon their initial election to the board of directors, an option to purchase 4,166 shares of common stock. Each of these options would vest as to 33.3333% of the shares of common stock underlying such option on the first anniversary of the date of grant, with the remainder vesting in equal monthly installments until the third anniversary of the date of grant, subject to the non-employee director's continued service as a director. Further, on the dates of each of Arsanis' annual meetings of stockholders, each non-employee director that had served on the board of directors for at least six months would automatically receive, under the 2017 Plan, an option to purchase 1,666 shares of common stock. Each of these options would vest in equal monthly installments until the first anniversary of the date of grant (or, if earlier, the date of Arsanis' next annual meeting of stockholders following the date of grant) unless otherwise provided at the time of grant, subject to the non-employee director's continued service as a director, with full acceleration of vesting upon a change in control of the company. All options issued to non-employee directors under the director compensation program were issued at exercise prices equal to the closing price of the common stock on the date of grant.

## TRANSACTIONS WITH RELATED PERSONS AND INDEMNIFICATION

### RELATED-PERSON TRANSACTIONS POLICY AND PROCEDURES

Our Board of Directors has adopted a written related person transaction policy to set forth policies and procedures for the review of any transaction, arrangement or relationship in which our company is a participant, the amount involved exceeds \$120,000, and one of our executive officers, directors, director nominees or 5% stockholders, or their immediate family members, each of whom we refer to as a “related person,” has a direct or indirect material interest.

If a related person proposes to enter into such a transaction, arrangement or relationship, which we refer to as a “related party transaction,” the related person must report the proposed related person transaction to our Chief Financial officer. The policy calls for the proposed related person transaction to be reviewed and approved by our Audit Committee. Whenever practicable, the reporting, review and approval will occur prior to entry into the transaction. If advance review and approval is not practicable, Audit Committee will review and, in its discretion, may ratify the related person transaction. The policy also permits the Chair of the Audit Committee to review and, if deemed appropriate, approve proposed related person transactions that arise between Audit Committee meetings, subject to ratification by the Audit Committee at its next meeting. Any related person transactions that are ongoing in nature will be reviewed annually.

A related person transaction reviewed under this policy will be considered approved or ratified if it is authorized by the Audit Committee in accordance with the standards set forth in the policy after full disclosure of the related person’s interests in the transaction. As appropriate for the circumstances, the policy provides that the Audit Committee will review and consider:

- the related person’s interest in the related person transaction;
- the approximate dollar value of the amount involved in the related person transaction;
- the approximate dollar value of the amount of the related person’s interest in the transaction without regard to the amount of any profit or loss;
- whether the transaction was undertaken in the ordinary course of our business;
- whether the terms of the transaction are no less favorable to us than the terms that could have been reached with an unrelated third party;
- the purpose of, and the potential benefits to us of, the transaction; and
- any other information regarding the related person transaction or the related person in the context of the proposed transaction that would be material to investors in light of the circumstances of the particular transaction.

The Audit Committee may approve or ratify the related person transaction only if the Audit Committee determines that, under all of the circumstances, the transaction is in our best interests. The Audit Committee may impose any conditions on the related person transaction as it deems appropriate. The policy also provides that transactions involving compensation of executive officers will be reviewed and approved by our Compensation Committee in the manner specified in its charter.

For purposes of the policy, we refer to certain related-party transactions below in which (a) we were a participant, (b) the amount involved exceeded or will exceed \$120,000 or, during such time as we qualify as a “smaller reporting company,” the lesser of (1) \$120,000 or (2) 1% of the average of our total assets for the last two completed fiscal years, and (c) one or more related persons had a direct or indirect material interest. Transactions involving compensation for services provided to us by an employee, director, consultant or individual performing in a similar capacity by a related person are not covered by this policy.

## **CERTAIN RELATED-PERSON TRANSACTIONS**

Since January 1, 2018, Arsanis and Private X4 have engaged in, or currently propose to engage in, the following related-party transactions. We believe that all of these transactions were on terms comparable to terms that could have been obtained from unrelated third parties.

### **Arsanis Related Party Transactions**

#### ***Services and Facilities Agreement with EveliQure Biotechnologies GmbH***

Arsanis' subsidiary, Arsanis Biosciences GmbH (now our subsidiary X4 Pharmaceuticals (Austria) GmbH), leased approximately 1,500 square meters of office and lab space from Marxbox Bauprojekt GmbH & Co. OG. In February 2015, Arsanis Biosciences GmbH entered into a services and facilities agreement with EveliQure Biotechnologies GmbH, or EveliQure, under which Arsanis provided certain laboratory services and sublet approximately 150 square meters of office and lab space. Tamás Henics, the husband of Eszter Nagy, Arsanis's former Chief Scientific Officer and director, served as Chief Scientific Officer at EveliQure.

On June 28, 2018 and in accordance with the terms of this agreement with EveliQure, Arsanis provided EveliQure with written notice that the services and facilities agreement will terminate and EveliQure will vacate the sublet space no later than December 31, 2018. As of December 31, 2018, EveliQure had vacated the office and lab space and its services and facilities agreement with Arsanis was terminated.

During the year ended December 31, 2018, Arsanis received payments from EveliQure under the agreement of \$0.2 million, respectively. As of December 31, 2018, amounts due from EveliQure totaled less than \$0.1 million. These amounts included rental charges as well as amounts attributable to facilities and laboratory services.

#### ***Agreements with Adimab, LLC***

Arsanis entered into two agreements with Adimab, LLC, or Adimab, the Adimab Collaboration Agreement and the Adimab Option Agreement, under which Arsanis was granted exclusive options to obtain ownership or exclusive worldwide licenses under specified patents relating to the development and commercialization of monoclonal antibodies. Tillman U. Gerngross, Ph.D., the former chairman of Arsanis's board of directors, is a co-founder of Adimab and currently serves as its chief executive officer. The following descriptions of the agreements with Adimab are summaries and are qualified by reference to the underlying agreements. As Dr. Gerngross is no longer a member of our Board or management team, Adimab is no longer a related party.

#### ***Adimab Collaboration Agreement***

In May 2011, Arsanis entered into a collaboration agreement with Adimab, which, as amended, and together with certain applicable option exercise letters Arsanis sent to Adimab, we refer to as the Adimab Collaboration Agreement. Under the Adimab Collaboration Agreement, Adimab and Arsanis were required to use reasonable efforts to conduct certain research, which Arsanis funded, to discover and optimize antibodies directed against targets selected by Arsanis. Prior to Arsanis's exercise of an option, (1) Arsanis and Adimab each grant the other a non-exclusive license to the relevant intellectual property Arsanis owns to allow each party to carry out its rights and obligations in connection with the research, and (2) except for Adimab's retained right to continue using and licensing its own libraries, each party agrees not to practice or license the patents arising out of the research that it owns for any purpose other than to carry out its rights and obligations in connection with the research.

With respect to each target that was the subject of the research, Arsanis had an exclusive option to obtain, with respect to a specified number of antibodies directed against such target and discovered or optimized by Adimab, (1) ownership of certain patent rights relating to such antibodies and (2) exclusive and non-exclusive

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licenses, with the right to grant sublicenses, in all human therapeutic, prophylactic and diagnostic areas, which we refer to as the licensed field, under certain patent rights and know-how, to research, develop, make, have made, use, sell, offer to sell, import and export such antibodies and products based on such antibodies (but not for antibody discovery purposes). In addition, upon exercise of each option, certain contractual restrictions on Arsanis's ability to prosecute, practice and license certain patents owned by Arsanis that arose out of the research were eliminated. All of Arsanis's options under the Adimab Collaboration Agreement have expired, or, with respect to multiple targets and hundreds of antibodies, have already been exercised.

Under the Adimab Collaboration Agreement, for each target for which Arsanis has exercised an option, we are required to use commercially reasonable efforts to develop and commercialize at least one product in major markets. If we do not fulfill these diligence obligations, Adimab may consider it a material breach, allowing Adimab to terminate the agreement with respect to such target and all associated products. We are obligated to pay Adimab royalties at a mid-single-digit percentage of net sales, made by us or our affiliates, of products based on antibodies for which Arsanis exercised its option, or products that use or are based on any antibody discovered or optimized under the agreement, any derivative or modified version of any such antibody, or any sequence information as to any such antibody.

If Arsanis (or one of its affiliates with rights under the agreement) underwent a change in control and, at the time of such change in control, Arsanis had not sold or licensed to third parties all of its rights in antibodies for which we are obligated to pay Adimab royalties under the agreement (which rights we refer to as undesignated rights), then we are obligated to either pay Adimab a percentage, in the mid double digits of the payments we receive from that change in control that are reasonably attributable to those undesignated rights and certain patents arising from the collaboration, or require our acquirer and all of its future third party collaborators to pay to Adimab the royalties described above with respect to net sales of all products based on those undesignated rights. As a result of the Merger, this royalty election was made by Arsanis. If we grant rights to a third party under certain patents that are not directed to the antibodies for which we are obligated to pay Adimab royalties, we are also obligated to pay Adimab, in place of royalties or a percentage of payments received from the third party, a lump sum in the high six digits.

If we sell or license to any third party, or otherwise grant rights to any third party to, any of the products for which we are obligated to pay Adimab royalties, either alone or as part of a package including specified patents not directed to these antibodies, we are obligated to pay Adimab either the same royalties on net sales of such products by such third party, or a percentage, ranging from the low double digits to a maximum of less than 30%, of the payments we receive from such third parties that are attributable to such grant of rights. In April 2017, Arsanis entered into a letter agreement with the Gates Foundation (described below), pursuant to which Arsanis licensed to the Gates Foundation certain rights under its ASN100 program.

Notwithstanding the payment obligations described above, we have no payment obligations under the Adimab Collaboration Agreement with respect to sales of certain antibody products if they are sold at cost in developing countries under Arsanis' April 2017 letter agreement with the Bill & Melinda Gates Foundation. However, if such products are sold in developing countries for an amount that exceeds cost, then the amount of such excess over cost will be subject to the royalty payment obligations.

The Adimab Collaboration Agreement will expire on a country-by-country basis twelve years after the first commercial sale in such country of the last product for which we are obligated to pay Adimab royalties in such country under the agreement. We have the right to terminate the agreement for any reason by providing Adimab with a specified amount of prior written notice. Adimab has the right to terminate the agreement if we materially breach the agreement. If Adimab terminates the agreement for our breach, or if we terminate the agreement for our convenience, then we must transfer or license to Adimab certain rights and assets relating to targets and antibodies for which Arsanis exercised its option. Adimab is then obligated to make payments to us with respect to these targets and antibodies that are similar to the payments we were required to make to Adimab during the term of the agreement. Certain of our payment obligations relating to specified products and patents arising from

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the agreement survive expiration or termination of the agreement. Under the Adimab Collaboration Agreement, as of December 31, 2018, Arsanis had paid Adimab approximately \$4.3 million in the aggregate, consisting of upfront payments and reimbursement for research conducted by Adimab. No fees were paid under the Adimab Collaboration Agreement in 2019.

### *Adimab Option and License Agreement*

In February 2017, Arsanis entered into an option and license agreement with Adimab, which we refer to as the Adimab Option Agreement. Under the Adimab Option Agreement, Adimab has provided to us certain proprietary antibodies against respiratory syncytial virus, or RSV, which we refer to as the initial RSV antibodies, for our evaluation during a specified option period and has granted us an exclusive, non-sublicensable license under certain Adimab patent rights and know-how during the option period to create, research, optimize, make, have made and use the initial RSV antibodies and modified or derivative forms of the initial RSV antibodies.

Under the Adimab Option Agreement, we were provided with an exclusive option, exercisable during the option period upon payment of an option fee to Adimab, to require Adimab to assign to us all rights in up to a specified number of RSV antibodies selected by us, which we refer to as the selected RSV antibodies, and certain patent rights owned by Adimab that cover these antibodies, and to obtain from Adimab a non-exclusive license, with the right to grant sublicenses, under certain other patent rights and know-how owned by Adimab, to research, develop, have developed, make, have made, use, sell, offer to sell, import and export products based on the selected RSV antibodies and modified or derivative forms of the selected RSV antibodies, for all indications and uses except for certain diagnostic uses. If we exercise our option under the agreement, we would be required to use commercially reasonable efforts to develop and commercialize at least one product based on a licensed RSV antibody in major markets.

In July 2019, we exercised our option under the Adimab Option Agreement and paid Adimab an option fee of \$0.3 million. In July 2019, as further described in note 16 to the consolidated financial statements in our Annual Report on Form 10-K filed with the SEC on March 12, 2020, we transferred the intellectual property related to the AS-500 program, which includes the rights in the Adimab Option Agreement, to an unrelated third party through an exclusive, worldwide license. We remain obligated to make payments to Adimab based on future clinical and regulatory milestones of up to approximately \$25.0 million, as well as royalty payments on a product-by-product and country-by-country basis of a mid-single-digit percentage based on net sales of products based on certain RSV antibodies during the applicable term for such product in that country. The third party is required to fund any future payments that become due to Adimab.

During the years ended December 31, 2019 and 2018, we and Arsanis made payments to Adimab of \$0.3 million and \$0.1 million, respectively, under the Adimab Option Agreement.

### *Agreements with Bill & Melinda Gates Foundation*

#### *February 2017 Grant Agreement and August 2018 Amended and Restated Gates Foundation Grant Agreement*

In February 2017, Arsanis entered into a grant agreement with the Gates Foundation, which was a 5% stockholder of Arsanis, pursuant to which the Gates Foundation granted Arsanis up to \$9.3 million to conduct preclinical development of monoclonal antibodies for the prevention of RSV infection in newborns, which we refer to as the RSV project. In return, Arsanis agreed to conduct the RSV project in a manner that ensures that the knowledge and information gained from the project will be promptly and broadly disseminated, and that the products, technologies, materials, processes and other intellectual property resulting from the RSV project (which Arsanis collectively refers to as the funded developments) will be made available and accessible at an affordable price to people most in need within developing countries. These obligations survive any expiration or termination of the grant agreement.

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To this end, Arsanis granted the Gates Foundation a non-exclusive, perpetual, royalty-free, fully paid up, sublicensable license to make, use, sell, offer to sell, import, distribute, copy, modify, create derivative works, publicly perform and display the funded developments and, to the extent incorporated into a funded development or required to use a funded development, any other technology created outside of the RSV project that was used as part of the RSV project, for the benefit of people in developing countries. Arsanis also agreed to seek prompt publication of data and results developed under the RSV project under “open access” terms and conditions. This license and these publication obligations survive any expiration or termination of the grant agreement.

In August 2018, Arsanis amended and restated the February 2017 grant agreement. The amended and restated grant agreement includes amendments to conform to current Gates Foundation audit, reporting, and other administrative requirements, as well as to make the perpetual Gates Foundation license grant described above irrevocable. The grant agreement, as amended, expired on October 31, 2019. Any grant funds that have not been used for, or committed to, the RSV project upon the expiration or termination of the agreement must be returned to the Gates Foundation or otherwise used as directed by the Gates Foundation.

During the years ended December 31, 2019 and 2018, we and Arsanis recognized grant income of \$0 and \$0, respectively, under the grant agreement with the Gates Foundation upon incurring qualifying expenses. As of December 31, 2019 and 2018, there were no amounts recorded as unearned income under the grant agreement with the Gates Foundation.

### *August 2018 Gates Foundation Grant Agreement*

In August 2018, Arsanis entered into an additional grant agreement with the Gates Foundation pursuant to which the Gates Foundation granted to Arsanis up to \$1.1 million to conduct preclinical development activities for the RSV project that were not included in the February 2017 grant agreement, as amended and restated in August 2018. In return, Arsanis agreed to conduct the RSV project in a manner that ensures that the knowledge and information gained from the project will be promptly and broadly disseminated, and that the products, technologies, materials, processes and other intellectual property resulting from the RSV project (collectively referred to as the funded developments) will be made available and accessible at an affordable price to people most in need within developing countries. These obligations survive any expiration or termination of the grant agreement.

To this end, Arsanis granted to the Gates Foundation a non-exclusive, perpetual, irrevocable, royalty-free, fully paid up, sublicensable license to make, use, sell, offer to sell, import, distribute, copy, modify, create derivative works, publicly perform and display the funded developments and, to the extent incorporated into a funded development or required to use a funded development, any other technology created outside of the RSV project that was used as part of the RSV project, for the benefit of people in developing countries. Arsanis also agreed to seek prompt publication of data and results developed under the RSV project under “open access” terms and conditions. This license and these publication obligations survive any expiration or termination of the grant agreements.

During the year ended December 31, 2018, Arsanis recognized grant income of \$1.1 million under the August 2018 grant agreement with the Gates Foundation upon incurring qualifying expenses. Accordingly, unearned income under the August 2018 grant agreement with the Gates Foundation was \$0 as of December 31, 2018. The August 2018 grant agreement expired during the year ended December 31, 2018.

### *Gates Foundation Letter Agreement and Investment*

In April 2017, Arsanis entered into a letter agreement with the Gates Foundation. In connection with the letter agreement, the Gates Foundation purchased 2,464,799 shares of Arsanis’s Series D redeemable convertible

preferred stock (the “Series D preferred stock”), which converted into 120,363 shares of Arsanis’s common stock in connection with Arsanis’s initial public offering after giving effect to a one-for-3.4130 reverse stock split and the Reverse Stock Split. Arsanis committed to use the proceeds of \$8.0 million from the investment by the Gates Foundation solely to advance the development of a specified monoclonal antibody program that

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involved the monoclonal antibodies ASN-1, ASN-2 and ASN-3 and Arsanis's product candidate, ASN100. Under the letter agreement, in addition to the initial project funded by the Gates Foundation with its initial investment, Arsanis also agreed to conduct up to four additional projects to be proposed and to be funded by the Gates Foundation.

The letter agreement contains certain global access obligations as well as requirements relating to Arsanis's use of the funds received from the Gates Foundation investment. In the event that we fail to comply with these obligations or requirements or any related U.S. legal obligations set forth in the letter agreement, the Gates Foundation will have the right, after expiration of a specified cure period, to require us to redeem all of the shares owned by the Gates Foundation or to locate a third party that will purchase such shares. For any redemption or purchase resulting from such default, the shares of our stock held by the Gates Foundation will be redeemed at an amount equal to the greater of the original purchase price (plus specified interest) or the fair market value of such stock on the date of such redemption. The term of the letter agreement continues in perpetuity.

In connection with this letter agreement, Arsanis granted to the Gates Foundation and/or Gates Foundation-supported entities certain licenses, including a non-exclusive, non-terminable, royalty-free (except as required under the Adimab Collaboration Agreement), sublicensable license to products, technologies, materials, processes and other intellectual property developed using funds provided by the Gates Foundation or a Gates Foundation-supported entity, or developed in connection with Arsanis's conduct of any funded project or additional funded project, as well as all of Arsanis's background intellectual property, to utilize and exploit products and services directed at pathogens or other targets subject to any funded project or additional funded project.

During the years ended December 31, 2019 and 2018, Arsanis incurred qualifying expenses of \$0 and \$0 million, respectively, under the letter agreement with the Gates Foundation.

### **Private X4 Related Person Transactions**

#### ***Private X4 Series B Preferred Stock Financing***

Since November 2017, Private X4 issued an aggregate of 18,616,569 shares of Private X4 Series B preferred stock at \$1.88 per share and warrants to purchase an aggregate of 3,504,906 shares of Private X4 Series B preferred stock for an aggregate purchase price of approximately \$35.0 million, which is referred to as the Series B preferred stock financing. Each share of Private X4 Series B preferred stock converted automatically into the right to receive shares of our common stock based on the exchange ratio immediately prior to the Merger.

The following table summarizes the Series B preferred stock and warrants to purchase Series B preferred stock purchased by Private X4's directors, executive officers and then-principal stockholders at the time of the Series B preferred stock financing.

<u>Name of Purchaser</u>	<u>Number of Shares of Series B Preferred Stock Purchased</u>	<u>Warrants to Purchase the Number of Shares of Series B Preferred Stock Listed Below</u>	<u>Exercise Price of Warrants</u>	<u>Aggregate Purchase Price</u>	<u>Date of Purchase</u>	<u>Expiration Date of Warrants</u>
Entities affiliated with Cormorant (1)	1,329,788	132,979	\$ 1.88	\$2,500,000	November 1, 2017	November 1, 2020
Healthcare Industry (Cayman) A Co., Limited	2,659,574	265,957	\$ 1.88	\$5,000,000	September 12, 2018	September 12, 2021

(1) Consists of 1,094,149 shares of Private X4 Series B preferred stock and warrants to purchase 109,415 shares of Private X4 Series B preferred stock issued to Cormorant Private Healthcare Fund I, L.P., 191,490 shares of Private X4 Series B preferred stock and warrants to purchase 19,149 shares of Private X4 Series B



preferred stock issued to Cormorant Global Healthcare Master Fund, L.P., and 44,149 shares of Private X4 Series B preferred stock and warrants to purchase 4,415 shares of Private X4 Series B preferred stock issued to CRMA SPV, L.P.

Private X4 also paid Maxim Partners LLC, or Maxim, fees and reimbursement of expenses of approximately \$2.8 million as placement agent for the Series B preferred stock financing, pursuant to a letter agreement between Private X4 and Maxim, dated as of July 6, 2017, as amended on February 13, 2018. As additional compensation, Private X4 issued warrants to purchase shares of Private X4 Series B preferred stock to Maxim. The first warrant was issued on December 28, 2017, was exercisable for 1,219,815 shares of Private X4 Series B preferred stock, had an exercise price of \$1.88 per share, and expires on December 28, 2027. The second warrant was issued on September 12, 2018, was exercisable for 212,765 shares of Private X4 Series B preferred stock, had an exercise price of \$1.88 per share, and expires on September 12, 2028. The letter agreement was terminated, effective as of May 16, 2018. In connection with the termination of the letter agreement, Private X4 agreed to pay Maxim a fee of \$25,000 for expenses incurred after December 31, 2017. In addition, Private X4 and Maxim agreed that if, within 12 months of termination of the letter agreement, we complete a private financing or capital raising activity with certain other qualified investors, Private X4 would be required to pay Maxim certain agreed upon fee amounts. In connection with the Merger, the warrants exercisable for Private X4 Series B preferred stock became warrants exercisable for our common stock at an agreed upon exchange ratio. The exercise price was also adjusted according to the exchange ratio.

#### ***Private X4 Series Seed Preferred Stock Repurchase***

In October 2017, Private X4 entered into a stock repurchase agreement with the Estate of Henri Termeer (the “Termeer Estate”), a founder of Private X4, pursuant to which Private X4 agreed to repurchase 598,975 shares of Private X4 Series Seed preferred stock from the Termeer Estate at an aggregate repurchase price of \$1,126,073. Alan E. Walts, Ph.D., a former director of Private X4 elected by the holders of Private X4 Series Seed preferred stock, serves as a business advisor to the Termeer Estate and receives a monthly consulting fee for such services. Dr. Walts does not have any voting or investment control over the securities held by the Termeer Estate and recused himself from the discussions with respect to this repurchase. The repurchase was settled in January 2018.

#### ***Private X4 Investors’ Rights, Voting and Co-sale Agreements***

In connection with Private X4’s preferred stock financings, Private X4 entered into investors’ rights, voting and right of first refusal and co-sale agreements containing registration rights, information rights, voting rights and rights of first refusal, among other things, with certain holders of Private X4 preferred stock and certain holders of Private X4 common stock. In accordance with and pursuant to the terms of the Merger Agreement, these stockholder agreements terminated upon the closing of the Merger.

#### ***Private X4 Agreements with X4 Directors***

##### ***Gary J. Bridger, Ph.D.***

On November 14, 2017, X4 entered into an independent contractor agreement with Gary J. Bridger, Ph.D. pursuant to which Dr. Bridger agreed to provide X4 with strategic advice in support of our research and development programs in oncology and WHIM syndrome. The agreement provided for an initial term of six months, which was renewed in accordance with its terms for an additional six months and expired in November 2018. The independent contractor agreement included standard assignment of invention, confidentiality and indemnification provisions. In consideration for the provision of consulting services pursuant to the agreement, Dr. Bridger was paid approximately \$105,000.

On October 4, 2018, Private X4 entered into a letter agreement with Dr. Bridger, pursuant to which Dr. Bridger agreed to serve as a member of the board of directors of Private X4. This letter agreement superseded

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the independent contractor agreement described above. Pursuant to the letter agreement, Private X4 granted Dr. Bridger an option to purchase 226,983 shares of Private X4 common stock to vest pursuant to the terms of 2015 Plan and a separate non-qualified stock option agreement. The letter agreement also specified that Dr. Bridger would be entitled to receive an annual grant of an option to purchase shares of Private X4 common stock at the level set for independent directors by the board of directors, if any. Private X4 also agreed to reimburse Dr. Bridger for expenses for which he received prior approval. Either Private X4 or Dr. Bridger may terminate the letter agreement at any time, for any reason, by giving the other 30 days' prior written notice. In connection with the Merger, the option to purchase shares of Private X4 common stock became an option to purchase 21,570 shares of our common stock.

### ***Alan E. Walts, Ph.D.***

On November 27, 2016, Private X4 entered into a letter agreement with its former director Alan E. Walts, Ph.D. to outline the applicable terms of his role as a member of the Private X4 board of directors. Pursuant to the letter agreement, Private X4 and Dr. Walts acknowledged that Private X4 had previously granted Dr. Walts an option to purchase 70,000 shares of Private X4 common stock, at an exercise price of \$0.65 per share, to vest pursuant to the terms of the 2015 Plan and a separate non-qualified stock option agreement previously entered into by and between Private X4 and Dr. Walts. In connection with the Merger, this option became an option to acquire 6,652 shares of our common stock at an exercise price of \$6.84 and was exercisable until December 31, 2019. The letter agreement also specified that Dr. Walts would be entitled to receive an annual grant of an option to purchase shares of Private X4 common stock at the level set for independent directors by the Private X4 board of directors, if any. Private X4 also agreed to reimburse Dr. Walts for expenses for which he received prior approval from Private X4. The letter agreement included standard assignment of invention and confidentiality provisions. Either Private X4 or Dr. Walts was entitled to terminate the letter agreement at any time, for any reason, by giving the other 30 days' prior written notice. Dr. Walts resigned as a director of Private X4 upon the completion of the Merger.

### ***Michael Gilman, Ph.D.***

On November 27, 2016, Private X4 entered into a letter agreement with its former director Michael Gilman to outline the applicable terms of his role as a member of the Private X4 board of directors. Pursuant to the letter agreement, X4 and Dr. Gilman acknowledged that Private X4 had previously granted Dr. Gilman options to purchase 70,000 and 8,000 shares of Private X4 common stock, at an exercise price of \$0.65 per share, to vest pursuant to the terms of the 2015 Plan and a separate non-qualified stock option agreement previously entered into by and between Private X4 and Dr. Gilman. In connection with the Merger, these options became options to acquire 6,652 and 760 shares, respectively, of our common stock at an exercise price of \$6.84, and were exercisable until December 31, 2019. The letter agreement also specified that Dr. Gilman would be entitled to receive an annual grant of an option to purchase shares of Private X4 common stock at the level set for independent directors by the Private X4 board of directors, if any. Private X4 also agreed to reimburse Dr. Gilman for expenses for which he receives prior approval from Private X4. The letter agreement included standard assignment of invention, confidentiality and indemnification provisions. Either Private X4 or Dr. Gilman was entitled to terminate the letter agreement at any time, for any reason, by giving the other 30 days' prior written notice. Dr. Gilman resigned as a director of Private X4 upon the completion of the Merger.

### ***Nancy Lurker***

On September 20, 2016, Private X4 entered into a letter agreement with its former director Nancy Lurker pursuant to which Ms. Lurker agreed to serve as Chairwoman of the Private X4 board of directors. Pursuant to the letter agreement, Private X4 granted Ms. Lurker an option to purchase 175,000 shares of Private X4 common stock to vest pursuant to the terms of the 2015 Plan and a separate non-qualified stock option agreement previously entered into by and between Private X4 and Ms. Lurker. The letter agreement also specified that Ms. Lurker would be entitled to receive an annual grant of an option to purchase shares of Private X4 common

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stock at the level set for independent directors by the Private X4 board of directors, if any. Private X4 also agreed to reimburse Ms. Lurker for expenses for which she received prior approval from X4. The letter agreement included standard assignment of invention, confidentiality and indemnification provisions. Either Private X4 or Ms. Lurker was entitled to terminate the letter agreement at any time, for any reason, by giving the other 30 days' prior written notice. Ms. Lurker resigned from the Private X4 board of directors as of January 21, 2018.

### **Shares of Our Common Stock Issued in the Merger**

On March 13, 2019, we completed the Merger and effected the Reverse Stock Split. In connection with the Merger, Paula Ragan, Ph.D., our President and Chief Executive Officer, received 181,366 shares of common stock in exchange for 1,870,000 shares of Private X4 common stock and 38,451 shares of Private X4 Series Seed preferred stock, as adjusted for the Reverse Stock Split. In addition, the following table sets forth the options to purchase Private X4 common stock held by our directors and executive officers that became exercisable for our common stock in connection with the Merger:

<b>Name</b>	<b>Number of Shares of X4 Common Stock Underlying Private X4 Options (#)</b>	<b>Private X4 Option Exercise Price (\$)</b>	<b>Number of Shares of Post-Merger Common Stock Underlying Post-Merger Options (#)</b>	<b>Post-Merger Option Exercise Price (\$)</b>
Paula Ragan, Ph.D.	1,059,935	0.65	100,729	6.84
	688,500	0.65	65,430	6.84
	843,496	0.67	80,160	7.08
Adam S. Mostafa	659,067	0.99	62,633	10.44
Michael S. Wyzga	740,000	0.99	70,324	10.44
Isaac Blech	744,967	0.65	70,796	6.84
Gary J. Bridger, Ph.D.	226,983	0.99	21,570	10.44

### **INDEMNIFICATION**

We provide indemnification for its directors and executive officers so that they will be free from undue concern about personal liability in connection with their service to us. Under our Bylaws, we are required to indemnify our directors and executive officers to the extent not prohibited under Delaware or other applicable law. We has also entered into indemnity agreements with certain officers and directors. These agreements provide, among other things, that we will indemnify the officer or director, under the circumstances and to the extent provided for in the agreement, for expenses, damages, judgments, fines and settlements he or she may be required to pay in actions or proceedings which he or she is or may be made a party by reason of his or her position as a director, officer or other agent of the Company, and otherwise to the fullest extent permitted under Delaware law and our Bylaws.

## **HOUSEHOLDING OF PROXY MATERIALS**

The SEC has adopted rules that permit companies and intermediaries (e.g., brokers) to satisfy the delivery requirements for Notices of Internet Availability of Proxy Materials or other Annual Meeting materials with respect to two or more stockholders sharing the same address by delivering a single Notice of Internet Availability of Proxy Materials or other Annual Meeting materials addressed to those stockholders. This process, which is commonly referred to as “householding,” potentially means extra convenience for stockholders and cost savings for companies.

This year, a number of brokers with account holders who are X4 stockholders will be “householding” the Company’s proxy materials. A single Notice of Internet Availability of Proxy Materials will be delivered to multiple stockholders sharing an address unless contrary instructions have been received from the affected stockholders. Once you have received notice from your broker that they will be “householding” communications to your address, “householding” will continue until you are notified otherwise or until you revoke your consent. If, at any time, you no longer wish to participate in “householding” and would prefer to receive a separate Notice of Internet Availability of Proxy Materials, please notify your broker or X4. Direct your written request to X4 Pharmaceuticals, Inc., Attn: Corporate Secretary, 955 Massachusetts Avenue, Cambridge, MA 02139 or contact the Corporate Secretary at (857) 529-8300. Stockholders who currently receive multiple copies of the Notices of Internet Availability of Proxy Materials at their addresses and would like to request “householding” of their communications should contact their brokers.

**OTHER MATTERS**

The Board of Directors knows of no other matters that will be presented for consideration at the Annual Meeting. If any other matters are properly brought before the Annual Meeting, it is the intention of the persons named in the accompanying proxy to vote on such matters in accordance with their best judgment.

By Order of the Board of Directors,

A handwritten signature in blue ink, appearing to read "Paula M. Ragan", with a long horizontal flourish extending to the right.

Paula Ragan  
President, Chief Executive Officer, Corporate Secretary and  
Director

April , 2020

**A copy of the Company's Annual Report to the Securities and Exchange Commission on Form 10-K for the fiscal year ended December 31, 2019 is available without charge upon written request to: Corporate Secretary, X4 Pharmaceuticals, Inc., 955 Massachusetts Avenue, 4th Floor, Cambridge, Massachusetts 02139.**

X4 Pharmaceuticals, Inc.

AMENDED AND RESTATED 2017 EQUITY INCENTIVE PLAN

1. Purpose

The purpose of this Amended and Restated 2017 Equity Incentive Plan (the “**Plan**”) of X4 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 consultants and advisors 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. Subject to any requirements of applicable law (including as applicable Sections 152 and 157(c) of the General Corporation Law of the State of Delaware), the Board may delegate to one or more officers of the Company the power to grant Awards (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 Awards to be granted by such officers, the maximum number of shares subject to Awards that the officers may grant, and the time period in which such Awards may be granted; and *provided further*, that no officer shall be authorized to grant 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(f) under the Exchange Act).

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### 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 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) 572,130 shares of Common Stock; plus

(B) such additional number of shares of Common Stock (up to 228,153 shares) as is equal to the sum of (x) the number of shares of Common Stock reserved for issuance under the Company's 2010 Special Stock Incentive Plan, as amended, and the Company's 2011 Stock Incentive Plan, as amended (the "**Existing Plans**") that remain available for grant under the Existing Plans immediately prior to the effectiveness of the registration statement for the Company's initial public offering and (y) the number of shares of Common Stock subject to awards granted under 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); plus

(C) an annual increase to be added on the first day of each fiscal year, beginning with the fiscal year ending December 31, 2018 and continuing for each fiscal year until, and including, the fiscal year ending December 31, 2027, equal to the least of (i) 4% of the outstanding shares on such date and (ii) an amount determined by the Board.

Shares issued under the Plan may consist in whole or in part of authorized but unissued shares or treasury shares. Notwithstanding anything to the contrary in this Section 4(a) and subject to adjustment under Section 9, the aggregate maximum number of shares of Common Stock that may be issued pursuant to the exercise of Incentive Stock Options is 3,146,241.

#### (2) Share Counting. For purposes of counting the number of shares available for the grant of Awards under the Plan:

(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; *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 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; and

(C) shares of Common Stock delivered (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 with respect to Awards (including shares retained from the Award creating the tax obligation) shall be added back to the number of shares available for the future grant of Awards.

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(b) 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), 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 X4 Pharmaceuticals, Inc., any of X4 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 “**Non-Qualified 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 Non-Qualified Option.

(c) Exercise Price. The Board shall establish the exercise price of each Option or the formula by which such exercise price will be determined. The exercise price shall be specified in the applicable Option agreement. The exercise price shall be not less than 100% of the Grant Date Fair Market Value (as defined below) of the Common Stock 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 Grant Date Fair Market Value on such future date. “**Grant Date Fair Market Value**” of a share of Common Stock for purposes of the Plan will be determined as follows:

(1) if the Common Stock trades on a national securities exchange, the closing sale price (for the primary trading session) on the date of grant; or

(2) if the Common Stock does not trade on any such exchange, the average of the closing bid and asked prices on the date of grant as reported by an over-the-counter marketplace designated by the Board; or

(3) if the Common Stock is not publicly traded, the Board will determine the Grant Date Fair Market Value for purposes of the Plan using any measure of value it determines to be appropriate (including, as it considers appropriate, relying on appraisals) in a manner consistent with the valuation principles under Code Section 409A, except as the Board may expressly determine otherwise.

For any date that is not a trading day, the Grant Date Fair Market Value of a share of Common Stock for such date will be determined by using the closing sale price or average of the bid and asked prices, as appropriate, for the immediately preceding trading day and with the timing in the formulas above adjusted accordingly. The Board can substitute a particular time of day or other measure of “closing sale price” or “bid and asked prices” if appropriate because of exchange or market procedures or can, in its sole discretion, use weighted averages either on a daily basis or such longer period as complies with Code Section 409A.

The Board has sole discretion to determine the Grant Date Fair Market Value for purposes of the Plan, and all Awards are conditioned on the Participants’ agreement that the Administrator’s determination is conclusive and binding even though others might make a different determination.



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(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 or by check, payable to the order of the Company;

(2) except as may otherwise be provided in the applicable Option agreement or approved by the Board, 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, by delivery (either by actual delivery or attestation) of shares of Common Stock owned by the Participant valued at their fair market value (valued in the manner determined by (or in a manner approved by) the Board), 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 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 Non-Qualified 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 of the Common Stock (valued in the manner determined by (or in a manner approved by) the Board) 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 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(b)) 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 of the Common Stock (valued in the manner determined by (or in the manner approved by) the Board) 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**”).

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### 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 (valued in the manner determined by (or in the manner approved by) the Board) over the measurement price established pursuant to Section 6(b). The date as of which such appreciation is determined shall be the exercise date.

(b) 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 Grant Date Fair Market Value of the Common Stock 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 Grant Date Fair Market Value on such future date.

(c) 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.

(d) 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.

(e) 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(b)) 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 of the Common Stock (valued in the manner determined by (or in a manner approved by) the Board) or (4) take any other action under the Plan that constitutes a “repricing” within the meaning of the rules of NASDAQ.

### 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 or is settled (“**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

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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 such number of shares of Common Stock or (if so provided in the applicable Award agreement) an amount of cash equal to the fair market value (valued in the manner determined by (or in a manner approved by) the Board) of such number of shares of Common Stock as are set forth in the applicable Restricted Stock Unit agreement. The Board may 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 may be settled in cash and/or shares of Common Stock and shall be subject to the same restrictions on transfer and forfeitability as the Restricted Stock Units with respect to which paid, in each case to the extent provided in the Award agreement.

## 8. Other Stock-Based Awards

(a) General. The Board 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 on, shares of Common Stock or other property (“**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.

## 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 set forth in Section 4(a), (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-

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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 unvested Awards will be forfeited immediately prior to the consummation of such Reorganization Event and/or 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

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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 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.

(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 Participant, 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, except with respect to Awards subject to Section 409A of the Code, 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.

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(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, 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 elect 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 Committee, a Participant may satisfy the 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 (valued in the manner determined by (or in a manner approved by) the Company); *provided, however*, except as otherwise provided by the Committee, 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), except that, to the extent that the Company is able to retain shares of Common Stock having a fair market value (determined by, or in a manner approved by, the Company) that exceeds the statutory minimum applicable withholding tax without financial accounting implications or the Company is withholding in a jurisdiction that does not have a statutory minimum withholding tax, the Company may retain such number of shares of Common Stock (up to the number of shares having a fair market value equal to the maximum individual statutory rate of tax (determined by, or in a manner approved by, the Company)) as the Company shall determine in its sole discretion to satisfy the tax liability associated with any Award. 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 Sections 5(g) and 6(e) with respect to repricings and Section 11(d) with respect to actions requiring stockholder approval, the Board 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 Non-Qualified 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 any Award shall become immediately exercisable in whole or in part, free from some or all restrictions or conditions, or otherwise realizable in whole or in part, as the case may be.

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### 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; Clawback Policy. 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 issued with respect to an Award until becoming the record holder of such shares. In accepting an Award under the Plan, a Participant agrees to be bound by any clawback policy the Company has in effect or may adopt in the future.

(c) Effective Date and Term of Plan. The Plan shall become effective immediately prior to the effectiveness of the Company's registration statement for its initial public offering (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 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. 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. No Award shall be made that is conditioned upon stockholder approval of any amendment to the Plan unless the Award provides that (i) it will terminate or be forfeited if stockholder approval of such amendment is not obtained within no more than 12 months from the date of grant and (2) it may not be exercised or settled (or otherwise result in the issuance of Common Stock) prior to such stockholder approval.

(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. 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.

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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.





**ANNUAL MEETING OF X4 Pharmaceuticals, Inc.**

**Date:** Wednesday, June 10, 2020  
**Time:** 11:00 a.m. (Eastern Time)  
**Place:** Cooley, LLP, 500 Boylston Street, 14th Floor, Boston, Massachusetts 02116

Please make your marks like this:  Use dark black pencil or pen only

The Board of Directors Recommends a Vote **FOR** the nominees listed in proposal 1 and for proposals 2, 3 and 4.

**1:** To elect the Board’s nominees, Gary J. Bridger, Ph.D. and Murray Stewart, M.D., to the Board of Directors to hold office until the 2023 Annual Meeting of Stockholders.

**Nominees:**

- 01 Gary J. Bridger, Ph.D.
- 02 Murray Stewart, M.D.

**Vote For All Nominees**

**Withhold Vote From All Nominees**

**Vote For All Except**

**INSTRUCTIONS:** To withhold authority to vote for any nominee, mark the “Exception” box and write the number(s) in the space provided to the right.

- |  | For                      | Against                  | Abstain                  |
|--|--------------------------|--------------------------|--------------------------|
| <b>2:</b> To approve the Company’s Amended and Restated 2017 Equity Incentive Plan.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b>3:</b> To approve an amendment to the Company’s Certificate of Incorporation to increase the authorized number of shares of common stock from 33,333,333 shares to 125,000,000 shares.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b>4:</b> To ratify the selection by the Audit Committee of the Board of Directors of PricewaterhouseCoopers LLP as the independent registered public accounting firm of the Company for its fiscal year ending December 31, 2020. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**IF YOU PLAN TO ATTEND the Annual Meeting please check this box.**

**Authorized Signatures - This section must be completed for your Instructions to be executed.**

Please Sign Here	Please Date Above
Please Sign Here	Please Date Above

Please sign exactly as your name(s) appears on your stock certificate. If held in joint tenancy, all persons should sign. Trustees, administrators, etc., should include title and authority. Corporations should provide full name of corporation and title of authorized officer signing the proxy.

↑ Please separate carefully at the perforation and return just this portion in the envelope provided. ↑



**Annual Meeting of X4 Pharmaceuticals, Inc.  
to be held on Wednesday, June 10, 2020  
for Holders as of April 15, 2020**

**This proxy is being solicited on behalf of the Board of Directors**

**VOTE BY:**



**INTERNET**

Go To **www.proxypush.com/XFOR**

- Cast your vote online.
- Have your Proxy Card/Voting Instruction Form ready.
- View Meeting Documents.



**TELEPHONE**

Call **866-474-8637**

**OR**

- Use any touch-tone telephone.
- Have your Proxy Card/Voting Instruction Form ready.
- Follow the simple recorded instructions.



**MAIL**

**OR**

- Mark, sign and date your Proxy Card/Voting Instruction Form.
- Detach your Proxy Card/Voting Instruction Form.
- Return your Proxy Card/Voting Instruction Form in the postage-paid envelope provided.

The undersigned hereby appoints Paula Ragan and Adam Mostafa, and each of them, as the true and lawful attorneys of the undersigned, with full power of substitution and revocation, and authorizes them, and each of them, to vote all the shares of capital stock of X4 Pharmaceuticals, Inc. which the undersigned is entitled to vote at said meeting and any adjournment thereof upon the matters specified and upon such other matters as may be properly brought before the meeting or any adjournment thereof, conferring authority upon such true and lawful attorneys to vote in their discretion on such other matters as may properly come before the meeting and revoking any proxy heretofore given.

THE SHARES REPRESENTED BY THIS PROXY WILL BE VOTED AS DIRECTED OR, IF NO DIRECTION IS GIVEN, SHARES WILL BE VOTED FOR THE ELECTION OF THE DIRECTORS IN ITEM 1, FOR THE PROPOSALS IN ITEMS 2, 3 AND 4 AND IN THE DISCRETION OF THE PROXYHOLDERS ON ANY OTHER MATTER THAT PROPERLY COMES BEFORE THE MEETING.



**PROXY TABULATOR FOR  
X4 Pharmaceuticals, Inc.  
c/o MEDIANT COMMUNICATIONS  
P.O. BOX 8016  
CARY, NC 27512-9903**



↑ Please separate carefully at the perforation and return just this portion in the envelope provided. ↑



**Proxy for Annual Meeting of Stockholders to be held  
on Wednesday, June 10, 2020**

**This proxy is being solicited on behalf of the Board of Directors**

**Please vote, date and sign this Proxy on the other side and return  
it in the enclosed envelope.**

The Stockholder signing on the reverse side (the “undersigned”), having received the Annual Report and Proxy Statement, hereby appoint(s) Paula Ragan and Adam Mostafa, and each of them, Proxies of the undersigned (with full power of substitution) to attend the Annual Meeting of X4 Pharmaceuticals, Inc. (the “Company”) to be held on Wednesday, June 10, 2020, and all adjournments and postponements thereof (the “Meeting”), and to vote all shares of Common Stock of the Company that the undersigned would be entitled to vote, if personally present, in regard to all matters that may properly come before the Meeting.

The undersigned hereby confer(s) upon the Proxies, and each of them, discretionary authority to consider and act upon such business, matters or proposals as may properly come before the Meeting. **The Proxy, when properly executed, will be voted in the manner specified herein. If no specification is made, the Proxies intend to vote FOR all nominees for director in Proposal 1 and FOR proposals 2, 3 and 4.**