

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

**FORM S-8
REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933**

GlycoMimetics, Inc.

(Exact name of Registrant as specified in its charter)

Delaware
(State or other jurisdiction of
Incorporation or organization)

06-1686563
(I.R.S. Employer
Identification No.)

**401 Professional Drive, Suite 250
Gaithersburg, MD 20879**
(Address of principal executive offices) (Zip code)

**2003 Stock Incentive Plan, as amended
2013 Equity Incentive Plan
2013 Employee Stock Purchase Plan**
(Full title of the plan)

**Rachel K. King
Chief Executive Officer
GlycoMimetics, Inc.
401 Professional Drive, Suite 250
Gaithersburg, MD 20879
(240) 243-1201**
(Name and address of agent for service) (Telephone number, including area code, of agent for service)

Copies to:

**Brent B. Siler
Christian E. Plaza
Brian F. Leaf
Cooley LLP
11951 Freedom Drive
Reston, VA 20190
Telephone: (703) 456-8000
Fax: (703) 456-8100**

**Brian M. Hahn
Chief Financial Officer
GlycoMimetics, Inc.
401 Professional Drive, Suite 250
Gaithersburg, MD 20879
Telephone: (240) 243-1201
Fax: (240) 243-1018**

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer

Accelerated filer

Non-accelerated filer (Do not check if a smaller reporting company)

Smaller reporting company

CALCULATION OF REGISTRATION FEE

Title of Securities to be Registered	Amount to be Registered (1)	Proposed Maximum Offering Price Per Share(2)	Proposed Maximum Aggregate Offering Price(2)	Amount of Registration Fee
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Common Stock, par value \$0.001 per share	2,147,226 shares	\$1.25-9.74	\$11,313,205.27	\$1,457.14
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- (1) Pursuant to Rule 416(a) of the Securities Act of 1933, as amended (the “*Securities Act*”), this Registration Statement shall also cover any additional shares of the Registrant’s common stock, par value \$0.001 (the “*Common Stock*”) that become issuable under the 2003 Stock Incentive Plan, as amended (the “2003 Plan”), the 2013 Equity Incentive Plan (the “*2013 EIP*”) and the 2013 Employee Stock Purchase Plan (the “*2013 ESPP*”) by reason of any stock dividend, stock split, recapitalization or other similar transaction effected without receipt of consideration that increases the number of the Registrant’s outstanding shares of Common Stock.
- (2) Estimated solely for the purpose of calculating the amount of the registration fee pursuant to Rule 457(h) and Rule 457(c) promulgated under the Securities Act. The offering price per share and the aggregate offering price are based upon (a) \$1.25, which is the weighted-average exercise price for outstanding options granted under the 2003 Plan, (b) \$8.00, which is the exercise price for outstanding options granted under the 2013 EIP and (c) \$9.74, which is the average of the high and low prices of the Registrant’s Common Stock as reported on the NASDAQ Global Market on January 10, 2014. The chart below details the calculations of the registration fee.

Securities	Number of Shares	Offering Price Per Share (2)	Aggregate Offering Price
Shares issuable upon the exercise of outstanding options granted under the 2003 Plan	972,226	\$1.25(2)(a)	\$1,211,877.39
Shares issuable upon the exercise of outstanding options granted under the 2013 EIP	771,938	\$8.00(2)(b)	\$6,175,504.00
Shares reserved for future grant under the 2013 EIP	228,062	\$9.74(2)(c)	\$2,221,323.88
Shares reserved for future grant under the 2013 ESPP	175,000	\$9.74(2)(c)	\$1,704,500.00
Proposed Maximum Aggregate Offering Price			\$11,313,205.27
Registration Fee			\$1,457.14

PART I

INFORMATION REQUIRED IN THE SECTION 10(a) PROSPECTUS

ITEM 1. PLAN INFORMATION.

Not required to be filed with this Registration Statement.

ITEM 2. REGISTRANT INFORMATION AND EMPLOYEE PLAN ANNUAL INFORMATION.

Not required to be filed with this Registration Statement.

PART II

ITEM 3. INCORPORATION OF DOCUMENTS BY REFERENCE

The following documents filed by GlycoMimetics, Inc. (the "*Registrant*") with the Securities and Exchange Commission are incorporated by reference into this Registration Statement:

(a) The Registrant's prospectus filed on January 10, 2014 pursuant to Rule 424(b) under the Securities Act relating to the Registration Statement on Form S-1 (File No. 333-191567), which contains audited financial statements for the Registrant's latest fiscal year for which such statements have been filed.

(b) The description of the Registrant's Common Stock which is contained in the Registrant's Registration Statement on Form 8-A filed on November 5, 2013 (File No. 001-36177) under the Securities Exchange Act of 1934, as amended (the "*Exchange Act*"), including any amendment or report filed for the purpose of updating such description.

(c) All documents, reports and definitive proxy or information statements filed by the Registrant pursuant to Sections 13(a), 13(c), 14 and 15(d) of the Exchange Act (other than Current Reports furnished under Item 2.02 or Item 7.01 of Form 8-K and exhibits furnished on such form that relate to such items) on or after the date of this Registration Statement and prior to the filing of a post-effective amendment to this Registration Statement that indicates that all securities offered have been sold or that deregisters all securities then remaining unsold shall be deemed to be incorporated by reference in this Registration Statement and to be part hereof from the date of filing of such documents. Any statement contained in a document incorporated or deemed to be incorporated by reference herein shall be deemed to be modified or superseded for purposes of this Registration Statement to the extent that a statement contained herein or in any subsequently filed document that also is deemed to be incorporated by reference herein modifies or supersedes such statement. Any such statement so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this Registration Statement.

ITEM 4. DESCRIPTION OF SECURITIES

See the description of the Registrant's Common Stock contained in the Registrant's Registration Statement on Form S-1 (File No. 333-191567).

ITEM 5. INTERESTS OF NAMED EXPERTS AND COUNSEL

Not applicable.

ITEM 6. INDEMNIFICATION OF DIRECTORS AND OFFICERS

The Registrant is incorporated under the laws of the State of Delaware. Section 102 of the Delaware General Corporation Law, or DGCL, permits a corporation to eliminate the personal liability of directors of a corporation to the corporation or its stockholders for monetary damages for a breach of fiduciary duty as a director, except where the director breached his duty of loyalty, failed to act in good faith, engaged in intentional misconduct or knowingly violated a law, authorized the payment of a dividend or approved a stock repurchase in violation of Delaware corporate law or obtained an improper personal benefit.

Section 145 of the DGCL provides that a corporation has the power to indemnify a director, officer, employee or agent of the corporation and certain other persons serving at the request of the corporation in related capacities against expenses (including attorneys' fees), judgments, fines and amounts paid in settlements actually and reasonably incurred by the person in connection with an action, suit or proceeding to which he is or is threatened to be made a party by reason of such position, if such person acted in good faith and in a manner he or she reasonably believed to be in or not opposed to the best interests of the corporation, and, in any criminal action or proceeding, had no reasonable cause to believe his or her conduct was unlawful, except that, in the case of actions brought by or in the right of the corporation, no indemnification shall be made with respect to any claim, issue or matter as to which such person shall have been adjudged to be liable to the corporation unless and only to the extent that the Court of Chancery or other adjudicating court determines that, despite the adjudication of liability but in view of all of the circumstances of the case, such person is fairly and reasonably entitled to indemnity for such expenses which the Court of Chancery or such other court shall deem proper.

As permitted by the DGCL, the Registrant's amended and restated certificate of incorporation and bylaws provide that: (i) the Registrant is required to indemnify its directors to the fullest extent permitted by the DGCL; (ii) the Registrant may, in its discretion, indemnify its officers, employees and agents as set forth in the DGCL; (iii) the Registrant is required, upon satisfaction of certain conditions, to advance all expenses incurred by its directors in connection with certain legal proceedings; (iv) the rights conferred in the bylaws are not exclusive; and (v) the Registrant is authorized to enter into indemnification agreements with its directors, officers, employees and agents.

The Registrant has entered into agreements with its directors that require the Registrant to indemnify them against expenses, judgments, fines, settlements and other amounts that any such person becomes legally obligated to pay (including with respect to a derivative action) in connection with any proceeding, whether actual or threatened, to which such person may be made a party by reason of the fact that such person is or was a director of the Registrant or any of its affiliates, provided such person acted in good faith and in a manner such person reasonably believed to be in, or not opposed to, the Registrant's best interests. The indemnification agreements also set forth certain procedures that will apply in the event of a claim for indemnification thereunder. At present, no litigation or proceeding is pending that involves any of the Registrant's directors or officers regarding which indemnification is sought, nor is the Registrant aware of any threatened litigation that may result in claims for indemnification.

The Registrant maintains a directors' and officers' liability insurance policy. The policy insures directors and officers against unindemnified losses arising from certain wrongful acts in their capacities as directors and officers and reimburses the Registrant for those losses for which it has lawfully indemnified the directors and officers. The policy contains various exclusions.

ITEM 7. EXEMPTION FROM REGISTRATION CLAIMED.

Not applicable.

ITEM 8. EXHIBITS

<u>Exhibit Number</u>	<u>Description</u>
3.1(1)	Amended and Restated Certificate of Incorporation, as currently in effect.
3.2(2)	Certificate of Amendment of Restated Certificate of Incorporation.
3.3(3)	Form of Amended and Restated Certificate of Incorporation to be effective upon completion of the Registrant's initial public offering.
3.4(4)	Amended and Restated Bylaws, as currently in effect.
3.5(5)	Form of Amended and Restated Bylaws to be effective upon completion of the Registrant's initial public offering.
4.1(6)	Specimen stock certificate evidencing shares of Common Stock.
4.2(7)	2003 Stock Incentive Plan, as amended to date.
4.3(8)	Form of Incentive Stock Option Agreement under 2003 Stock Incentive Plan.
4.4(9)	Form of Nonqualified Stock Option Agreement under 2003 Stock Incentive Plan.
4.5(10)	2013 Equity Incentive Plan.
4.6(11)	Form of Stock Option Grant Notice and Stock Option Agreement under 2013 Equity Incentive Plan.
4.7(12)	Form of Restricted Stock Unit Grant Notice and Restricted Stock Unit Award Agreement under 2013 Equity Incentive Plan.
4.8(13)	2013 Employee Stock Purchase Plan.
5.1	Opinion of Cooley LLP.
23.1	Consent of Ernst & Young LLP, independent registered public accounting firm.
23.2	Consent of Cooley LLP (included in Exhibit 5.1).
24.1	Power of Attorney (included on the signature page of this Form S-8).
(1)	Previously filed as Exhibit 3.1 to the Registrant's Registration Statement on Form S-1 (File No. 333-191567), filed with the Commission on October 4, 2013, and incorporated by reference herein.
(2)	Previously filed as Exhibit 3.2 to Amendment No. 1 to the Registrant's Registration Statement on Form S-1 (File No. 333-191567), filed with the Commission on October 28, 2013, and incorporated by reference herein.
(3)	Previously filed as Exhibit 3.3 to the Registrant's Registration Statement on Form S-1 (File No. 333-191567), filed with the Commission on October 4, 2013, and incorporated by reference herein.
(4)	Previously filed as Exhibit 3.4 to the Registrant's Registration Statement on Form S-1 (File No. 333-191567), filed with the Commission on October 4, 2013, and incorporated by reference herein.
(5)	Previously filed as Exhibit 3.5 to the Registrant's Registration Statement on Form S-1 (File No. 333-191567), filed with the Commission on October 4, 2013, and incorporated by reference herein.

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- (6) Previously filed as Exhibit 4.2 to Amendment No. 2 to the Registrant's Registration Statement on Form S-1 (File No. 333-191567), filed with the Commission on October 31, 2013, and incorporated by reference herein.
 - (7) Previously filed as Exhibit 10.8 to the Registrant's Registration Statement on Form S-1 (File No. 333-191567), filed with the Commission on October 4, 2013, and incorporated by reference herein.
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 - (11) Previously filed as Exhibit 10.12 to Amendment No. 1 to the Registrant's Registration Statement on Form S-1 (File No. 333-191567), filed with the Commission on October 28, 2013, and incorporated by reference herein.
 - (12) Previously filed as Exhibit 10.13 to Amendment No. 1 to the Registrant's Registration Statement on Form S-1 (File No. 333-191567), filed with the Commission on October 28, 2013, and incorporated by reference herein.
 - (13) Previously filed as Exhibit 10.14 to Amendment No. 1 to the Registrant's Registration Statement on Form S-1 (File No. 333-191567), filed with the Commission on October 28, 2013, and incorporated by reference herein.

ITEM 9. UNDERTAKINGS

1. The undersigned registrant hereby undertakes:

(a) To file, during any period in which offers or sales are being made, a post-effective amendment to this registration statement:

(i) To include any prospectus required by Section 10(a)(3) of the Securities Act;

(ii) To reflect in the prospectus any facts or events arising after the effective date of the registration statement (or the most recent post-effective amendment thereof) which, individually or in the aggregate, represent a fundamental change in the information set forth in the registration statement. Notwithstanding the foregoing, any increase or decrease in volume of securities offered (if the total dollar value of securities offered would not exceed that which was registered) and any deviation from the low or high end of the estimated maximum offering range may be reflected in the form of prospectus filed with the Commission pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than a 20% change in the maximum aggregate offering price set forth in the "Calculation of Registration Fee" table in the effective registration statement.

(iii) To include any material information with respect to the plan of distribution not previously disclosed in the registration statement or any material change to such information in the registration statement;

Provided, however, that paragraphs (a)(i) and (a)(ii) do not apply if the information required to be included in a post-effective amendment by those paragraphs is contained in reports filed with or furnished to the Commission by the registrant pursuant to section 13 or section 15(d) of the Exchange Act that are incorporated by reference in the registration statement.

(b) That, for the purpose of determining any liability under the Securities Act, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered herein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

(c) To remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering.

(d) That, for the purpose of determining liability of the registrant under the Securities Act to any purchaser in the initial distribution of the securities, the undersigned registrant undertakes that in a primary offering of securities of the undersigned registrant pursuant to this registration statement, regardless of the underwriting method used to sell the securities to the purchaser, if the securities are offered or sold to such purchaser by means of any of the following communications, the undersigned registrant will be a seller to the purchaser and will be considered to offer or sell such securities to such purchaser:

(i) Any preliminary prospectus or prospectus of the undersigned registrant relating to the offering required to be filed pursuant to Rule 424;

(ii) Any free writing prospectus relating to the offering prepared by or on behalf of the undersigned registrant or used or referred to by the undersigned registrant;

(iii) The portion of any other free writing prospectus relating to the offering containing material information about the undersigned registrant or its securities provided by or on behalf of the undersigned registrant; and

(iv) Any other communication that is an offer in the offering made by the undersigned registrant to the purchaser.

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2. The undersigned registrant hereby undertakes that, for purposes of determining any liability under the Securities Act, each filing of the registrant's annual report pursuant to Section 13(a) or Section 15(d) of the Exchange Act (and, where applicable, each filing of an employee benefit plan's annual report pursuant to section 15(d) of the Exchange Act) that is incorporated by reference in the Registration Statement shall be deemed to be a new registration statement relating to the securities offered herein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.
 3. Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the registrant of expenses incurred or paid by a director, officer or controlling person of the registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Securities Act and will be governed by the final adjudication of such issue.

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, as amended, the Registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-8 and has duly caused this Registration Statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Gaithersburg, State of Maryland, on this 10th day of January, 2014.

GLYCOMIMETICS, INC.

By: /s/ Rachel K. King

Rachel K. King

President and Chief Executive Officer

POWER OF ATTORNEY

KNOW ALL BY THESE PRESENTS, that each person whose signature appears below hereby constitutes and appoints Rachel K. King, Brian Hahn and Brent B. Siler, and each or any one of them, his or her true and lawful attorney-in-fact and agent, with full power of substitution and resubstitution, for him or her and in his or her name, place and stead, in any and all capacities, to sign any and all amendments (including post-effective amendments) to this Registration Statement, and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully to all intents and purposes as he or she might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, or any of them, or their or his substitutes or substitute, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act of 1933, as amended, this Registration Statement has been signed by the following persons in the capacities and on the dates indicated.

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ Rachel K. King</u> Rachel K. King	President, Chief Executive Officer and Director (<i>Principal Executive Officer</i>)	January 10, 2014
<u>/s/ Brian M. Hahn</u> Brian M. Hahn	Chief Financial Officer (<i>Principal Financial Officer and Principal Accounting Officer</i>)	January 10, 2014
<u>/s/ M. James Barrett, Ph.D.</u> M. James Barrett, Ph.D.	Director	January 10, 2014
<u>John J. Baldwin, Ph.D.</u>	Director	January 10, 2014
<u>/s/ William M. Gust</u> William M. Gust	Director	January 10, 2014
<u>Michael A. Henos</u>	Director	January 10, 2014
<u>/s/ John L. Magnani, Ph.D.</u> John L. Magnani, Ph.D.	Director	January 10, 2014
<u>/s/ Franklin H. Top, Jr., M.D.</u> Franklin H. Top, Jr., M.D.	Director	January 10, 2014

EXHIBIT INDEX

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5.1	Opinion of Cooley LLP.
23.1	Consent of Cooley LLP (included in Exhibit 5.1).
23.2	Consent of Ernst & Young LLP, independent registered public accounting firm.
24.1	Power of Attorney (included on the signature page of this Form S-8).
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Darren K. DeStefano
T: +1 703 456 8034
ddestefano@cooley.com

January 10, 2014

GlycoMimetics, Inc.
401 Professional Drive, Suite 250
Gaithersburg, Maryland 20879

Ladies and Gentlemen:

We have represented GlycoMimetics, Inc., a Delaware corporation (the "*Company*"), in connection with the filing by the Company of a Registration Statement on Form S-8 (the "*Registration Statement*") with the Securities and Exchange Commission covering the offering of up to (i) 972,226 shares of the Company's Common Stock, par value \$0.001 per share (the "*Common Stock*"), pursuant to the Company's 2003 Stock Incentive Plan, as amended (the "*2003 Plan Shares*"), (ii) 1,000,000 shares of Common Stock pursuant to the Company's 2013 Equity Incentive Plan (the "*2013 EIP Shares*") and (iii) 175,000 shares of the Company's Common Stock pursuant to the Company's 2013 Employee Stock Purchase Plan (the "*2013 ESPP Shares*").

In connection with this opinion, we have examined and relied upon (a) the Registration Statement and the related prospectuses, (b) the Company's Amended and Restated Certificate of Incorporation, filed as Exhibit 4.1 to the Registration Statement, and the Company's Amended and Restated Bylaws, filed as Exhibit 4.2 to the Registration Statement, each as currently in effect, and (c) the originals or copies certified to our satisfaction of such records, documents, certificates, memoranda and other instruments as in our judgment are necessary or appropriate to enable us to render the opinion expressed below. We have assumed the genuineness and authenticity of all documents submitted to us as originals and the conformity to originals of all documents submitted to us as copies thereof. As to certain factual matters, we have relied upon a certificate of officers of the Company and have not sought to independently verify such matters.

Our opinion is expressed only with respect to the federal laws of the United States of America and the General Corporation Law of the State of Delaware. We express no opinion as to whether the laws of any particular jurisdiction other than those identified above are applicable to the subject matter of this opinion.

On the basis of the foregoing, and in reliance thereon, we are of the opinion that the 2003 Plan Shares, the 2013 EIP Shares and the 2013 ESPP Shares, when sold and issued in accordance with the Company's 2003 Stock Incentive Plan, as amended, the Company's 2013 Equity Incentive Plan and the Company's 2013 Employee Stock Purchase Plan, respectively, and the Registration Statement and related prospectuses, will be validly issued, fully paid and nonassessable.

We consent to the filing of this opinion as an exhibit to the Registration Statement.

Sincerely,

COOLEY LLP

By: /s/ Darren K. DeStefano
Darren K. DeStefano

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in the Registration Statement (Form S-8) filed on January 10, 2014 pertaining to the 2003 Stock Incentive Plan, as amended, 2013 Equity Incentive Plan and 2013 Employee Stock Purchase Plan of GlycoMimetics, Inc. of our report dated August 16, 2013 (except for the second paragraph of Note 10, as to which the date is October 25, 2013), with respect to the financial statements of GlycoMimetics, Inc. included in its Registration Statement (Form S-1, No. 333-191567) and related Prospectus, filed with the Securities and Exchange Commission.

/s/ Ernst & Young LLP

McLean, Virginia
January 10, 2014