

Jeffrey Riley

**Chief Executive Officer
9605 Medical Center Drive, Suite 270**

Rockville, Maryland 20850

(Name and address of agent for service)

(301) 417-4364

(Telephone number, including area code, of agent for service)

Copy to:

Leslie Marlow, Esq.

Gracin & Marlow, LLP

The Chrysler Building

405 Lexington Avenue, 26th Floor

New York, New York 10174

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. (Check one):

Large accelerated filer Accelerated filer Non-accelerated filer Smaller reporting company
(do not check if smaller reporting company)

CALCULATION OF REGISTRATION FEE

Title of securities to be registered (1)	Amount to be Registered (2)	Proposed maximum offering price per share (3)	Proposed maximum aggregate offering price (1)	Amount of registration fee (4)
Common Stock, par value \$0.001 per share	6,000,000	\$ 1.60	\$9,600,000	\$ 967

(1) The securities to be registered include options and rights to acquire the common stock of Synthetic Biologics, Inc.

Pursuant to Rule 416(a) under the Securities Act of 1933, as amended (the "Securities Act"), this registration (2) statement also covers any additional securities that may be offered or issued in connection with any stock split, stock dividend or similar transaction.

Estimated pursuant to Rule 457(c) and 457(h) of the Securities Act solely for purposes of calculating the (3) registration fee. The price for the shares under the plan is based upon the average of the high and low sale prices of the Common Stock on August 26, 2016, as reported by the NYSE MKT.

(4) Calculated pursuant to Section 6(b) of the Securities Act as .00010070 of the proposed maximum aggregate offering price.

Explanatory Note

The Registrant filed with the Securities and Exchange Commission (the “SEC”) its Registration Statement on Form S-8 (Registration No. 333-170858) on November 29, 2010 (the “2010 Registration Statement”) pursuant to and in accordance with the requirements of General Instruction E to Form S-8 for the purpose of registering under the Securities Act of 1933, as amended (the “Securities Act”), 3,000,000 shares of the Registrant’s common stock, par value \$0.001 per share (the “Common Stock”), to be offered and sold under the Registrant’s 2010 Stock Incentive Plan (the “2010 Plan”). Pursuant to General Instruction E to Form S-8, the contents of the 2010 Registration Statement are incorporated into this Registration Statement by reference.

The Registrant filed with the SEC its Registration Statement on Form S-8 (Registration No. 333-192355) on November 15, 2013 (the “2013 Registration Statement”) pursuant to and in accordance with the requirements of General Instruction E to Form S-8 for the purpose of registering under the Securities Act an additional 3,000,000 shares of Common Stock to be offered and sold under the Registrant’s 2010 Plan. Pursuant to General Instruction E to Form S-8, the contents of the 2013 Registration Statement are incorporated into this Registration Statement by reference.

The Registrant also filed with the SEC its Registration Statement on Form S-8 (Registration No. 333-206268) on August 10, 2015 (the “2015 Registration Statement”) pursuant to and in accordance with the requirements of General Instruction E to Form S-8 for the purpose of registering under the Securities Act an additional 2,000,000 shares of Common Stock to be offered and sold under the Registrant’s 2010 Plan. Pursuant to General Instruction E to Form S-8, the contents of the 2015 Registration Statement are incorporated into this Registration Statement by reference.

This Registration Statement on Form S-8 has been prepared and filed pursuant to and in accordance with the requirements of General Instruction E to Form S-8 for the purpose of registering under the Securities Act 6,000,000 additional shares of Common Stock to be offered and sold under the 2010 Plan. These shares represented 6,000,000 shares of Common Stock that were added to the 2010 Plan as of August 25, 2016 by vote of the Registrant’s stockholders at the Registrant’s 2016 Annual Meeting of Stockholders and, in accordance with the terms of the 2010 Plan, are to be assigned to and made available for grant under the 2010 Plan.

PART II

INFORMATION REQUIRED IN THE REGISTRATION STATEMENT

Item 3. Incorporation of Documents By Reference.

The Company has filed the documents listed below with the SEC under the Securities Exchange Act of 1934, as amended (the "Exchange Act"), and these documents are incorporated into this registration statement by reference:

Our Annual Report on Form 10-K for the fiscal year ended December 31, 2015 filed with the SEC on March 10, 2016 (File No. 001-12584);

Our Quarterly Report on Form 10-Q for the quarter ended March 31, 2016 filed with the SEC on May 5, 2016 (File No. 001-12584);

Our Quarterly Report on Form 10-Q for the quarter ended June 30, 2016 filed with the SEC on August 3, 2016 (File No. 001-12584);

Our Current Reports on Form 8-K filed with the SEC on February 2, 2016, August 5, 2016 and August 26, 2016 (File No. 001-12584); and

The description of our common stock set forth in our registration statement on Form 8-A12B, filed with the SEC on June 20, 2007 (File No. 000-12584).

All documents filed by the Company pursuant to Sections 13(a), 13(c), 14 and 15(d) of the Exchange Act subsequent to the date hereof and prior to the filing of a post-effective amendment which indicates that all securities offered hereby have been sold or which deregisters all securities then remaining unsold, shall be deemed to be incorporated by reference in this registration statement and to be a part hereof from the date of filing of such documents.

Item 4. Description of Securities.

Not Applicable

Item 5. Interests of Named Experts and Counsel.

Not applicable.

Item 6. Indemnification of Directors and Officers.

Section 78.138 of the Nevada Revised Statutes provides that a director or officer is not individually liable to the Registrant or its stockholders or creditors for any damages as a result of any act or failure to act in his capacity as a director or officer unless it is proven that (1) his act or failure to act constituted a breach of his fiduciary duties as a director or officer and (2) his breach of those duties involved intentional misconduct, fraud or a knowing violation of law.

This provision is intended to afford directors and officers protection against and to limit their potential liability for monetary damages resulting from suits alleging a breach of the duty of care by a director or officer. As a consequence of this provision, the Registrant's stockholders will be unable to recover monetary damages against directors or officers for action taken by them that may constitute negligence or gross negligence in performance of their duties unless such conduct falls within one of the foregoing exceptions. The provision, however, does not alter the applicable standards governing a director's or officer's fiduciary duty and does not eliminate or limit the right of the Registrant or any of its stockholder to obtain an injunction or any other type of non-monetary relief in the event of a breach of fiduciary duty.

The Registrant's Articles of Incorporation, as amended, and amended and restated bylaws provide for indemnification of directors, officers, employees or agents of the Registrant to the fullest extent permitted by Nevada law (as amended from time to time). Section 78.7502 of the Nevada Revised Statutes provides that such indemnification may only be provided if the person acted in good faith and in a manner he reasonably believed to be in, or not opposed to, the best interest of the Registrant and, with respect to any criminal action or proceeding, had no reasonable cause to believe his conduct was unlawful.

Item 7. Exemption from Registration Claimed.

Not applicable.

Item 8. Exhibits.

Exhibit No. Description

4.1	Synthetic Biologics, Inc. 2010 Incentive Stock Plan (as amended on May 31, 2016)*
5.1	Opinion of Parsons Behle & Latimer as to the legality of securities being registered*
23.1	Consent of BDO USA, LLP*
23.2	Consent of Parsons Behle & Latimer (included in Exhibit 5.1 hereof)*
24.1	Power of Attorney (included on the signature page of this registration statement)*

*Filed Herewith

Item 9. Undertakings.

(a) The undersigned Registrant hereby undertakes:

(1) 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 this 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 this registration statement;

Provided, however, that paragraphs (a)(1)(i) and (a)(1)(ii) of this section do not apply if the registration statement is on Form S-8 and the information required to be included in a post-effective amendment by those paragraphs is contained in periodic reports filed with or furnished to the Securities Exchange 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.

(2) 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.

(3) 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.

(4) 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 this 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.

(5) Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of the Registrant pursuant to existing provisions or arrangements whereby the Registrant may indemnify a trustee, officer or controlling person of the Registrant against liabilities arising under the Securities Act, 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 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 trustee, officer or controlling person of the Registrant in the successful defense of any action, suit or proceeding) is asserted by such trustee, 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 Act and will be governed by the final adjudication of such issue.

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, 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 Rockville and State of Maryland, on the 31st day of August, 2016.

SYNTHETIC BIOLOGICS, INC.

By: /s/ Jeffrey Riley
Jeffrey Riley

Chief Executive Officer,
President and Director
(Principal Executive Officer)

By: /s/ Steven A. Shallcross
Steven A. Shallcross

Chief Financial Officer
(Principal Financial and
Accounting Officer)

Each of the undersigned, whose signature appears below, hereby severally constitute and appoint each of Jeffrey Riley and Steven A. Shallcross, with full power to each of them to act alone, as our true and lawful attorneys-in-fact and agent, with full power of substitution and resubstitution to each of said attorneys to each to sign for us, and in our names in the capacities indicated below, to the registration statement, and any amendment, post-effective amendment, supplement or papers supplemental thereto, any subsequent registration statements pursuant to Rule 462 of the Securities Act of 1933, as amended, 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 and about the premises, as fully to all intents and purposes as he 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 or her substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act of 1933, this registration statement has been signed below by the following persons in the capacities and on the date indicated.

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Signature	Title	Date
/s/ Jeffrey Riley Jeffrey Riley	Chief Executive Officer (Principal Executive Officer) and Director	August 31, 2016
/s/ Steven A. Shallcross Steven A. Shallcross	Chief Financial Officer (Principal Financial and Accounting Officer)	August 31, 2016
/s/ Jeffrey J. Kraws Jeffrey J. Kraws	Chairman of the Board	August 31, 2016
/s/ Scott L. Tarriff Scott L. Tarriff	Director	August 31, 2016
/s/ Jeffrey Wolf Jeffrey Wolf	Director	August 31, 2016

EXHIBIT INDEX

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