

PROSPECTUS SUPPLEMENT NO. 5

SYNTHETIC BIOLOGICS, INC.

112,573 Shares of Common Stock

This prospectus supplement amends and supplements our prospectus, dated July 26, 2012 relating to the resale, from time to time, of up to 112,573 shares of common stock of Synthetic Biologics, Inc. upon the exercise of warrants issued in July 2011 at an exercise price of \$1.00 per share and warrants sold in our July 2010 offering at an exercise price of \$1.32 per share. We will receive proceeds if the warrants are exercised for cash; to the extent we receive such proceeds, they will be used for working capital purposes.

Our common stock became eligible for trading on the NYSE MKT October 16, 2008. Our common stock is eligible for quotation on the NYSE MKT under the symbol "SYN". The closing price of our stock on October 8, 2012 was \$2.21.

This prospectus supplement is being filed to include the information set forth in the Current Report on Form 8-K filed on October 5, 2012, which is set forth below. This prospectus supplement should be read in conjunction with the prospectus dated July 26, 2012, supplement no. 1 dated August 9, 2012, prospectus supplement no. 2 dated August 15, 2012, prospectus supplement no. 3 dated August 15, 2012 and prospectus supplement no. 4 dated September 12, 2012 which are to be delivered with this prospectus supplement.

Investing in our securities involves a high degree of risk. See "Risk Factors" beginning on page 4 of the original prospectus for more information.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined if this prospectus or the prospectus to which it relates is truthful or complete. Any representation to the contrary is a criminal offense.

The date of this Prospectus Supplement No. 5 is October 9, 2012.

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

FORM 8-K

CURRENT REPORT

Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934

Date of Report (date of earliest event reported): October 5, 2012

Synthetic Biologics, Inc.

(Exact name of registrant as specified in charter)

Nevada

(State or other jurisdiction of incorporation)

01-12584

(Commission File Number)

13-3808303

(IRS Employer Identification No.)

617 Detroit Street, Suite 100
Ann Arbor, MI 48104

(Address of principal executive offices and zip code)

(734) 332-7800

(Registrant's telephone number including area code)

N/A

(Former Name and Former Address)

Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligation of registrant under any of the following provisions:

- .. Written communications pursuant to Rule 425 under the Securities Act (17 CFR 230.425)
 - .. Soliciting material pursuant to Rule 14a-12(b) under the Exchange Act (17 CFR 240.14a-12)
 - .. Pre-commencement communications pursuant to Rule 14d-2(b) under the Exchange Act (17 CFR 240.14d-2(b))
 - .. Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c))
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Item 5.07 Submission of Matters to a Vote of Security Holders.

On October 5, 2012, Synthetic Biologics, Inc. (the “Company”) held its Annual Meeting of Stockholders (the “Meeting”). The matters voted on at the Meeting were: (1) the election of five directors: (a) Steve H. Kanzer, (b) Jeffrey J. Kraws, (c) Jeffrey Riley, (d) Scott L. Tarriff, and (e) Jeffrey Wolf; (2) the ratification of the Board’s appointment of BDO USA, LLP as the Company’s independent registered public accounting firm for the year ending December 31, 2012; and, (3) the approval of the issuance of the issuance of 3,552,210 shares of common stock to Intrexon Corporation in connection with the Exclusive Channel Collaboration. These matters are described in detail in the Company’s proxy statement for the Meeting, which was filed with the Securities and Exchange Commission on September 11, 2012. As of the record date for the meeting, August 6, 2012, 33,477,020 shares of common stock were issued and 33,395,538 shares of common stock were outstanding, each of which was entitled to one vote with respect to each of the matters voted on at the meeting. Each of the directors up for reelection was reelected and the other matters were approved by the required number of votes on each such matter. The final voting results were as follows:

Matter	For	Withheld	Broker Non-votes
1. Election of Directors			
(a) Steven Kanzer	17,358,175	618,268	11,275,243
(b) Jeffrey J. Kraws	17,793,892	182,551	11,275,243
(c) Jeffrey Riley	17,953,080	23,363	11,275,243
(d) Scott L. Tarriff	17,938,169	38,274	11,275,243
(e) Jeffrey Wolf	17,377,620	598,823	11,275,243

Matter	For	Against	Abstained	Broker Non-votes
2. Ratification of the appointment of BDO USA, LLP	29,076,000	158,126	17,560	0
3. Approval of the issuance of 3,552,210 shares of common stock to Intrexon Corporation in connection with the Exclusive Channel Collaboration	17,833,577	135,693	7,173	11,275,243

In connection with the reelection of directors, the Board of Directors appointed Mr. Tarriff to the Audit Committee.

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned hereunto duly authorized.

SYNTHETIC BIOLOGICS, INC.

Dated: October 5, 2012

By: /s/ C. Evan Ballantyne

Name: C. Evan Ballantyne

Title: Chief Financial Officer