Synthetic Biologics, Inc.
Form 424B3
August 15, 2012

Filed Pursuant to Rule 424(b)(3)

Registration Statement No. 333-180562

August 15, 2012

PROSPECTUS SUPPLEMENT NO. 2

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 August 14, 2012 was $2.00.

This prospectus supplement is being filed to include the information set forth in the Current Report on Form 8-K filed on August 14, 2012, which is set forth below. This prospectus supplement should be read in conjunction with the prospectus dated July 26, 2012 and prospectus supplement no. 1 dated August 9, 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. 2 is August 15, 2012.

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): August 14, 2012

SYNTHETIC BIOLOGICS, INC.

(Exact name of registrant as specified in its charter)

Nevada	1-12584	13-3808303
(State or other jurisdiction of incorporation)	(Commission File No.)	(IRS Employer Identification No.)

617 Detroit Street, Suite 100

Ann Arbor, Michigan 48104

(Address of principal executive offices) (Zip Code)

Registrant’s telephone number, including area code: (734) 332-7800

N/A

(Former name or former address, if changed since last report)

Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligation of the 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 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))

Item 2.02 – Results of Operations and Financial Condition.

On August 14, 2012, Synthetic Biologics, Inc., a Nevada corporation (the “Registrant") issued the attached press release that included financial information for its second quarter ended June 30, 2012. A copy of the press release is attached as Exhibit 99.1 to this Report on Form 8-K. The information contained in the press release is being furnished to the Commission and shall not be deemed incorporated by reference into any of the Registrant’s registration statements or other filings with the Commission.

Item 9.01Financial Statements and Exhibits.

(d) Exhibits.

Exhibit 99.1 Press Release issued by Synthetic Biologics, Inc. dated August 14, 2012.

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.

Date: August 14, 2012 By: /s/ C. Evan Ballantyne
Name: C. Evan Ballantyne
Title: Chief Financial Officer

EXHIBIT INDEX

Exhibit No .	Exhibits.
99.1	Press Release issued by Synthetic Biologics, Inc. dated August 14, 2012

Synthetic Biologics Reports Second Quarter 2012 Financial Results

-- Addition of Monoclonal Antibodies for Infectious Diseases Emphasizes Focus on Synthetic Biologics --

For Immediate Release

Ann Arbor, MI, August 14, 2012 – Synthetic Biologics, Inc. (NYSE MKT: SYN), a developer of synthetic biologics and innovative medicines for unmet medical needs, today reported financial results for the three and six months ended June 30, 2012 and summarized operational highlights.

Operational Highlights

Expanding Synthetic Biologic Programs

- Enhanced our relationship with Intrexon by entering into a second worldwide exclusive channel collaboration for the development and commercialization of a series of monoclonal antibody (mAb) therapies for the treatment of certain infectious diseases not adequately addressed by existing therapies. Utilizing Intrexon's comprehensive suite of proprietary technologies, initial discovery efforts will target three infectious disease indications.

- Initiated preclinical research for the development of a synthetic DNA-based therapy for pulmonary arterial hypertension (PAH), utilizing the UltraVector® platform and RheoSwitch Therapeutic System® of our collaborator, Intrexon.

- Appointed biologics expert and gene therapy veteran, Michael Kaleko, M.D., Ph.D., to serve as Scientific Director. Dr. Kaleko has worked in the field of gene therapy since its inception in the mid-1980s and has extensive experience developing vector platforms, inducible transcription systems and product candidates in multiple disease areas.

Advancing Clinical Trial Programs

- Strengthened our clinical and regulatory functions by recruiting the former Chief Medical Officer of Clinical Data, Inc., Carol Reed, M.D., to serve as Senior Vice President of Clinical & Regulatory Affairs. Dr. Reed, who led the design and management of two consecutive successful Phase III clinical trials and FDA approval for VIIBRYD®, is responsible for the design and implementation of all aspects of clinical development and clinical trials, as well as regulatory initiatives.

- Completed enrollment of 164 patients in a randomized, double-blind, placebo-controlled, multi-center Phase II clinical trial evaluating the efficacy and safety of our proprietary oral formulation of estriol (Trimesta™) for the treatment of relapsing-remitting multiple sclerosis (MS) in women. According to various reports, sales of oral disease-modifying therapies for MS, of which Trimesta™, if and when approved, would be in a drug class, is expected to reach $5 billion annually by 2017.

- Initiated patient enrollment in a second randomized, double-blind, placebo-controlled Phase II clinical trial of Trimesta™ for the treatment of cognitive dysfunction in MS. Charitable organizations have pledged to financially support a majority of this new MS clinical trial. As of August 1, 2012, 11 of 64 patients have been enrolled into this trial and patient recruitment continues.

Board of Directors – Improved Corporate Governance

- Improved corporate governance and strengthened the Board by separating the roles of Chairman and Chief Executive Officer with the appointment of Jeffrey J. Kraws to serve as independent, non-executive Chairman of the Board. Mr. Kraws has served on the Board of Directors since January 2006.

"We continue to broaden our reach within the synthetic biologics area as evidenced by the recent expansion of our relationship with Intrexon for the development of monoclonal antibodies to treat infectious diseases. These discovery programs enhance our product pipeline and further emphasize our commitment to the development of new treatment options for unmet medical needs," said Jeffrey Riley, Chief Executive Officer of Synthetic Biologics. "We look forward to announcing more about our infectious disease targets and program progress in the near future."

Three and Six Months Ended June 30, 2012 Financial Results

As part of management's plan to streamline our focus, we sold the clinical reference lab on March 8, 2012. Laboratory revenues for the three and six months ended June 30, 2012 and June 30, 2011 were charged to discontinued operations, resulting in no revenues for these periods. In addition, the gain on the sale of the clinical reference lab of $677,000 was included in discontinued operations for the six months ended June 30, 2012.

General and administrative expenses were $1.2 million and $2.6 million for the three and six months ended June 30, 2012, respectively, compared to $524,000 and $1.8 million for the same periods in 2011. These increases of 124% and 50%, respectively, are primarily the result of additional employee costs, the expansion of our investor relation activities and legal fees related to various Securities and Exchange Commission filings. Charges related to stock-based compensation were $287,000 and $786,000 for the three and six months ended June 30, 2012, respectively, compared to $51,000 and $810,000 for the same periods in 2011.

Research and development expenses were $547,000 and $933,000 for the three and six months ended June 30, 2012, respectively, compared to $281,000 and $512,000 for the same periods in 2011. These increases of 95% and 82%, respectively, are primarily the result of additional employee costs and increased program costs associated with our expanded pipeline, including the initiation of our preclinical program for the treatment of PAH and our clinical trial for the treatment of cognitive dysfunction in MS.

Other income was $7,000 for the three months ended June 30, 2012, compared to other expense of $761,000 for the same period in 2011. Other income was $12,000 for the six months ended June 30, 2012, compared to other expense of $1.5 million for the same period in 2011. Other expense for the three and six months ended June 30, 2011 included $760,000 and $1.6 million, respectively, relating to the estimated fair value of the warrants associated with the January 2011 and April 2011 financings, adjusted for the change in their fair value at the end of each period.

Cash at June 30, 2012 was $5.9 million compared to $6.7 million at December 31, 2011. As of July 31, 2012, we had approximately $5.6 million in cash.

About Synthetic Biologics, Inc.

Synthetic Biologics is a biotechnology company focused on the development of product candidates to address serious diseases and unmet medical needs. Synthetic Biologics is developing the following synthetic biologic candidates: a series of monoclonal antibodies (mAbs) for the treatment of serious infectious diseases not adequately addressed by existing therapies and a synthetic DNA-based therapy for the treatment of pulmonary arterial hypertension (PAH). The Company is also developing drug candidates for the treatment of relapsing-remitting multiple sclerosis (MS), cognitive dysfunction in MS, amyotrophic lateral sclerosis (ALS) and fibromyalgia (partnered with Meda AB). For more information, please visit Synthetic Biologics' website at www.syntheticbiologics.com.

UltraVector® and RheoSwitch Therapeutic System® are registered trademarks of Intrexon Corporation.

This release includes forward-looking statements on Synthetic Biologics' current expectations and projections about future events. In some cases forward-looking statements can be identified by terminology such as "may," "should," "potential," "continue," "expects," "anticipates," "intends," "plans," "believes," "estimates," and similar expressions. These statements are based upon current beliefs, expectations and assumptions and are subject to a number of risks and uncertainties, many of which are difficult to predict and include statements regarding our continued focus of our efforts in the field of synthetic biology and advancing our clinical programs and the expected size of the future market for sales of oral disease-modifying therapies for MS. The forward-looking statements are subject to risks and uncertainties that could cause actual results to differ materially from those set forth or implied by any forward-looking statements. Important factors that could cause actual results to differ materially from those reflected in Synthetic Biologics' forward-looking statements include, among others, a failure to receive the necessary regulatory approvals for commercialization of our therapeutics, a failure of our clinical trials to be commenced or completed on time or to achieve desired results, a failure of our clinical trials to receive anticipated funding, a failure of gene therapy to receive market acceptance, a failure of our monoclonal antibodies for the treatment of infectious diseases to be successfully developed or commercialized, our inability to maintain our licensing agreements, including our agreement with Intrexon, or a failure by us or our strategic partners to successfully commercialize products and other factors described in Synthetic Biologics' report on Form 10-K/A for the year ended December 31, 2011 and any other filings with the SEC. The information in this release is provided only as of the date of this release, and Synthetic Biologics undertakes no obligation to update any forward-looking statements contained in this release on account of new information, future events, or otherwise, except as required by law.

- Financial Tables to Follow -

Synthetic Biologics, Inc. and Subsidiaries
(in thousands, except share data)

Condensed Consolidated Balance Sheets

	June 30, 2012 (Unaudited)	December 31, 2011 (Audited)
Assets		
Cash	$5,932	$6,678
Accounts receivable, net	245	405
Other	94	16
Assets of discontinued operations	-	23
Property and equipment, net	254	323
Long-term note receivable	700	-
Deposits and other assets	20	31
Total assets	$7,245	$7,476
Liabilities and Stockholders' Equity		
Current liabilities	$395	$417
Stockholders' equity	6,850	7,059
Total liabilities and stockholders' equity	$7,245	$7,476

Condensed Consolidated Statements of Operations (Unaudited)

	For the three months ended June 30,		For the six months ended June 30,	
	2012	2011	2012	2011
Operating Costs and Expenses				
General and administrative	$1,176	$524	$2,644	$1,757
Research and development	547	281	933	512
Total operating costs and expenses	1,723	805	3,577	2,269
Loss from Continuing Operations	(1,723)	(805)	(3,577)	(2,269)
Other Income (Expense)				
Warrant expense	-	(776)	-	(1,492)
Change in fair value of warrant liability	-	16	-	(78)
Other income (expense)	7	(1)	12	50
Total other income (expense), net	7	(761)	12	(1,520)
Loss from Continuing Operations	(1,716)	(1,566)	(3,565)	(3,789)
Income (Loss) from Discontinued Operations	(156)	(114)	493	(77)
Net Loss and Comprehensive Loss	$(1,872)	$(1,680)	$(3,072)	$(3,866)
Net Income (Loss) Per Share - Basic and Dilutive				
Continuing Operations	$(0.05)	$(0.06)	$(0.11)	$(0.14)
Discontinued Operations	-	-	0.02	-
Net Loss Per Share	$(0.05)	$(0.06)	$(0.09)	$(0.14)
Weighted average number of common shares outstanding - Basic and Dilutive	33,011,460	27,885,479	32,507,312	26,560,448

For further information, please contact:

Kris Maly

Vice President of Corporate Communication

(734) 332-7800, Ext. 22

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