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

DIVISION OF
CORPORATION FINANCE

November 19, 2013

Via E-mail
William Clark
Chief Executive Officer
Genocea Biosciences, Inc.
100 Acorn Park Drive, 5th Floor
Cambridge, MA 02140

Re: Genocea Biosciences, Inc.
Draft Registration Statement on Form S-1
Submitted October 23, 2013
CIK No. 0001457612

Dear Mr. Clark:

We have reviewed your draft registration statement and have the following comments. In some of our comments, we may ask you to provide us with information so we may better understand your disclosure.

Please respond to this letter by providing the requested information and either submitting an amended draft registration statement or publicly filing your registration statement on EDGAR. If you do not believe our comments apply to your facts and circumstances or do not believe an amendment is appropriate, please tell us why in your response.

After reviewing the information you provide in response to these comments and your amended draft registration statement or filed registration statement, we may have additional comments.

General

1. Please update your financial statements and related disclosures through the period ended September 30, 2013 as required by Rule 3-12 of Regulation S-X.

2. Please file all exhibits as soon as practicable. We may have further comments upon examination of these exhibits.

3. Prior to its use please provide us proofs of all graphic, visual or photographic information you will provide in the printed prospectus. Please note that we may have comments regarding this material.

4. Please supplementally provide us with any written materials that you or anyone authorized to do so on your behalf provides in reliance on Section 5(d) of the Securities

Act to potential investors that are qualified institutional buyers or institutional accredited investors. Similarly, please supplementally provide us with any research reports about you that are published or distributed in reliance upon Section 2(a)(3) of the Securities Act of 1933 added by Section 105(a) of the Jumpstart Our Business Startups Act by any broker or dealer that is participating or will participate in your offering.

5. Comments to your application for confidential treatment will be delivered under separate cover.

We may encounter substantial delays in our clinical trials . . ., page 16

6. We note that your IND for GEN-003 was subject to a clinical hold. Please expand your disclosure to discuss how you resolved the FDA's concerns and summarize any additional discussions or guidance that you received from the FDA.

GEN-003 includes a novel vaccine adjuvant . . ., page 17

7. Please provide a description of an adjuvant and its intended purpose the first time this term is used.

If we fail to attract and keep senior management . . ., page 31

8. We note your dependence on Mr. Clark and Dr. Hetherington. Please expand your discussion to identify all of the personnel on whom you are highly dependent. Additionally, please describe the extent to which you have employment agreements with such personnel, and discuss the extent to which departures have affected you in the past.

Selected Financial Data, page 51

9. Revise to include historical balance sheet data for December 31, 2011and December 31, 2012. Refer to Item 301 of Regulation S-K.

Management's Discussion and Analysis of Financial Condition and Results of Operations
Critical Accounting Policies and Significant Judgments and Estimates
Stock-based Compensation, page 57

10. Please expand your disclosure to disclose the intrinsic value of outstanding vested and unvested options based on the estimated IPO price and the options outstanding as of the most recent balance-sheet date presented. Also include a discussion of each significant factor contributing to the difference between the fair value as of the date of each grant and the estimated IPO price.

Contractual Obligations, page 71

11. You have omitted future payments to third party licensors that become due and payable on the achievement of certain development, regulatory and commercial milestones because the achievement and timing of these milestones is not fixed or determinable. Please disclose the amount and timing of milestone commitments that are reasonably likely to be paid. Please refer to Section 501.13 of the Financial Reporting Codification added by FR-72.

12. Also you disclose that contracts with CROs and other vendors are not included in the table of contractual obligations because they are cancellable contracts. The contracts with CROs and other vendors appear to be needed in your research and development and appear to meet the definition of purchase obligations. Please revise your disclosure to include any contracts with CROs or other vendors that meet the definition of purchase obligations. As noted in Item 303(a)(5) of Regulation S-K the tabular presentation may be accompanied by footnotes to describe provisions that create, increase or accelerate obligations, or other pertinent data to the extent necessary for an understanding of the timing and amount of the registrant's specified contractual obligations.

Business, page 74

13. Please amend your disclosure to describe the INDs submitted for GEN-003 and GEN-004 by indication and disclose when these INDs were filed and by whom. Additionally, please clarify whether you or anyone else has filed INDs for GEN-003 or GEN-004. If so, provide the same information as requested for the INDs that you have submitted. Additionally, with a view towards revised disclosure, if you or someone else has not filed an IND for each of GEN-003 or GEN-004, please explain your decision not to file the applicable IND.

14. We note on page 78 that you disclose that a person has one of nine HLA supertypes and that a person belonging to different supertypes may mount a T cell response to different protein epitopes or an entirely different protein. Please clarify if you have observed or anticipate that GEN-003 and GEN-004 will elicit a relatively strong helper and killer T cell response in populations representative of each HLA supertype, even though each of these products contain a relatively small number of antigens.

15. We note on pages 83 and 89 that GEN-003 consists of two protein antigens and GEN-004 consists of three protein antigens. We also note on page 90 that it is believed that there are limits to how many polysaccharides can physically be included in a vaccine. With a view towards revised disclosure, please explain if there is a practical limitation on the number of antigens that you can include in your product, and, if so, discuss how this may limit your ability generally to develop effective products to treat more genetically complex pathogens, including Chlamydia and Malaria.

16. We note your statement on page 93 that you have entered into collaborations with the Naval Medical Research Center, and recently initiated a second collaboration with the Gates Foundation. To the extent material, please identify the terms of these collaborations, including payment terms including grants, the material rights and obligations of the parties, duration of the agreement and termination provisions. In addition, please file these collaboration agreements as exhibits pursuant to Item 601(b)(10) of Regulation S-K or provide us with an analysis supporting your determination that the applicable agreement is not material to the company.

Herpes Simplex Virus—2 (HSV-2), page 83

17. Please clarify if gD2 was discovered or selected based on the ATLAS screens or as a B cell antigen.

Intellectual Property, page 94

18. Please identify any patents that cover material non-U.S. jurisdictions and provide the jurisdiction(s), expiration date(s) and other relevant information comparable to your disclosures regarding your U.S. patent portfolio.

In-License Agreements
University of California, page 97

19. We note that you have a collaboration agreement with the University of California on page 97. Please disclose your material payment terms, including the minimum annual royalty. Please revise your disclosure to provide more precise information about the percentage of consideration to be paid for sublicenses. For example, you may either provide a range for the applicable payment within ten percent or a statement that the percentage is in the single digits, low double digits to teens, twenties, etc. In addition, please disclose the potential aggregate milestone payments.

Harvard University, page 97

20. We note that you have a collaboration agreement with Harvard on page 97. Please revise your disclosure to provide more precise information about the percentage of consideration to be paid for sublicenses. In addition, please disclose the potential aggregate milestone payments.

University of Washington, page 98

21. Please disclose your material payment terms, including the minimum annual royalty. Please revise your disclosure to provide more precise information about the percentage of consideration to be paid for sublicenses. In addition, please disclose the potential aggregate milestone payments.

Children's Medical Center Corporation, page 99

22. Please disclose your material payment terms, including aggregate milestone payments to be paid. In addition, please revise your disclosure to provide more precise information about the percentage of consideration to be paid for sublicenses.

Isconova AB, page 100

23. Please disclose your material payment terms, including aggregate milestone payments to be paid. In addition, please revise your disclosure to provide more precise information about the percentage of consideration to be paid for sublicenses.

Executive and Director Compensation, page 118

24. We note on page 119 that you provide modest benefits to your named executive officers. Please include all other compensation in the summary compensation table that is required by Regulation S-K Item 402(c)(2)(ix).

2012 Director Compensation, page 112

25. Please clarify if you have compensated any directors other than Dr. Siber in the last completed fiscal year. If any other directors have received compensation, please include them in the Director Compensation table as required by Regulation S-K Item 402(r). Additionally, to the extent known, please amend your disclosure to summarize the terms of your proposed director compensation program.

2013 Equity Plan, page 124

26. To the extent known, please amend your disclosure to summarize the terms of your 2013 Equity Plan.

Principal Stockholders, page 128

27. Please expand the discussion in footnote 1 to identify the natural persons who exercise voting or investment control over Polaris Venture Management Co. V, LLC and North Star Venture Management 2000, LLC.

28. Please provide Mr. Paul's full name and disclose his relationship with Lux Ventures.

29. Please disclose the natural person or persons who exercise the voting and/or dispositive powers with respect to the shares of Lux Ventures and the related funds.

30. Please disclose the relationship between Skyline Venture Partners V, L.P. and Dr. Hoffman.

31. Please disclose the natural person or persons who exercise the voting and/or dispositive powers with respect to the shares of CVF, LLC.

32. Please disclose the natural person or persons who exercise the voting and/or dispositive powers with respect to the shares of Auriga Ventures, III FCPR.

33. Please disclose the relationship between CVR, LLC and the Bill & Melinda Gates Foundation.

Shares Eligible for Future Sale, page 138

34. Once available please file copies of each of the lock-up agreements.

Notes to Financial Statements
2. Summary of significant accounting policies
License agreement, page F-13

35. Regarding your 2012 license agreement with a not-for-profit entity, please revise to disclose each individual milestone and the related contingent consideration as required by ASC 605-28-50-2. At a minimum, disclose potential future milestones by category, i.e. completion of development activities, regulatory approval, and achievement of product sales.

If you intend to respond to these comments with an amended draft registration statement, please submit it and any associated correspondence in accordance with the guidance we provide in the Division's October 11, 2012 announcement on the SEC website at http://www.sec.gov/divisions/corpfin/cfannouncements/drsfilingprocedures101512.htm.

Please keep in mind that we may publicly post filing review correspondence in accordance with our December 1, 2011 policy (http://www.sec.gov/divisions/corpfin/cfannouncements/edgarcorrespondence.htm). If you intend to use Rule 83 (17 CFR 200.83) to request confidential treatment of information in the correspondence you submit on EDGAR, please properly mark that information in each of your confidential submissions to us so we do not repeat or refer to that information in our comment letters to you.

You may contact Ibolya Ignat at (202) 551-3656 or Lisa Vanjoske at (202) 551-3614 if you have questions regarding comments on the financial statements and related matters. Please contact Matthew Jones at (202) 551-3786, John Krug at (202) 551-3862 or me at (202) 551-3715 with any other questions.

Sincerely,

/s/ Daniel Greenspan for

Jeffrey P. Riedler
Assistant Director

cc: Marc Rubenstein, Esq.
Ropes & Gray LLP
Prudential Tower
800 Boylston Street
Boston, MA 02199