GENOCEA BIOSCIENCES, INC.
Form PRE 14A
April 13, 2018

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549
SCHEDULE 14A
Proxy Statement Pursuant to Section 14(a) of
the Securities Exchange Act of 1934
Filed by the Registrant ý

Filed by a Party other than the Registrant o
Check the appropriate box:
ý Preliminary Proxy Statement
o Confidential, for Use of the Commission Only (as permitted by Rule 14a-6(e)(2))
o Definitive Proxy Statement
o Definitive Additional Materials
o Soliciting Material under §240.14a-12

Genocea Biosciences, 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):
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(3) Filing Party:
(4) Date Filed:

Genocea Biosciences, Inc.
100 Acorn Park Drive,
Cambridge, MA 02140

NOTICE OF ANNUAL MEETING OF STOCKHOLDERS

The 2018 Annual Meeting of Stockholders of Genocea Biosciences, Inc. (the "Company" or "Genocea") will be held on June 21, 2018, at 9:00 a.m. local time, at Ropes & Gray LLP, Prudential Tower, 800 Boylston Street, Boston, MA 02199 (the “Annual Meeting”) for the following purposes:

1. To elect Mr. Kenneth Bate, Dr. Ali Behbahani and Dr. Howard Mayer as Class I directors, each for a three-year term;

2. To approve an amendment to the Company’s amended and restated certificate of incorporation to provide for an increase in the total number of shares of common stock that the Company is authorized to issue from 175,000,000 shares to 250,000,000 shares;

3. To approve the Amended and Restated Genocea Biosciences, Inc. 2014 Equity Incentive Plan;

4. To approve an amendment to the Genocea Biosciences, Inc. 2014 Employee Stock Purchase Plan to increase the number of shares of the Company's common stock reserved for issuance thereunder by 2,500,000 shares and to increase the number of shares that may be purchased by a participant on any exercise date by 18,000 shares;

5. To ratify the appointment of Ernst & Young LLP as the independent registered public accounting firm for the Company for the fiscal year ending December 31, 2018; and

6. To consider and act upon any other matters that properly come before the Annual Meeting or any adjournment or postponement thereof.

Each outstanding share of the Company's common stock (Nasdaq: GNCA) entitles the holder of record at the close of business on April 23, 2018, to receive notice of and to vote at the Annual Meeting or any adjournment or postponement of the Annual Meeting.

WHETHER OR NOT YOU EXPECT TO ATTEND THE ANNUAL MEETING, WE URGE YOU TO VOTE YOUR SHARES BY FOLLOWING THE INSTRUCTIONS TO THE IMPORTANT NOTICE REGARDING THE AVAILABILITY OF PROXY MATERIALS THAT YOU PREVIOUSLY RECEIVED AND SUBMIT YOUR PROXY BY INTERNET, TELEPHONE, OR BY SIGNING, DATING AND RETURNING THE PROXY CARD INCLUDED IN THESE MATERIALS. IF YOU CHOOSE TO ATTEND THE ANNUAL MEETING, YOU MAY STILL VOTE YOUR SHARES IN PERSON, EVEN THOUGH YOU HAVE PREVIOUSLY VOTED OR RETURNED YOUR PROXY BY ANY OF THE METHODS DESCRIBED IN OUR PROXY STATEMENT. IF YOUR SHARES ARE HELD IN A BANK OR BROKERAGE ACCOUNT, PLEASE REFER TO THE MATERIALS PROVIDED BY YOUR BANK OR BROKER FOR VOTING INSTRUCTIONS.

ALL STOCKHOLDERS ARE EXTENDED A CORDIAL INVITATION TO ATTEND THE ANNUAL MEETING.

By Order of the Board of Directors

William Clark

President and Chief Executive Officer
April [ ], 2018

Genocea Biosciences, Inc.
100 Acorn Park Drive,
Cambridge, MA 02140

PROXY STATEMENT FOR ANNUAL MEETING OF STOCKHOLDERS
To Be Held On Thursday, June 21, 2018 at 9:00 am EDT

This proxy statement (the "Proxy Statement"), along with the accompanying Notice of 2018 Annual Meeting of Stockholders, contains information about the Annual Meeting, including any adjournments or postponements of the Annual Meeting. We are holding the Annual Meeting at 9:00 a.m. local time, at Ropes & Gray LLP, Prudential Tower, 800 Boylston Street, Boston, MA 02199.

On or about April [ ], 2018, we made available this Proxy Statement and the attached Notice of 2018 Annual Meeting of Stockholders to all stockholders entitled to vote at the Annual Meeting, and we began sending the proxy card and the Important Notice Regarding the Availability of Proxy Materials to all stockholders entitled to vote at the Annual Meeting. Although not part of this Proxy Statement, we have also made available with this Proxy Statement our Annual Report on Form 10-K for the fiscal year ended December 31, 2017 (the "Annual Report"), which includes our financial statements for the fiscal year ended December 31, 2017.

IMPORTANT NOTICE REGARDING THE AVAILABILITY OF PROXY MATERIALS FOR THE STOCKHOLDER MEETING TO BE HELD ON JUNE 21, 2018

This Proxy Statement and our Annual Report are available for viewing, printing and downloading at www.proxyvote.com. To view these materials, please have your 16-digit control number(s) available that appears on your proxy card.

Additionally, you can find a copy of our Annual Report on the website of the Securities and Exchange Commission ("SEC") at www.sec.gov, or in the "Financial Filings - Annual Reports and Proxies" tab of the "Investors & Media" section of our website at www.genocea.com. You may also obtain a printed copy of our Annual Report, free of charge, by sending a written request to: Genocea Biosciences, Inc., 100 Acorn Park Drive, Cambridge, Massachusetts 02140, Attention: Secretary. Exhibits, if any, will be provided upon written request and payment of an appropriate processing fee.

GENERAL INFORMATION

When are this Proxy Statement and the accompanying material scheduled to be sent to stockholders?

On or about April [ ], 2018, we began sending the Important Notice Regarding the Availability of Proxy Materials to all stockholders entitled to vote at the Annual Meeting.

Who is soliciting my vote?

The Board of Directors of the Company is soliciting your vote for the 2018 Annual Meeting of Stockholders.

When is the record date for the Annual Meeting?

The Company's Board of Directors has fixed the record date for the Annual Meeting as of the close of business on April 23, 2018.

How many votes can be cast by all stockholders?

A total of [ ] shares of common stock of the Company were outstanding on April 23, 2018 and are entitled to be voted at the Annual Meeting. Each share of common stock is entitled to one vote on each matter.

How do I vote?

If you are a stockholder of record and your shares are registered directly in your name, you may vote:

- By Internet. Access the website at www.proxyvote.com and follow the instructions provided on the Important Notice Regarding Availability of Proxy Materials on the proxy card. Your shares will be voted in accordance with your instructions. You must specify how you want your shares voted, or your Internet vote cannot be completed and you will receive an error message.

- By Telephone. Call 1-800-690-6903 toll-free and follow the instructions on the enclosed proxy card. Your shares will be voted in accordance with your instructions. You must specify how you want your shares voted, or your telephone vote cannot be completed.

- By Mail. Complete and mail the enclosed proxy card to Vote Processing, c/o Broadridge, 51 Mercedes Way, Edgewood, NY, 11717 in the enclosed postage prepaid envelope. Your proxy will be voted in accordance with your instructions. If you sign and return the enclosed proxy but do not specify how you want your shares voted, they will be voted (i) FOR the election as directors of the nominees named herein to the Company's Board of Directors, (ii) FOR approval of the amendment to our amended and restated certificate of incorporation to increase the number of shares of common stock authorized for issuance from 175,000,000 shares to 250,000,000 shares; (iii) FOR approval of the Amended and Restated Genocea Biosciences, Inc. 2014 Equity Incentive Plan; (iv) FOR approval of the amendment to the Genocea Biosciences, Inc. 2014 Employee Stock Purchase Plan to increase the number of shares of common stock reserved for issuance thereunder by 2,500,000 shares and to increase the number of shares that may be purchased by a participant on any exercise date by 18,000 shares; and (v) FOR the ratification of Ernst & Young LLP as the Company's independent registered public accounting firm for the fiscal year ending December 31, 2018, and (vi) will be voted according to the discretion of the proxy holder named in the proxy card upon any other business that may properly be brought before the Annual Meeting and at all adjournments and postponements thereof.

- In Person at the Annual Meeting. If you attend the Annual Meeting, be sure to bring a form of personal picture identification with you, and you may deliver your completed proxy card in person, or you may vote by completing a ballot, which will be available at the Annual Meeting.

If your shares of common stock are held in street name (held for your account by a broker or other nominee):

- By Internet or By Telephone. You will receive instructions from your broker or other nominee if you are permitted to vote by Internet or telephone.

- By Mail. You will receive instructions from your broker or other nominee explaining how to vote your shares.

- In Person at the Annual Meeting. If you attend the Annual Meeting, in addition to picture identification, you should both bring an account statement or a letter from the record holder indicating that you owned the shares as of the record date, and contact the broker or other nominee who holds your shares to obtain a broker's proxy card and bring it with you to the Annual Meeting.

What are the Board's recommendations on how to vote my shares?

The Board of Directors recommends a vote:

Proposal 1: FOR ALL - election of the three Class I directors.

Proposal 2: FOR approving the amendment to our amended and restated certificate of incorporation to provide for an increase in the total number of shares of common stock that the Company is authorized to issue from 175,000,000 shares to 250,000,000 shares.

Proposal 3: FOR approving the Amended and Restated Genocea Biosciences, Inc. 2014 Equity Incentive Plan.

Proposal 4: FOR approving the amendment to the Genocea Biosciences, Inc. 2014 Employee Stock Purchase Plan to increase the number of shares of our common stock reserved for issuance thereunder by 2,500,000 shares and to increase the number of shares that may be purchased by a participant on any exercise date by 18,000 shares.

Proposal 5: FOR ratification of the appointment of Ernst & Young LLP as the Company's independent registered public accounting firm for the fiscal year 2018.

Who pays the cost for soliciting proxies?

Genocea will bear the cost of solicitation of proxies. This includes the charges and expenses of brokerage firms and others for forwarding solicitation material to beneficial owners of our outstanding common stock. Genocea may solicit proxies by mail, personal interview, telephone, or via the Internet through its officers, directors and other management employees, who will receive no additional compensation for their services.

Can I change my vote?

You may revoke your proxy at any time before it is voted by notifying the Secretary in writing, by returning a signed proxy with a later date, by transmitting a subsequent vote over the Internet or by telephone prior to the close of the Internet voting facility or the telephone voting facility, or by attending the Annual Meeting and voting in person. If your stock is held in street name, you must contact your broker or nominee for instructions as to how to change your vote.

How is a quorum reached?

The presence, in person or by proxy, of holders of at least a majority of the total number of outstanding shares entitled to vote is necessary to constitute a quorum for the transaction of business at the Annual Meeting. Abstentions and "broker non-votes" (i.e., shares represented at the Annual Meeting held by brokers, bankers or other nominees as to which instructions have not been received from the beneficial owners or persons entitled to vote such shares and, with respect to one or more but not all issues, such brokers or nominees do not have discretionary voting power to vote such shares), if any, will be counted for purposes of determining whether a quorum is present for the transaction of business at the Annual Meeting.

What vote is required to approve each item?

Directors are elected by a plurality of votes cast (Proposal 1). A vote to withhold or a broker non-vote will have no direct effect on the outcome. The affirmative vote of a majority of the shares of common stock outstanding and entitled to vote is necessary for the approval of the amendment to our amended and restated certificate of incorporation (Proposal 2). Abstentions and broker non-votes will have the effect of a negative vote on Proposal 2. A majority of votes cast is necessary for the approval of the Amended and Restated Genocea Biosciences, Inc. 2014 Equity Incentive Plan (Proposal 3). A majority of votes cast is necessary for the approval of the amendment to the Genocea Biosciences, Inc. 2014 Employee Stock Purchase Plan (Proposal 4). A majority of votes cast is necessary for ratification of the selection of Ernst & Young LLP as the Company's independent registered public accounting firm for the fiscal year ending December 31, 2018 (Proposal 5). A vote to abstain will have no direct effect on the outcome.

If there are insufficient votes to approve these proposals, your proxy may be voted by the persons named in the proxy card to adjourn the Annual Meeting in order to solicit additional proxies in favor of the approval of such proposals. If the Annual Meeting is adjourned or postponed for any purpose, at any subsequent reconvening of the Annual Meeting, your proxy will be voted in the same manner as it would have been voted at the original convening of the Annual Meeting unless you withdraw or revoke your proxy.

Could other matters be decided at the Annual Meeting?

Genocea does not know of any other matters that may be presented for action at the Annual Meeting. Should any other business come before the Annual Meeting, the persons named on the enclosed proxy will have discretionary authority to vote the shares represented by such proxies in accordance with their best judgment. If you hold shares through a broker, bank or other nominee as described above, they will not be able to vote your shares on any other business that comes before the Annual Meeting unless they receive instructions from you with respect to such matter.

What happens if the Annual Meeting is postponed or adjourned?

Your proxy may be voted at the postponed or adjourned Annual Meeting. You will still be able to change your proxy until it is voted.

What does it mean if I receive more than one proxy card or voting instruction form?

It means that you have multiple accounts at the transfer agent or with brokers. Please complete and return all proxy cards or voting instruction forms to ensure that all of your shares are voted.

Who should I call if I have any additional questions?

If you hold your shares directly, please call William Clark, Secretary, at 617-876-8191. If your shares are held in street name, please contact the telephone number provided on your voting instruction form or contact your broker or nominee holder directly.

PROPOSAL NO. 1—ELECTION OF DIRECTORS

In accordance with the Company's amended and restated certificate of incorporation and amended and restated by-laws, the Board of Directors is divided into three classes of approximately equal size. The members of each class are elected to serve a three-year term with the term of office of each class ending in successive years. Kenneth Bate, Ali Behbahani, M.D. and Howard Mayer, M.D. are the Class I directors whose terms expire at the Annual Meeting. Each of Mr. Bate, Dr. Behbahani and Dr. Mayer has been nominated for and has agreed to stand for re-election to the Board of Directors to serve as a Class I director of the Company until the 2021 annual meeting of stockholders and until his successor is duly elected.

It is intended that, unless you give contrary instructions, shares represented by proxies will be voted for the election of the three nominees listed above as director nominees. Genocea has no reason to believe that any nominee will be unable to serve. In the event that one or more nominees is unexpectedly not available to serve, proxies may be voted for another person nominated as a substitute by the Board of Directors, or the Board of Directors may reduce the number of directors to be elected at the Annual Meeting. Information relating to each nominee for election as director and for each continuing director, including his or her period of service as a director of Genocea, principal occupation and other biographical material, is shown below.

THE BOARD OF DIRECTORS UNANIMOUSLY RECOMMENDS THAT YOU VOTE
FOR
ALL OF THESE NOMINEES FOR CLASS I DIRECTOR
(PROPOSAL 1 ON YOUR PROXY CARD)

DIRECTOR BIOGRAPHIES

Below sets forth information concerning our directors as of March 31, 2018. The biographical description of each director includes the specific experience, qualifications, attributes and skills that the Board of Directors would expect to consider if it were making a conclusion currently as to whether such person should serve as a director.

CLASS I DIRECTOR NOMINEES

Kenneth Bate, age 67, is a Class I director who has served as a member of our Board of Directors since September 2014. Mr. Bate has served as an independent consultant in the biotechnology field since 2012. From 2009 to 2012, Mr. Bate served as President and Chief Executive Officer of Archemix, Inc., a privately-held biotechnology company. From 2006 to 2009, Mr. Bate served in various positions at NitroMed, Inc., a pharmaceutical company, most recently as President and Chief Executive Officer. From 2002 to 2005, Mr. Bate served as Chief Financial Officer of Millennium Pharmaceuticals Inc., where he headed the commercial organization. Prior to joining Millennium Pharmaceuticals Inc., Mr. Bate co-founded JSB Partners, LLC, a banking and advisory services firm for biopharmaceutical and life sciences companies. From 1990 to 1996, he was with Biogen Inc., a biotechnology company, first as their Chief Financial Officer, and then as head of the commercial organization responsible for launching the multiple sclerosis business. Mr. Bate is currently a director of AVEO Pharmaceuticals, Catabasis Pharmaceuticals, Epizyme Inc., Madrigal Pharmaceuticals and Vanda Pharmaceuticals Inc. He holds an M.B.A. from The Wharton School of the University of Pennsylvania and a B.A. from Williams College. We believe that Mr. Bate’s experience as a chief executive officer of multiple biotechnology companies, as well as his experience as a director of other companies, qualifies him to serve as a member of our Board of Directors.

Ali Behbahani, M.D., age 41, is a Class I director who has served as a member of our Board of Directors since February 2018. Dr. Behbahani is a Partner on the healthcare team at New Enterprise Associates since 2013, having worked for the fund since 2007, specializing in investments in the biopharmaceutical, medical device, specialty

pharmaceutical and healthcare services sectors. He is also currently a member of the board of directors of CRISPR Therapeutics, Adaptimmune and Nevro Corp. He has previously worked as a consultant in business development at The Medicines Company and held positions as a Venture Associate at Morgan Stanley Venture Partners from 2000 to 2002 and as a Healthcare Investment Banking Analyst at Lehman Brothers from 1998 to 2000. Dr. Behbahani conducted basic science research in the fields of viral fusion inhibition and structural proteomics at the National Institutes of Health and at Duke University. He holds an M.D. degree from The University of Pennsylvania School of Medicine and an M.B.A. from The University of Pennsylvania Wharton School. We believe Dr. Behbahani's experience in the biopharmaceutical industry, as well as his experience as a member on the boards of directors of multiple companies in the industry, qualifies him to serve as a member of our Board of Directors.

Howard Mayer, M.D., age 55, is a Class I director who has served as a member of our Board of Directors since March 2017. Dr. Mayer is currently Senior Vice President and Chief Medical Officer at Shire plc. Dr. Mayer joined Shire in 2012 and is responsible for global clinical development across hematology, immunology, oncology, genetic diseases, GI/metabolic, neuroscience and ophthalmology therapeutic areas. Previously he served as Chief Medical Officer at EMD Serono, a division

of Merck KGaA, since 2009. Prior to that, he held a variety of global roles at Pfizer Inc. ("Pfizer"), including Head of Clinical Development and Medical Affairs for Virology/Infectious Diseases. Prior to joining Pfizer, he served as Director of Infectious Diseases Clinical Research at BMS for five years. Dr. Mayer obtained his B.A. from the University of Pennsylvania and his M.D. from Albert Einstein College of Medicine in New York, which was followed by an internship and residency at Mount Sinai Hospital and an Infectious Diseases fellowship at Harvard Medical School. He currently serves on the scientific advisory boards of Macrolide Pharmaceuticals, and Arsanis Biosciences, and has served on the board of Autism Speaks in New England since 2011 and on the board of the Melmark Charitable Foundation since 2016. In 2011 and 2017, he was honored by PharmaVoice as one of the 100 Most Inspiring People in the Life Sciences Industry. We believe that Dr. Mayer's scientific expertise, which includes clinical development experiences in both infectious disease and oncology, qualifies him to serve as a member of our Board of Directors.

DIRECTORS NOT STANDING FOR ELECTION AT THE ANNUAL MEETING

Katrine Bosley, age 49, is a Class II director who has served as a member of our Board of Directors since March 2013 and as our chair since August 2013. Ms. Bosley is the Chief Executive Officer of Editas Medicine Inc. ("Editas"), a position to which she was appointed in June 2014. Prior to Editas, Ms. Bosley was the Entrepreneur-in-Residence at The Broad Institute from September 2013 to May 2014. She served as Chief Executive Officer of Avila Therapeutics Inc. ("Avila"), from May 2009 to March 2012, when Avila was acquired by Celgene Corporation. Before Avila, she was Vice President, Strategic Operations at Adnexus Therapeutics Inc. ("Adnexus"), a BMS Company, and was Vice President, Business Development at Adnexus before that. She joined Adnexus from Biogen Idec where she held roles in business development, commercial operations, and portfolio strategy in the United States and Europe and led the in-licensing of Tysabri® (natalizumab) among a number of other transactions. Earlier, she was part of the healthcare team at the venture firm Highland Capital Partners from 1993 to 1995. In addition to serving as a director of our Company, Ms. Bosley currently serves as a director of Galapagos NV and Scholar Rock LLC. She also is a member of the BIO Governing Board for Emerging Companies. Ms. Bosley graduated from Cornell University with a B.A. in Biology. We believe that Ms. Bosley’s experience as a chief executive officer of a biotechnology company and her breadth of experience in creating strategic and business development value qualifies her to serve as a member of our Board of Directors.

William Clark, age 49, is a Class III director who has served on our Board of Directors and as our President and Chief Executive Officer since February 2011. Previously he served as our Chief Business Officer from August 2010 to February 2011. Mr. Clark has served on our Board of Directors since February 2011. Prior to joining our Company, he served as Chief Business Officer at Vanda Pharmaceuticals, Inc. ("Vanda"), a biopharmaceutical company he co-founded in 2004. While at Vanda, he led the company’s strategic and business development activities, and played a central role in raising more than $220 million in multiple public and private financings. Prior to Vanda, Mr. Clark was a principal at Care Capital, LLC, a venture capital firm investing in biopharmaceutical companies, after serving in a variety of commercial and strategic roles at SmithKline Beecham (now GlaxoSmithKline). Mr. Clark holds a B.A. from Harvard University and an M.B.A. from The Wharton School at the University of Pennsylvania. We believe that Mr. Clark’s operational and historical experience with our Company gained from serving as our Chief Executive Officer, President and member of our Board of Directors, combined with his prior experience at Vanda and in the venture capital industry focusing on biopharmaceutical companies, qualifies him to serve as a member of our Board of Directors.

Ronald Cooper, age 55, is a Class III director who has served as a member of our Board of Directors since June 2016. Mr. Cooper is President and CEO of Albireo Pharma ("Albireo"), a position that he was appointed to in June 2015. Mr. Cooper is a life sciences leader with a track record of growing and rejuvenating businesses, brands and organizations in the U.S. and Europe, ranging from entrepreneurial and resource-constrained, up to sales exceeding $4.5 billion. Prior to Albireo, Mr. Cooper was with Bristol-Myers Squibb ("BMS") for over 25 years working in five

different countries and holding positions of increasing responsibility in sales, marketing and general management, culminating in President of Europe. In Europe, Mr. Cooper was responsible for over 30 countries with sales exceeding $4.5 billion. While at BMS, Mr. Cooper was directly associated with several product successes, including Abilify®, Avapro®, Atripla®, Eliquis®, Orencia®, Pravachol®, Plavix®, Reyataz®, Sustiva®, Sprycel® and Yervoy®. Mr. Cooper has successfully completed over a dozen business development deals including the creation of the first single tablet HIV/AIDS regimen partnership. Mr. Cooper is a graduate of St. Francis Xavier University in Canada. We believe that Mr. Cooper's experience in the pharmaceutical industry, including product launch and marketing experience, along with his background as an executive officer of a public company, qualifies him to serve as a member of our Board of Directors.

Michael Higgins, age 55, is a Class II director who has served as a member of our Board of Directors since February 2015. In January 2015, Mr. Higgins joined Polaris Venture Partners as an Entrepreneur-in-Residence. Prior to joining Polaris Venture Partners, Mr. Higgins served as Chief Operating Officer and Chief Financial Officer at Ironwood Pharmaceuticals ("Ironwood") from 2003 through 2014, playing a key role in Ironwood's evolution from a privately-funded discovery organization through its

initial public offering and the launch of its first commercial product. Under his leadership, Ironwood was able to raise more than one billion dollars to help support the development of the business during that period. Prior to his work at Ironwood, from 1997 through 2003, Mr. Higgins worked at Genzyme Corporation ("Genzyme") in a variety of leadership roles including Vice President, Corporate Finance and Vice President, Business Development. While at Genzyme, he was involved with multiple businesses including the Cell Therapy, Gene Therapy, and Orphan Disease business units. Previously, Mr. Higgins served as Chief Financial Officer of Procept, Inc., from 1992 to 1997, and led the company through its initial public offering. Mr. Higgins currently serves as a director of Pulmatrix, Inc. and Voyager Therapeutics. Mr. Higgins began his pharmaceutical career as a sales representative for Schering-Plough Corporation in 1986. Mr. Higgins earned his B.S. from Cornell University and holds an M.B.A. from the Amos Tuck School of Business at Dartmouth College. We believe that Mr. Higgin's financial and business expertise, including his diversified background as an executive officer in public pharmaceutical companies, qualifies him to serve as a member of our Board of Directors.

George Siber, M.D., age 73, is a Class III director who has served as a member of our Board of Directors since 2007. From 1996 to 2007, Dr. Siber served as Executive Vice President and Chief Scientific Officer of Wyeth Vaccines ("Wyeth"). While at Wyeth, Dr. Siber oversaw the development and approval of multiple widely-used childhood vaccines, including: Prevnar, a pneumococcal vaccine which has achieved multibillion dollar revenues; Acel-Imune, an acellular pertussis vaccine; and Meningitec, a meningococcal meningitis vaccine. Prior to Wyeth, Dr. Siber was Director of the Massachusetts Public Health Biologic Laboratories and a Harvard Medical School Associate Professor of Medicine at Dana Farber Cancer Institute. During this time, Dr. Siber led the research and manufacturing of multiple vaccines and immune globulins including Respigam, a human immune globulin against respiratory syncytial virus. Since 2007, Dr. Siber has served on the boards of directors of several vaccine companies, including Crucell, Selecta Biosciences, Vedantra Pharmaceuticals and Affinivax Inc., and as a consultant or scientific advisory board member of ClearPath Vaccines Company, of which he is currently the Chief Scientific Officer, PaxVax, Vaxess Technologies, Inc., the Bill & Melinda Gates Foundation, PATH, the Wellcome Trust, the European Commission (on vaccinations), the National Institutes of Health, or NIH, and the Korean FDA. Dr. Siber serves as a member of the Board of Trustees of the International Vaccine Institute. Dr. Siber holds an M.D. degree from McGill University in Canada, received post-doctoral training in Internal Medicine at Rush-Presbyterian Hospital in Chicago and Beth Israel Hospital in Boston and Infectious Disease and vaccinology training at Children's Hospital and Beth Israel Hospital, Harvard Medical School Boston. We believe that Dr. Siber's experience in life sciences and vaccine industries and his experience overseeing the development of multiple vaccines qualifies him to serve as a member of our Board of Directors.

BOARD OF DIRECTORS AND ITS COMMITTEES

The following table describes which directors serve on each of the committees of the Board of Directors as of April [ ], 2018.

Name	Nominating and Corporate Governance Committee	Compensation Committee	Audit Committee
Kenneth Bate		X	(1) X
Ali Behbahani, M.D.			
Katrine Bosley	X	(1)	
William Clark			
Ronald Cooper	X		X
Michael Higgins			X (1)
		X	

Howard Mayer,
M.D.
George Siber, M.D.
(1) Chair of the committee.

THE BOARD OF DIRECTORS AND ITS COMMITTEES

Director Independence

As required by the listing standards of The Nasdaq Global Market ("Nasdaq"), the Board of Directors has affirmatively determined, upon the recommendation of the Nominating and Corporate Governance Committee, that each of our directors (other than George Siber, M.D., as a result of his consulting relationship with us, and William Clark, our President and Chief Executive Officer) is independent. To make this determination, our Board of Directors reviews all relevant transactions or relationships between each director and Genocea, its senior management and its independent registered public accounting firm. During this review, the Board of Directors considers whether there are any transactions or relationships between directors or any member of their immediate family (or any entity of which a director or an immediate family member is an executive officer, general partner or significant equity holder) and members of our senior management or their affiliates. The Board of Directors consults with Genocea's outside corporate counsel to ensure that the Board of Directors' determinations are consistent with all relevant securities and other laws and regulations regarding the definition of "independent," including those set forth in pertinent Nasdaq listing standards, as in effect from time to time.

Board Meetings and Attendance

The Board of Directors held sixteen meetings during the year ended December 31, 2017. Each of the directors, other than Howard Mayer, attended at least 75% of the meetings of the Board of Directors and the committees of the Board of Directors on which he or she served during the year ended December 31, 2017 (in each case, which were held during the period for which he or she was a director and/or a member of the applicable committee). Each director who is up for election at an annual meeting of stockholders or who has a term that continues after such annual meeting is expected to attend the Annual Meeting. All of our then existing directors on the Board of Directors attended our 2017 annual meeting.

Board Committees

The Board of Directors has standing Audit, Compensation and Nominating and Corporate Governance Committees, each of which is comprised solely of independent directors, and is described more fully below. The charters for the Audit, Compensation and Nominating and Corporate Governance Committees are all available on our website (http://ir.genocea.com/) under "Investors & Media" at "Corporate Governance".

Audit Committee

Our Audit Committee is composed of Mr. Bate, Mr. Cooper, and Mr. Higgins, with Mr. Higgins serving as chair of the committee. Our Board of Directors has determined, upon the recommendation of the Nominating and Corporate Governance Committee, that each member of the Audit Committee meets the independence requirements of Rule 10A-3 under the Exchange Act of 1934, as amended (the “Exchange Act”) and the applicable listing standards of Nasdaq. Our Board of Directors has determined that each of Mr. Bate, Mr. Cooper, and Mr. Higgins is an “audit committee financial expert” within the meaning of the SEC regulations and applicable listing standards of Nasdaq. Our Audit Committee operates pursuant to a written charter and it reviews and assesses the adequacy of its charter annually.

The Audit Committee’s responsibilities include:

- appointing, approving the compensation of, and assessing the qualifications, performance and independence of our independent registered public accounting firm by considering (i) evaluations of our independent registered public

accounting firm by our management and internal auditors, (ii) our independent registered public accounting firm's effectiveness of communications and working with the Audit Committee and our management and internal auditors, (iii) the length of time our independent registered public accounting firm has served as our independent auditors, (iv) the quality and depth of our independent registered public accounting firm's expertise and experience in the biotech and life sciences industries in light of the breadth, complexity and global reach of our business and (v) the advisability and potential impact of selecting a different independent registered public accounting firm;

- pre-approving audit and permissible non-audit services, and the terms of such services, to be provided by our independent registered public accounting firm;
- reviewing the internal audit plan with the independent registered public accounting firm and members of management responsible for preparing our financial statements;

- reviewing and discussing with management and the independent registered public accounting firm our annual and quarterly financial statements and related disclosures as well as critical accounting policies and practices used by us;
- reviewing the adequacy of our internal control over financial reporting;
- establishing policies and procedures for the receipt and retention of accounting-related complaints and concerns;
- recommending, based upon the Audit Committee's review and discussions with management and the Company's independent registered public accounting firm, whether our audited financial statements shall be included in our Annual Report;
- monitoring our compliance with legal and regulatory requirements as they relate to our financial statements and accounting matters;
- preparing the Audit Committee report required by the rules of the SEC to be included in our annual proxy statement;
- viewing all related party transactions for potential conflict of interest situations and approving all such transactions; and
- reviewing and discussing with management and our independent registered public accounting firm our earnings releases and scripts.

All audit and non-audit services to be provided to us by our independent registered public accounting firm must be approved in advance by the Audit Committee. During the year ended December 31, 2017, the Audit Committee met three times. The report of the Audit Committee is included in this Proxy Statement under "Audit Committee Report".

Compensation Committee

Our Compensation Committee is composed of Mr. Bate and Dr. Mayer, with Mr. Bate serving as chair of the committee. The Board of Directors has determined, upon the recommendation of the Nominating and Corporate Governance Committee, that each member of the Compensation Committee is "independent" within the meaning of the rules and regulations of Nasdaq and the SEC. In addition, each member qualifies as an "outside director" within the meaning of Section 162(m) of the Internal Revenue Code and is a "non-employee director" within the meaning of the SEC rules. Our Compensation Committee operates pursuant to a written charter and it reviews and assesses the adequacy of its charter periodically.

The Compensation Committee's responsibilities include:

- annually reviewing and recommending to the Board of Directors for approval the corporate goals and objectives relevant to the compensation of our Chief Executive Officer;
- evaluating the performance of our Chief Executive Officer in light of such corporate goals and objectives and recommending to the Board of Directors for approval the compensation of our Chief Executive Officer;
- reviewing and approving the compensation of our other executive officers;
- appointing, compensating and overseeing the work of any compensation consultant, legal counsel or other advisor retained by the Compensation Committee;
- conducting the independence assessment outlined in Nasdaq rules with respect to any compensation consultant, legal counsel or other advisor retained by the Compensation Committee;
- annually reviewing and reassessing the adequacy of the committee charter in accordance with the listing requirements of Nasdaq;
- reviewing and establishing our overall management compensation philosophy and policy;
- overseeing and administering our equity compensation and other incentive compensation programs;
- reviewing and approving our equity and incentive policies and procedures for the grant of equity-based awards and approving the grant of such equity-based awards;

- reviewing and making recommendations to the Board of Directors with respect to director compensation; and
- reviewing and discussing with management the compensation discussion and analysis to be included in our annual proxy statement or Annual Report.

During the year ended December 31, 2017, the Compensation Committee met three times.

Nominating and Corporate Governance Committee

Our Nominating and Corporate Governance Committee is composed of Ms. Bosley and Mr. Cooper, with Ms. Bosley serving as chair of the committee. Our Board of Directors has determined that each member of the Nominating and Corporate Governance Committee is "independent" within the meaning of the rules and regulations of Nasdaq. Our Nominating and Corporate Governance Committee operates pursuant to a written charter and it reviews and assesses the adequacy of its charter periodically.

The Nominating and Corporate Governance Committee's responsibilities include:

- developing and recommending to the Board of Directors criteria for board and committee membership;
- establishing procedures for identifying and evaluating Board of Director candidates, including nominees recommended by stockholders;
- identifying individuals qualified to become members of the Board of Directors;
- recommending to the Board of Directors the persons to be nominated for election as directors and to each of the Board of Directors' committees;
- developing and recommending to the Board of Directors a set of corporate governance principles;
- articulating to each director what is expected, including reference to the corporate governance principles and directors' duties and responsibilities;
- reviewing and recommending to the Board of Directors practices and policies with respect to directors;
- reviewing and recommending to the Board of Directors the functions, duties and compositions of the committees of the Board of Directors;
- reviewing and assessing the adequacy of the committee charter and submitting any changes to the Board of Directors for approval;
- considering and reporting to the Board of Directors any questions of possible conflicts of interest of Board of Directors members;
- providing for new director orientation and continuing education for existing directors on a periodic basis;
- performing an evaluation of the performance of the committee; and
- overseeing the evaluation of the Board of Directors and management.

The Nominating and Corporate Governance Committee does not set specific, minimum qualifications that nominees must meet in order to be recommended to the Board of Directors, but rather believes that each nominee should be evaluated based on his or her individual merits, taking into account the needs of Genocea and the composition of the Board of Directors. Additionally, neither the Nominating and Corporate Governance Committee nor the Board of Directors has a specific policy with regard to the consideration of diversity in identifying director nominees; however, both may consider the diversity of background and experience of a director nominee in the context of the overall composition of the Board of Directors at that time, such as diversity of knowledge, skills, experience, geographic location, age, gender, and ethnicity. Members of the Nominating and Corporate Governance Committee discuss and evaluate possible candidates in detail and suggest individuals to explore in more depth.

The Nominating and Corporate Governance Committee will consider candidates recommended by stockholders. Candidates recommended by stockholders are given appropriate consideration in the same manner as other candidates.

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During the year ended December 31, 2017, the Nominating and Corporate Governance Committee met one time.

Board of Directors Leadership Structure

Ms. Bosley has served as the chair of our Board of Directors since August 2013. The independent members of the Board of Directors have periodically reviewed the Board of Directors' leadership structure and have determined that Genocea and our stockholders are well served with this structure.

The chair of the Board of Directors provides leadership to the Board of Directors and works with the Board of Directors to define its activities and the calendar for fulfillment of its responsibilities. The chair of the Board of Directors approves the meeting agendas after input from the Board of Directors and management, facilitates communication among directors and presides at meetings of our Board of Directors and stockholders.

The Board of Directors' Role in Risk Oversight

The Board of Directors plays an important role in risk oversight through direct decision-making authority with respect to significant matters as well as through the oversight of management by the Board of Directors and its committees. In particular, the Board of Directors administers its risk oversight function through (1) the review and discussion of regular periodic reports by the Board of Directors and its committees on topics relating to the risks that we face, (2) the required approval by the Board of Directors (or a committee of the Board of Directors) of significant transactions and other decisions, (3) the direct oversight of specific areas of our business by the Audit, Compensation and Nominating and Corporate Governance Committees, and (4) regular periodic reports from our independent registered public accounting firm and other outside consultants regarding various areas of potential risk, including, among others, those relating to our internal control over financial reporting and executive compensation. The Board of Directors also relies on management to bring significant matters impacting our Company to the attention of the Board of Directors.

Pursuant to the Audit Committee's charter, the Audit Committee is responsible for reviewing and discussing with management and the independent registered public accounting firm our system of internal controls, our critical accounting practices, and policies relating to risk assessment and management. As part of this process, the Audit Committee discusses our major financial risk exposures and steps that management has taken to monitor and control such exposure. In addition, the Audit Committee has established procedures for the receipt, retention and treatment of complaints received by the Company regarding accounting, internal accounting controls or auditing matters, and the confidential, anonymous submissions by employees of concerns regarding questionable accounting or accounting matters.

Because of the role of the Board of Directors and the Audit Committee in risk oversight, the Board of Directors believes that any leadership structure that it adopts must allow it to effectively oversee the management of the risks relating to our operations. The Board of Directors acknowledges that there are different leadership structures that could allow it to effectively oversee the management of the risks relating to the Company's operations and believes its current leadership structure enables it to effectively provide oversight with respect to such risks.

Compensation Consultant

As a part of determining compensation for our named executive officers, the Compensation Committee engaged Pay Governance LLC (“Pay Governance”) as its independent compensation consultant for 2017. As its independent compensation consultant, Pay Governance provided analysis and recommendations to the Compensation Committee regarding:

- trends with respect to executive and director compensation;
- the development of a peer group used for compensation-related purposes;
- forms and levels of compensation for executives and directors;
- stock utilization and related metrics;
- employment and separation agreements with our executive officers; and
- the risk profile of our compensation programs.

When requested, consultants from Pay Governance attended meetings of the Compensation Committee, including executive sessions in which executive compensation matters were discussed. Pay Governance reported to the Compensation Committee and not to management, although Pay Governance met with management for purposes of gathering information for its analyses and recommendations.

Although the Board of Directors and the Compensation Committee considers the advice and recommendations of Pay Governance (or any other compensation consultant it might engage in the future) as related to our executive compensation program, the Board of Directors and the Compensation Committee ultimately make their own decisions about the compensation arrangements for our executive officers.

In determining whether to engage Pay Governance, the Compensation Committee considered the independence of Pay Governance, taking into consideration relevant factors, including the absence of other services provided to the Company by Pay Governance, the amount of fees the Company paid to Pay Governance as a percentage of Pay Governance's total revenues, the policies and procedures of Pay Governance that are designed to prevent conflicts of interest, any business or personal relationship of the individual compensation advisors employed by Pay Governance with any executive officer of the Company, any business or personal relationship of the individual compensation advisors employed by Pay Governance with any member of the Compensation Committee, and any stock of the Company owned by Pay Governance or the individual compensation advisors employed by Pay Governance (the "Independence Factors"). The Compensation Committee has determined, based on its analysis in light of all relevant factors, including the Independence Factors listed above, that the work of Pay Governance and the individual compensation advisors employed by Pay Governance as compensation consultants to the Compensation Committee has not created any conflicts of interest, and that Pay Governance was independent under the independence standards set forth in the Nasdaq listing standards promulgated pursuant to Section 10C of the Exchange Act.

Compensation Committee Interlocks and Insider Participation

None of our executive officers serves as a member of the Board of Directors or Compensation Committee, or other committee serving an equivalent function, of any other entity that has one or more of its executive officers serving as a member of our Board of Directors or Compensation Committee. In 2017, our Compensation Committee was and is currently composed of Mr. Bate and Dr. Mayer, with Mr. Bate serving as chair of the committee. Dr. Mayer joined our Compensation Committee effective April 14, 2017. Dr. Kevin Bitterman and Dr. Stephen Hoffman served on our Board of Directors and our Compensation Committee prior to their resignations in 2017. Dr. Bitterman resigned from our Board of Directors and our Compensation Committee effective February 28, 2017 and Dr. Hoffman resigned from our Board of Directors and our Compensation Committee effective April 11, 2017. None of the individuals who served on our Compensation Committee in 2017 has ever been employed by us.

Non-Employee Director Compensation Policy

Our Board of Directors adopted a non-employee director compensation policy that is designed to enable us to attract and retain, on a long-term basis, highly-qualified non-employee directors. Under the policy, as it may be amended from time to time, all non-employee directors will be paid cash compensation as set forth in the table below. Cash fees are prorated for partial years of service.

	Annual
Board of Directors:	
All non-employee members	$35,000
Additional retainer for chair	$40,000
Audit Committee:	
Members	$7,500
Additional retainer for chair	$7,500
Compensation Committee:	
Members	$5,000
Additional retainer for chair	$5,000
Nominating and Corporate Governance Committee:	

Members	$3,500
Additional retainer for chair	$3,500

Under our non-employee director compensation policy, effective January 1, 2016, each non-employee director who is initially appointed or elected to our Board of Directors is eligible to be granted options to purchase 25,000 shares of our common stock under the Genocea Biosciences Inc. 2014 Equity Incentive Plan ("2014 Equity Plan") at the time of his or her initial appointment or election to our Board of Directors. These options vest annually in equal installments over a three-year period, generally subject to the non-employee director's continued service. In addition, each continuing non-employee director is

eligible to be granted options to purchase 15,000 shares of our common stock under our 2014 Equity Plan on an annual basis, which vest in full on the first anniversary of the grant date, generally subject to the non-employee director's continued service through such date. These option grants are made on the date of the Company's annual meeting of stockholders for the relevant year or as soon thereafter as is reasonably practicable.

Director Agreements

Dr. Siber

We entered into a consulting agreement with Dr. Siber dated May 16, 2007, as amended on June 30, 2009, December 16, 2010, June 15, 2011, June 5, 2013, June 15, 2015 and June 13, 2017. The consulting agreement provides for a monthly consulting fee, which was increased from $5,208 per month to $9,833 per month on June 13, 2017, for consulting services performed by Dr. Siber related to strategic scientific and business development. Prior to our initial public offering ("IPO"), Dr. Siber was granted stock options pursuant to this consulting agreement. All stock options granted to Dr. Siber pursuant to the consulting agreement will fully vest if, within 12 months following a change of control, either we (or our successor) terminate the consulting agreement without cause (as such term is defined in the consulting agreement), or we (or our successor) do not offer to extend the term of the agreement if it expires during such 12-month period.

Dr. Siber has agreed not to solicit our employees, contractors and customers for a period of 12 months following the termination of the consulting agreement and is subject to covenants relating to the use and disclosure of confidential information and the assignment of inventions. Unless extended or earlier terminated, the term of the consulting agreement will expire on June 17, 2019.

Director Compensation

The following table sets forth information concerning the compensation earned by our non-employee directors during 2017. All of our non-employee directors were compensated for service on our Board of Directors under our non-employee director compensation policy and Dr. Siber receives additional compensation as set forth in his consulting agreement, in each case, as described above. Mr. Clark receives no additional compensation for his service as a director, and, consequently, is not included in this table. The compensation received by Mr. Clark as our President and Chief Executive Officer during 2017 is set forth in the "Summary Compensation Table" under the section "Executive Compensation".

Name	Fees earned or paid in cash ($)(1)	Option awards ($)(2)(3)	Total ($)
Kenneth Bate	54,617	51,416	106,033
Kevin Bitterman, Ph.D.	7,129	—	7,129
Katrine Bosley	82,000	51,416	133,416
Ronald Cooper	45,000	51,416	96,416
Michael Higgins	50,000	51,416	101,416
Stephen Hoffman, M.D., Ph.D.	11,793	—	11,793
Howard Mayer, M.D.	32,349	82,550	114,899
George Siber, M.D.	140,209	51,416	191,625

(1) Amounts represent annual director fees and, in the case of Dr. Siber, include consulting fees, for services rendered, as described above. Consulting fees paid to Dr. Siber were paid in equal monthly installments and all other director fees were paid quarterly in arrears. Annual director fees paid to Dr. Bitterman and Dr. Hoffman for 2017 were

prorated for their partial years of service.

(2) As of December 31, 2017, our directors held the following aggregate number of options to purchase shares of our common stock: Mr. Bate held options to purchase 45,126 shares of our common stock, Ms. Bosley held options to purchase 72,008 shares of our common stock, Mr. Cooper held options to purchase 40,000 shares of our common stock, Mr. Higgins held options to purchase 40,084 shares of our common stock, Dr. Mayer held options to purchase 25,000 shares of our common stock, and Dr. Siber held options to purchase 115,376 shares of our common stock. Dr. Bitterman and Dr. Hoffman did not hold any outstanding options to purchase shares of our common stock on December 31, 2017.

(3) Amounts in the table represent the aggregate grant date fair value of the options to purchase shares of our common stock granted during 2017. Dr. Mayer was granted options to purchase 25,000 shares of our common stock in March 2017, upon his election to our Board of Directors, pursuant to our non-employee director compensation policy. These options will vest in equal installments on each of the first three anniversaries of the date of grant, generally subject to Dr. Mayer's continued service. All other non-employee directors received grants of time-based options to purchase 15,000 shares of our common stock that vest in full on the one-year anniversary of the respective date of grant, generally subject to the non-employee director's continued service. These grant date fair value amounts were computed in accordance with Financial Accounting Standards Board Accounting Standards Codification Topic 718, Compensation — Stock Compensation ("ASC 718"), excluding the effect of estimated forfeitures. Assumptions used in the calculation of these amounts are included in Note 10 to our financial statements included in our Annual Report. Dr. Bitterman and Dr. Hoffman were not granted any options to purchase shares of our common stock during 2017.

SECTION 16(a) BENEFICIAL OWNERSHIP REPORTING COMPLIANCE

Our directors, executive officers and beneficial owners of more than 10% of our common stock are required under Section 16(a) of the Securities and Exchange Act of 1934 (the "Exchange Act"), to file reports of ownership and changes in ownership of our securities with the SEC. To our knowledge, based solely on review of these filings and written representations from the certain reporting persons, we believe that all filing requirements applicable to our officers, directors and beneficial owners of more than 10% of our common stock were complied with, except Jonathan Poole was delinquent in filing a Form 4 report in May 2017. Such filing has been made at the time of filing this proxy statement.

AUDIT COMMITTEE REPORT

The Audit Committee reviewed the Genocea audited financial statements for the year ended December 31, 2017 and discussed these statements with management and Ernst & Young LLP, the Company's independent registered public accounting firm. Genocea management is responsible for the preparation of the Company's financial statements and for maintaining an adequate system of disclosure controls and procedures and internal control over financial reporting for that purpose. Ernst & Young LLP is responsible for expressing an opinion on the conformity of the audited financial statements with generally accepted accounting principles, discussing their judgments as to the quality, not just the acceptability, of the Company's accounting principles and such other matters as are required to be discussed with the Audit Committee under generally accepted auditing standards. The Audit Committee is responsible for providing independent, objective oversight of the Company's accounting functions and internal controls.

The Audit Committee also received from, and discussed with, Ernst & Young LLP all communications required under the standards of the Public Company Accounting Oversight Board (the "PCAOB"), including the matters required to be discussed by Ernst & Young LLP with the Audit Committee, including the matters to be discussed by Statement on Auditing Standards 1301, Communications with Audit Committees Concerning Independence.

Ernst & Young LLP also provided the Audit Committee with the written disclosures and the letter required under the PCAOB, which requires that independent registered public accounting firms annually disclose in writing all relationships that in their professional opinion may reasonably be thought to bear on independence, to confirm their perceived independence and engage in a discussion of independence. The Audit Committee reviewed this disclosure and discussed with Ernst & Young LLP their independence from Genocea.

Based on its discussions with management and our independent registered public accounting firm, and its review of the representations and information provided by management and our independent registered public accounting firm, the Audit Committee recommended to the Board of Directors that the audited financial statements be included in the

Genocea Annual Report on Form 10-K for the year ended December 31, 2017, for filing with the SEC.

Respectfully submitted by the

Audit Committee,

Michael Higgins, Chair
Kenneth Bate
Ronald Cooper

EXECUTIVE COMPENSATION

Our named executive officers for the fiscal year ended December 31, 2017 were:

- William Clark, our President and Chief Executive Officer;
- Seth Hetherington, M.D., our former Chief Medical Officer*; and
- Jonathan Poole, our former Chief Financial Officer*.

*Dr. Hetherington resigned and entered into a consulting agreement with the Company, each effective January 31, 2018, as described under “Agreements with Dr. Hetherington” below, and Mr. Poole resigned effective March 23, 2018.

Executive Compensation

Each year, our Compensation Committee considers a variety of factors in assessing the competitiveness of our executive compensation program and the individual compensation of each of our executives, including our named executive officers. These factors include the executive’s experience and individual performance, the Company’s performance as a whole, and data from surveys, as well as compensation paid at companies in our peer group, as described below, cost of living increases and general industry conditions. Our Compensation Committee does not assign any specific weighting to any one factor when making compensation decisions.

Market Benchmarks and Competitive Analysis

As discussed above, our Compensation Committee engaged Pay Governance as its independent compensation consultant for 2017. Pay Governance assisted the Compensation Committee in the development of a list of peer companies used for executive compensation-related purposes. In determining our peer companies, we selected companies that are publicly-traded, that operate in our industry and have a similar market capitalization, and that are of comparable size and scientific stage of development (among the group, market capitalizations range from approximately $75 million to $900 million). When making compensation decisions with respect to our named executive officers, our Compensation Committee considered data from the peer companies as well as broader market compensation surveys provided by Pay Governance.

Elements of Executive Compensation

The compensation of our named executive officers consists of base salary, annual cash bonuses and equity awards, as well as employee benefits that are made available to our salaried employees generally. Our named executive officers are also entitled to certain compensation and benefits upon certain terminations of employment, including following certain change of control transactions pursuant to employment letter agreements, as described under "Employment Letter Agreements" section below.

Base Salaries. Base salaries for our named executive officers are reviewed annually by our Compensation Committee and are set by our Board of Directors. When making its base salary recommendations to our Board of Directors, our Compensation Committee takes the factors described above into account, but does not assign any specific weighting to any one factor. Our Board of Directors determines each named executive officer’s base salary after reviewing the Compensation Committee’s recommendation with respect to such salaries. In fiscal year 2017, on the recommendation of our Compensation Committee, our Board of Directors approved a base salary of $500,000 for Mr. Clark, $405,720 for Dr. Hetherington, and $393,750 for Mr. Poole, representing increases of 8.7%, 3.5% and 5.0%, respectively, from the base salary for each such executive in 2016.

Annual Cash Bonuses. Our annual cash bonus program promotes and rewards the achievement of key strategic business goals and individual performance goals. For fiscal year 2017, the target annual bonus as a percentage of base salary was 50% for Mr. Clark and 40% for each of Dr. Hetherington and Mr. Poole. In the case of Mr. Clark, 100% of

his annual bonus was based on the achievement of pre-established corporate performance goals and, in the case of Dr. Hetherington and Mr. Poole, their respective annual bonuses were based on the achievement of pre-established corporate performance goals and pre-established individual performance goals.

At the beginning of fiscal year 2017, our Compensation Committee established the corporate performance goals for fiscal year 2017, with each goal having a designated weighting. These corporate performance goals included key strategic and financial goals related to business development collaborations and financings, cash management, the development and commencement of certain clinical and commercial programs, and other strategic objectives related to our clinical pipeline. Also at the beginning of fiscal year 2017, our Chief Executive Officer, working with Dr. Hetherington and Mr. Poole, established

individual performance goals for Dr. Hetherington and Mr. Poole and their weightings. These goals included, to the extent applicable to the executive, objectives related to oversight of clinical activities for compliance with laws, developing and conducting clinical programs and studies, research and development, managing studies according to schedule and within budgets, business and corporate development and demonstrating leadership with respect to direct reports.

In February 2018, our Compensation Committee met to review and consider the level of corporate and individual performance goals that were achieved for purposes of making its recommendation to our Board of Directors regarding the amount of the annual cash bonus earned by our named executive officers for fiscal year 2017. As described in further detail under “Agreements with Dr. Hetherington” below, Dr. Hetherington was paid 50% of the amount of his annual cash bonus for fiscal year 2017 at the same time annual cash bonuses were paid to employees generally and is eligible to receive the remaining 50%, subject to his performance of specified consulting services under his consulting agreement. The Compensation Committee reviewed and evaluated our corporate performance against the pre-established corporate performance goals for fiscal year 2017, taking into consideration Mr. Clark’s evaluation of our performance in 2017. With respect to the individual performance goals applicable to Dr. Hetherington and Mr. Poole, our Compensation Committee also considered Mr. Clark’s determination that Dr. Hetherington and Mr. Poole had achieved 80% and 110%, respectively, of such individual performance goals. After reviewing the achievement of the fiscal year 2017 corporate performance goals, and after considering Mr. Clark’s determination regarding the level of achievement of individual performance goals, our Compensation Committee recommended, and our Board of Directors approved, a 55% level of achievement of corporate performance goals, a 80% and 110% level of achievement of Dr. Hetherington's and Mr. Poole's individual goals, respectively, and a fiscal year 2017 annual cash bonus of $137,500 for Mr. Clark, $71,406 for Dr. Hetherington (50% of which was payable as described under “Agreements with Dr. Hetherington” below) and $95,288 for Mr. Poole.

Equity Awards. Our named executive officers have each been granted stock options, including options intended to qualify as incentive stock options, and in 2017 Mr. Poole was granted restricted stock units ("RSUs"), in each case, under our 2014 Equity Plan. Our 2014 Equity Plan was adopted by our Board of Directors in connection with our IPO. Prior to our IPO, Mr. Clark and Dr. Hetherington were granted equity awards under the Genocea Biosciences, Inc. Amended and Restated 2007 Equity Incentive Plan ("2007 Equity Plan"). Following the adoption of our 2014 Equity Plan and our IPO, all stock options and other equity-based awards have been granted under our 2014 Equity Plan and no future awards may be made under our 2007 Equity Plan.

Stock option awards serve to align the interests of our named executive officers with our stockholders because no value is created unless the value of our common stock appreciates after grant. Stock option awards also encourage retention through the use of time-based vesting conditions. We have from time to time in the past also granted stock options that are subject to performance-based vesting conditions, thereby incentivizing the achievement of key strategic goals. The RSUs granted to Mr. Poole in 2017 were intended to encourage retention through the use of time-based vesting conditions and, through the performance-based vesting conditions described below, to incentivize the achievement of key strategic goals.

In February 2017, Mr. Clark, Dr. Hetherington, and Mr. Poole were each granted awards of time-based options to purchase 288,000, 100,000, and 135,000 shares, respectively, of our common stock under our 2014 Equity Plan. These stock options vest in equal monthly installments over the 48 months following the date of grant, generally subject to the executive's continued employment. In connection with their resignations in January 2018 and March 2018, respectively, Dr. Hetherington and Mr. Poole forfeited all stock options held by them that were unvested as of their termination of employment. In May 2017, Mr. Poole was granted 47,620 RSUs of which 7,937 RSUs vested on the date of grant, 23,810 RSUs were eligible to vest on the eighteen month anniversary of the grant date and the remaining 15,873 RSUs were eligible to vest upon the completion of a material financing event on or before

September 30, 2017. The RSUs that were eligible to vest based upon the completion of a financing event were forfeited on October 1, 2017 because the financing event was not achieved by this date and the RSUs that were eligible to vest on the eighteen-month anniversary of the grant date were forfeited in connection with Mr. Poole's resignation in March 2018. Pursuant to his employment letter agreement, stock options held by Mr. Clark would vest automatically upon certain terminations of employment following a change of control. See "Employment Letter Agreements" below for additional details about Mr. Clark's agreement.

Benefits. We provide modest benefits to all of our salaried employees, including our executive officers, which are limited to participation in our 401(k) plan, our employee stock purchase plan, and health and welfare benefit coverage.

Employment Letter Agreements. We have entered into an employment letter agreement with Mr. Clark that includes severance and change of control protections. Prior to their terminations of employment, Dr. Hetherington and Mr. Poole were also party to an employment letter agreement with us. Our named executive officers are also subject to restrictive covenants

covering noncompetition, nonsolicitation and confidentiality. See “Employment Letter Agreements” below for additional details about these agreements.

Agreements with Dr. Hetherington. Dr. Hetherington’s employment terminated and he entered into a consulting agreement with the Company, in each case, effective January 31, 2018. In connection with his termination of employment, the Company agreed to pay to Dr. Hetherington nine months’ of base salary continuation and an amount equal to 50% of the annual cash bonus that would have otherwise been paid to him for 2017, subject to his execution of a letter agreement that included a release of claims in favor of the Company. Under the consulting agreement, the Company agreed to pay to Dr. Hetherington, in respect of his consulting services, $300 per hour (not to exceed $10,000 per month) and up to 50% of the annual cash bonus that would have otherwise been paid to him for 2017, subject to his completion of specified services in the time periods provided in the agreement. The consulting agreement is for a one-year term and may be terminated by Dr. Hetherington or the Company on 20 days’ notice.

Summary Compensation Table

The following table sets forth information about compensation earned, awarded or paid to our named executive officers for fiscal years 2017 and 2016.

Name and principal position	Year	Salary ($)(1)	Stock Awards (2)	Option awards ($)(3)	Nonequity incentive plan compensation ($)(4)	All other compensation ($)(5)	Total ($)
William Clark,	2017	493,333	—	890,755	137,500	5,425	1,527,013
President and Chief Executive Officer	2016	455,497	—	548,300	184,000	5,040	1,192,837
Seth Hetherington, M.D.,	2017	403,433	—	309,290	35,703	8,014	756,440
Former Chief Medical Officer	2016	390,090	—	190,400	86,700	7,950	675,140
Jonathan Poole,	2017	390,625	300,006	417,542	95,288	6,295	1,209,756
Former Chief Financial Officer	2016	367,433	—	257,000	110,250	6,583	741,266

(1) Salaries include amounts contributed by the named executive officer to our 401(k) plan.

(2) Amounts represent the aggregate grant date fair value of the RSUs granted to Mr. Poole in fiscal year 2017, computed in accordance with ASC 718, excluding the effect of estimated forfeitures. The aggregate fair value of these RSUs was determined using the market value of our common stock on the date of grant, multiplied by the aggregate number of restricted stock units granted, and assumed full achievement of the performance-based vesting condition. Assumptions used in the calculation of these amounts are included in Note 10 to our consolidated financial statements included in our Annual Report. As described under “Equity Awards” above, certain of the RSUs granted to Mr. Poole were forfeited in 2017 and 2018.

(3) Amounts shown reflect the aggregate grant date fair value of time-based options to purchase shares of our common stock awarded in the applicable fiscal year, computed in accordance with ASC 718, excluding the effect of estimated forfeitures. Assumptions used in the calculation of these amounts are included in Note 10 to our consolidated financial statements included in our Annual Report. As described under “Equity Awards” above, in connection with their resignations in January 2018 and March 2018, respectively, Dr. Hetherington and Mr. Poole forfeited all of their then-unvested stock options.

(4) Amounts shown for Messrs. Clark and Poole reflect the annual cash bonuses paid to the named executive officers that were earned based on the achievement of Company performance goals, in the case of Mr. Clark, and Company and individual performance goals, in the case of Mr. Poole, in the applicable fiscal year, as described under "Annual Cash Bonuses" above. Amounts shown for Dr. Hetherington reflect (i) the annual cash bonus paid to Dr. Hetherington for 2016 that was earned based on the achievement of Company and individual performance goals and (ii) 50% of the amount of the annual cash bonus earned based on the achievement of Company and individual performance goals for 2017, which was paid to Dr. Hetherington in connection with his termination of employment. See “Agreements with Dr. Hetherington” above.

(5) Amounts shown reflect employer matching contributions under our 401(k) plan.

Outstanding Equity Awards at Fiscal Year-End

The following table sets forth information regarding equity awards held by our named executive officers as of December 31, 2017.

OPTION AWARDS

	Option Awards					Stock Awards			
Name	Number of securities underlying unexercised options (#) exercisable)	Number of securities underlying unexercised options (#) unexercisable	Equity incentive plan awards: number of securities underlying unexercised unearned options (#)	Option Exercise Price ($)(5)	Option Expiration Date(6)	Number of shares or units of stock that have not vested (#)	Market value of shares or units of stock that have not vested ($)	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 ($)
William Clark	24,716 (1)	—	—	$ 2.86	12/17/2020	—	$—	—	$ —
	—	—	39,807 (2)	$ 2.86	12/17/2020	—	$—	—	$ —
	340,568 (1)	—	—	$ 2.02	2/17/2021	—	$—	—	$ —
	133,602 (3)	—	—	$ 3.45	7/25/2023	—	$—	—	$ —
	81,670	—	—	$ 3.45	7/25/2023	—	$—	—	$ —
	97,750 (1)	40,250 (1)	—	$ 9.08	2/26/2025	—	$—	—	$ —
	133,999 (1)	156,001 (1)	—	$ 3.09	2/2/2026	—	$—	—	$ —
	60,000 (1)	228,000 (1)	—	$ 4.67	2/28/2027	—	$—	—	$ —
Seth Hetherington, M.D. (8)	61,955 (4)	—	—	$ 2.02	2/17/2021	—	$—	—	$ —
	11,562	—	—	$ 2.02	2/17/2021	—	$—	—	$ —
	57,017 (3)	—	—	$ 3.45	7/25/2023	—	$—	—	$ —
	36,125 (1)	14,875 (1)	—	$ 9.08	2/26/2025	—	$—	—	$ —
	45,833 (1)	54,167 (1)	—	$ 3.09	2/2/2026	—	$—	—	$ —
	20,830 (1)	79,170 (1)	—	$ 4.67	2/28/2027	—	$—	—	$ —
Jonathan Poole (8)	183,998 (4)	16,728 (4)	—	$ 17.89	4/7/2024	—	$—	—	$ —
	67,291 (1)	27,709 (1)	—	$ 9.08	2/26/2025	—	$—	—	$ —
	16,874 (1)	73,126 (1)	—	$ 3.09	2/2/2026	—	$—	—	$ —
	28,120 (1)	106,880 (1)	—	$ 4.67	2/28/2027	23,810 (7)	$ 27,620	—	$ —

(1) Reflects time-based options to purchase shares of our common stock that vest in 48 equal monthly installments following the date of grant, generally subject to the executive's continued employment.

(2) Reflects performance-based options to purchase shares of our common stock that vest as to 100% of the shares subject to the stock option upon the company's achievement of specified strategic financing or development

milestones, generally subject to Mr. Clark's continued employment. These performance-based stock options remain unvested as the performance condition has not yet been achieved.

(3) Reflects time-based options to purchase shares of our common stock that vested as to 1/8th of the shares subject to the stock option on the date of grant and that continue to vest in equal monthly installments over 42 months following the date of grant, generally subject to the executive's continued employment.

(4) Reflects time-based options to purchase shares of our common stock that vest as to 25% of the shares subject to the stock option on the vesting commencement date (approximately 12 months from the grant date) and thereafter vest in equal monthly installments over the following 36 months, generally subject to the executive's continued employment.

(5) The exercise price of each option is not less than the fair market value of a share of our common stock on the date of grant, as determined by our Board of Directors. For stock options granted following our IPO, the exercise price is the closing price of a share of our common stock on the date of grant of the stock option.

(6) All options have a 10-year term measured from the date of grant.

(7) 47,620 RSUs were granted to Mr. Poole on May 3, 2017 and were eligible to vest as to (i) 7,937 RSUs immediately on the date of grant, (ii) 23,810 RSUs on the eighteen month anniversary of the date of grant, subject to Mr. Poole's continued employment, and (iii) 15,873 RSUs upon achievement of completing a material financing event on or before September 30, 2017. The RSUs that were eligible to vest based upon the completion of a financing event were forfeited on October 1, 2017 because the financing event was not achieved by this date and the RSUs that were eligible to vest on the eighteen-month anniversary of the grant date were forfeited in connection with Mr. Poole's resignation in March 2018.

(8) As described under "Equity Awards" above, in connection with their resignations in January 2018 and March 2018, respectively, Dr. Hetherington and Mr. Poole forfeited all stock options that were held by them that were unvested as of their termination of employment.

Retirement Benefits

We do not maintain any qualified or non-qualified defined benefit plans or supplemental executive retirement plans. We offer a tax-qualified defined contribution retirement plan, which we refer to as our 401(k) plan, to eligible employees, including our current named executive officers. Our 401(k) plan permits eligible employees to defer their annual eligible compensation subject to the limitations imposed by the Internal Revenue Service. We may, but are not required to, make discretionary profit-sharing contributions on behalf of eligible employees under this plan. In fiscal year 2015, we commenced making an employer match of 50% for the first 6% of employee contributions. Employer matching contributions vest over a four-year period starting with the employee's date of hire.

Employment Letter Agreements

We have entered into an employment letter agreement with Mr. Clark, which was amended and restated on January 16, 2014 and became effective prior to our IPO. Prior to their terminations of employment, Dr. Hetherington and Mr. Poole were also party to an employment letter agreement with us. As described under "Agreements with Dr. Hetherington" above, Dr. Hetherington received certain payments in connection with his termination of employment and entered into a consulting agreement with the Company. Mr. Poole did not receive any severance payments or benefits in connection with his termination of employment. Mr. Clark's employment letter agreement provides for an initial base salary and target annual bonus as well as severance payments and benefits upon certain terminations of his employment as described below. The terms "change of control," "cause," "good reason" and "disability" referred to below are defined in Mr. Clark's employment letter agreement.

Termination of Employment without Cause or for Good Reason Following a Change of Control. If, within 12 months after a change of control, Mr. Clark's employment is terminated by us without cause or if he terminates his employment for good reason, all stock options or other equity awards then held by him will fully vest. In addition, Mr. Clark will be entitled to receive base salary and payment of COBRA premiums for 18 months following such termination of employment.

Termination of Employment without Cause or for Good Reason. If Mr. Clark's employment is terminated by us without cause or if he terminates his employment for good reason other than following a change of control as described above, he will be entitled to receive base salary and payment of COBRA premiums for 12 months following such termination of employment.

Termination of Employment Due to Death or Disability. If Mr. Clark's employment is terminated by us due to his disability or is terminated due to his death, we will pay him (or, if applicable, his estate) a portion of his target annual cash

bonus for the year in which such termination of employment occurs, prorated based on the number of days he was employed during such year until the date of such termination.

Severance Subject to Release of Claims. Our obligation to provide Mr. Clark with any severance payments or other benefits under his employment letter agreement is conditioned on his signing and not revoking an effective release of claims in our favor.

Other Termination of Employment. If Mr. Clark's employment is terminated for any reason other than by us without cause, by him for good reason, or due to his death or disability, Mr. Clark will only be entitled to receive earned but unpaid base salary and any accrued but not used vacation as of the termination date.

280G Better-of Provision. In the event of a change in ownership or control of our Company under Section 280G of the Internal Revenue Code of 1986, as amended (the "Code"), and the regulations thereunder, if any portion of the payments made pursuant to Mr. Clark's employment letter agreement (or otherwise) constitutes an "excess parachute payment" within the meaning of Section 280G of the Code, Mr. Clark will be entitled to receive an amount of such payments reduced so that no portion of the payments would constitute an excess parachute payment, or the amount otherwise payable to the him under the employment letter agreement (or otherwise) reduced by all applicable taxes, including the excise tax imposed under Section 4999 of the Code, whichever amount results in the greater amount payable to him on an after-tax basis.

As a condition to their employment with us, each of our named executive officers was required to sign and must comply with the terms of an At-Will Employment, Confidential Information, Invention Assignment and Non-Competition Agreement, pursuant to which he has agreed not to compete with us for a period of 12 months following the termination of his employment and not to solicit our employees or independent contractors for a period of 36 months following the termination of his employment. Each executive has also agreed to covenants relating to the use and disclosure of confidential information and the assignment of inventions.

Equity Compensation Plan Information

The following table provides information as of December 31, 2017 about our common stock that may be issued upon the exercise of options, warrants, and rights under our existing equity compensation plans (in thousands) (not taking into account the proposed share pool increases that are the subject of Proposal 3 and 4 of this Proxy Statement):

Plan Category	Number of Securities to be Issued Upon Exercise of Outstanding Options, Warrants and Rights (1)	Weighted-Average Exercise Price of Outstanding Options, Warrants and Rights	Number of Securities Remaining Available for Future Issuance Under Equity Compensation Plans
Equity compensation plans approved by security holders	4,152,988	$ 5.48	1,114,067
Equity compensation plans not approved by security holders	—	$ —	—
Total	4,152,988	$ 5.48	1,114,067

(1) Includes an aggregate of 23,810 shares of common stock that may be issued upon settlement of RSUs. The weighted average share price in column (b) does not take into account RSUs, which do not have an exercise price.

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COMPENSATION COMMITTEE REPORT

The Compensation Committee of our Board of Directors currently consists of Mr. Bate and Dr. Mayer, each an independent director of the Company, with Mr. Bate serving as the Chair of the Compensation Committee. Dr. Mayer was appointed to the Compensation Committee in April 2017.

The Compensation Committee of our Board of Directors has reviewed and discussed the "Executive Compensation" section of this Proxy Statement, and the information contained herein, with our management. Based on this review and discussion, the Compensation Committee recommended to the Board of Directors that this Executive Compensation section and discussion be included in our Proxy Statement.

Members of the Compensation Committee:

Kenneth Bate, Chair
Howard Mayer

PROPOSAL NO. 2—TO APPROVE AN AMENDMENT TO OUR AMENDED AND RESTATED CERTIFICATE OF INCORPORATION TO PROVIDE FOR AN INCREASE IN THE TOTAL NUMBER OF SHARES OF COMMON STOCK THAT THE COMPANY IS AUTHORIZED TO ISSUE FROM 175,000,000 SHARES TO 250,000,000 SHARES

General

Stockholders are being asked to approve an amendment to our amended and restated certificate of incorporation, in the form attached hereto as Appendix A (the "Charter Amendment"). The Charter Amendment increases the number of authorized shares of common stock from one hundred seventy-five million (175,000,000) shares to two hundred fifty million (250,000,000) shares. On April 12, 2018, the Board of Directors approved the Charter Amendment, subject to stockholder approval, and directed that the Charter Amendment be submitted to a vote of the Company's stockholders at this Annual Meeting. The Board of Directors has determined that the Charter Amendment is in the best interests of the Company and its stockholders and recommends approval by the stockholders.

The current Amended and Restated Certificate of Incorporation, as amended (the "Current Charter") authorizes the issuance of up to 175,000,000 shares of common stock, par value of $0.01 per share. As of the close of business on April 23, 2018, [ ] shares of common stock were outstanding. In addition, as of the close of business on April 23, 2018, the Company had [ ] shares of common stock subject to outstanding stock options granted under the 2014 Equity Incentive Plan (subject to approval by the Company's stockholders of the Amended and Restated 2014 Equity Incentive Plan), [ ] shares of common stock reserved for issuance under the 2014 Equity Incentive Plan (subject to approval by the Company's stockholders of the amendment to the 2014 Equity Incentive Plan and not giving effect to the so-called evergreen provision contained therein), [ ] shares of common stock subject to outstanding stock options granted under the Company's 2014 Employee Stock Purchase Plan, [ ] shares of common stock reserved for issuance under the Company's 2014 Employee Stock Purchase Plan (subject to approval by the Company's stockholders of the amendment to the Company's 2014 Employee Stock Purchase Plan), [ ] shares of common stock subject to outstanding stock options granted under inducement awards, [ ] shares reserved for issuance upon the exercise of outstanding warrants, and [ ] shares reserved for issuance upon conversion of Series A preferred stock. This means that as of April 23, 2018, the Company had just [ ] shares of common stock available for corporate purposes, including, among other things, the issuance of stock options and stock splits by way of dividend. The Current Charter also authorizes the issuance of 25,000,000 shares of preferred stock, with only [ ] shares of preferred stock issued and outstanding as of April 23, 2018. The Charter Amendment will not increase or otherwise affect the Company's authorized preferred stock or otherwise affect any other provisions of the Current Charter.

Purpose of the Charter Amendment

The Board of Directors believes it is in the best interest of the Company to increase the number of authorized shares of common stock in order to give the Company greater flexibility in considering and planning for future potential business needs.

With the exception of the Company's routine practice of granting stock options to employees and directors, the Company has no current specific plan, commitment, arrangement, understanding, or agreement regarding the issuance of the additional shares of common stock resulting from the proposed increase in authorized shares. The additional shares of common stock will be available for issuance by the Board of Directors for various corporate purposes, including but not limited to, grants under employee stock plans, financings, potential strategic transactions, including mergers, acquisitions, strategic partnerships, joint ventures, divestitures, business combinations, stock splits, stock dividends, as well as other general corporate transactions.

Having this additional authorized common stock available for future use will allow the Company to issue additional shares of common stock without the expense and delay of arranging a special meeting of stockholders.

Possible Effects of the Charter Amendment and Additional Anti-takeover Consideration

If the Charter Amendment is approved, the additional authorized shares would be available for issuance at the discretion of the Board of Directors and without further stockholder approval, except as may be required by law or the rules of Nasdaq. The additional shares of authorized common stock would have the same rights and privileges as the shares of common stock currently issued and outstanding. The adoption of the Charter Amendment would not have any immediate dilutive effect on the proportionate voting power or other rights of existing stockholders. Shares of common stock issued otherwise than for a stock split may decrease existing stockholders' percentage equity ownership and, depending on the price at which they are issued, could be dilutive to the voting rights of existing stockholders and have a negative effect on the market price of the common stock. The common stock carries no preemptive rights to purchase additional shares of common stock.

The Company cannot provide assurances that any such transactions will be consummated on favorable terms or at all, that they will enhance stockholder value or that they will not adversely affect the Company's business or the trading price of our stock.

The Company has not proposed the increase in the number of authorized shares of common stock with the intention of using the additional authorized shares for anti-takeover purposes, but the Company would be able to use the additional shares to oppose a hostile takeover attempt or delay or prevent changes in control or management of the Company. For example, without further stockholder approval, the Board of Directors could sell shares of common stock in a private transaction to purchasers who would oppose a takeover or favor the current Board of Directors. Although this proposal to increase the authorized number of shares of common stock has been prompted by business and financial considerations and not by the threat of any known or threatened hostile takeover attempt, stockholders should be aware that approval of this proposal could facilitate future efforts by the Company to oppose changes in control of the Company and perpetuate the Company's management, including transactions in which the stockholders might otherwise receive a premium for their shares over then current market prices.

If the Company's stockholders approve the Charter Amendment, the Board of directors will have authority to file with the Secretary of State of Delaware the Charter Amendment. The Charter Amendment will become effective on the date it is filed. The Board of Directors reserves the right to abandon or delay the filing of the Charter Amendment even if it is approved by our stockholders. The Charter Amendment is attached to this proxy statement as Appendix A.

Neither Delaware law, the Current Charter, nor the Company's By-laws provides for appraisal or other similar rights for dissenting stockholders in connection with this proposal. Accordingly, the Company's stockholders will have no right to dissent and obtain payment for their shares.

The affirmative vote of a majority of the outstanding shares of common stock is required to approve the Amended Charter. Accordingly, abstentions and broker non-votes will have the effect of a negative vote.

THE BOARD OF DIRECTORS UNANIMOUSLY RECOMMENDS THAT YOU VOTE
FOR
THE APPROVAL OF THE AMENDMENT TO OUR AMENDED AND RESTATED CERTIFICATE OF INCORPORATION TO PROVIDE FOR AN INCREASE IN THE TOTAL NUMBER OF SHARES OF COMMON STOCK THAT THE COMPANY IS AUTHORIZED TO ISSUE FROM 175,000,000 SHARES TO 250,000,000 SHARES
(PROPOSAL 2 ON YOUR PROXY CARD)

PROPOSAL NO. 3—TO APPROVE THE AMENDED AND RESTATED GENOCEA BIOSCIENCES, INC. 2014 EQUITY INCENTIVE PLAN

The 2014 Equity Plan was originally approved by our Board of Directors and our stockholders prior to the effectiveness of our IPO in 2014. On April 12, 2018, our Board of Directors approved the Amended and Restated 2014 Equity Plan, subject to stockholder approval, to (i) increase the number of shares of common stock reserved for issuance under the 2014 Equity Plan by an additional 2,500,000 shares (which amount is subject to adjustment in the event of stock splits and other similar events), (ii) increase the maximum number of shares of common stock subject to awards that may be granted to any participant in any calendar year, and (iii) provide that the maximum number of shares of common stock subject to awards that may be granted to any non-employee director in any calendar year is the lesser of (A) 250,000 shares and (B) shares having an annual grant date fair value of not more than $1 million. Our Board of Directors did not approve any other changes to the 2014 Equity Plan. We are seeking stockholder approval of the Amended and Restated 2014 Equity Plan.

Our Board of Directors approved the Amended and Restated 2014 Equity Plan, subject to stockholder approval, primarily to replenish the shares available to Genocea for the grant of equity awards. Our Board of Directors believes that the effective use of long-term equity compensation is vital to our ability to achieve strong performance in the future and that the continued growth and success of the Company 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 of Directors has determined that it is in the best interests of the Company and its stockholders to approve this proposal. Our Board of Directors has approved the Amended and Restated 2014 Equity 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 outstanding shares of common stock that are present in person or by proxy and entitled to vote on the proposal at the Annual Meeting.

If stockholders approve this proposal, the Amended and Restated 2014 Equity Plan will become effective as of the date of stockholder approval. If stockholders do not approve this proposal, the Amended and Restated 2014 Equity Plan will not become effective and our 2014 Equity Plan will continue to be administered in its current form. In addition, if stockholders do not approve this proposal, certain awards that were granted contingent upon obtaining stockholder approval of this proposal, as described in more detail under “New Plan Benefits” below, will be automatically forfeited.

Background

The 2014 Equity Plan was initially adopted by our Board of Directors and approved by our stockholders prior to the effectiveness of our IPO, and had an initial share reserve of 903,494 shares, plus 219,765 shares that were available for grant under our 2007 Equity Plan on the date the 2014 Equity Plan was adopted. The 2014 Equity Plan’s share reserve has an evergreen provision that automatically increases the share reserve annually on each January 1st, through January 1, 2024, in an amount equal to the lesser of 4% of outstanding shares of our common stock as of the close of business on the immediately preceding December 31st or the number of shares determined by our Board of Directors.

In addition, any shares subject to outstanding awards under the 2014 Equity Plan that expire or are otherwise forfeited to, or repurchased by, the Company become available again for future awards under the 2014 Equity Plan.

Upon the initial adoption of the 2014 Equity Plan, shares were no longer available for grant under our 2007 Equity Plan.

As of March 31, 2018, taking into account our 2018 annual equity grants (which were made in February 2018), 1,224,054 shares remain available for grant under the 2014 Equity Plan, including 793,000 shares granted in February 2018 which remain subject to approval by the Company's stockholders of this proposal. The table below includes aggregate information regarding outstanding equity awards granted under the 2014 Equity Plan or otherwise, the number of shares available for future awards under the 2014 Equity Plan and the 2014 ESPP as of March 31, 2018, and the proposed number of shares that would be available for issuance under the 2014 Equity Plan and the 2014 ESPP if this proposal and Proposal 4 are approved by our stockholders. The table below does not include the future effect, in 2019 and beyond, of the evergreen provision of the 2014 Equity Plan, which would remain in effect in accordance with the current terms of the 2014 Equity Plan if stockholders approve this proposal.

	Number of shares	As a percentage of stock outstanding	
Outstanding stock options	5,192,397	6.3	%
Total shares subject to outstanding awards	5,192,397	6.3	%
Total shares available for future awards under 2014 Equity Incentive Plan (1)	1,224,054	1.5	%
Proposed additional shares to be available for future awards under 2014 Equity Incentive Plan (2)	2,500,000	3.0	%
Total shares outstanding under existing equity awards and proposed to be available for issuance under Amended and Restated 2014 Equity Incentive Plan (1)	8,916,451	10.7	%
Total shares subject to outstanding options under 2014 ESPP	—		
Total shares available for future options under 2014 ESPP	7		
Proposed additional shares to be available for future options under 2014 ESPP (3)	2,500,000	3.0	%
Total shares outstanding under existing options and proposed to be available for issuance under 2014 ESPP	2,500,007	3.0	%
Total shares subject to outstanding options granted under inducement awards(4)	200,000	0.2	%

(1) Includes 793,000 shares under awards granted in February 2018 subject to stockholder approval of this Proposal 3. Does not include the future effect, in 2019 and beyond, of the evergreen provision of the 2014 Equity Plan.

(2) Share counting provisions, including adjustments to the number of shares available under the 2014 Equity Incentive Plan, are described below under “Authorized Shares” and “Certain Transactions; Certain Adjustments”.

(3) See Proposal 4, below.

(4) On March 12, 2018, the Company granted an option to purchase 200,000 shares of common stock as an inducement award in accordance with Nasdaq Listing Rule 5635(c)(4).

Our Board of Directors believes that additional shares are necessary to meet the Company’s anticipated equity compensation needs. Our Board of Directors believes the Company can meet these anticipated needs for approximately the next four to six years after the Annual Meeting if this Proposal 3 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 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.

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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 the Company's 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.

Consider Unique Factors to Genocea

- The weighted average exercise price of our outstanding options as of March 31, 2018 was $4.13, which is significantly higher than the $1.05 closing market price of the Company's common stock on the Nasdaq Global Market on March 29, 2018. 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 2018 evergreen increase to the share reserve that occurred on January 1, 2018 was based on 28,734,898 outstanding shares of common stock; subsequently, on January 17, 2018, the Company entered into agreements to raise approximately $55.0 million and issue 53,365,000 additional shares of common stock and 1,635 shares of Series A convertible preferred stock (convertible into 1,635,000 shares of common stock). As a result, the 2018 evergreen increase to the share reserve was significantly lower than originally intended, exacerbating the strain on our ability to provide competitive grants under the new capitalization following the financing event.

Our Company is Committed to the Effective Utilization of Shares

- The Compensation Committee has engaged Pay Governance, 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 in structuring a compensation program designed to optimize our share utilization.

- The Company has maintained an annual burn rate within competitive biotechnology company market ranges in the last three fiscal years of 5.3%, 5.6%, and 2.9% in 2017, 2016, and 2015, 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 2,500,000 shares, the executive awards contingent on shareholder approval of proposal #3 and the proposed share increase under the 2014 ESPP), as of March 31, 2018, was 7.7% of stock outstanding, which is positioned at the low end of market for biotechnology companies.

The 2014 Equity Plan Requires Additional Shares to Meet our Forecasted Needs

We have granted equity awards representing 2,336,708 shares in February 2018 (roughly 2.8% of our outstanding shares as of March 31, 2018), of which 793,000 shares are subject to stockholder approval of this Proposal 3. We anticipate granting additional awards in 2018 as our Company grows.

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 2014 Equity 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.

In addition, our Board of Directors, based on the recommendation of the Compensation Committee, concluded that adjusting the individual limits under the 2014 Equity Plan was appropriate due to the decrease in the market value of our common stock from when the 2014 Equity Plan was originally approved. As a result, our Board of Directors, based on the recommendation of the Compensation Committee approved adjustments to the annual limits applicable

to participants. The adjustments (i) increase the maximum number of shares of stock subject to stock options and SARs that may be granted to any participant in any calendar year, in each case, to 1,500,000 shares, (ii) increase the maximum number of shares of stock subject to other awards that may be granted to any participant in any calendar year to 1,000,000 shares, and (iii) provide that the maximum number of shares of common stock subject to awards that may be granted to any non-employee director in any calendar year is the lesser of (A) 250,000 shares and (B) shares having an annual grant date fair value of not more than $1 million. The other material features of the 2014 Equity Plan remain the same as under the terms of the 2014 Equity Plan previously approved by our stockholders. A summary of the 2014 Equity Plan, as amended and restated, are described below. The following summary is qualified in its entirety by reference to our 2014 Equity Plan, as amended and restated, a copy of which is set forth as Appendix B.

Material Features of the 2014 Equity Plan

Administration

The 2014 Equity Plan is administered by our Compensation Committee. Our Compensation Committee has the authority to, among other things, interpret the 2014 Equity 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 2014 Equity Plan. Our Compensation Committee's determinations under the 2014 Equity Plan are conclusive and binding. Our Compensation Committee may delegate its authority under the 2014 Equity Plan to the extent permitted by applicable law. References in this summary to our Compensation Committee refer to our Compensation Committee and its applicable delegates.

Eligibility

Our key employees, directors, consultants and advisors are eligible to participate in the 2014 Equity Plan. As of March 31, 2018, we estimate that approximately 49 employees, seven directors and three consultants and advisors would be eligible to participate in the 2014 Equity Plan.

Authorized Shares

Subject to adjustment, as described below, the maximum number of shares of our common stock that may be delivered in satisfaction of awards under the 2014 Equity Plan as of March 31, 2018 is 6,416,451 shares, of which 1,224,054 shares remained available for grant as of March 31, 2018 (including 793,000 shares under awards granted in February 2018 subject to stockholder approval of this Proposal 3). If this proposal is approved by stockholders, an additional 2,500,000 shares will become available under the 2014 Equity Plan. The number of shares of our common stock available for issuance under the 2014 Equity Plan will be automatically increased annually on each January 1st, through January 1, 2024, in an amount equal to the lesser of 4% of outstanding shares of our common stock as of the close of business on the immediately preceding December 31st or the number of shares determined by our Board of Directors. Subject to adjustment, as described below, no more than 9,000,000 shares of our common stock may be delivered in satisfaction of incentive stock options, or ISOs, awarded under the 2014 Equity Plan.

The shares of our common stock to be issued under the 2014 Equity Plan may be authorized but unissued shares of our common stock or previously issued shares of our common stock acquired by us. Any shares of our common stock underlying awards that are settled in cash, expire or become unexercisable without having been exercised or that are forfeited or repurchased by us will again be available for issuance under the 2014 Equity Plan. In addition, the number of shares of our common stock delivered in satisfaction of awards will be determined net of shares of our common stock withheld by us in payment of the exercise price of an award or in satisfaction of tax withholding requirements with respect to an award.

The closing price of our common stock as reported on Nasdaq on March 29, 2018 was $1.05 per share.

Individual Limits

The maximum number of shares of our common stock subject to stock options and the maximum number of shares of our common stock subject to stock appreciation rights, or SARs, that may be granted to any participant in the 2014 Equity Plan in any calendar year is, in each case, 1,500,000 shares. The maximum number of shares of our common stock subject to other awards that may be granted to any participant in the 2014 Equity Plan in any calendar year is 750,000 shares. A participant who is a non-employee director on our Board of Directors may not receive awards in

any calendar year with respect to the lesser of (A) 250,000 shares of our common stock, or (B) shares of our common stock having an aggregate grant date fair value in excess of $1 million (such limit does not apply to any award granted pursuant to a director's election to receive shares of our common stock in lieu of cash fees).

Types of Awards

The 2014 Equity Plan provides for awards of stock options, SARs, restricted stock, unrestricted stock, stock units, performance awards and other awards convertible into or otherwise based on shares of our common stock. Eligibility for stock options intended to be ISOs is limited to our employees. Dividend equivalents may also be provided in connection with an award under the 2014 Equity Plan.

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 Compensation Committee will determine the time or times at which stock options or SARs become exercisable and the terms on which such awards remain exercisable.

Restricted and unrestricted stock. A restricted stock award is an award of shares of our common stock subject to forfeiture restrictions, while an unrestricted stock award is not subject to such restrictions.

Stock units. A 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 stock unit may be subject to the satisfaction of performance conditions or other vesting conditions.

Performance awards. A performance award is an award the vesting, settlement or exercisability of which is subject to the satisfaction of specified performance criteria.

Other awards. Other awards are awards that are convertible into or otherwise based on shares of our common stock.

Performance Awards

The 2014 Equity Plan provides for the grant of performance awards that are made based upon, and subject to achieving, performance objectives. Performance objectives with respect to those awards that are intended to qualify as "performance-based compensation" for purposes of Section 162(m) of the Code, or Section 162(m), to the extent applicable, are limited to an objectively determinable measure or measures of performance relating to any or any combination of the following (measured either absolutely or by reference to an index or indices and determined either on a consolidated basis or, as the context permits, on a divisional, subsidiary, line of business, project or geographical basis or in combinations thereof): sales; revenues; assets; expenses; earnings before or after deduction for all or any portion of interest, taxes, depreciation, amortization or equity expense, whether or not on a continuing operations or an aggregate or per share basis; return on equity, investment, capital, capital employed or assets; one or more operating ratios; operating income or profit, including on an after-tax basis; net income; borrowing levels, leverage ratios or credit rating; market share; capital expenditures; cash flow; stock price; stockholder return; sales of particular products or services; customer acquisition or retention; acquisitions and divestitures (in whole or in part); joint ventures, strategic alliances, licenses or collaborations; spin-offs, split-ups and the like; reorganizations; recapitalizations, restructurings, financings (issuance of debt or equity) or refinancings; manufacturing or process development; or achievement of clinical trial or research objectives, regulatory or other filings or approvals or other product development milestones.

To the extent consistent with the requirements for satisfying the performance-based compensation exception under Section 162(m), to the extent applicable, our Compensation Committee may provide in the case of any award intended to qualify for such exception that one or more of the performance objectives applicable to an award will be adjusted in an objectively determinable manner to reflect events (for example, the impact of charges for restructurings, discontinued operations, mergers, acquisitions, extraordinary items, and other unusual or non-recurring items, and the cumulative effects of tax or accounting changes, each as defined by U.S. generally accepted accounting principles) occurring during the performance period that affect the applicable performance objectives.

Vesting; Termination of Employment or Service

Our Compensation Committee has the authority to determine the vesting schedule applicable to each award, and to accelerate the vesting or exercisability of any award. Our Compensation Committee will determine the effect of termination of employment or service on an award. Unless otherwise provided by our Compensation Committee, upon a termination of a participant's employment or service, all unvested stock options and SARs then held by the participant will terminate and all other unvested awards will be forfeited and all vested stock options and SARs then held by the participant will remain outstanding for three months following such termination, or one year in the case of death, or, in each case, until the applicable expiration date, if earlier. All stock options and SARs held by a participant immediately prior to the participant's termination of employment or service will immediately terminate if such termination is for cause, as defined in the 2014 Equity Plan, or occurs in circumstances that would have constituted grounds for the participant's employment or service to be terminated for cause.

Non-Transferability of Awards

Awards under the 2014 Equity Plan may not be transferred other than by the laws of descent and distribution, unless, for awards other than ISOs, otherwise provided by our Compensation Committee.

Recovery of Compensation

Our Compensation Committee may cancel, rescind, withhold or otherwise limit or restrict any award at any time under the 2014 Equity Plan if the participant is not in compliance with the provisions of the 2014 Equity Plan or any award thereunder or if the participant breaches any agreement with our company with respect to non-competition, non-solicitation or confidentiality. Our Compensation Committee also may recover any award or payments or gain in respect of any award under the 2014 Equity Plan in accordance with any applicable company recoupment policy or as otherwise required by applicable law or applicable stock exchange listing standards.

Certain Transactions; Certain Adjustments

In the event of a consolidation, merger or similar transaction or series of related transactions, including a sale or other disposition of shares of our common stock, in which our company is not the surviving corporation or that results in the acquisition of all or substantially all of our then outstanding shares of common stock by a single person or entity or by a group of persons and/or entities acting in concert, a sale of all or substantially all of our assets or our dissolution or liquidation (any of the foregoing, a “covered transaction”), our Compensation Committee may, among other things, provide for the continuation or assumption of outstanding awards, for new grants in substitution of outstanding awards, for the accelerated vesting or delivery of shares under awards or for a cash-out of outstanding awards, in each case, on such terms and with such restrictions as it deems appropriate. Except as our Compensation Committee may otherwise determine, awards not assumed in connection with such a transaction will terminate automatically and, in the case of outstanding restricted stock, will be forfeited automatically, upon the consummation of a covered transaction.

In the event of a stock dividend, stock split or combination of shares, including a reverse stock split, recapitalization or other change in our capital structure that constitutes an equity restructuring within the meaning of FASB ASC 718, our Compensation Committee will make appropriate adjustments to the maximum number of shares of our common stock that may be delivered under, and the ISO and individual share limits included in, the 2014 Equity Plan, and will also make appropriate adjustments to the number and kind of shares or securities subject to awards, the exercise prices of such awards or any other terms of awards affected by such change. Our Compensation Committee may also make the types of adjustments described above to take into account distributions and other events other than those listed above if it determines that such adjustments are appropriate to avoid distortion in the operation of the 2014 Equity Plan.

Amendment; Termination

Our Compensation Committee may amend the 2014 Equity Plan or outstanding awards, or terminate the 2014 Equity Plan as to future grants of awards, except that our Compensation Committee 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 (unless expressly provided in the 2014 Equity Plan or the right to alter the terms of an award was expressly reserved by our Compensation Committee at the time the award was granted). Stockholder approval will be required for any amendment to the 2014 Equity Plan to the extent such approval is required by law, including applicable stock exchange requirements.

Certain Federal Income Tax Consequences

This following is a summary of certain U.S. federal income tax consequences associated with awards granted under the 2014 Equity Plan. The summary does not purport to cover federal employment tax or other U.S. federal tax consequences that may be associated with the 2014 Equity Plan, nor does it cover state, local or non-U.S. taxes.

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 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. A corresponding deduction is generally available to the Company. 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.

ISOs

In general, a participant realizes no taxable income upon the grant or exercise of an ISO. However, the exercise of an ISO may result in an alternative minimum tax liability to the participant. With some exceptions, a disposition of shares acquired upon exercise of an ISO within two years from the date of grant or within one year after exercise produces ordinary income to the participant (and generally a deduction to the Company) equal to the value of the shares at the time of exercise less the exercise price. Any additional gain recognized in the disposition is treated as a capital gain for which the Company is not entitled to a deduction. If the participant does not dispose of the shares until after the expiration of these one and two-year holding periods, any gain or loss recognized upon a subsequent sale of shares acquired upon exercise of an ISO is treated as a long-term capital gain or loss for which the Company is not entitled to a deduction.

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.

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. 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. 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 2014 Equity 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.

Unrestricted Stock Awards

A participant who purchases or is awarded unrestricted stock generally 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.

Restricted Stock Units

The grant of a restricted stock unit does not itself generally result in taxable income. Instead, the participant is taxed upon vesting and settlement (and a corresponding deduction is generally available to the Company), unless he or she has made a proper election to defer receipt of the shares (or cash if the award is cash settled) under Section 409A of

the Code. If the shares delivered are restricted for tax purposes, the participant will instead be subject to the rules described above for restricted stock.

New Plan Benefits

Because future awards under the 2014 Equity Plan will be granted in the discretion of our Board of Directors or our Compensation Committee, the type, number, recipients, and other terms of such awards cannot be determined at this time.

The following table sets forth stock options that were approved by our Board of Directors to the persons and groups named below under the 2014 Equity Plan in February 2018, subject to receiving the approval of stockholders of this proposal. Should such stockholder approval not be obtained, then these grants will be automatically forfeited. These stock options vest annually in 48 equal monthly installments beginning on the first monthly anniversary of the grant date.

Name and Position	Number of Stock Options
William Clark, President and Chief Executive Officer	468,000
Seth Hetherington, M.D., Former Chief Medical Officer	—
Jonathan Poole, Former Chief Financial Officer	—
Other Executives	325,000
Executive Group	793,000
Non-Executive Director Group	—
Non-Executive Officer Employee Group	—

THE BOARD OF DIRECTORS UNANIMOUSLY RECOMMENDS THAT YOU VOTE
FOR
THE APPROVAL OF THE AMENDED AND RESTATED GENOCEA BIOSCIENCES, INC. 2014 EQUITY INCENTIVE PLAN
(PROPOSAL 3 ON YOUR PROXY CARD)

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PROPOSAL NO. 4—TO APPROVE AN AMENDMENT TO THE GENOCEA BIOSCIENCES, INC. 2014 EMPLOYEE STOCK PURCHASE PLAN TO INCREASE THE NUMBER OF SHARES OF COMMON STOCK RESERVED FOR ISSUANCE BY 2,500,000 SHARES AND TO INCREASE THE NUMBER OF SHARES THAT MAY BE PURCHASED BY A PARTICIPANT ON ANY EXERCISE DATE BY 18,000 SHARES

Our Board of Directors is asking the stockholders to approve an amendment to our 2014 Employee Stock Purchase Plan (the "2014 ESPP"), to increase by 2,500,000 shares the number of shares of our common stock reserved for issuance and to increase the number of shares that may be purchased by a participant on any exercise date by 18,000 shares (to 20,000 shares) under the 2014 ESPP (the "2014 ESPP Amendment"). As of April 23, 2018, 7 shares of our common stock remained reserved for issuance under the 2014 ESPP. Upon approval of the 2014 ESPP Amendment, an additional 2,500,000 shares of our common stock would be made available for sale under the 2014 ESPP, increasing the aggregate number of shares authorized for sale to 2,500,007 shares and increasing the number of shares that may be purchased by a participant on any exercise date to 20,000 shares. Other than the proposed increase to the number of shares reserved for issuance under the 2014 ESPP and the increase in the number of shares that may be purchased by a participant on any exercise date, the 2014 ESPP Amendment does not make any other changes to the 2014 ESPP.

The 2014 ESPP is an employee benefit plan that enables eligible employees to purchase shares of our common stock through payroll deductions without incurring broker commissions. The purposes of the 2014 ESPP are to assist eligible employees in acquiring a stock ownership interest in the Company and to encourage them to continue as our employees. The 2014 ESPP is intended to qualify for favorable federal income tax treatment under Section 423 of the Code.

We believe that the 2014 ESPP provides a valuable opportunity for employees to acquire an ownership interest in the Company and provides stockholder value by aligning employee and stockholder interests. We rely on equity incentives to attract and retain our employees, and we believe that such incentives are essential to our long-term growth and future success. The proposed share increase will ensure that a sufficient reserve of common stock remains available under the 2014 ESPP to allow us to continue to provide equity incentives to our employees on a competitive level.

If stockholders do not approve this Proposal 4, the 2014 ESPP will continue to remain in effect in accordance with its current terms. However, because only 7 shares of our common stock remained available for issuance under the 2014 ESPP as of April 23, 2018, we would no longer be able to use this form of equity-based compensation to attract, retain and motivate our employees.

The material terms of the 2014 ESPP are summarized below, after giving effect to the 2014 ESPP Amendment. This summary of the 2014 ESPP is not intended to be a complete description of the 2014 ESPP and is qualified in its entirety by the actual text of the 2014 ESPP. The 2014 ESPP, as proposed to be amended as a result of the 2014 ESPP Amendment, is set forth in Appendix C of this proxy statement.

Administration

The 2014 ESPP is administered by our Compensation Committee, which has the authority to interpret the 2014 ESPP, determine eligibility under the 2014 ESPP, prescribe forms, rules and procedures relating to the 2014 ESPP and otherwise do all things necessary or appropriate to carry out the purposes of the 2014 ESPP. Our Compensation Committee's determinations under the 2014 ESPP are final and binding on all participants. Our Compensation Committee may delegate its authority under the 2014 ESPP to the extent permitted by applicable law. References in this summary to our Compensation Committee refer to our Compensation Committee and its applicable delegates.

Eligibility

Generally, each of our employees (including employees of participating subsidiaries) will be eligible to participate in the 2014 ESPP if such employee has been employed by us (or a participating subsidiary) for at least 10 business days as of the first day of an option period and customarily works 20 hours or more per week. However, an employee may not be granted an option to purchase shares of our common stock under the 2014 ESPP if, immediately after the option is granted, the employee would own stock possessing 5% or more of the total combined voting power or value of all classes of our stock or would hold rights to purchase shares of our common stock under all our employee stock purchase plans, including the 2014 ESPP, that accrue at a rate that exceeds $25,000 in fair market value for each calendar year. As of March 31, 2018, we estimate that approximately 49 employees would be eligible to participate in the 2014 ESPP.

Authorized Shares

Subject to adjustment, as described below, the maximum aggregate number of shares of our common stock available for purchase pursuant to the exercise of options granted under the 2014 ESPP is 2,500,007 shares. The closing price of our common stock as reported on Nasdaq on March 29, 2018 was $1.05 per share.

Option Periods

The 2014 ESPP provides for six-month option periods commencing on January 1 and ending June 30 and commencing July 1 and ending December 31 of each calendar year, unless otherwise determined by the Compensation Committee.

Option Grant

Subject to the limitations in the 2014 ESPP, participants in the 2014 ESPP will be granted an option on the first day of an option period to purchase shares of our common stock on the last day of the option period (i.e., the exercise date).

Participation

Eligible employees may participate in the 2014 ESPP by executing and delivering to our Compensation Committee a payroll deduction and participation authorization form in accordance with the rules set forth in the 2014 ESPP. Participants may end their participation in a current option period upon notice to our Compensation Committee (not less than 10 days prior to the exercise date) and the accrued payroll deductions will be returned to the participant. Participation ends automatically upon termination of employment with us.

Purchase Price

The purchase price of a share of our common stock issued pursuant to the exercise of an option under the 2014 ESPP will be equal to 85% (or such greater percentage as specified by the Compensation Committee) of the lower of the fair market value of our common stock on the first day of the option period or the exercise date.

Exercise of Option

The 2014 ESPP will permit participants to purchase shares of our common stock through payroll deductions of up to $1,000 of their eligible compensation per payroll period. A participant may purchase a maximum of 20,000 shares of our common stock during any option period. Subject to the limitations described herein and set forth in the 2014 ESPP, on the exercise date of each option period, each participant will be deemed to have exercised his or her option and the participant's accumulated payroll deductions will be applied to purchase shares of our common stock.

Non-transferable

A participant may not transfer an option granted under the 2014 ESPP.

Change in Capitalization

In the event of a change in our outstanding shares of common stock due to a stock dividend, split-up, recapitalization, merger, consolidation, reorganization, or other capital change, the aggregate number and type of shares of our common stock available under the 2014 ESPP, the number and type of shares granted under any outstanding option, and the purchase price per share under any outstanding option will be appropriately adjusted in a manner that

complies with Section 423.

Merger, Sale of Assets

In the event of a sale of all or substantially all of our assets, or a merger or similar transaction in which the Company is not the surviving corporation or that results in the acquisition of the Company by another person, the Compensation Committee may, in its discretion, (a) if the Company is merged with or acquired by another corporation, provide that each outstanding option will be assumed or exchanged for a substitute option granted by the acquiror or successor corporation, (b) cancel each outstanding option, and/or (c) terminate the option period then in effect.

Amendment; Termination

Our Board of Directors has the right to amend, suspend or terminate the 2014 ESPP at any time. Unless terminated earlier, the 2014 ESPP will automatically terminate in 2024.

Certain Federal Income Tax Consequences

This following is a summary of certain U.S. federal income tax consequences associated with options granted under the 2014 ESPP and shares purchased upon the exercise of options granted under the 2014 ESPP ("Shares"). The summary does not purport to cover federal employment tax or other U.S. federal tax consequences that may be associated with the 2014 ESPP, nor does it cover state, local or non-U.S. taxes. We intend, and this summary assumes, that the 2014 ESPP will qualify as an "employee stock purchase plan" under Section 423 of the Code.

Payroll Deductions; Grant of Option

The amounts deducted from a participating employee's compensation pursuant to the 2014 ESPP will be included in the employee's compensation and will be subject to federal income and employment tax. In general, no income will be recognized by the employee either on the grant of an option under the 2014 ESPP or when the employee purchases Shares upon the exercise of an option under the 2014 ESPP.

Qualifying Disposition of Shares

If Shares are sold or disposed of (i) two years after the option grant, and (ii) one year after the Shares were purchased under the ESPP, or after the employee's death if the employee dies while holding the Shares (a "qualifying disposition"), the employee (or in the case of death, the employee's estate) recognizes ordinary income to the extent of the lesser of (a) the excess of the fair market value of the Shares on the first trading day of the offering period over the purchase price of the Shares (or such other amount equal to the purchase price discount), or (b) the excess of fair market value of the Shares at the time of such disposition over the purchase price of the Shares. Any further gain recognized on a qualifying disposition will be long-term capital gain. If the sale price is less than the purchase price, then the employee will not recognize ordinary income, and any loss recognized by the employee generally will be a long-term capital loss.

Disqualifying Disposition of Shares

When an employee sells or disposes of the Shares acquired under the 2014 ESPP before the expiration of the required holding periods described above (a "disqualifying disposition"), the employee will recognize ordinary income to the extent of the difference between the purchase price for the Shares and the fair market value of the Shares on the purchase date, regardless of the price at which the Shares are sold. Any additional gain recognized upon the disqualifying disposition will be capital gain. The capital gain will be long-term if the employee held the Shares more than one year. If the sale price is less than the fair market value of the Shares on the purchase date, then the employee will recognize a capital loss equal to such difference.

Tax Deduction by the Company

Even though an employee must treat part of his or her gain on a qualifying disposition of Shares acquired under the 2014 ESPP as ordinary income, the Company may not take a deduction for this amount. However, if an employee makes a disqualifying disposition of Shares, the amount of ordinary income recognized by the employee generally qualifies as a deduction for the Company, subject to any limitations imposed under the Code.

New Plan Benefits

Participation in the 2014 ESPP is entirely within the discretion of the eligible employees. Because we cannot presently determine the rate of contributions by these employees or the eventual purchase price under the 2014 ESPP, it is not possible to determine the value of benefits that may be obtained by participants under the 2014 ESPP.

THE BOARD OF DIRECTORS UNANIMOUSLY RECOMMENDS THAT YOU VOTE
FOR
THE APPROVAL OF THE AMENDMENT TO THE GENOCEA BIOSCIENCES, INC. 2014 EMPLOYEE STOCK PURCHASE PLAN TO INCREASE THE NUMBER OF SHARES OF COMMON STOCK RESERVED FOR ISSUANCE BY 2,500,000 SHARES AND TO INCREASE THE NUMBER OF SHARES THAT MAY BE PURCHASED BY A PARTICIPANT ON ANY EXERCISE DATE BY 18,000 SHARES

(PROPOSAL 4 ON YOUR PROXY CARD)

PROPOSAL NO. 5—RATIFICATION OF SELECTION OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

The Audit Committee and the Board of Directors believe that the continued retention of Ernst & Young LLP as our independent registered public accounting firm is in the best interest of the Company and our stockholders and we are asking our stockholders to ratify the Audit Committee's selection of Ernst & Young LLP as our independent registered public accounting firm for the fiscal year ending December 31, 2018. Although ratification is not required by our amended and restated by-laws or otherwise, the Board of Directors is submitting the selection of Ernst & Young LLP to our stockholders for ratification as a matter of good corporate practice. If the selection is not ratified, the Audit Committee will consider whether it is appropriate to select another independent registered public accounting firm. Even if the selection is ratified, the Audit Committee in its discretion may select a different registered public accounting firm at any time during the year if the committee determines that such a change would be in the best interests of the Company and our stockholders.

The Board of Directors first approved Ernst & Young LLP as our independent registered public accounting firm in 2009, and Ernst & Young LLP has audited our consolidated financial statements at December 31, 2017 and 2016, and for the years ended December 31, 2017, 2016 and 2015. Representatives of Ernst & Young LLP are expected to be present at the Annual Meeting. They will be given an opportunity to make a statement at the Annual Meeting if they desire to do so, and they will be available to respond to appropriate questions.

The Audit Committee pre-approves all audit and permitted non-audit services (including the fees and terms thereof) to be performed by Ernst & Young LLP, subject to the de minimis exception for non-audit services that are approved by the Audit Committee prior to the completion of an audit. The Audit Committee may delegate pre-approval authority to one or more members of the Audit Committee consistent with applicable law and listing standards, provided that the decisions of such Audit Committee member or members must be presented to the full Audit Committee at its next scheduled meeting. All of the services described in the following fee table were approved in conformity with the Audit Committee's pre-approval process.

Principal Accountant Fees and Services

We regularly review the services and fees of our independent registered public accounting firm. These services and fees are also reviewed by the Audit Committee on an annual basis. The aggregate fees billed for the fiscal years ended December 31, 2017 and 2016 for each of the following categories of services are as follows:

Fee Category	2017	2016
Audit Fees	$513,703	$551,777
Audit-Related Fees	—	—
Tax Fees	—	—
All Other Fees	—	—
Total Fees	$513,703	$551,777

Audit Fees. Consists of fees billed for professional services rendered for the audit of our annual financial statements, the review of interim financial statements and services provided in connection with our registration statements on Form S-8.

Audit-Related Fees. Consist of fees billed for assurance and related services that are reasonably related to the performance of the audit or review of our financial statements and are not reported under Audit Fees.

Tax Fees. Consists of fees billed for tax compliance, tax advice and tax planning and includes fees for tax return preparation.

All Other Fees. Consists of all other fees billed other than those described above under Audit Fees, Audit-Related Fees and Tax Fees.

All of the services under the captions "Audit Fees" were pre-approved by our Audit Committee.

Pre-Approval Policies and Procedures

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

From time to time, our Audit Committee may pre-approve specified types of services that are expected to be provided to us by our registered public accounting firm during the next 12 months. Any such pre-approval is detailed as to the particular service or type of services to be provided and is also generally subject to a maximum dollar amount.

THE BOARD OF DIRECTORS UNANIMOUSLY RECOMMENDS THAT YOU VOTE
FOR
THE RATIFICATION OF THE APPOINTMENT OF ERNST & YOUNG LLP AS THE COMPANY'S INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM.

(PROPOSAL 5 ON YOUR PROXY CARD)

BENEFICIAL OWNERSHIP OF COMMON STOCK

The following table sets forth information relating to the beneficial ownership of our common stock as of March 31, 2018, by: each person, or group of affiliated persons, known by us to beneficially own more than 5% of our outstanding shares of common stock; each of our directors; each of our named executive officers; and all directors and executive officers as a group.

The percentage of shares beneficially owned is computed on the basis of 83,057,643 shares of our common stock outstanding as of March 31, 2018. The number of shares beneficially owned by each entity, person, director or executive officer is determined in accordance with the rules of SEC, and the information is not necessarily indicative of beneficial ownership for any other purpose. Shares of our common stock that a person has the right to acquire within 60 days of March 31, 2018 are deemed outstanding for purposes of computing the percentage ownership of the person holding such rights, but are not deemed outstanding for purposes of computing the percentage ownership of any other person, except with respect to the percentage ownership of all directors and executive officers as a group. Unless otherwise indicated below, the address for each beneficial owner listed is c/o Genocea Biosciences, Inc., Cambridge Discovery Park, 100 Acorn Park Drive, Cambridge, MA 02140.

Name and Address of Beneficial Owned	Number of Shares Beneficially Owned	Percentage of Shares Beneficially Owned	
5% or greater stockholders:			
New Enterprise Associates 16, L.P. (1) 1954 Greenspring Drive, Suite 600 Timonium, MD 2093	37,500,000	39.24	%
Vivo Opportunity , LLC (2) 505 Hamilton Avenue, Suite 2017 Palo Alto, CA 94301	8,315,000	9.99	%
BVF Inc. and affiliates (3) 1 Sansome Street, 30th Floor San Francisco, CA 94104	7,500,000	8.77	%
Directors and Named Executive Officers:			
William Clark (4)	1,052,634	1.25	%
Seth Hetherington, M.D. (5)	264,549	*	
Jonathan Poole (6)	380,342	*	
Kenneth Bate (7)	30,126	*	
Ali Behbahani, M.D.	—	—	
Katrine Bosley (8)	88,100	*	
Ronald Cooper (9)	8,333	*	
Michael Higgins (10)	25,084	*	
Howard Mayer, M.D. (11)	8,333	*	
George Siber, M.D.(12)	139,195	*	
All executive officers and directors as a group (13 persons) (13)	2,512,982	2.95	%

*Represents beneficial ownership of less than one percent of our outstanding common stock.

(1) Based on a Schedule 13D filed with the SEC on January 26, 2018, consisting of 25,000,000 shares of common stock and 25,000,000 Class A warrants to purchase 12,500,000 shares of common stock within 60 days of March 31, 2018, held of record by New Enterprise Associates 16, L.P. ("NEA 16"). NEA Partners 16, L.P. ("NEA Partners 16") is the sole general partner of NEA 16. NEA 16 GP, LLC ("NEA 16 LLC") is the sole general partner of NEA Partners 16. The individual managers of NEA 16 LLC are Peter J. Barris, Forest Baskett, Anthony A.

Florence, Jr., Mohamad H. Makhzoumi, Joshua Makower, David M. Mott, Chetan Puttagunta, Jon M. Sakoda, Scott D. Sandell, Peter W. Sonsini and Ravi Viswanathan (collectively, the "Managers"). The Managers share voting and dispositive power with regard to the shares held directly by NEA 16.

(2) Based on a Schedule 13G filed with the SEC on January 26, 2018, consisting of 8,180,000 shares of common stock and 135,000 shares of common stock issuable upon conversion of Series A convertible preferred stock held of record by Vivo Opporunity Fund, L.P. Excludes 1,500,000 shares of common stock issuable upon conversion of Serie

s A convertible preferred stock and 4,907,500 shares of common stock issuable upon exercise of 9,815,000 Class A warrants, which are not exercisable within 60 days of March 31, 2018 by virtue of the beneficial ownership limitation described below. Vivo Opportunity, LLC is the general partner of Vivo Opportunity Fund, L.P. The voting members of Vivo Opportunity, LLC are Frank Kung, Albert Cha, Shan Fu, Gaurav Aggarwal and Michael Chang, none of whom has individual voting or investment power with respect to these shares of common stock and each of whom disclaims beneficial ownership of such shares of common stock. The number of shares of common stock into which the Series A convertible preferred stock are convertible is limited to that number of shares of common stock which would result in the stockholder, together with its affiliates, having an aggregate beneficial ownership of no more than 9.99% of the total issued and outstanding shares of common stock. The number of shares of common stock issuable upon exercise of Class A warrants is limited to that number of shares of common stock which would result in the stockholder, together with its affiliates, having an aggregate beneficial ownership of no more than 4.99% to the total issued and outstanding shares of common stock. This beneficial ownership limitation may be increased or decreased to an amount not to exceed 9.99% of the number of shares of common stock outstanding immediately after giving effect to the issuance of shares of common stock issuable upon exercise of the Class A warrants.

(3) Based on a Schedule 13G filed with the SEC on January 29, 2018, consisting of 2,362,373 shares of common stock held of record by Biotechnology Value Fund, L.P. ("BVF"), 1,578,241 shares of common stock held of record by Biotechnology Value Fund II, L.P. ("BVF2"), 405,088 shares of common stock held of record by Biotechnology Value Trading Fund OS LP ("Trading Fund OS"), 654,298 shares of common stock held of record by BVF Partners OS Ltd. ("Partners OS"), Class A warrants to purchase 1,181,187 shares of common stock held of record by BVF, Class A warrants to purchase 789,120 shares of common stock held of record by BVF2, Class A warrants to purchase 202,544 shares of common stock held of record by Trading Fund OS, and Class A warrants to purchase 327,149 shares of common stock held of record by Partners OS. Partners OS, as the general partner of Trading Fund OS, may be deemed to beneficially own the 405,088 shares of common stock and Class A warrants to purchase 202,544 shares of common stock beneficially owned by Trading Fund OS. BVF Partners L.P. ("Partners"), as the general partner of BVF, BVF2, the investment manager of Trading Fund OS, and the sole member of Partners OS, may be deemed to beneficially own the 5,000,000 shares of common stock and Class A warrants to purchase 2,500,000 shares of common stock beneficially owned in the aggregate by BVF, BVF2, Trading Fund OS, and certain Partners managed accounts (the “Partners Managed Accounts”), including 654,298 shares of common stock and Class A warrants to purchase 327,149 shares of common stock held in the Partners Managed Accounts. BVF Inc., as the general partner of Partners, may be deemed to beneficially own the 5,000,000 shares of common stock and Class A warrants to purchase 2,500,000 shares of common stock beneficially owned by Partners. All Class A warrants to purchase 2,500,000 shares of common stock are exercisable within 60 days of March 31, 2018. Mark N. Lampert, as a director and officer of BVF Inc., may be deemed to beneficially own the 5,000,000 shares of common stock and Class A warrants to purchase 2,500,000 shares of common stock beneficially owned by BVF Inc. Partners OS disclaims beneficial ownership of the shares of common stock and Class A warrants beneficially owned by Trading Fund OS. Each of Partners, BVF Inc. and Mr. Lampert disclaims beneficial ownership of the shares of common stock and Class A warrants beneficially owned by BVF, BVF2, Trading Fund OS and the Partners Managed Accounts.

(4) Consisting of 83,205 shares of common stock and 969,429 shares of common stock that can be acquired upon the exercise of options within 60 days of March 31, 2018.

(5) Consisting of 26,000 shares of common stock and 238,549 shares of common stock that can be acquired upon the exercise of options within 60 days of March 31, 2018. Dr. Hetherington resigned effective January 31, 2018 and his outstanding options will cancel three months after the date of his resignation.

(6) Consisting of 48,960 shares of common stock and 331,382 shares of common stock that can be acquired upon the exercise of options within 60 days of March 31, 2018. Mr. Poole resigned effective March 23, 2018 and his outstanding options will cancel three months after the date of his resignation.

(7) Consisting of 30,126 shares of common stock that can be acquired upon the exercise of options within 60 days of March 31, 2018.

(8)

Consisting of 31,092 shares of common stock and 57,008 shares of common stock that can be acquired upon the exercise of options within 60 days of March 31, 2018.

(9) Consisting of 8,333 shares of common stock that can be acquired upon the exercise of options within 60 days of March 31, 2018.

(10) Consisting of 25,084 shares of common stock that can be acquired upon the exercise of options within 60 days of March 31, 2018.

(11) Consisting of 8,333 shares of common stock that can be acquired upon the exercise of options within 60 days of March 31, 2018.

(12) Consisting of 55,348 shares of common stock and 83,847 shares of common stock that can be acquired upon the exercise of options within 60 days of March 31, 2018.

(13) Consisting of 272,707 shares of common stock and 2,240,275 shares of common stock that can be acquired upon the exercise of options within 60 days of March 31, 2018.

CERTAIN RELATIONSHIPS AND RELATED PERSON TRANSACTIONS

The following is a description of transactions since January 2017, to which we have been a party, in which the amount involved exceeded or will exceed $120,000, and in which any related person had a direct or indirect material interest.

Indemnification Agreements

We entered into indemnification agreements with each of our directors and executive officers. These agreements will require us to indemnify these individuals and, in certain cases, affiliates of such individuals, to the fullest extent permissible under Delaware law against liabilities that may arise by reason of their service to us or at our direction, and to advance expenses incurred as a result of any proceeding against them as to which they could be indemnified.

Registration Rights Agreement

We are a party to a registration rights agreement with certain holders of common stock, including some of our directors, executive officers and 5% stockholders and their affiliates and entities affiliated with our directors. The registration rights agreement provides these holders the right to demand that we file a registration statement or request that their shares be covered by a registration statement that we are otherwise filing.

Transactions with Our Executive Officers, Directors and 5% Stockholders

On May 16, 2007, we entered into a consulting agreement with Dr. George Siber, a member of our Board of Directors. The consulting agreement was amended on each of June 30, 2009, December 16, 2010, June 15, 2011, June 5, 2013, June 15, 2015 and June 13, 2017 and is in effect through June 17, 2019. Pursuant to the consulting agreement, Dr. Siber performs various consulting services for us, including determining our general scientific and business direction, recruitment of scientific advisory board members and consultants, recruitment of full-time management and scientific personnel and identifying and reviewing scientific developments and intellectual property. Since the beginning of 2012, Dr. Siber has been paid approximately $5,000 per month under the consulting agreement which was amended to approximately $9,800 per month on June 13, 2017. See “The Board of Directors and its Committees — Director Agreements — Dr. Siber” for further details on compensation paid to Dr. Siber under the consulting agreement.

In connection with our January 2018 equity financing, we agreed to elect one representative from New Enterprise Associates, or NEA, to serve as a member of our Board of Directors. NEA was a lead investor in the January 2018 equity financing and beneficially owns approximately 31% of our common stock as of March 31, 2018. In February 2018, the Board of Directors elected Ali Behbahani, a partner in the healthcare group at NEA, as a director of the Company. We do not have any obligation to continue to nominate NEA’s representative on our Board of Directors.

Related Person Transactions Policy

Pursuant to our written related person transaction approval policy, if we want to enter into a transaction with a related person or an affiliate of a related person, our Chief Financial Officer will review the proposed transaction to determine, based on applicable Nasdaq and SEC rules, if such transaction requires pre-approval by the Audit Committee and/or Board of Directors. If pre-approval is required, such matters will be reviewed at the next regular or special Audit Committee and/or Board of Directors meeting. We may not enter into a related person transaction unless our Chief Financial Officer has either specifically confirmed in writing that no further reviews are necessary or that all requisite corporate reviews have been obtained.

Transactions with related persons

If a related person proposes to enter into such a transaction, arrangement or relationship, which we refer to as a "related person transaction," the related person must report the proposed related person transaction to our principal financial officer or his or her designee. The policy calls for the proposed related person transaction to be reviewed and, if deemed appropriate, 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, the 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, in which the amount involved does not exceed $500,000, 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 the policy will be considered approved or ratified if it is authorized by the Audit Committee after full disclosure of the related person's interest in the transaction.

In addition to the transactions that are excluded by the instructions to the SEC's related person transaction disclosure rule, our Board of Directors has determined that the following transactions are pre-approved by the Audit Committee even if the aggregate amount of such transaction exceeds $120,000:

- employment of executive officers where the related compensation is required to be reported in a proxy statement (general applicable to “named executive officers”) or the executive officer is not an immediate family member of another executive officer or director, the related compensation would be reported as compensation in a proxy statement and the Compensation Committee approved (or recommended that the Board of Directors approve) such compensation;
- any compensation paid to a director if the compensation is required to be reported in a proxy statement;
- any transaction with another company at which a related person’s only relationship is an employee (other than an executive officer), director of beneficial owner of less than 10% of that company’s shares, if the aggregate amount involved does not exceed the greater of $1 million or 2% of that company’s total annual revenues;
- any transaction where our Company is indebted to another company at which a related person’s only relationship is an employee (other than an executive officer), director of beneficial owner of less than 10% of that company’s shares, if the total amount of our Company’s indebtedness to the other company at the end of that company’s last completed fiscal year does not exceed 1% of that company’s total consolidated assets;
- any transaction where the related person’s interest arises solely from the ownership of our Company’s common stock and all holders of our Company’s common stock received the same benefit on a pro rata basis;
- any transaction involving a related person where the rates or charges involved are determined by competitive bids;
- any transaction with a related person involving the rendering of services as common or contract carrier, or public utility, at rates or charges fixed in conformity with law or governmental authority; or
- any transaction with a related person involving services as a bank depository of funds, transfer agent, registrar, trustee under a trust indenture, or similar services.

GENERAL MATTERS

Code of Business Conduct and Ethics and Corporate Governance Guidelines

We have adopted a Code of Business Conduct and Ethics for our directors, officers and employees. A copy of the Code of Business Conduct and Ethics may be accessed free of charge by visiting our website at http://ir.genocea.com/ and going to the "Investor Relations—Corporate Governance" section or by requesting a copy in writing from William Clark, Secretary, at our Cambridge, Massachusetts office. We intend to post on our website amendments to, or waivers under, a provision of the Code of Business Conduct and Ethics that apply to certain of our executive officers within four business days following the date of such amendment or waiver.

A copy of the Corporate Governance Guidelines may also be accessed free of charge by visiting the website at http://ir.genocea.com/ and going to the "Investors & Media—Corporate Governance" section or by requesting a copy in writing from William Clark, Secretary, at our Cambridge, Massachusetts office.

Availability of Certain Documents

A copy of our 2017 Annual Report has been posted on the Internet along with this Proxy Statement. We will mail without charge, upon written request, a copy of our 2017 Annual Report excluding exhibits. Please send a written request to our Corporate Secretary at:

Genocea Biosciences, Inc.
100 Acorn Park Drive

Cambridge, MA 02140

Attention: Secretary

Only one copy of this Proxy Statement is being delivered to multiple stockholders sharing an address, unless we have received contrary instructions from one or more of the stockholders. We will undertake to deliver promptly, upon written or oral request, a separate copy to a stockholder at a shared address to which a single copy of the Proxy Statement was delivered. You may make a written or oral request by sending a written notification to our Secretary at the address above, providing your name, your shared address, and the address to which we should direct the additional copy of the Proxy Statement. Multiple stockholders sharing an address who have received one copy of the Proxy Statement and would prefer us to mail each stockholder a separate copy of future mailings should contact us at our principal executive offices. Additionally, if current stockholders with a shared address received multiple copies of the Proxy Statement and would prefer us to mail one copy of future mailings to stockholders at the shared address, notification of that request may also be made through our principal executive offices.

Stockholder Proposals and Nominations

Requirements for Stockholder Proposals to be Considered for Inclusion in our Proxy Materials. To be considered for inclusion in next year's Proxy Statement, stockholder proposals pursuant to Rule 14a-8 under the Exchange Act must be received by our Secretary at Genocea Biosciences, Inc., 100 Acorn Park Drive, Cambridge, MA 02140 no later than 120 days prior to April [ ], 2019.

Requirements for Stockholder Proposals or Director Nominations to be Brought Before an Annual Meeting. Our amended and restated by-laws provide that, for stockholder nominations to the Board of Directors or other proposals to be considered at an annual meeting, the stockholder must have given timely notice thereof in writing to the Secretary at Genocea Biosciences, Inc., 100 Acorn Park Drive, Cambridge, MA 02140. To be timely for the 2019 annual meeting, the stockholder's notice must be delivered to or mailed and received by us not more than 120 days, and not less than 90 days, before the anniversary date of the preceding annual meeting, except that if there was no annual meeting in the prior year or if the current year’s annual meeting is more than 30 days before or after the anniversary date of the previous year’s annual meeting, we must receive the notice not later than the close of business on the tenth day following the day on which we provide notice or public disclosure of the date of the meeting. Such notice must provide the information required by our by-laws with respect to each matter the stockholder proposes to bring before the 2019 annual meeting.

Communications with the Board of Directors

A stockholder may send general communications to our Board of Directors, any committee of our Board of Directors or any individual director by directing such communication to our Corporate Secretary at:

Genocea Biosciences, Inc.
100 Acorn Park Drive
Cambridge, Massachusetts 02140
Attention: Secretary

The communication must prominently display the legend "BOARD COMMUNICATION" in order to indicate to the Secretary that it is a communication for the Board of Directors. Upon receiving such a communication, the Secretary will promptly forward the communication to the relevant individual or group to which it is addressed. Certain items that are unrelated to the Board of Directors' duties and responsibilities may be excluded, such as spam, junk mail and mass mailings, resumes and other forms of job inquiries, surveys and business solicitations or advertisements. The Secretary will not forward any communication determined in his good faith belief to be frivolous, unduly hostile, threatening, illegal or similarly unsuitable.

Other Matters

As of the date of this Proxy Statement, the Board of Directors does not intend to present any matters other than those described herein at the Annual Meeting and is unaware of any matters to be presented by other parties. If other matters are properly brought before the Annual Meeting for action by the stockholders, proxies will be voted in accordance with the recommendation of the Board of Directors or, in the absence of such a recommendation, in accordance with the judgment of the proxy holder.

Directions to Annual Meeting

Directions to the 2018 Annual Meeting of Stockholders, to be held at Ropes & Gray LLP, Prudential Tower, 800 Boylston Street, Boston, MA 02199 are set forth below:

From North of Boston: From Route 93 take exit 26, Leverett Connector/Storrow Drive, and follow to the Copley Square exit on the left. Take a right onto Beacon Street and follow to Exeter Street. Take a left onto Exeter Street and follow 11 blocks. Take a right on Huntington Avenue. The Prudential Center Garage will be on the right.

From West of Boston: Follow the Mass Pike eastbound into Boston (the Mass Pike is accessible from Route 128/I-95). Get off at exit 22, Copley Square/Prudential Center. Follow signs for Prudential Center. This will take you directly to the Prudential Center Garage entrance, which will be on your right.

From South of Boston: From Route 93 take exit 18, Massachusetts Avenue. Follow sign to Massachusetts Avenue and turn right. Follow Massachusetts Avenue for about 2 miles to Huntington Avenue. Take a right on Huntington Avenue. Take a left on Belvidere Street. The Prudential Center garage entrance will be on your right before Sovereign Bank.

From Logan Airport: Access Boston via the Sumner Tunnel and exit onto Route 93 North. Take exit 26, Leverett Connector/Storrow Drive, and follow to the Copley Square exit on the left. Take a right onto Beacon Street and follow to Exeter Street. Take a left onto Exeter Street and follow 11 blocks. Take a right on Huntington Avenue. The Prudential Center Garage will be on the right.

Parking: The Prudential Tower is best accessed via the South Garage, which has two entrances on Huntington Avenue, one on Dalton Street and one on Belvedere Street. The Red and Yellow levels are both part of the South Garage. Attendant parking is available on both levels at no additional charge.

By Order of the Board of Directors

William Clark
President and Chief Executive Officer
April [ ], 2018

Appendix A
CERTIFICATE OF AMENDMENT
TO THE
RESTATED CERTIFICATE OF INCORPORATION
OF
GENOCEA BIOSCIENCES, INC.

Genocea Biosciences, Inc., a corporation organized and existing under the General Corporation Law of the State of Delaware (the "Corporation"), DOES HEREBY CERTIFY:

FIRST: The Certificate of Incorporation of the Corporation was filed with the Secretary of State of Delaware on August 16, 2006 under the name "Genocea, Inc."

SECOND: The Certificate of Incorporation was amended and restated on December 21, 2006, on February 10, 2009, on December 17, 2010 and on September 27, 2012, and was amended on September 30, 2013 and January 21, 2014. The Certificate of Incorporation was most recently amended and restated on February 10, 2014 (the "Amended and Restated Certificate of Incorporation").

THIRD: This Certificate of Amendment amends the Amended and Restated Certificate of Incorporation and has been duly adopted in accordance with the provisions of Sections 228 and 242 of the General Corporation Law of the State of Delaware by the directors and stockholders of the Corporation.

FOURTH: The Amended and Restated Certificate of Incorporation is hereby amended by deleting subsection (a) of Article IV "Capital Stock" and replacing it as follows:

"The total number of shares of stock which the Corporation shall have authority to issue is 275,000,000, consisting of 250,000,000 shares of common stock, par value $0.001 per share ("Common Stock"), and 25,000,000 shares of preferred stock, par value $0.001 per share ("Preferred Stock"). Such stock may be issued from time to time by the Corporation for such consideration as may be fixed by the board of directors of the Corporation (the "Board of Directors").

IN WITNESS WHEREOF, the Corporation has caused this Certificate of Amendment to be signed by its duly authorized officer this _____ day of _____, 2018.

By:_____
Name:
Title:

Appendix B

GENOCEA BIOSCIENCES, INC.

AMENDED AND RESTATED 2014 EQUITY INCENTIVE PLAN

1. DEFINED TERMS

Exhibit A, which is incorporated by reference, defines the terms used in the Plan and sets forth certain operational rules related to those terms.

2. PURPOSE

The Plan has been established to advance the interests of the Company by providing for the grant to Participants of Stock-based Awards.

3. ADMINISTRATION

The Administrator has discretionary authority, subject only to the express provisions of the Plan, to interpret the Plan; determine eligibility for and grant Awards; determine, modify or waive the terms and conditions of any Award; determine the form of settlement of Awards (whether in cash, shares of Stock or other property); prescribe forms, rules and procedures relating to the Plan; and otherwise do all things necessary or appropriate to carry out the purposes of the Plan. Determinations of the Administrator made under the Plan will be conclusive and will bind all parties.

4. LIMITS ON AWARDS UNDER THE PLAN

(a)Number of Shares. The maximum number of shares of Stock that may be delivered in satisfaction of Awards under the Plan is 8,916,451 shares (the "Share Pool"), of which 2,931,054 shares remain available for future Awards as of March 31, 2018 (subject to stockholder approval of 2,500,000 shares at the 2018 annual meeting of the Company's stockholders), together with any shares of Stock that again become available pursuant to this Section 4(a)). The Share Pool shall automatically increase annually on each January 1st, from January 1, 2015 through January 1, 2024, in an amount equal to four percent (4%) of the number of shares of Stock outstanding as of the close of business on the immediately preceding December 31st. Notwithstanding the foregoing, the Board may act prior to January 1st of a given year to provide that there will be no January 1st increase in the Share Pool for such year or that the increase in the Share Pool for such year will be a lesser number of shares of Stock than would otherwise occur pursuant to the preceding sentence. Notwithstanding the preceding sentences, no more than 9,000,000 shares of Stock may be delivered in satisfaction of ISOs awarded under the Plan. Nothing in this Section 4(a) will be construed as requiring that any, or any fixed number of, ISOs be awarded under the Plan. The limits set forth in this Section 4(a) shall be construed to comply with Section 422 of the Code. For purposes of this Section 4(a), the number of shares of Stock delivered in satisfaction of Awards will be determined net of shares of Stock withheld by the Company in payment of the exercise price of the Award or in satisfaction of tax withholding requirements with respect to the Award and, for the avoidance of doubt, without including any shares of Stock underlying Awards settled in cash or that otherwise expire or become unexercisable without having been exercised or that are forfeited to or repurchased by the Company due to failure to vest. To the extent consistent with the requirements of Section 422 and the regulations thereunder, and with other applicable legal requirements (including applicable stock exchange requirements), Stock issued under awards of an acquired company that are converted, replaced or adjusted in connection with the acquisition shall not reduce the number of shares of Stock available for Awards under the Plan.

(b)Type of Shares. Stock delivered by the Company under the Plan may be authorized but unissued Stock or previously issued Stock acquired by the Company. No fractional shares of Stock will be delivered under the Plan.
(c)Individual Limits. The following additional limits will apply to Awards of the specified type granted to any person in any calendar year:
(1)Stock Options: 1,500,000 shares of Stock.
(2)SARs: 1,500,000 shares of Stock.
(3)Awards other than Stock Options or SARs: 750,000 shares of Stock.
In applying the foregoing limits, (i) all Awards of the specified type granted to the same person in the same calendar year will be aggregated and made subject to one limit; (ii) the limits applicable to Stock Options and SARs refer to the number of shares of Stock subject to those Awards; and (iii) the share limit under clause (3) refers to the maximum number of shares of Stock that may be delivered, or the value of which could be paid in cash or other property, under an Award or Awards of the type specified in clause (3) assuming a maximum payout. The foregoing provisions will be construed in a manner consistent with Section 162(m), including, without limitation, where applicable, the rules under Section 162(m) pertaining to permissible deferrals of exempt awards.
(d)Notwithstanding any other provision of the Plan to the contrary, including subsection (c) above, a Participant who is a non-employee Director may not receive Awards in any calendar year with respect to the lesser of (i) 250,000 shares or (ii) that number of shares having an aggregate grant date fair value (computed as of the date of grant in accordance with applicable financial accounting rules) of no more than $1,000,000. The foregoing limits shall not apply to any Award or shares of Stock granted pursuant to a Director's election to receive shares of Stock in lieu of cash fees.
5. ELIGIBILITY AND PARTICIPATION
The Administrator will select Participants from among key Employees and Directors of, and consultants and advisors to, the Company and its Affiliates who are in a position to contribute significantly to the success of the Company and its Affiliates. Eligibility for ISOs is limited to individuals described in the first sentence of this Section 5 who are employees of the Company or of a "parent corporation" or "subsidiary corporation" of the Company as those terms are defined in Section 424 of the Code. Eligibility for Stock Options other than ISOs is limited to individuals described in the first sentence of this Section 5 who are providing direct services on the date of grant of the Stock Option to the Company or to a subsidiary of the Company that would be described in the first sentence of Treas. Regs. §1.409A-1(b)(5)(iii)(E).
6. RULES APPLICABLE TO AWARDS
(a)All Awards.
(1)Award Provisions. The Administrator will determine the terms of all Awards, subject to the limitations provided herein. By accepting (or, under such rules as the Administrator may prescribe, being deemed to have accepted) an Award, the Participant will be deemed to have agreed to the terms of the Award and the Plan. Notwithstanding any provision of this Plan to the contrary, awards of an acquired company that are converted, replaced or adjusted in connection with the acquisition may contain

terms and conditions that are inconsistent with the terms and conditions specified herein, as determined by the Administrator.

(2)Term of Plan. No Awards may be made after ten years from the Date of Adoption, but previously granted Awards may continue beyond that date in accordance with their terms.

(3)Transferability. Neither ISOs nor, except as the Administrator otherwise expressly provides in accordance with the third sentence of this Section 6(a)(3), other Awards may be transferred other than by will or by the laws of descent and distribution. During a Participant's lifetime, ISOs (and, except as the Administrator otherwise expressly provides in accordance with the third sentence of this Section 6(a)(3), SARs and NSOs) may be exercised only by the Participant. The Administrator may permit the gratuitous transfer (i.e., transfer not for value) of Awards other than ISOs, subject to such limitations as the Administrator may impose.

(4)Vesting, etc. The Administrator will determine the time or times at which an Award will vest or become exercisable and the terms on which a Stock Option or SAR will remain exercisable. Without limiting the foregoing, the Administrator may at any time accelerate the vesting or exercisability of an Award, regardless of any adverse or potentially adverse tax or other consequences resulting from such acceleration. Unless the Administrator expressly provides otherwise, however, the following rules will apply if a Participant's Employment ceases:

(A)Immediately upon the cessation of the Participant's Employment and except as provided in (B) and (C) below, each Stock Option and SAR that is then held by the Participant or by the Participant's permitted transferees, if any, will cease to be exercisable and will terminate and all other Awards that are then held by the Participant or by the Participant's permitted transferees, if any, to the extent not already vested will be forfeited.

(B)Subject to (C) and (D) below, all Stock Options and SARs held by the Participant or the Participant's permitted transferees, if any, immediately prior to the cessation of the Participant's Employment, to the extent then exercisable, will remain exercisable for the lesser of (i) a period of three months or (ii) the period ending on the latest date on which such Stock Option or SAR could have been exercised without regard to this Section 6(a)(4), and will thereupon immediately terminate.

(C)All Stock Options and SARs held by a Participant or the Participant's permitted transferees, if any, immediately prior to the cessation of the Participant's Employment due to his or her death, to the extent then exercisable, will remain exercisable for the lesser of (i) a period of twelve (12) months or (ii) the period ending on the latest date on which such Stock Option or SAR could have been exercised without regard to this Section 6(a)(4), and will thereupon immediately terminate.

(D)All Stock Options and SARs (whether or not exercisable) held by a Participant or the Participant's permitted transferees, if any, immediately prior to the cessation of the Participant's Employment will immediately terminate upon such cessation of Employment if the termination is for Cause or occurs in circumstances that in the sole determination of the Administrator would have constituted grounds for the Participant's Employment to be terminated for Cause.

(5)Additional Restrictions. The Administrator may cancel, rescind, withhold or otherwise limit or restrict any Award at any time if the Participant is not in compliance with all applicable

provisions of the Award agreement and the Plan, or if the Participant breaches any agreement with the Company or its Affiliates with respect to non-competition, non-solicitation or confidentiality. Without limiting the generality of the foregoing, the Administrator may recover Awards made under the Plan and payments under or gain in respect of any Award in accordance with any applicable Company clawback or recoupment policy, as such policy may be amended and in effect from time to time, or as otherwise required by applicable law or applicable stock exchange listing standards, including, without limitation, Section 10D of the Securities Exchange Act of 1934, as amended.

(6)Taxes. The delivery, vesting and retention of Stock, cash or other property under an Award are conditioned upon full satisfaction by the Participant of all tax withholding requirements with respect to the Award. The Administrator will prescribe such rules for the withholding of taxes as it deems necessary. The Administrator may, but need not, hold back shares of Stock from an Award or permit a Participant to tender previously owned shares of Stock in satisfaction of tax withholding requirements (but not in excess of the minimum withholding required by law).

(7)Dividend Equivalents, Etc. The Administrator may provide for the payment of amounts (on terms and subject to conditions established by the Administrator) in lieu of cash dividends or other cash distributions with respect to Stock subject to an Award whether or not the holder of such Award is otherwise entitled to share in the actual dividend or distribution in respect of such Award. Any entitlement to dividend equivalents or similar entitlements will be established and administered either consistent with an exemption from, or in compliance with, the requirements of Section 409A. Dividends or dividend equivalent amounts payable in respect of Awards that are subject to restrictions may be subject to such limits or restrictions as the Administrator may impose.

(8)Rights Limited. Nothing in the Plan will be construed as giving any person the right to continued employment or service with the Company or its Affiliates, or any rights as a stockholder except as to shares of Stock actually issued under the Plan. The loss of existing or potential profit in Awards will not constitute an element of damages in the event of a termination of Employment for any reason, even if the termination is in violation of an obligation of the Company or any Affiliate to the Participant.

(9)Section 162(m). In the case of any Performance Award (other than a Stock Option or SAR) intended to qualify for the performance-based compensation exception under Section 162(m), the Administrator will establish the applicable Performance Criterion or Criteria in writing no later than ninety (90) days after the commencement of the period of service to which the performance relates (or at such earlier time as is required to qualify the Award as performance-based under Section 162(m)) and, prior to the event or occurrence (grant, vesting or payment, as the case may be) that is conditioned on the attainment of such Performance Criterion or Criteria, will certify whether it or they have been attained. The preceding sentence will not apply to an Award eligible (as determined by the Administrator) for exemption from the limitations of Section 162(m) by reason of the post-initial public offering transition relief in Section 1.162-27(f) of the Treasury Regulations.

(10)Coordination with Other Plans. Awards under the Plan may be granted in tandem with, or in satisfaction of or substitution for, other Awards under the Plan or awards made under other compensatory plans or programs of the Company or its Affiliates. For example, but without limiting the generality of the foregoing, awards under other compensatory plans or programs of the Company or its Affiliates may be settled in Stock (including, without limitation, Unrestricted Stock) if the Administrator so determines, in which case the shares delivered will be treated as awarded under the Plan (and will reduce the number of shares thereafter available under the Plan in accordance with the rules set forth in Section 4). In any case where an award is made under another plan or program of the Company or its

Affiliates and such award is intended to qualify for the performance-based compensation exception under Section 162(m), and such award is settled by the delivery of Stock or another Award under the Plan, the applicable Section 162(m) limitations under both the other plan or program and under the Plan will be applied to the Plan as necessary (as determined by the Administrator) to preserve the availability of the Section 162(m) performance-based compensation exception with respect thereto.

(11)Section 409A. Each Award will contain such terms as the Administrator determines, and will be construed and administered, such that the Award either qualifies for an exemption from the requirements of Section 409A or satisfies such requirements.

(12)Fair Market Value. In determining the fair market value of any share of Stock under the Plan, the Administrator will make the determination in good faith consistent with the rules of Section 422 and Section 409A to the extent applicable.

(b)Stock Options and SARs.

(1)Time And Manner Of Exercise. Unless the Administrator expressly provides otherwise, no Stock Option or SAR will be deemed to have been exercised until the Administrator receives a notice of exercise (in form acceptable to the Administrator), which may be an electronic notice, signed (including electronic signature in form acceptable to the Administrator) by the appropriate person and accompanied by any payment required under the Award. A Stock Option or SAR exercised by any person other than the Participant will not be deemed to have been exercised until the Administrator has received such evidence as it may require that the person exercising the Award has the right to do so.

(2)Exercise Price. The exercise price (or the base value from which appreciation is to be measured) of each Award requiring exercise will be no less than 100% (or in the case of an ISO granted to a ten-percent shareholder within the meaning of subsection (b)(6) of Section 422, 110%) of the fair market value of the Stock subject to the Award, determined as of the date of grant, or such higher amount as the Administrator may determine in connection with the grant. Except in connection with a corporate transaction involving the Company (which term shall include, without limitation, any stock dividend, stock split, extraordinary cash dividend, recapitalization, reorganization, merger, consolidation, split-up, spin-off, combination, or exchange of shares) or as otherwise contemplated by Section 7 of the Plan, the terms of outstanding Stock Options or SARs, as applicable, may not be amended to reduce the exercise prices of such Stock Options or the base values from which appreciation under such SARs are to be measured other than in accordance with the stockholder approval requirements of the NASDAQ Global Market.

(3)Payment Of Exercise Price. Where the exercise of an Award is to be accompanied by payment, payment of the exercise price will be by cash or check acceptable to the Administrator or by such other legally permissible means, if any, as may be acceptable to the Administrator.

(4)Maximum Term. Stock Options and SARs will have a maximum term not to exceed ten (10) years from the date of grant (or five (5) years from the date of grant in the case of an ISO granted to a ten-percent shareholder described in Section 6(b)(2) above); provided, however, that, if a Participant still holding an outstanding but unexercised NSO or SAR ten (10) years from the date of grant (or, in the case of an NSO or SAR with a maximum term of less than ten (10) years, such maximum term) is prohibited by applicable law or a written policy of the Company applicable to similarly situated employees from engaging in any open-market sales of Stock, and if at such time the Stock is publicly traded (as determined by the Administrator), the maximum term of such Award will instead be deemed to

expire on the thirtieth (30th) day following the date the Participant is no longer prohibited from engaging in such open market sales.

7.EFFECT OF CERTAIN TRANSACTIONS

(a)Mergers, etc. Except as otherwise provided in an Award agreement, the following provisions will apply in the event of a Covered Transaction:

(1)Assumption or Substitution. If the Covered Transaction is one in which there is an acquiring or surviving entity, the Administrator may (but, for the avoidance of doubt, need not) provide (i) for the assumption or continuation of some or all outstanding Awards or any portion thereof or (ii) for the grant of new awards in substitution therefor by the acquiror or survivor or an affiliate of the acquiror or survivor.

(2)Cash-Out of Awards. Subject to Section 7(a)(5) below the Administrator may (but, for the avoidance of doubt, need not) provide for payment (a "cash-out"), with respect to some or all Awards or any portion thereof, equal in the case of each affected Award or portion thereof to the excess, if any, of (A) the fair market value of one share of Stock (as determined by the Administrator in its reasonable discretion) times the number of shares of Stock subject to the Award or such portion, over (B) the aggregate exercise or purchase price, if any, under the Award or such portion (in the case of an SAR, the aggregate base value above which appreciation is measured), in each case on such payment terms (which need not be the same as the terms of payment to holders of Stock) and other terms, and subject to such conditions, as the Administrator determines, it being understood that if the exercise or purchase price (or base value) of an Award is equal to or greater than the fair market value of one share of Stock, the Award may be cancelled with no payment due hereunder.

(3)Acceleration of Certain Awards. Subject to Section 7(a)(5) below, the Administrator may (but, for the avoidance of doubt, need not) provide that any Award requiring exercise will become exercisable, in full or in part and/or that the delivery of any shares of Stock remaining deliverable under any outstanding Award of Stock Units (including Restricted Stock Units and Performance Awards to the extent consisting of Stock Units) will be accelerated in full or in part, in each case on a basis that gives the holder of the Award a reasonable opportunity, as determined by the Administrator, following exercise of the Award or the delivery of the shares, as the case may be, to participate as a stockholder in the Covered Transaction.

(4)Termination of Awards Upon Consummation of Covered Transaction. Except as the Administrator may otherwise determine in any case, each Award will automatically terminate (and in the case of outstanding shares of Restricted Stock, will automatically be forfeited) upon consummation of the Covered Transaction, other than Awards assumed pursuant to Section 7(a)(1) above.

(5)Additional Limitations. Any share of Stock and any cash or other property delivered pursuant to Section 7(a)(2) or Section 7(a)(3) above with respect to an Award may, in the discretion of the Administrator, contain such restrictions, if any, as the Administrator deems appropriate to reflect any performance or other vesting conditions to which the Award was subject and that did not lapse (and were not satisfied) in connection with the Covered Transaction. For purposes of the immediately preceding sentence, a cash-out under Section 7(a)(2) above or acceleration under Section 7(a)(3) above will not, in and of itself, be treated as the lapsing (or satisfaction) of a performance or other vesting condition. In the case of Restricted Stock that does not vest and is not forfeited in connection with the Covered Transaction, the Administrator may require that any amounts delivered, exchanged or otherwise paid in respect of such Stock in connection with the Covered Transaction be placed in escrow or otherwise

made subject to such restrictions as the Administrator deems appropriate to carry out the intent of the Plan.

(b)Changes in and Distributions With Respect to Stock.

(1)Basic Adjustment Provisions. In the event of a stock dividend, stock split or combination of shares (including a reverse stock split), recapitalization or other change in the Company's capital structure that constitutes an equity restructuring within the meaning of FASB ASC 718, the Administrator will make appropriate adjustments to the Share Pool, to the maximum number of shares of Stock that may be delivered in satisfaction of ISOs under the Plan, and to the maximum share limits described in Section 4(c), and will also make appropriate adjustments to the number and kind of shares of stock or securities subject to Awards then outstanding or subsequently granted, any exercise or purchase prices (or base values) relating to Awards and any other provision of Awards affected by such change.

(2)Certain Other Adjustments. The Administrator may also make adjustments of the type described in Section 7(b)(1) above to take into account distributions to stockholders other than those provided for in Section 7(a) and 7(b)(1), or any other event, if the Administrator determines that adjustments are appropriate to avoid distortion in the operation of the Plan, having due regard for the qualification of ISOs under Section 422, the requirements of Section 409A, and for the performance-based compensation rules of Section 162(m), where applicable.

(3)Continuing Application of Plan Terms. References in the Plan to shares of Stock will be construed to include any stock or securities resulting from an adjustment pursuant to this Section 7.

8.LEGAL CONDITIONS ON DELIVERY OF STOCK

The Company will not be obligated to deliver any shares of Stock pursuant to the Plan or to remove any restriction from shares of Stock previously delivered under the Plan until: (i) the Company is satisfied that all legal matters in connection with the issuance and delivery of such shares have been addressed and resolved; (ii) if the outstanding Stock is at the time of delivery listed on any stock exchange or national market system, the shares to be delivered have been listed or authorized to be listed on such exchange or system upon official notice of issuance; and (iii) all conditions of the Award have been satisfied or waived. The Company may require, as a condition to exercise of the Award, such representations or agreements as counsel for the Company may consider appropriate to avoid violation of the Securities Act of 1933, as amended, or any applicable state or non-U.S. securities law. Any Stock required to be issued to Participants under the Plan will be evidenced in such manner as the Administrator may deem appropriate, including book-entry registration or delivery of stock certificates. In the event that the Administrator determines that Stock certificates will be issued to Participants under the Plan, the Administrator may require that certificates evidencing Stock issued under the Plan bear an appropriate legend reflecting any restriction on transfer applicable to such Stock, and the Company may hold the certificates pending lapse of the applicable restrictions.

9.AMENDMENT AND TERMINATION

The Administrator may at any time or times amend the Plan or any outstanding Award for any purpose which may at the time be permitted by law, and may at any time terminate the Plan as to any future grants of Awards; provided, that, except as otherwise expressly provided in the Plan, the Administrator may not, without the Participant's consent, alter the terms of an Award so as to affect materially and adversely the Participant's rights under the Award, unless the Administrator expressly

reserved the right to do so at the time the Award was granted. Any amendments to the Plan will be conditioned upon stockholder approval only to the extent, if any, such approval is required by law (including the Code and applicable stock exchange requirements), as determined by the Administrator.

10.OTHER COMPENSATION ARRANGEMENTS

The existence of the Plan or the grant of any Award will not in any way affect the Company's right to Award a person bonuses or other compensation in addition to Awards under the Plan.

11.MISCELLANEOUS

(a)Waiver of Jury Trial. By accepting an Award under the Plan, each Participant waives any right to a trial by jury in any action, proceeding or counterclaim concerning any rights under the Plan and any Award, or under any amendment, waiver, consent, instrument, document or other agreement delivered or which in the future may be delivered in connection therewith, and agrees that any such action, proceedings or counterclaim will be tried before a court and not before a jury. By accepting an Award under the Plan, each Participant certifies that no officer, representative, or attorney of the Company has represented, expressly or otherwise, that the Company would not, in the event of any action, proceeding or counterclaim, seek to enforce the foregoing waivers. Notwithstanding anything to the contrary in the Plan, nothing herein is to be construed as limiting the ability of the Company and a Participant to agree to submit disputes arising under the terms of the Plan or any Award made hereunder to binding arbitration or as limiting the ability of the Company to require any eligible individual to agree to submit such disputes to binding arbitration as a condition of receiving an Award hereunder.

(b)Limitation of Liability. Notwithstanding anything to the contrary in the Plan, neither the Company, nor any Affiliate, nor the Administrator, nor any person acting on behalf of the Company, any Affiliate, or the Administrator, will be liable to any Participant or to the estate or beneficiary of any Participant or to any other holder of an Award by reason of any acceleration of income, or any additional tax (including any interest and penalties), asserted by reason of the failure of an Award to satisfy the requirements of Section 422 or Section 409A or by reason of Section 4999 of the Code, or otherwise asserted with respect to the Award; provided, that nothing in this Section 11(b) will limit the ability of the Administrator or the Company, in its discretion, to provide by separate express written agreement with a Participant for any payment in connection with any such acceleration of income or additional tax.

12.ESTABLISHMENT OF SUB-PLANS

The Administrator may from time to time establish one or more sub-plans under the Plan for purposes of satisfying applicable blue sky, securities or tax laws of various jurisdictions. The Administrator will establish such sub-plans by adopting supplements to the Plan setting forth (i) such limitations on the Administrator's discretion under the Plan as it deems necessary or desirable and (ii) such additional terms and conditions not otherwise inconsistent with the Plan as it deems necessary or desirable. All supplements so established will be deemed to be part of the Plan, but each supplement will apply only to Participants within the affected jurisdiction (as determined by the Administrator).

13.GOVERNING LAW

(a)Certain Requirements of Corporate Law. Awards will be granted and administered consistent with the requirements of applicable Delaware law relating to the issuance of stock and the consideration to be received therefor, and with the applicable requirements of the stock exchanges or other

trading systems on which the Stock is listed or entered for trading, in each case as determined by the Administrator.
(b)Other Matters. Except as otherwise provided by the express terms of an Award agreement, under a sub-plan described in Section 12 or as provided in Section 13(a) above, the provisions of the Plan and of Awards under the Plan and all claims or disputes arising out of or based upon the Plan or any Award under the Plan or relating to the subject matter hereof or thereof will be governed by and construed in accordance with the domestic substantive laws of the State of Massachusetts without giving effect to any choice or conflict of laws provision or rule that would cause the application of the domestic substantive laws of any other jurisdiction.
(c)Jurisdiction. By accepting an Award, each Participant will be deemed to (a) have submitted irrevocably and unconditionally to the jurisdiction of the federal and state courts located within the geographic boundaries of the United States District Court for the District of Massachusetts for the purpose of any suit, action or other proceeding arising out of or based upon the Plan or any Award; (b) agree not to commence any suit, action or other proceeding arising out of or based upon the Plan or an Award, except in the federal and state courts located within the geographic boundaries of the United States District Court for the District of Massachusetts; and (c) waive, and agree not to assert, by way of motion as a defense or otherwise, in any such suit, action or proceeding, any claim that it is not subject personally to the jurisdiction of the above-named courts that its property is exempt or immune from attachment or execution, that the suit, action or proceeding is brought in an inconvenient forum, that the venue of the suit, action or proceeding is improper or that the Plan or an Award or the subject matter thereof may not be enforced in or by such court.

EXHIBIT A

Definition of Terms

The following terms, when used in the Plan, will have the meanings and be subject to the provisions set forth below:

"Administrator": The Compensation Committee, except that the Compensation Committee may delegate (i) to one or more of its members (or one or more other members of the Board (including the full Board)) such of its duties, powers and responsibilities as it may determine; (ii) to one or more officers of the Company the power to grant Awards to the extent permitted by Section 157(c) of the Delaware General Corporation Law; and (iii) to such Employees or other persons as it determines such ministerial tasks as it deems appropriate. In the event of any delegation described in the preceding sentence, the term "Administrator" will include the person or persons so delegated to the extent of such delegation.

"Affiliate": Any corporation or other entity that stands in a relationship to the Company that would result in the Company and such corporation or other entity being treated as one employer under Section 414(b) and Section 414(c) of the Code.

"Award": Any or a combination of the following:

(i) Stock Options.

(ii) SARs.

(iii) Restricted Stock.

(iv) Unrestricted Stock.

(v) Stock Units, including Restricted Stock Units.

(vi) Performance Awards.

(vii) Awards (other than Awards described in (i) through (vi) above) that are convertible into or otherwise based on Stock.

"Board": The Board of Directors of the Company.

"Cause": In the case of any Participant who is party to an employment or severance-benefit agreement that contains a definition of "Cause," the definition set forth in such agreement will apply with respect to such Participant under the Plan for so long as such agreement is in effect. In the case of any other Participant, "Cause" will mean, as determined by the Administrator in its reasonable judgment, (i) a substantial failure of the Participant to perform the Participant's duties and responsibilities to the Company or subsidiaries or substantial negligence in the performance of such duties and responsibilities; (ii) the commission by the Participant of a felony or a crime involving moral turpitude; (iii) the commission by the Participant of theft, fraud, embezzlement, material breach of trust or any material act of dishonesty involving the Company or any of its subsidiaries; (iv) a significant violation by the Participant of the code of conduct of the Company or its subsidiaries of any material policy of the Company or its subsidiaries, or of any statutory or common law duty of loyalty to the Company or its subsidiaries; (v) material breach of any of the terms of the Plan or any Award made under the Plan, or of the terms of any other agreement between the Company or subsidiaries and the Participant; or (vi) other

conduct by the Participant that could reasonably be expected to be harmful to the business, interests or reputation of the Company.

"Code": The U.S. Internal Revenue Code of 1986 as from time to time amended and in effect, or any successor statute as from time to time in effect.

"Compensation Committee": The Compensation Committee of the Board.

"Company": Genocea Biosciences, Inc.

"Covered Transaction": Any of (i) a consolidation, merger, or similar transaction or series of related transactions, including a sale or other disposition of stock, in which the Company is not the surviving corporation or that results in the acquisition of all or substantially all of the Company's then outstanding common stock by a single person or entity or by a group of persons and/or entities acting in concert, (ii) a sale or transfer of all or substantially all the Company's assets, or (iii) a dissolution or liquidation of the Company. Where a Covered Transaction involves a tender offer that is reasonably expected to be followed by a merger described in clause (i) (as determined by the Administrator), the Covered Transaction will be deemed to have occurred upon consummation of the tender offer.

"Date of Adoption": January 20, 2014.

"Director": A member of the Board.

"Employee": Any person who is employed by the Company or an Affiliate.

"Employment": A Participant's employment or other service relationship with the Company and its Affiliates. Employment will be deemed to continue, unless the Administrator expressly provides otherwise, so long as the Participant is employed by, or otherwise is providing services in a capacity described in Section 5 to the Company or an Affiliate. If a Participant's employment or other service relationship is with an Affiliate and that entity ceases to be an Affiliate, the Participant's Employment will be deemed to have terminated when the entity ceases to be an Affiliate unless the Participant transfers Employment to the Company or its remaining Affiliates. Notwithstanding the foregoing and the definition of "Affiliate" above, in construing the provisions of any Award relating to the payment of "nonqualified deferred compensation" (subject to Section 409A) upon a termination or cessation of Employment, references to termination or cessation of employment, separation from service, retirement or similar or correlative terms will be construed to require a "separation from service" (as that term is defined in Section 1.409A-1(h) of the Treasury Regulations, after giving effect to the presumptions contained therein) from the Company and from all other corporations and trades or businesses, if any, that would be treated as a single "service recipient" with the Company under Section 1.409A-1(h)(3) of the Treasury Regulations. The Company may, but need not, elect in writing, subject to the applicable limitations under Section 409A, any of the special elective rules prescribed in Section 1.409A-1(h) of the Treasury Regulations for purposes of determining whether a "separation from service" has occurred. Any such written election will be deemed a part of the Plan.

"ISO": A Stock Option intended to be an "incentive stock option" within the meaning of Section 422. Each Stock Option granted pursuant to the Plan will be treated as providing by its terms that it is to be an NSO unless, as of the date of grant, it is expressly designated as an ISO.

"NSO": A Stock Option that is not intended to be an "incentive stock option" within the meaning of Section 422.

“Participant”: A person who is granted an Award under the Plan.
“Performance Award”: An Award subject to Performance Criteria. The Administrator in its discretion may grant Performance Awards that are intended to qualify for the performance-based compensation exception under Section 162(m) and Performance Awards that are not intended so to qualify.
“Performance Criteria”: Specified criteria, other than the mere continuation of Employment or the mere passage of time, the satisfaction of which is a condition for the grant, exercisability, vesting or full enjoyment of an Award. For purposes of Awards that are intended to qualify for the performance-based compensation exception under Section 162(m), a Performance Criterion will mean an objectively determinable measure or measures of performance relating to any or any combination of the following (measured either absolutely or by reference to an index or indices and determined either on a consolidated basis or, as the context permits, on a divisional, subsidiary, line of business, project or geographical basis or in combinations thereof) : sales; revenues; assets; expenses; earnings before or after deduction for all or any portion of interest, taxes, depreciation, amortization or equity expense, whether or not on a continuing operations or an aggregate or per share basis; return on equity, investment, capital, capital employed or assets; one or more operating ratios; operating income or profit, including on an after-tax basis; net income; borrowing levels, leverage ratios or credit rating; market share; capital expenditures; cash flow; stock price; stockholder return; sales of particular products or services; customer acquisition or retention; acquisitions and divestitures (in whole or in part); joint ventures, strategic alliances, licenses or collaborations; spin-offs, split-ups and the like; reorganizations; recapitalizations, restructurings, financings (issuance of debt or equity) or refinancings; manufacturing or process development; or achievement of clinical trial or research objectives, regulatory or other filings or approvals or other product development milestones. A Performance Criterion and any targets with respect thereto determined by the Administrator need not be based upon an increase, a positive or improved result or avoidance of loss. To the extent consistent with the requirements for satisfying the performance-based compensation exception under Section 162(m), the Administrator may provide in the case of any Award intended to qualify for such exception that one or more of the Performance Criteria applicable to such Award will be adjusted in an objectively determinable manner to reflect events (for example, the impact of charges for restructurings, discontinued operations, mergers, acquisitions, extraordinary items, and other unusual or non-recurring items, and the cumulative effects of tax or accounting changes, each as defined by U.S. generally accepted accounting principles) occurring during the performance period that affect the applicable Performance Criterion or Criteria.
“Plan”: The Genocea Biosciences, Inc. 2013 Equity Incentive Plan as from time to time amended and in effect.
“Restricted Stock”: Stock subject to restrictions requiring that it be redelivered or offered for sale to the Company if specified conditions are not satisfied.
“Restricted Stock Unit”: A Stock Unit that is, or as to which the delivery of Stock or cash in lieu of Stock is, subject to the satisfaction of specified performance or other vesting conditions.
“SAR”: A right entitling the holder upon exercise to receive an amount (payable in cash or in shares of Stock of equivalent value) equal to the excess of the fair market value of the shares of Stock subject to the right over the base value from which appreciation under the SAR is to be measured.
“Section 409A”: Section 409A of the Code.

"Section 422": Section 422 of the Code.
"Section 162(m)": Section 162(m) of the Code.
"Stock": Common stock of the Company, par value $0.001 per share.
"Stock Option": An option entitling the holder to acquire shares of Stock upon payment of the exercise price.
"Stock Unit": An unfunded and unsecured promise, denominated in shares of Stock, to deliver Stock or cash measured by the value of Stock in the future.
"Unrestricted Stock": Stock not subject to any restrictions under the terms of the Award.

Appendix C
GENOCEA BIOSCIENCES, INC.
2014 EMPLOYEE STOCK PURCHASE PLAN, AS AMENDED

Section 1. Defined Terms
Exhibit A, which is incorporated by reference, defines the terms used in the Plan and sets forth certain operational rules related to those terms.
Section 2. Purpose of Plan
The Plan is intended to enable Eligible Employees of the Company and its Designated Subsidiaries to use payroll deductions to purchase shares of Stock, and thereby acquire an interest in the future of the Company. The Plan is intended to qualify as an "employee stock purchase plan" under Section 423 and to be exempt from the application and requirements of Section 409A of the Code, and is to be construed accordingly.
Section 3. Options to Purchase Stock
Subject to adjustment pursuant to Section 16 of the Plan, the maximum aggregate number of shares of Stock available for purchase pursuant to the exercise of Options granted under the Plan to Eligible Employees will be 2,500,007 shares. The shares of Stock to be delivered upon exercise of Options under the Plan may be either shares of authorized but unissued Stock, treasury Stock, or Stock acquired in an open-market transaction. If any Option granted under the Plan expires or terminates for any reason without having been exercised in full or ceases for any reason to be exercisable in whole or in part, the unpurchased shares of Stock subject to such Option will again be available for purchase pursuant to the exercise of Options under the Plan. If, on an Exercise Date, the total number of shares of Stock that would otherwise be subject to Options granted under the Plan exceeds the number of shares then available under the Plan (after deduction of all shares for which Options have been exercised or are then outstanding), the Administrator shall make a pro rata allocation of the shares remaining available for the Option grants in as uniform a manner as shall be practicable and as it shall determine to be equitable. In such event, the Administrator shall give written notice to each Participant of such reduction of the number of Options affected thereby and shall similarly reduce the rate of payroll deductions, if necessary.
Section 4. Eligibility
Subject to Section 13 of the Plan, and any exceptions and limitations set forth in Section 6 of the Plan, or as may be provided elsewhere in the Plan, each Employee who (a) has been continuously employed by the Company or a Designated Subsidiary, as applicable, for at least ten (10) business days as of the first day of any Option Period, (b) customarily works twenty (20) hours or more per week, and (c) satisfies the requirements set forth in the Plan will be an Eligible Employee. In no event, however, may an Employee be granted an Option under the Plan if, immediately after the Option is granted, the Employee would own (or pursuant to Section 424(d) of the Code would be deemed to own) stock possessing five percent (5%) or more of the total combined voting power or value of all classes of stock of the Company or of its Parent or Subsidiaries, if any. The Administrator may, for Option Periods that have not yet commenced, establish additional eligibility requirements not inconsistent with Section 423.

Section 5. Option Periods

The Plan will generally be implemented by a series of "Option Periods". Unless otherwise determined by the Administrator, the Option Periods will be the six-month periods commencing January 1 and ending June 30 and commencing July 1 and ending December 31 of each year. Each June 30 and December 31 will be an "Exercise Date". The Administrator may change the Exercise Date and the commencement date, ending date and duration of the Option Periods to the extent permitted by Section 423.

Section 6. Option Grant

Subject to the limitations set forth in Section 4 and Section 10 of the Plan and the Maximum Share Limit, on the first day of an Option Period, each Participant automatically will be granted an Option to purchase shares of Stock on the Exercise Date; provided, however, that no Participant will be granted an Option under the Plan that permits the Participant's right to purchase shares of Stock under the Plan and under all other employee stock purchase plans of the Company and its Parent and Subsidiaries, if any, to accrue at a rate that exceeds $25,000 in Fair Market Value (or such other maximum as may be prescribed from time to time by the Code) for each calendar year during which any Option granted to such Participant is outstanding at any time, as determined in accordance with Section 423(b)(8) of the Code.

Section 7. Method of Participation

To participate in an Option Period, an Eligible Employee must execute and deliver to the Administrator a payroll deduction and participation authorization form in accordance with the procedures prescribed by and in a form acceptable to the Administrator and, in so doing, the Eligible Employee will thereby become a Participant as of the first day of such Option Period. Such an Eligible Employee will remain a Participant with respect to subsequent Option Periods until his or her participation in the Plan is terminated as provided herein. Such payroll deduction and participation authorization must be delivered no later than ten (10) business days prior to the first day of an Option Period, or such other time as specified by the Administrator.

A Participant's authorization will remain in effect for subsequent Option Periods unless the Participant files a new authorization within ten (10) business days prior to the first day of such new Option Period (or such other time as specified by the Administrator) or the Participant's Option is cancelled pursuant to Section 13 or Section 14 of the Plan. During an Option Period, payroll deduction authorizations may not be increased or decreased, except that a Participant may terminate his or her payroll deduction authorization by canceling his or her Option in accordance with Section 13 of the Plan.

Each payroll deduction authorization will request payroll deductions in a whole dollar amount between fifteen dollars ($15) and one thousand dollars ($1,000) of the employee's total cash compensation, including base pay or salary and any overtime, cash bonuses or commissions per payroll period.

All payroll deductions made pursuant to this Section 7 will be credited to the Participant's Account. Amounts credited to a Participant's Account will not be required to be set aside in trust or otherwise segregated from the Company's general assets.

Section 8. Method of Payment

A Participant must pay for shares of Stock purchased upon the exercise of an Option with accumulated payroll deductions credited to the Participant's Account.

Section 9. Purchase Price

The Purchase Price of shares of Stock issued pursuant to the exercise of an Option on each Exercise Date will be eighty-five percent (85%) (or such greater percentage specified by the Administrator to the extent permitted under Section 423) of the lesser of (a) the Fair Market Value of a share of Stock on the date on which the Option was granted pursuant to Section 6 of the Plan (i.e., the first day of the Option Period) and (b) the Fair Market Value of a share of Stock on the date on which the Option is deemed exercised pursuant to Section 10 of the Plan (i.e., the Exercise Date).

Section 10. Exercise of Options

Subject to the limitations set forth in Section 6 of the Plan and this Section 10, with respect to each Option Period, on the applicable Exercise Date, each Participant will be deemed to have exercised his or her Option and the accumulated payroll deductions in the Participant's Account will be applied to purchase the greatest number of whole shares of Stock (rounded down to the nearest whole share) that can be purchased with such Account balance at the applicable Purchase Price; provided, however, that no more than 20,000 shares of Stock may be purchased by a Participant on any Exercise Date, or such lesser number as the Administrator may prescribe in accordance with Section 423 (the "Maximum Share Limit"). As soon as practicable thereafter, shares of Stock so purchased will be placed, in book-entry form, into a record keeping account in the name of the Participant. No fractional shares will be purchased; any payroll deductions accumulated in a Participant's Account that are not sufficient to purchase a full share will be retained in the Participant's Account for the subsequent Option Period, subject to earlier withdrawal by the Participant as provided in Section 13 of the Plan.

Except as provided above with respect to fractional shares, any amount of payroll deductions in a Participant's Account that are not used for the purchase of shares of Stock, whether because of the Participant's withdrawal from participation in an Option Period or for any other reason, will be returned to the Participant or his or her designated beneficiary or legal representative, as applicable, without interest, as soon as administratively practicable after such withdrawal or other event, as applicable.

If the Participant's accumulated payroll deductions on the Exercise Date would otherwise enable the Participant to purchase shares of Stock in excess of the Maximum Share Limit or the maximum Fair Market Value set forth in Section 6 of the Plan, the excess of the amount of the accumulated payroll deductions over the aggregate Purchase Price of the shares of Stock actually purchased will be returned to the Participant, without interest, as soon as administratively practicable after such Exercise Date.

Notwithstanding any provision of the Plan to the contrary, no Option may be exercised after 27 months from its grant date.

Section 11. Interest

No interest will be payable on any amount held in the Account of any Participant.

Section 12. Taxes

Payroll deductions will be made on an after-tax basis. The Administrator will have the right, as a condition to exercising an Option, to make such provision as it deems necessary to satisfy its obligations to withhold federal, state, local income or other taxes incurred by reason of the purchase or disposition of shares of Stock under the Plan. In the Administrator's discretion and subject to applicable law, such tax obligations may be paid in whole or in part by delivery of shares of Stock to the Company, including

shares of Stock purchased under the Plan, valued at Fair Market Value, but not in excess of the minimum statutory amounts required to be withheld.

Section 13. Cancellation and Withdrawal

A Participant who holds an Option under the Plan may cancel all (but not less than all) of his or her Option and terminate his or her payroll deduction authorization by revoking such authorization by written notice delivered to the Administrator, which, to be effective with respect to an upcoming Exercise Date, must be delivered not later than ten (10) business days prior to such Exercise Date (or such other time as specified by the Administrator). Upon such termination and cancellation, the balance in the Participant's Account will be returned to the Participant, without interest, as soon as administratively practicable thereafter. For the avoidance of doubt, a Participant who reduces his or her withholding rate for future payroll periods to zero pursuant to Section 7 of the Plan, will be deemed to have revoked his or her payroll deduction authorization and canceled his or her Option as to future Option Periods.

A Participant who makes a hardship withdrawal from a 401(k) Plan will be deemed to have terminated his or her payroll deduction authorization for subsequent payroll dates relating to the then current Option Period as of the date of such hardship withdrawal and amounts accumulated in the Participant's Account as of such date will be returned to the Participant, without interest, as soon as administratively practicable thereafter. An Employee who has made a hardship withdrawal from a 401(k) Plan will not be permitted to participate in Option Periods commencing after the date of his or her hardship withdrawal until the first Option Period that begins at least six months after the date of his or her hardship withdrawal.

Section 14. Termination of Employment; Death of Participant

Upon the termination of a Participant's employment with the Company (or a Designated Subsidiary, as applicable) for any reason or the death of a Participant during an Option Period prior to an Exercise Date or in the event the Participant ceases to qualify as an Eligible Employee, the Participant will cease to be a Participant, any Option held by him or her under the Plan will be deemed canceled, the balance in the Participant's Account will be returned to the Participant (or his or her estate or designated beneficiary in the event of the Participant's death), without interest, as soon as administratively practicable thereafter, and the Participant will have no further rights under the Plan.

Section 15. Equal Rights; Participant's Rights Not Transferable

All Participants granted Options under the Plan will have the same rights and privileges consistent with the requirements set forth in Section 423. Any Option granted under the Plan will be exercisable during the Participant's lifetime only by him or her and may not be sold, pledged, assigned, or transferred in any manner. In the event any Participant violates or attempts to violate the terms of this Section 15, as determined by the Administrator in its sole discretion, any Options held by him or her may be terminated by the Company and, upon the return to the Participant of the balance of his or her Account, without interest, all of the Participant's rights under the Plan will terminate.

Section 16. Change in Capitalization; Merger

In the event of any change in the outstanding Stock by reason of a stock dividend, split-up, recapitalization, merger, consolidation, reorganization, or other capital change, the aggregate number and type of shares of Stock available under the Plan, the number and type of shares of Stock granted under any outstanding Options, the maximum number and type of shares of Stock purchasable under any

outstanding Option, and the purchase price per share of Stock under any outstanding Option will be appropriately adjusted; provided, that any such adjustment shall be made in a manner that complies with Section 423.

In the event of a sale of all or substantially all of the Stock or a sale of all or substantially all of the assets of the Company, or a merger or similar transaction in which the Company is not the surviving corporation or that results in the acquisition of the Company by another person, the Administrator may, in its discretion, (a) if the Company is merged with or acquired by another corporation, provide that each outstanding Option will be assumed or exchanged for a substitute Option granted by the acquiror or successor corporation or by a parent or subsidiary of the acquiror or successor corporation, (b) cancel each outstanding Option and return the balances in Participants' Accounts to the Participants, and/or (c) pursuant to Section 18 of the Plan, terminate the Option Period on or before the date of the proposed sale, merger or similar transaction.

Section 17. Administration of Plan

The Plan will be administered by the Administrator, which will have the authority to interpret the Plan, determine eligibility under the Plan, prescribe forms, rules and procedures relating to the Plan and otherwise do all things necessary or appropriate to carry out the purposes of the Plan. All determinations and decisions by the Administrator regarding the interpretation or application of the Plan will be final and binding on all Participants.

The Administrator may specify the manner in which Employees are to provide notices and payroll deduction authorizations. Notwithstanding any requirement of "written notice" herein, the Administrator may permit Employees to provide notices and payroll deduction authorizations electronically.

Section 18. Amendment and Termination of Plan

The Board reserves the right at any time or times to amend the Plan to any extent and in any manner it may deem advisable; provided, that any amendment that would be treated as the adoption of a new plan for purposes of Section 423 will have no force or effect unless approved by the shareholders of the Company within 12 months before or after its adoption.

The Board reserves the right at any time or times to suspend or terminate the Plan. In connection therewith, the Board may provide, in its sole discretion, either that outstanding Options will be exercisable either at the Exercise Date for the applicable Option Period or on such earlier date as the Board may specify (in which case such earlier date will be treated as the Exercise Date for the applicable Option Period), or that the balance of each Participant's Account will be returned to the Participant, without interest.

Section 19. Approvals

Shareholder approval will be obtained prior to the date that is 12 months after the date of Board approval. Notwithstanding anything herein to the contrary, the obligation of the Company to issue and deliver shares of Stock under the Plan will be subject to the approval required of any governmental authority in connection with the authorization, issuance, sale or transfer of such shares of Stock and to any requirements of any national securities exchange applicable thereto, and to compliance by the Company with other applicable legal requirements in effect from time to time.

Section 20. Participants' Rights as Shareholders and Employees

A Participant will have no rights or privileges as a shareholder of the Company and will not receive any dividends in respect of any shares of Stock covered by an Option granted hereunder until such Option has been exercised, full payment has been made for such shares of Stock, and the shares of Stock have been issued to the Participant.

Nothing contained in the provisions of the Plan will be construed as giving to any Employee the right to be retained in the employ of the Company or any Designated Subsidiary or as interfering with the right of the Company or any Designated Subsidiary to discharge, promote, demote or otherwise re-assign any Employee from one position to another within the Company or any Designated Subsidiary at any time.

Section 21. Information Regarding Disqualifying Dispositions.

By electing to participate in the Plan, each Participant agrees to provide such information about any transfer of Stock acquired under the Plan that occurs within two years after the first day of the Option Period in which such Stock was acquired and within one year after the acquisition of such Stock as may be requested by the Company or any Designated Subsidiary in order to assist it in complying with applicable tax laws.

Section 22. Governing Law

The Plan will be governed by and interpreted consistently with the laws of the State of Delaware, except as may be necessary to comply with applicable requirements of federal law.

Section 23. Effective Date and Term

The Plan will become effective upon adoption of the Plan by the Board and no rights will be granted hereunder after the earliest to occur of (a) the Plan's termination by the Company, (b) the issuance of all shares of Stock available for issuance under the Plan or (c) January 19, 2024.

EXHIBIT A
Definition of Terms

The following terms, when used in the Plan, will have the meanings and be subject to the provisions set forth below:

“401(k) Plan”: A savings plan qualifying under Section 401(k) of the Code that is sponsored by the Company for the benefit of its employees.

“Account”: A payroll deduction account maintained in the Participant’s name on the books of the Company.

“Administrator”: The Compensation Committee of the Board and its delegates, except that the Compensation Committee may delegate its authority under the Plan to a sub-committee comprised of one or more of its members, to members of the Board, or to officers or employees of the Company to the extent permitted by applicable law. In each case, references herein to the Administrator refer, as applicable, to such persons or groups so delegated to the extent of such delegation.

“Board”: The Board of Directors of the Company.

“Code”: The U.S. Internal Revenue Code of 1986 as from time to time amended and in effect, or any successor statute as from time to time in effect.

“Company”: Genocea Biosciences, Inc.

“Designated Subsidiary”: A Subsidiary of the Company that has been designated by the Board or the Compensation Committee of the Board from time to time as eligible to participate in the Plan as set forth on Exhibit B to the Plan.

“Effective Date”: The date set forth in Section 23 of the Plan.

“Eligible Employee”: Any Employee who meets the eligibility requirements set forth in Section 4 of the Plan.

“Employee”: Any person who is employed by the Company or a Designated Subsidiary. For the avoidance of doubt, independent contractors and independent contractors are not “Employees”.

“Exercise Date”: The date set forth in Section 5 of the Plan or otherwise designated by the Administrator with respect to a particular Option Period on which a Participant will be deemed to have exercised the Option granted to him or her for such Option Period.

“Fair Market Value”:

(a) If the Stock is readily traded on an established national exchange or trading system (including the NASDAQ Global Market), the closing price of a share of Stock as reported by the principal exchange on which such Stock is traded; provided, however, that if such day is not a trading day, Fair Market Value will mean the reported closing price of a share of Stock for the immediately preceding day that is a trading day.

(b) If the Stock is not traded on an established national exchange or trading system, the average of the bid and ask prices for shares Stock where the bid and ask prices are quoted.

(c) If the Stock cannot be valued pursuant to clauses (a) or (b), the value as determined in good faith by the Board in its sole discretion.

“Maximum Share Limit”: The meaning set forth in Section 10 of the Plan.

“Option”: An option granted pursuant to the Plan entitling the holder to acquire shares of Stock upon payment of the Purchase Price per share of Stock.

“Option Period”: An offering period established in accordance with Section 5 of the Plan.

“Parent”: A “parent corporation” as defined in Section 424(e) of the Code.

“Participant”: An Eligible Employee who elects to enroll in the Plan.

“Plan”: The Genocea Biosciences, Inc. 2014 Employee Stock Purchase Plan, as from time to time amended and in effect.

“Purchase Price”: The price per share of Stock with respect to an Option Period determined in accordance with Section 9 of the Plan.

“Section 423”: Section 423 of the Code and the regulations thereunder.

“Stock”: Common stock of the Company, par value $0.001 per share.

“Subsidiary”: A “subsidiary corporation” as defined in Section 424(f) of the Code.

EXHIBIT B
Designated Subsidiaries

Designated Subsidiaries as of the date of adoption of the Plan by the Board are listed below: