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

DIVISION OF
CORPORATION FINANCE

September 19, 2013

Via- Email
Ms. Rachel King
Chief Executive Officer
GlycoMimetics, Inc.
401 Professional Drive, Suite 250
Gaithersburg, MD 20879

Re: GlycoMimetics, Inc.
Confidential Draft Registration Statement on Form S-1
Submitted August 21, 2013
CIK No. 0001253689

Dear Ms. King:

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

2. 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.

3. 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.

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

Risk Factors
"Our ability to utilize our net operating loss carryforwards . . .," page 13

5. Please expand your disclosure to explain the circumstances under which the completion of your proposed offering could result an "ownership change" for purposes of Section 382 of the Internal Revenue Code.

"We face substantial competition, which may result in others discovering, developing or commercializing drugs . . .," page 20

6. We note that you are aware of many companies developing therapies intended to treat or prevent VOC. Please expand your disclosure to describe the risk that a competitor's drug with an orphan drug designation receives marketing approval prior to GMI-1070. Please also disclose whether you are currently aware of any competitor's product that presents this risk.

Special Note Regarding Forward-Looking Statements and Industry Data, page 38

7. Please note that it is not appropriate to state or imply that you do not have liability for the statements in your registration statement. Your statements that you have not independently verified data obtained from industry publications and third party research, surveys and studies could imply that you are not taking liability for this information. In order to eliminate any inference that you are not liable for all of the information in your registration statement, please delete this statement or include a statement specifically accepting liability for information that appears in your registration statement that was obtained from third party sources.

8. With respect to your collaborative research agreement with the University of Basel for the biological evaluation of selectin antagonists, please disclose all of the material terms agreed to by the parties. This includes, but is not limited to:

- material payment terms, including royalties owed;
- scope of the research activities and allocation of responsibilities;
- the relevant intellectual property covered and rights conveyed as to such property;
- the duration of the agreement; and
- and the material termination provisions

9. Please file your agreement with the University of Basel as an exhibit pursuant to Item 601(b)(10) 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 50

10. Please confirm that no other stock options have been granted that have not already been disclosed and update that confirmation through the date the filing goes effective.

11. Please revise your disclosure to separately present the intrinsic value of outstanding vested and unvested options as of the most recent practicable date based on the estimated offering price.

12. Please note we may have additional comments on your accounting for stock compensation and related disclosure once you have disclosed an estimated offering price.

Research and Development Expense, page 59

13. In the first paragraph in this section you indicate that the increase in research and development expense was primarily attributable to an increase in expenses related to your Phase 2 clinical trial of GMI-1070. This statement appears to conflict with the information presented in the table on page 60 which shows an almost half million dollar decline for GMI-1070 and an approximately $1.3 million increase associated with GMI-1271. Please revise your disclosure to remove this apparent inconsistency.

Our Strategy, page 65

14. We note on page 20 that Mast Therapeutics is currently conducting a Phase 3 clinical trial for a drug to treat ongoing VOC episodes. Accordingly, where you discuss your belief that GMI-1070 has the potential to become the first drug approved to treat VOC, please revise your disclosure to make clear that there are competitors, such as Mast Therapeutics, who are also pursuing such treatments and are in late-stage clinical trials.

Our Platform, page 65

15. Please expand your disclosure to explain your glycomimetics platform in such a way to give investors a sense of the tools and methods you employ to identify and design your drug candidates.

GMI-1070 Clinical Results, page 68

16. Please disclose whether you have submitted any INDs for GMI-1070. If so, please provide the date(s) filed and the identity of the filer if different from the company.

Our Collaboration with Pfizer, page 72

17. We note on page 72, as well as on pages 1, 46 and 64, you state that you are eligible to receive low double-digit royalties from Pfizer based on worldwide net sales of GMI-1070. Please revise your disclosure on these pages and throughout the registration statement, as applicable, to provide more precise information about the royalty rate. For example, you may provide a range of royalties (within ten percent) or a statement that the percentage is in the teens, twenties, etc.

GMI-1070, page 74

18. We note that, in addition to your patent coverage for GMI-1070 in the U.S., you have related patents and patent applications abroad. 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.

Other Drug Candidates, page 74

19. We note that you have patents and patent applications abroad that related to your U.S. patent portfolio. 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.

Non-Employee Director Compensation, page 92

20. We note that you expect to adopt a director compensation plan to be effective following the offering. Upon adopting a new director compensation plan, please revise your disclosure to state the standard compensation arrangements under the plan and any alternative arrangements for certain directors.

Potential Payments upon Termination of Employment, page 96

21. We note on page 96 that you expect to amend the employment agreements with each of your executive officers prior to the completion of the offering. Upon amending the employment agreements, please revise your disclosure to state the material terms of each named executive officer's employment agreement.

Shares Eligible for Future Sale
Lock-Up Agreements, page 111

22. Once available, please file copies of the lock-up agreements.

Notes to Financial Statements
Note 2: Summary of Significant Accounting Policies
Revenue Recognition, page F-10

23. You disclose that you have been awarded reimbursement contracts and development grant contracts. Please tell us whether any of these contracts contain repayment, refund or royalty provisions depending upon the outcome or the underlying activities. If so, please tell us why it is appropriate to recognize revenue when you incur the costs and reference for us the authoritative literature you rely upon to support your accounting. Please revise your disclosure accordingly.

24. In disclosing your policy for assessing multiple-element arrangements you indicate that two criteria must be met in order to reflect deliverables in separate units of accounting. You appear to imply in the second criterion that an arrangement must include a general right of return. Under ASC 605-25-25-5c that second criterion is conditional. If a general right of return exists related to the delivered item, then your delivery of the undelivered item must be probable and substantially within your control. Please revise your policy here and throughout your filing to clarify.

25. In the second full paragraph on page F-11 you disclose your criteria of identifying a milestone as being substantive. Please tell us how each of these criteria are consistent with the guidance in ASC 605-28-25-2. In your response specifically tell us:

    - How your policy considers the requirement in ASC 605-28-25-2a that the achievement of the milestone is a direct result of your performance or an enhancement of value resulting from a specific outcome based on your performance. In this regard, as it applies to your Pfizer agreement, it appears that Pfizer's performance will result in the achievement of the various milestones.

    - How your policy considers the requirement in ASC 605-28-25-2b that the achievement of the milestone relates solely to past performance.

    - Why a reasonable amount of time must pass as indicated in your fifth criterion to qualify as a substantive milestone.

Note 8: Research and License Agreements, page F-19

26. Please provide us your analysis supporting your conclusion that your license, research and development services and participation on the joint steering committee under the Pfizer agreement are a single unit of accounting recognized over a 1.5 year period. Reference for us the authoritative literature you rely upon to support your accounting. In your response, please specifically tell us:

    - Why you consider your participation on the steering committee to be a component of your research and development services. Without providing names, tell us who participates on this committee and your obligation to sit on it as well as the powers of this committee and the term of its existence.

    - Why a 1.5-year performance period is appropriate given your disclosed strategy on page 2 and elsewhere to support Pfizer's continued development of GMI-1070.

    - How Pfizer will exploit the license without the input of your expertise after the completion of the Phase 2 clinical trial.

27. Please revise your disclosure to provide a description of each milestone you could receive from Pfizer and its related contingent consideration as required by ASC 605-28-50-2b.

Exhibits Index

28. Please file the Investor Rights Agreement as an exhibit pursuant to Item 601of Regulation S-K.

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 Scott Wuenschell at (202) 551-3467 or Mark Brunhofer at (202) 551-3638 if you have questions regarding comments on the financial statements and related matters. Please contact Matthew Jones at (202) 551-3786, Dan Greenspan at (202) 551-3623, or me at (202) 551-3715 with any other questions.

Sincerely,

/s/ Daniel Greenspan for

Jeffrey P. Riedler
Assistant Director

cc: Brent Siler
Cooley LLP
11951 Freedom Drive
Reston, VA 20190