

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

POST-EFFECTIVE AMENDMENT NO. 2 TO FORM S-3  
ON  
FORM S-1

REGISTRATION STATEMENT UNDER THE SECURITIES ACT OF 1933

SYNTHETIC BIOLOGICS, INC.  
(Exact Name of Registrant as Specified in Its Charter)

Nevada  
(State or Other Jurisdiction of Incorporation or Organization)

2834  
(Primary Standard Industrial Classification Code Number)

13-3808303  
(I.R.S. Employer Identification No.)

617 Detroit Street, Suite 100  
Ann Arbor, MI 48104  
(734) 332-7800  
(Address and telephone number of principal executive offices)

*Copy to:*

Leslie Marlow, Esq.  
Hank Gracin, Esq.  
Gracin & Marlow, LLP  
The Chrysler Building  
405 Lexington Avenue, 26th Floor  
New York, New York 10174  
(212) 907-6457  
(Name, address and telephone number of agent for service)

Approximate Date of Proposed Sale to the Public: From time to time after the date this registration statement becomes effective.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, check the following box. ☐

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following ☐

box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. o

If this Form is a post-effective amendment filed pursuant to Rule 462(d) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. p (File No. 333-180562)

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	<input type="radio"/>	Accelerated filer	<input type="radio"/>
Non-accelerated filer	<input type="radio"/>	Smaller reporting company	<input type="radio"/>

(Do not check if a smaller reporting company)

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#### EXPLANATORY NOTE

This Post-Effective Amendment No. 2 to Form S-3 on Form S-1 Registration Statement (File No. 333-180562) is filed pursuant to Rule 462(d) solely to add XBRL exhibits not previously filed with respect to such registration statement.

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## PART II - INFORMATION NOT REQUIRED IN PROSPECTUS

### ITEM 16. EXHIBITS

- 3.1 Certificate of Incorporation, as amended (Incorporated by reference to (i) Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed October 16, 2008, (ii) Exhibit 3.1 of the Registrant's Quarterly Report on Form 10-Q for the quarterly period ended June 30, 2001 filed August 14, 2001 and (iii) Exhibits 3.1, 4.1 and 4.2 of the Registrant's Quarterly Report on Form 10-Q for the quarterly period ended June 30, 1998 filed August 14, 1998)
- 3.2 Articles of Merger (Incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed October 19, 2009.)
- 3.3 Certificate of Merger filed with the Secretary of State of Delaware (Incorporated by reference to Exhibit 3.2 of the Registrant's Current Report on Form 8-K filed October 19, 2009.)
- 3.4 Articles of Incorporation filed with the Nevada Secretary of State (Incorporated by reference to Exhibit 3.3 of the Registrant's Current Report on Form 8-K filed October 19, 2009.)
- 3.5 By-Laws (Incorporated by reference to (i) Exhibit 3.4 of the Registrant's Current Report on Form 8-K filed October 19, 2009 and (ii) Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed June 3, 2010. )
- 3.6 Amended and Restated Bylaws Adopted and Effective October 31, 2011 (Incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed November 2, 2011.)
- 3.7 Certificate of Amendment to Articles of Incorporation (Incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed February 16, 2012.)
- 4.1 Form of Warrant Certificate (Incorporated by reference to Exhibit 4.1 to the Registrant's Current Report on Form 8-K filed December 1, 2006.)
- \*4.2 2001 Stock Incentive Plan (Incorporated by reference to Exhibit 4.1 of the Registrant's Registration Statement on Form S-8 filed January 18, 2008.)
- \*4.3 2007 Stock Incentive Plan (Incorporated by reference to Exhibit 4.2 of the Registrant's Registration Statement on Form S-8 filed January 18, 2008.)
- \*4.4 2010 Stock Incentive Plan (Incorporated by reference to Exhibit 4.1 of the Registrant's Registration Statement on Form S-8 filed November 29, 2010.)
- 4.5 Form of Warrant Certificate issued to Enclave Capital LLC (Incorporated by reference to Exhibit 4.1 of the Registrant's Current Report on Form 8-K filed July 6, 2010.)
- 4.6 Form of Warrant to Purchase Common Stock issued January 2011(Incorporated by reference to Exhibit 10.3 of the Registrant's Current Report on Form 8-K filed February 2, 2011.)
- 4.7 Form of Warrant to Purchase Common Stock issued April 2011(Incorporated by reference to Exhibit 10.3 of the Registrant's Current Report on Form 8-K filed April 6, 2011.)
- 4.8 Form of Exchange Warrant to Purchase Common Stock issued in exchange of the Warrant issued April 2011(Incorporated by reference to Exhibit 4.1 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2011 filed August 15, 2011.)

4.9 Form of Exchange Warrant to Purchase Common Stock issued in exchange of the Warrant issued February 2011(Incorporated by reference to Exhibit 4.2 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2011 filed August 15, 2011.)

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- 4.10 Form of Warrant to Purchase Common Stock issued February 2012 (Incorporated by reference to Exhibit 4.10 of the Registrant's Annual Report on Form 10-K for the year ended December 31, 2011 filed March 30, 2012.)
- 4.11 Form of Warrant to Purchase Common Stock (Incorporated by reference to Exhibit 4.10 of the Registrant's Annual Report on Form 10-K filed March 30, 2012.)
- 5.1 Legal Opinion of Gracin & Marlow, LLP \*\*
- 10.1 Unit Purchase Agreement (Incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed December 1, 2006.)
- 10.2 License Agreement between The Regents of the University of California and Epitepe Pharmaceuticals, Inc. (Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q for the quarterly period ended September 30, 2008 filed November 14, 2008.)
- \*10.3 Form of Director/Officer Indemnification Agreement (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed January 6, 2009.)
- 10.4 Warrant Cancellation and Registration Rights Agreement between Accredited Adventures Capital LLC and Adeona (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed January 20, 2009.)
- 10.5 Stock Purchase Agreement with Neil O. Colwell and Connie Colwell (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed April 16, 2009.)
- 10.6 Escrow Agreement Nayaran Torke (Incorporated by reference to Exhibit 10.5 of the Registrant's Current Report on Form 8-K filed July 16, 2009.)
- 10.7 Consulting Agreement with Nayaran Torke (Incorporated by reference to Exhibit 10.4 of the Registrant's Current Report on Form 8-K filed July 16, 2009.)
- 10.8 Purchase Agreement 1st Amendment HartLab LLC (Incorporated by reference to Exhibit 10.2 of the Registrant's Current Report on Form 8-K filed July 16, 2009.)
- 10.9 Purchase Agreement 2nd Amendment Hartlab LLC (Incorporated by reference to Exhibit 10.3 of the Registrant's Current Report on Form 8-K filed July 16, 2009.)
- 10.10 Agreement and Plan of Reincorporation Merger (Incorporated by reference to Exhibit 1.1 of the Registrant's Current Report on Form 8-K filed October 19, 2009.)
- \*10.11 Employment Agreement with James S. Kuo, M.D., (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed February 9, 2010.)
- \*10.12 Separation Agreement with Max Lyons (Incorporated by reference to Exhibit 10.2 of the Registrant's Current Report on Form 8-K filed February 9, 2010.)
- 10.13 Sublicense Agreement between Meda AB, Adeona Pharmaceuticals, Inc. and Pipex Therapeutics, Inc. (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed May 11, 2010.)
- 10.14 Non-Disturbance Agreement among Pipex Therapeutics, Inc., Mclean Hospital Corp and Meda AB (Incorporated by reference to Exhibit 10.2 of the Registrant's Current Report on Form 8-K filed May 11,

2010.)

- 10.15 Placement Agent Agreement with Enclave Capital LLC (Incorporated by reference to Exhibit 1.1 of the Registrant's Current Report on Form 8-K filed July 6, 2010.)
  - 10.16 Common Stock Purchase Agreement with Seaside 88,LP (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed July 6, 2010.)
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- 10.17 Agreement with Chardan Capital Markets, LLC (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed February 2, 2011.)
- 10.18 Securities Purchase Agreement with investors (Incorporated by reference to Exhibit 10.2 of the Registrant's Current Report on Form 8-K filed February 2, 2011.)
- 10.19 McLean Hospital Corporation Exclusive License Agreement (Incorporated by reference to Exhibit 10.21 of the Registrant's Annual Report on Form 10-K filed March 31, 2011)
- 10.20 Agreement with Chardan Capital Markets, LLC (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed April 6, 2011.)
- 10.21 Securities Purchase Agreement with investors (Incorporated by reference to Exhibit 10.2 of the Registrant's Current Report on Form 8-K filed April 6, 2011.)
- 10.22 Exchange Agreement with respect to Warrant issued April 2011(Incorporated by reference to Exhibit 10.1 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2011 filed August 15, 2011.)
- 10.23 Exchange Agreement with respect to Warrant issued February 2011(Incorporated by reference to Exhibit 10.2 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2011 filed August 15, 2011.)
- 10.24 Exclusive Channel Collaboration Agreement with Intrexon Corporation (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed November 21, 2011.)
- 10.25 Stock Purchase Agreement with Intrexon Corporation (Incorporated by reference to Exhibit 10.2 of the Registrant's Current Report on Form 8-K filed November 21, 2011.)
- 10.26 Registration Rights Agreement with Intrexon Corporation (Incorporated by reference to Exhibit 10.3 of the Registrant's Current Report on Form 8-K filed November 21, 2011.)
- \*10.27 Employment Agreement with Jeffrey Riley (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed February 6, 2012.)
- 10.28 Consulting Agreement with Dr. James Kuo (Incorporated by reference to Exhibit 10.2 of the Registrant's Current Report on Form 8-K filed February 6, 2012.)
- \*10.29 Employment Agreement with C. Evan Ballantyne (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed February 7, 2012.)
- \*10.30 Employment Agreement with Steve H. Kanzer (1)Incorporated by reference to Exhibit 10.304 of the Registrant's Annual Report on Form 10-K for the year ended December 31, 2011 filed March 30, 2012.)
- 10.31 Membership Interest Purchase Agreement by and among Synthetic Biologics, Inc., Hartlab LLC, and Adeona Clinical Laboratory, LLC, dated as of March 7, 2012 (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed March 12, 2012.)
- 10.32 Pledge and Security Agreement between Synthetic Biologics, Inc. and Hartlab, LLC dated as of March 7, 2012 (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed March 12, 2012.)
- 10.33 Non-Recourse Promissory Note between Synthetic Biologics, Inc. and Hartlab, LLC dated as of March 7,



2012 (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed March 12, 2012.)

10.34 Financial Advisory Agreement with Griffin Securities, Inc. (Incorporated by reference to Exhibit 10.34 of the Registrant's Annual Report on Form 10-K for the year ended December 31, 2011 filed March 30, 2012.)

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21 List of Subsidiaries (Incorporated by reference to Exhibit 10.34 of the Registrant's Annual Report on Form 10-K filed March 30, 2012.)

23.1 Consent of Independent Registered Accounting Firm \*\*

23.2 Consent of Gracin & Marlow, LLP (Included in its opinion filed as Exhibit 5)

24 Power of Attorney (Included on signature page)

101.INS XBRL Instance Document \*\*\*

101.SCH XBRL Taxonomy Extension Schema Document \*\*\*

101.CAL XBRL Taxonomy Calculation Linkbase Document \*\*\*

101.LAB XBRL Taxonomy Extension Label Linkbase Document \*\*\*

101.PRE XBRL Taxonomy Extension Presentation Linkbase Document \*\*\*

101.DEF XBRL Taxonomy Extension Definition Linkbase Document \*\*\*

\* Management contract or compensatory plan or arrangement required to be identified pursuant to Item 15(a)(3) of this report

\*\* Previously filed

\*\*\* Filed herewith

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## 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 the Post-Effective Amendment No. 2 to Form S-3 on Form S-1 and has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Ann Arbor, State of Michigan, August 10, 2012.

SYNTHETIC BIOLOGICS, INC.

By: /s/ Jeffrey Riley

Jeffrey Riley

Chief Executive Officer and Director

(Principal Executive Officer)

Date: August 10, 2012

By: /s/ C. Evan Ballantyne

C. Evan Ballantyne

Chief Financial Officer

(Principal Financial and Principal Accounting Officer)

Date: August 10, 2012

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Pursuant to the requirements of the Securities Act of 1933, this report has been signed by the following persons on behalf of the Registrant and in the capacities and on the dates indicated.

By: /s/ Jeffrey Riley  
Date: August 10, 2012 Jeffrey Riley  
Chief Executive Officer and Director  
(Principal Executive Officer)

Date: August 10, 2012 By: /s/ Jeffrey J. Kraws \*  
Jeffrey J. Kraws  
Chairman

Date: August 10, 2012 By: /s/ Steve H. Kanzer \*  
Steve H. Kanzer  
Director

Date: August 10, 2012 By: \_\_\_\_\_  
James S. Kuo  
Director

Date: August 10, 2012 By: \_\_\_\_\_  
Nelson K. Stacks  
Director

Date: August 10, 2012 By: /s/ Scott L. Tarriff \*  
Scott L. Tarriff  
Director

Date: August 10, 2012 By: /s/ Jeffrey Wolf \*  
Jeffrey Wolf  
Director

\*By: /s/ Jeffrey Riley  
Jeffrey Riley  
Chief Executive Officer and President  
Attorney-in-fact

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