

Synthetic Biologics, Inc.  
Form 10-K/A  
April 01, 2019

**UNITED STATES**

**SECURITIES AND EXCHANGE COMMISSION**

**Washington, DC 20549**

**FORM 10-K/A**

**Amendment No. 1**

**ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

**For the fiscal year ended December 31, 2018**

**OR**

**TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES ACT OF 1934**

**For the transition period from            to**

**Commission File Number: 1-12584**

**SYNTHETIC BIOLOGICS, INC.**

*(Exact Name of Registrant as Specified in Its Charter)*

**Nevada**

*(State or Other Jurisdiction of Incorporation or Organization)*

**13-3808303**

*(I.R.S. Employer Identification Number)*

**9605 Medical Center Drive, Ste. 270  
Rockville, MD 20850**

*(Address of Principal Executive Offices) (Zip Code)*

**Registrant's telephone number, including area code:  
(301) 417-4364**

**Securities registered pursuant to Section 12(b) of the Act:  
Common Stock, \$0.001 par value per share**

**Name of each exchange on which registered:  
NYSE AMERICAN, LLC**

**Securities registered pursuant to Section 12(g) of the Act:  
None**

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.

Yes  No

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act.

Yes  No

Indicate by check mark whether the issuer: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.

Yes  No

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (section 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files).

Yes  No

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of issuer's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K.

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

Large Accelerated Filer  Accelerated Filer

Non-accelerated Filer   Smaller Reporting Company

Emerging growth company

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act).

Yes  No

The aggregate market value of the registrant's common stock held by non-affiliates of the registrant as of June 29, 2018, the last business day of the registrant's recently completed second quarter, was approximately \$27.8 million based on \$8.40, the closing price of the registrant's common stock as reported by the NYSE American on that date.

As of February 26, 2019, the registrant had 15,484,411 shares of common stock outstanding.

Documents incorporated by reference: **None**



## EXPLANATORY NOTE

This Amendment No. 1 on Form 10-K/A hereby amends the Registrant's Annual Report on Form 10-K for the fiscal year ended December 31, 2018 (the "Original Filing"), which the Registrant filed with the Securities and Exchange Commission on February 27, 2019. This Amendment No. 1 is being filed solely to correct and replace Exhibit 23.1 to the Original Filing, which inadvertently omitted a reference to the Registrant's registration statement on Form S-1.

Except as described above, no changes have been made to the Original Filing and this Amendment No. 1 does not modify, amend or update in any way any of the financial or other information contained in the Original Filing. This Amendment No. 1 does not reflect events that may have occurred subsequent to the Original Filing Date.

Accordingly, this Amendment No. 1 should be read in conjunction with the Original Filing Pursuant to Rule 12b-15 under the Securities Exchange Act of 1934, as amended, this Amendment No. 1 also contains new certifications pursuant to Section 302 and Section 906 of the Sarbanes-Oxley Act of 2002, which are attached hereto.

## PART IV

### Item 15. Exhibits, Financial Statement Schedules.

(a) Index to Financial Statements and Exhibits

(2) EXHIBITS

Exhibit 23.1 Consent of Independent Registered Public Accounting Firm

Exhibit 31.1 Certification of the Chief Executive Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002

Exhibit 31.2 Certification of the Chief Financial Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002

Exhibit 32.1 Certification of the Chief Executive Officer pursuant to Section 906 of the Sarbanes-Oxley Act of 2002

Exhibit 32.2 Certification of the Chief Financial Officer pursuant to Section 906 of the Sarbanes-Oxley Act of 2002

The exhibits listed in the accompanying Index to Exhibits are filed or incorporated by reference as part of this annual report.

**SIGNATURES**

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this Amendment No. 1 to this report to be signed on its behalf by the undersigned.

SYNTHETIC BIOLOGICS, INC.

By: /s/ Steven A. Shallcross

Steven A. Shallcross  
Chief Executive Officer, Chief Financial Officer and Director  
(Principal Executive Officer, Principal Financial Officer and Principal Accounting Officer)  
Date: April 1, 2019

## PART IV

### Item 15. Exhibits and Financial Statement Schedules

- (a)(1) The following financial statements are included in this Annual Report on Form 10-K for the fiscal years ended December 31, 2018 and 2017.
1. Independent Registered Public Accounting Firm
  2. Consolidated Balance Sheets as of December 31, 2018 and 2017
  3. Consolidated Statements of Operations for the years ended December 31, 2018 and 2017
  4. Consolidated Statements of changes in Stockholders' Equity for the years ended December 31, 2018 and 2017
  5. Consolidated Statements of Cash Flows for the years ended December 31, 2018 and 2017
  6. Notes to Consolidated Financial Statements
- (a)(2) All financial statement schedules have been omitted as the required information is either inapplicable or included in the Consolidated Financial Statements or related notes.
- (a)(3) The following exhibits are either filed as part of this report or are incorporated herein by reference:
- 1.1 At Market Issuance Agreement dated August 5, 2016 between Synthetic Biologics, Inc. and FBR Capital Markets & Co. (Incorporated by reference to Exhibit 1.1 of the Registrant's Current Report on Form 8-K filed August 5, 2016, File No. 001-12584.)
  - 1.2 Amendment No. 1 to At The Market Issuance Sales Agreement (Incorporated by reference to Exhibit 1.1 of the Registrant's Current Report on Form 8-K filed May 7, 2016, File No. 001-12584.)
  - 1.3 Underwriting Agreement, dated October 10, 2018, by and between Synthetic Biologics, Inc. and A.G.P./Alliance Global Partners, as representative of the underwriters (Incorporated by reference to Exhibit 1.1 of the Registrant's Current Report on Form 8-K filed October 31, 2018), File No. 001-12584.)
  - 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, File No. 001-12584, (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, File No. 001-12584; 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, File No. 001-12584.)
  - 3.2



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- Articles of Merger (Incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed October 19, 2009, File No. 001-12584.)
- 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, File No. 001-12584.)
- 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, File No. 001-12584.)
- 3.5 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, File No. 001-12584.)
- 3.6 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, File No. 001-12584.)
- 3.7 Certificate of Amendment to Certificate of Incorporation. (Incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed May 18, 2015, File No. 001-12584.)
- 3.8 Certificate of Amendment to Certificate of Incorporation. (Incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed September 8, 2017, File No. 001-12584.)
- 3.9 Certificate of Designations for Series A Preferred Stock to Certificate of Incorporation (Incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed September 12, 2017, File No. 001-12584.)
- 3.10 Certificate of Change Pursuant to NRS 78. 209(Incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed August 13, 2018, File No. 001-12584.)
- 3.11 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 September 26, 2018, File No. 001-12584.)
- 3.12 Certificate of Designations for Series B Preferred Stock to Certificate of Incorporation (Incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed October 15, 2018, File No. 001-12584.)
- 3.13 Certificate of Amendment to Certificate of Designations for Series B Preferred Stock to Certificate of Incorporation (Incorporated by reference to Exhibit 3.2 of the Registrant's Current Report on Form 8-K filed October 15, 2018, File No. 001-12584.)
- \*4.1 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, File No. 333-148764.)
- \*4.2 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, File No. 333-148764.)
- \*4.3 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, File No. 333-170858.)

- 4.4 Form of Warrant to Purchase Common Stock issued to Griffin Securities, Inc. on October 30, 2012 (Incorporated by reference to Exhibit 10.4 of the Registrant's Current Report on Form 8-K filed October 31, 2012, File No. 001-12584.)
- 4.5 Specimen Stock Certificate (Incorporated by reference to Exhibit 4.1 to the Registrant's Registration Statement on Form S-3 filed on July 3, 2013, File No. 333-189794.)
- 4.6 Amended and Restated 2010 Stock Incentive Plan (Incorporated by reference to Exhibit 4.1 to the Registrant's Registration Statement on Form S-8 filed on November 15, 2013, File No. 333-192355.)
- 4.7 Form of Warrant for Purchasers of Units (Incorporated by reference to Exhibit 4.1 to the Registrant's Current Report on Form 8-K filed on October 10, 2014, File No. 001-12584.)
- \*4.8 Synthetic Biologics, Inc. 2010 Stock Incentive Plan, as amended and restated on May 15, 2015. (Incorporated by reference to Exhibit 4.1 to the Registrant's Registration Statement on Form S-8 filed on August 10, 2015, File No. 333-206268.)
- 4.9 Synthetic Biologics, Inc. 2010 Stock Incentive Plan, as amended and restated on May 15, 2015. (Incorporated by reference to Exhibit 4.1 to the Registrant's Registration Statement on Form S-8 filed on August 31, 2016, File No. 333-206268.)
- 4.10 Form of Series A Warrant to Purchase Common Stock issued November 18, 2016 (Incorporated by reference to Exhibit 4.1 of the Registrant's Current Report on Form 8-K filed on November 15, 2016, File No. 001-12584.)
- 4.11 Form of Series B Warrant to Purchase Common Stock issued November 18, 2016 (Incorporated by reference to Exhibit 4.2 of the Registrant's Current Report on Form 8-K filed on November 15, 2016, File No. 001-12584.)
- 4.12 Form of Warrant Agreement, dated November 18, 2016 between Synthetic Biologics, Inc. and Corporate Stock Transfer, Inc. (Incorporated by reference to Exhibit 4.3 of the Registrant's Current Report on Form 8-K filed on November 15, 2016, File No. 001-12584.)
- \*4.13 Amended and Restated 2010 Stock Incentive Plan (Incorporated by reference to Exhibit 4.1 to the Registrant's Registration Statement on Form S-8 filed on September 8, 2017, File No. 333-220401.)
- 4.14 Form of Warrant issued December 26, 2017 to InSite Communications (Incorporated by reference to Exhibit 4.1 of the Registrant's Current Report on Form 10-Q filed May 5, 2018, File No. 001-12584.)
- \*4.15 Amended and Restated 2010 Stock Incentive Plan (Incorporated by reference to Exhibit 4.1 to the Registrant's Registration Statement on Form S-8 filed on October 2, 2018, File No. 333—227668.)
- 4.16 Warrant Agency Agreement, dated October 15, 2018, by and between Synthetic Biologics, Inc. and Corporate Stock Transfer, Inc. (including the form of warrant certificate)
- 10.1 License Agreement between The Regents of the University of California and Epitope Pharmaceuticals, Inc. (Incorporated by reference to Exhibit 10.22 of the Registrant's Quarterly Report on Form 10-Q for the quarterly

period ended June 30, 2008 filed August 14, 2008, File No. 001-12584.)

- \*10.2 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, File No. 001-12584.)
- 10.3 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, File No. 001-12584.)
- 10.4 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, File No. 001-12584.)
- 10.5 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, File No. 001-12584.)
- 10.6 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, File No. 001-12584.)

- 10.7 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, File No. 001-12584.)
- 10.8 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, File No. 001-12584.)
- \*10.9 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, File No. 001-12584.)
- 10.10 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 August 9, 2012, File No. 001-12584.)
- 10.11 Stock Purchase Agreement with Intrexon Corporation (Incorporated by reference to Exhibit 10.2 of the Registrant's Current Report on Form 8-K filed August 9, 2012, File No. 001-12584.)
- 10.12 First Amendment to Registration Rights Agreement between Synthetic Biologics, Inc. and Intrexon Corporation (Incorporated by reference to Exhibit 10.3 of the Registrant's Current Report on Form 8-K filed August 9, 2012, File No. 001-12584.)
- 10.13 Stock Purchase Agreement dated October 25, 2012 with investors (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed October 31, 2012, File No. 001-12584.)
- 10.14 Registration Rights Agreement dated October 25, 2012 with investors (Incorporated by reference to Exhibit 10.2 of the Registrant's Current Report on Form 8-K filed October 31, 2012, File No. 001-12584.)
- 10.15 Joinder Agreement by and among Synthetic Biologics, Inc., NRM VII Holdings I, LLC and Intrexon Corporation (Incorporated by reference to Exhibit 10.3 of the Registrant's Current Report on Form 8-K filed October 31, 2012, File No. 001-12584.)
- 10.16 Patent License Agreement dated December 19, 2012 between Synthetic Biologics, Inc. and The University of Texas at Austin (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed December 21, 2012, File No. 001-12584.)
- 10.17 Sponsored Research Agreement dated December 19, 2012 between Synthetic Biologics, Inc. and The University of Texas at Austin (Incorporated by reference to Exhibit 10.2 of the Registrant's Current Report on Form 8-K filed December 21, 2012, File No. 001-12584.)

- 10.18 Exclusive License Agreement with The Regents of The University of California (Incorporated by reference to Exhibit 10.45 of the Registrant's Annual Report on Form 10-K filed April 16, 2013, File No. 001-12584.)
- 10.19 First Amendment to Exclusive License Agreement with The Regents of The University of California (Incorporated by reference to Exhibit 10.46 of the Registrant's Annual Report on Form 10-K filed April 16, 2013, File No. 001-12584.)
- 10.20 Second Amendment to Exclusive License Agreement with The Regents of The University of California (Incorporated by reference to Exhibit 10.47 of the Registrant's Annual Report on Form 10-K filed April 16, 2013, File No. 001-12584.)
- 10.21 Third Amendment to Exclusive License Agreement with The Regents of The University of California (Incorporated by reference to Exhibit 10.48 of the Registrant's Annual Report on Form 10-K filed April 16, 2013, File No. 001-12584.)
- 10.22 Fourth Amendment to Exclusive License Agreement with The Regents of The University of California (Incorporated by reference to Exhibit 10.49 of the Registrant's Annual Report on Form 10-K filed April 16, 2013, File No. 001-12584.)
- 10.23 Exclusive License Agreement between Synthetic Biologics, Inc., Synthetic Biomics, Inc. and Cedars-Sinai Medical Center dated December 5, 2013 (Incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed on December 10, 2013, File No. 001-12584.)
- 10.24 Exclusive Option Agreement between Synthetic Biologics, Inc., Synthetic Biomics, Inc. and Cedars-Sinai Medical Center dated December 5, 2013 (Incorporated by reference to Exhibit 10.2 to the Registrant's Current Report on Form 8-K filed on December 10, 2013, File No. 001-12584.)
- 10.25 Stock Purchase Agreement between Synthetic Biologics, Inc., Synthetic Biomics, Inc. and Cedars-Sinai Medical Center dated December 5, 2013 (Incorporated by reference to Exhibit 10.3 to the Registrant's Current Report on Form 8-K filed on December 10, 2013, File No. 001-12584.)
- 10.26 Stock Purchase Agreement between Synthetic Biologics, Inc., Synthetic Biomics, Inc. and Mark Pimentel dated December 5, 2013 (Incorporated by reference to Exhibit 10.4 to the Registrant's Current Report on Form 8-K filed on December 10, 2013, File No. 001-12584.)
- 10.27 Stock Purchase Agreement between Synthetic Biologics, Inc., Synthetic Biomics, Inc. and Cedars-Sinai Medical Center dated December 5, 2013 (Incorporated by reference to Exhibit 10.5 to the Registrant's Current Report on Form 8-K filed on December 10, 2013, File No. 001-12584.)
- 10.28 First Amendment to Exclusive License Agreement. (Incorporated by reference to Exhibit 10.49 of the Registrant's Annual Report on Form 10-K for the year ended December 31, 2013 filed March 31, 2014, File No. 001-12584.)
- \*10.29 Employment Agreement, dated March 18, 2015, by and between Jeffrey Riley and the Company. (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed on March 19, 2015, File No. 001-12584.)

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Employment Agreement, dated March 18, 2015, by and between C. Evan Ballantyne and the Company.  
\*10.30 (Incorporated by reference to Exhibit 10.2 of the Registrant's Current Report on Form 8-K filed on March 19, 2015, File No. 001-12584.)

10.31 Amended and Restated 2010 Stock Incentive Plan. (Incorporated by reference to Exhibit B to the Definitive Proxy Statement filed on April 13, 2015, File No. 001-12584.)

Employment Agreement, dated April 28, 2015, by and between Stephen A. Shallcross and the Company.  
\*10.32 (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed on May 4, 2015, File No. 001-12584.)

Severance Agreement, dated April 29, 2015, by and between C. Evan Ballantyne and the Company.  
\*10.33 (Incorporated by reference to Exhibit 10.2 of the Registrant's Current Report on Form 8-K filed on May 4, 2015, File No. 001-12584.)

Fifth Amendment to the Exclusive License Agreement with The Regents of The University of California, dated  
10.34 July 25, 2014. (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed on July 9, 2015, File No. 001-12584.)

Sixth Amendment to the Exclusive License Agreement with The Regents of The University of California,  
10.35 dated July 8, 2015. (Incorporated by reference to Exhibit 10.2 of the Registrant's Current Report on Form 8-K filed on July 9, 2015, File No. 001-12584.)

10.36 Clinical Trial Agreement between Putney Drug Corp. and The Regents of The University of California, dated April 29, 2010. (Incorporated by reference to Exhibit 10.3 of the Registrant's Current Report on Form 8-K filed on July 9, 2015, File No. 001-12584.)

10.37 Amendment to the Clinical Trial Agreement between Putney Drug Corp. and The Regents of The University of California, dated July 8, 2015. (Incorporated by reference to Exhibit 10.4 of the Registrant's Current Report on Form 8-K filed on July 9, 2015, File No. 001-12584.)

10.38 Exclusive Channel Collaboration Agreement by and between Synthetic Biologics, Inc. and Intrexon Corporation dated as of August 10, 2015\*\*. (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed on August 10, 2015, File No. 001-12584.)

10.39 Stock Issuance Agreement by and between Synthetic Biologics, Inc., and Intrexon Corporation, dated August 10, 2015. (Incorporated by reference to Exhibit 10.2 to the Registrant's Current Report on Form 8-K filed on August 10, 2015, File No. 001-12584.)

10.40 Second Amendment to the Registration Rights Agreement by and between Synthetic Biologics, Inc. and Intrexon Corporation, dated as of August 10, 2015. (Incorporated by reference to Exhibit 10.3 of the Registrant's Current Report on Form 8-K filed August 10, 2015, File No. 001-12584.)

10.41 Amendment, dated August 29, 2015, to the Stock Purchase Agreement, dated December 3, 2013, by and among Synthetic Biologics, Inc., Synthetic Biomics, Inc. and Mark Pimentel, M.D. (Incorporated by reference to Exhibit 10.5 of the Registrant's Current Report on Form 8-K filed September 3, 2015, File No. 001-12584.)

10.42 Third Amendment to the License Agreement between Synthetic Biologics, Inc., Synthetic Biomics, Inc. and Cedar-Sinai Medical Center, dated September 4, 2015. (Incorporated by reference to Exhibit 10.1 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 30, 2015 filed November 5, 2015, File No. 001-12584.)

\*10.43 Amendment to Employment Agreement by and between Synthetic Biologics, Inc. and Jeffrey Riley, dated as of December 4, 2015. (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed December 10, 2015, File No. 001-12584.)

\*10.44 Form of Stock Option Agreement. (Incorporated by reference to Exhibit 10.2 of the Registrant's Current Report on Form 8-K filed December 10, 2015, File No. 001-12584.)

\*10.45 Amendment to Employment Agreement by and between Synthetic Biologics, Inc. and Steven A. Shallcross, dated as of December 1, 2016. (Incorporated by reference to Exhibit 1.1 of the Registrant's Current Report on Form 8-K filed December 2, 2016, File No. 001-12584.)

\*10.46 Employment Agreement by and between Synthetic Biologics, Inc. and Joseph Sliman dated as of January 17, 2017 (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed January 19, 2017, File No. 001-12584.)

\*10.47 Employment Agreement by and between Synthetic Biologics, Inc. and Jeffrey Riley dated as of February 27, 2017.

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10.48 Share Purchase Agreement dated as of September 11, 2017 between Synthetic Biologics, Inc. and MSD Credit Opportunity Master Fund, L.P. (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed September 12, 2017, File No. 001-12584.)

\*10.49 Amendment to Employment Agreement dated May 31, 2017 between Synthetic Biologics, Inc. and Steven A. Shallcross (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed June 2, 2017, File No. 001-12584.)

10.50 Separation Agreement dated December 5, 2017 between Synthetic Biologics, Inc. and Jeffrey Riley (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed December 7, 2017, File No. 001-12584.)

\*10.51 Amendment to Employment Agreement dated December 20, 2017 between Synthetic Biologics, Inc. and Steven A. Shallcross (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed December 21, 2017, File No. 001-12584.)



10.52 Registration Rights Agreement dated as of September 11, 2017 between Synthetic Biologics, Inc. and MSD Credit Opportunity Master Fund, L.P. (Incorporated by reference to Exhibit 4.1 of the Registrant's Current Report on Form 8-K filed on September 12, 2017, File No. 001-12584.)

10.53 Fourth Amendment to Exclusive License Agreement entered into February 16, 2017 between Synthetic Biologics, Inc. and Cedars-Sinai Medical Center. (Incorporated by reference to Exhibit 10.53 of the Registrant's Annual Report on Form 10-K filed on February 22, 2018, File No. 001-12584.)

10.54 Fifth Amendment dated August 22, 2017 to Sponsored Research Agreement dated December 19, 2012 between Synthetic Biologics, Inc. and The University of Texas at Austin (Incorporated by reference to Exhibit 10.54 of the Registrant's Annual Report on Form 10-K filed on February 22, 2018, File No. 001-12584.)

10.55 Stock Purchase Agreement entered into as of September 5, 2018 by and among Synthetic Biologics, Inc., Synthetic Biomics, Inc., and Cedars-Sinai Medical Center (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed on September 6, 2018, File No. 001-12584.)

\*10.56 Employment Agreement between Synthetic Biologics, Inc. and Steven A. Shallcross dated as of December 6, 2018 (Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed on December 6, 2018), File No. 001-12584.

21 List of Subsidiaries <sup>(2)</sup>

23.1 Consent of Independent Registered Public Accounting Firm (BDO USA, LLP) <sup>(1)</sup>

31.1 Certification of Steven A. Shallcross, Chief Executive Officer, pursuant to Rule 13a-14(a)/15d-14(a) <sup>(1)</sup>

31.2 Certification of Steven A. Shallcross, Chief Financial Officer pursuant to Rule 13a-14(a)/15d-14(a) <sup>(1)</sup>

32.1 Certification of Steven A. Shallcross, Chief Executive Officer pursuant to Section 1350 of the Sarbanes-Oxley Act of 2002 <sup>(1)</sup>

32.2 Certification of Steven A. Shallcross, Chief Financial Officer pursuant to Section 1350 of the Sarbanes-Oxley Act of 2002 <sup>(1)</sup>

101.INS XBRL Instance Document

101.SCH XBRL Taxonomy Extension Schema Document

101.CAL XBRL Taxonomy Extension Calculation Linkbase Document

101.DEF XBRL Taxonomy Extension Definition Linkbase Document

101.LAB XBRL Taxonomy Extension Label Linkbase Document

101.PRE XBRL Taxonomy Extension Presentation Linkbase Document

**(1) Filed herewith.**

**(2) Previously filed.**

- \* **Management contract or compensatory plan or arrangement required to be identified pursuant to Item 15(a)(3) of this report.**
- \*\* **Confidential treatment has been requested as to certain portions of this exhibit pursuant to Rule 24b-2 of the Securities Exchange Act of 1934, as amended.**