Synthetic Biologics, Inc.
Form 424B3
December 21, 2012

Filed Pursuant to Rule 424(b)(3)

Registration Statement No. 333-180562

December 21, 2012

PROSPECTUS SUPPLEMENT NO. 13

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 December 20, 2012 was $1.64.

This prospectus supplement is being filed to include the information set forth in the Current Report on Form 8-K filed on December 21, 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, prospectus supplement no. 4 dated September 12, 2012, prospectus supplement no. 5 dated October 9, 2012, prospectus supplement no. 6 dated October 17, 2012, prospectus supplement no. 7 dated November 1, 2012, prospectus supplement no. 8 dated November 14, 2012; prospectus supplement no. 9 dated November 15, 2012; prospectus supplement no. 10 dated November 15, 2012; prospectus

supplement no. 11 dated December 3, 2012 and prospectus supplement no. 12 dated December 6, 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. 13 is December 21, 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): **December 19, 2012**

Synthetic Biologics, Inc.

(Exact name of registrant as specified in charter)

Nevada

(State or other jurisdiction of incorporation)

01-12584 **13-3808303**
(Commission File Number) (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))

Item 1.01 Entry into a Material Definitive Agreement.

On December 19, 2012, Synthetic Biologics, Inc. (the "Company") entered into a Patent License Agreement (the "License Agreement") with The University of Texas at Austin (the "University") for the exclusive license of the right to use, develop, manufacture, market and commercialize certain research and patents related to pertussis antibodies developed in the lab of Dr. Jennifer A. Maynard, Assistant Professor of Chemical Engineering. The License Agreement provides that the University is entitled to payment of past patent expenses, an annual payment of $50,000 per year commencing on the effective date through December 31, 2014 and a $25,000 payment on December 31, 2015 and milestone payments of $50,000 upon commencement of Phase I Clinical Trials, $100,000 upon commencement of Phase III Clinical Trials, $250,000 upon NDA submission in the United States, $100,000 upon European Medicines Agency approval and $100,000 upon regulatory approval in an Asian country. In addition, the University is entitled to a running royalty upon Net Product Sales and Net Service Sales (as defined in the License Agreement). The License Agreement terminates upon the expiration of the patent rights (as defined in the License Agreement); provided, however that the License Agreement is subject to early termination by the Company in its discretion and by the University for a breach of the License Agreement by the Company.

In connection with the License Agreement, the Company and the University also entered into a Sponsored Research Agreement (the "Research Agreement") pursuant to which the University will perform certain research work related to pertussis under the direction of Dr. Jennifer Maynard and the Company will obtain certain rights to patents and technology developed during the course of such research. All inventions conceived during such research shall be subject to the License Agreement. The Research Agreement may be renewed annually, in the sole discretion of the Company, after the first year for two additional one year terms with a fixed fee for the first year of $303,287 and for the second and third years, if renewed, a fixed fee of $316,438 and $328,758 respectively, all payable in quarterly installments. If renewed by the Company after the first year for the remaining two years, the research shall be performed from the effective date of the Research Agreement until December 31, 2015; provided, however, the Research Agreement is subject to early termination upon the written agreement of the parties, a default in the material obligations under the Research Agreement which remain uncured for sixty days after receipt of notice, automatically upon the Company's bankruptcy or insolvency and by the Company in its sole discretion at any time after the one year anniversary of the date of execution thereof upon no less than 90 days notice. Upon termination prior to December 31, 2014, the Company shall only be responsible for payment of expenses that do not exceed the fixed annual amount and are incurred prior to the termination date and non-cancellable expenses committed to be expended by the University prior to the termination date for the lesser of the remainder of their appointment in the case of salaries and December 31, 2014. Upon a termination after December 31, 2014 or due to a breach by the University, the Company shall only be responsible for all reasonable expenses that do not exceed the fixed annual amount and that are incurred by the University prior to the termination date for services performed prior to the termination date.

The foregoing description of the License Agreement and Research Agreements does not purport to be complete and is qualified in its entirety by reference to the full text of the License Agreement and Research Agreements which are filed as Exhibits 10.1 and 10.2 to this Current Report on Form 8-K and incorporated herein by reference.

On December 20, 2012, the Company issued the press release attached hereto as Exhibit 99.1 regarding the Agreement described herein.

Important Notice regarding the Agreement

The License Agreement and Research Agreements have been included as exhibits to this Current Report on Form 8-K to provide investors and security holders with information regarding their terms. They are not intended to provide any other financial information about the Company. The representations, warranties and covenants contained in the License Agreement and Research Agreements were made only for purposes of those agreements and as of specific dates; were solely for the benefit of the parties to the License Agreement and Research Agreements; may be subject to limitations agreed upon by the parties, including being qualified by disclosures made for the purposes of allocating contractual risk between the parties to the License Agreement and Research Agreements instead of establishing these matters as facts; and may be subject to standards of materiality applicable to the contracting parties that differ from those applicable to investors. Investors should not rely on the representations, warranties and covenants or any description thereof as characterizations of the actual state of facts or condition of the Company. Moreover, information concerning the subject matter of the representations, warranties and covenants may change after the date of the License Agreement and Research Agreements, which subsequent information may or may not be fully reflected in public disclosures by the Company.

Item 9.01 Financial Statements and Exhibits.

(d) Exhibits

Exhibit No.	Description
10.1	Patent License Agreement between Synthetic Biologics, Inc. and The University of Texas dated December 19, 2012**
10.2	Sponsored Research Agreement between Synthetic Biologics, Inc. and The University of Texas dated December 19, 2012
99.1	Press Release dated December 20, 2012.

** 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.

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.

Dated: December 21, 2012

SYNTHETIC BIOLOGICS, INC.
(Registrant)

By:/s/ C. Evan Ballantyne
Name: C. Evan Ballantyne
Title: Chief Financial Officer

INDEX OF EXHIBITS

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99.1	Press Release dated December 20, 2012.

** 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.

Exhibit 10.1

Portions herein identified by [*****] have been omitted pursuant to a request for confidential treatment under Rule 24b-2 of the Securities Exchange Act of 1934, as amended. A complete copy of this document has been filed separately with the Securities and Exchange Commission

PATENT LICENSE AGREEMENT

AGT. No. PM1300101

This Patent License Agreement is between the Licensor and the Licensee identified below (collectively, “Parties”, or singly, “Party”).

No binding agreement between the Parties will exist until this Patent License Agreement has been signed by both Parties. Unsigned drafts of this Patent License Agreement shall not be considered offers.

Background

Licensor owns or controls Patent Rights. Licensee desires to secure the right and license to use, develop, manufacture, market, and commercialize the Patent Rights. Licensor has determined that such use, development, and commercialization of the Patent Rights is in the public’s best interest and is consistent with Licensor’s educational and research missions and goals. Licensor desires to have the Patent Rights developed and used for the benefit of Licensee, the inventors, Licensor, and the public.

NOW, THEREFORE, in consideration of the mutual covenants and premises herein contained, the Parties hereby agree as follows:

The Terms and Conditions of Patent License attached hereto as Exhibit A are incorporated herein by reference in their entirety (the “Terms and Conditions”). In the event of a conflict between provisions of this Patent License Agreement and the Terms and Conditions, the provisions in this Patent License Agreement shall govern. Unless defined in this Patent License Agreement, capitalized terms used in this Patent License Agreement shall have the meanings given to them in the Terms and Conditions.

The section numbers used in the left hand column in the table below correspond to the section numbers in the Terms and Conditions.

1. Definitions

Effective Date	
Licensor	The University of Texas at Austin, on behalf of the Board of Regents of the University of Texas System, an agency of the State of Texas, whose address is 3925 W. Braker Lane, Suite 1.9A (R3500), Austin, Texas 78759.
Licensee	Synthetic Biologics, Inc., a Nevada corporation, with its principal place of business at 617 Detroit Street, Suite 100, Ann Arbor, MI 48104
Contract Year and Contract Quarters	x Contract Year is 12-month period ending on December 31 and Contract Quarters are 3-month periods ending on March 31, June 30, Sept. 30, Dec. 31 OR ¨ Other: Contract Year is 12-month period ending on (specify): [month and day]; Contract Quarters are 3-month periods ending on (specify): [month and day, Q1], [month and day, Q2], [month and day, Q3], [month and day, Q4]
Territory	Worldwide
Field	x All fields OR ¨ Limited fields

Portions herein identified by [*****] have been omitted pursuant to a request for confidential treatment under Rule 24b-2 of the Securities Exchange Act of 1934, as amended. A complete copy of this document has been filed separately with the Securities and Exchange Commission

Patent Rights

App. No./ Date of Filing	Title	Inventor(s)	Jointly Owned? (Y/N; if Y, with whom?)	Prosecution Counsel
13/236,530 September 19, 2011	Pertussis Antibodies and Uses Thereof	Jennifer A. Maynard Jamie Sutherland	¨ Yes, w/[whom] ¨ No	Kilpatrick Townsend & Stockton LLP

	Check one box:	
USPTO Entity Status as of Effective Date	¨ Small	x Large

2.4. Diligence Milestones

Milestones and deadlines	Milestone Events	Deadlines
	1. Begin Phase I Clinical Trials	
	2. Start Phase III Clinical Trials	
	3. First Regulatory Approval in the United States of America	
	4. European Medicines Agency (EMA) Approval	
	5. Regulatory approval in an Asian country	

3. Compensation

3.1(a)	Patent expenses due upon Effective Date	Amount $32,246.49	based on invoices received as of: August 21, 2012

		Milestone Events	Milestone Fees
3.1(b)	Milestone fees	1. Begin Phase I Clinical Trials	$50,000.00
		2. Start Phase III Clinical Trials	$100,000.00

3. NDA submission in the United States of America	$250,000.00
4. European Medicines Agency (EMA) Approval	$100,000.00
5. Regulatory approval in an Asian country	$100,000.00

3.1(c)	Scheduled license fee payments	$50,000.00 due on Effective Date $50,000.00 due on December 31, 2013 $50,000.00 due on December 31, 2014 $25,000.00 due on December 31, 2015
3.1(d)	Sublicense Fees	22.5% of Non-Royalty Sublicensing Consideration
3.1(e)	Assignment fee	20% of consideration received by Licensee for assignment of the Agreement, provided that such fee shall not apply in the case of (i) a merger or sale of all or substantially all of the assets of the Licensee or (ii) an assignment to an Affiliate.
3.2	Running royalty rate (applies to Sales by Licensee, Affiliates and Sublicensees)	*****

Portions herein identified by [*****] have been omitted pursuant to a request for confidential treatment under Rule 24b-2 of the Securities Exchange Act of 1934, as amended. A complete copy of this document has been filed separately with the Securities and Exchange Commission

3.3	Minimum royalty (includes Sublicense Fees paid)	N/A

18. Contact Information

Licensee Contacts Contact for Notice:	Licensor Contacts Contact for Notice:
Attn: C. Evan Ballantyne	Attn: Contract Manager
617 Detroit St., Suite 100	3925 W. Braker Lane, Suite 1.9A (R3500)
Ann Arbor, MI 48104	Austin, TX 78759
Fax: (734) 332-7878	Fax: 512.475.6894
Phone: (401) 215-6003	Phone: 512.471.2995
E-mail: EBallantyne@SyntheticBiologics.com	E-mail: licensing@otc.utexas.edu

Accounting contact:	Payment and reporting contact:
Attn: Julie Caudill	Checks payable to “The University of Texas at Austin”
617 Detroit St., Suite 100	Attn: Accounting
Ann Arbor, MI 48104	3925 W. Braker Lane, Suite 1.9A (R3500)
Fax: (734) 332-7878	Austin, TX 78759
Phone: (734) 332-7800 ext. 21	Fax: 512.475.6894
E-mail: JCaudill@SyntheticBiologics.com	Phone: 512.471.2995
	E-mail: accounting@otc.utexas.edu

Patent prosecution contact:

Attn: Dean Farmer, Ph.D., J.D.	Patent prosecution contact:
Cooley LLP	Attn: Patents
500 Boylston Street	3925 W. Braker Lane, Suite 1.9A (R3500)
Boston, MA 02116-3736	Austin, TX 78759
Fax: (617) 937-2400	Fax: 512.475.6894
Phone: (617) 937-2370	Phone: 512.471.2995
	E-mail: patents@otc.utexas.edu

For Licensor Administrative Purposes Only

Changes to Standard Form Terms and Conditions	1 (definition of Licensed Product), 6.5, 7.2, 8.2, and 11.1

20. Special Provision. The Parties hereby agree to the following special provisions set forth in this Section 20 with respect to this Patent License Agreement.

20.1 New Inventions resulting from Sponsored Research. In addition to the specific patent applications identified as Licensed Patents in Section 1 above, "Licensed Patents" shall also include each new invention of the Licensor that meets all of the following criteria (each, a "New Invention"):

(a) The invention results from the performance of a Sponsored Research Agreement which is funded by Licensee, in accordance with a specific Sponsored Research Agreement between Licensor and Licensee, for research in the Laboratory of Dr. Jennifer A. Maynard; and

(b) The invention is within the "Field" of pertussis antibody and subunit vaccine development; and

(c) Licensee gives written notice to Licensor of Licensee's election to add the invention (and related patent rights) to this Agreement, which notice is received by Licensor within sixty (60) days after Licensee has received from Licensor a written disclosure of such invention, which disclosure Licensor shall be obligated to provide promptly following the receipt from the inventor; and

Portions herein identified by [*****] have been omitted pursuant to a request for confidential treatment under Rule 24b-2 of the Securities Exchange Act of 1934, as amended. A complete copy of this document has been filed separately with the Securities and Exchange Commission

(d) Licensee pays an additional license fee of $10,000.00 at the time providing the written notice in (c) above.

Notwithstanding anything in the foregoing, in the event that any new invention results from the performance of a Sponsored Research Agreement which is funded by Licensee, in accordance with a specific Sponsored Research Agreement between Licensor and Licensee, for research in the Laboratory of Dr. Jennifer A. Maynard, but such invention falls outside the "Field" (as defined in clause (ii) above), Licensee's ability to obtain a license to such invention shall be governed by such Sponsored Research Agreement.

For the purposes of Section 7.3 of the Terms and Conditions, a breach by Licensee of payment obligations under a Sponsored Research Agreement under which invention disclosures are submitted to Licensor hereunder shall be considered a breach of the Patent License Agreement and, if not cured in the time period in Section 7.3, shall subject the Patent License Agreement to termination by Licensor.

21. No Other Promises and Agreements; Representation by Counsel. Licensee expressly warrants and represents and does hereby state and represent that no promise or agreement which is not herein expressed has been made to Licensee in executing this Patent License Agreement except those explicitly set forth herein and in the Terms and Conditions, and that Licensee is not relying upon any statement or representation of Licensor or its representatives. Licensee is relying on Licensee's own judgment and has had the opportunity to be represented by legal counsel. Licensee hereby warrants and represents that Licensee understands and agrees to all terms and conditions set forth in this Patent License Agreement and said Terms and Conditions.

22. Deadline for Execution by Licensee. If this Patent License Agreement is executed first by the Licensor and is not executed by the Licensee and received by the Licensor at the address and in the manner set forth in Section 18 of the Terms and Conditions within 30 days of the date of signature set forth under the Licensor's signature below, then this Patent License Agreement shall be null and void and of no further effect.

IN WITNESS WHEREOF, the Parties hereto have caused their duly authorized representatives to execute this Patent License Agreement.

LICENSEE: SYNTHETIC BIOLOGICS, INC.

LICENSOR: The University of Texas at Austin
on behalf of the Board of Regents
of the University of Texas System

By: /s/Daniel W. Sharp, J.D.

By: /s/ Jeffrey Riley

Daniel W. Sharp, J.D.

Jeffrey Riley

Interim Director

Chief Executive Officer

Office of Technology Commercialization

December 19, 2012

Date December 19, 2012

EXHIBIT A

Terms and Conditions of Patent License

These Terms and Conditions of Patent License ("Terms and Conditions") are incorporated by reference into the Patent License Agreement to which they are attached. All Section references in these Terms and Conditions shall be references to provisions in these Terms and Conditions unless explicitly stated otherwise.

1. Definitions

"**Affiliate**" means any business entity more than 50% owned by Licensee, any business entity which owns more than 50% of Licensee, or any business entity that is more than 50% owned by a business entity that owns more than 50% of Licensee.

"**Agreement**" means collectively (i) these Terms and Conditions, and (ii) the Patent License Agreement.

"**Contract Quarter**" means the three-month periods indicated as the Contract Quarter in Section 1 of the Patent License Agreement, or any stub period thereof at the commencement of the Agreement or the expiration or termination of the Agreement.

"**Contract Year**" means the 12-month periods indicated as the Contract Year in Section 1 of the Patent License Agreement, or any stub period thereof at the commencement of the Agreement or the expiration or termination of the Agreement.

"**Effective Date**" means the date indicated as the Effective Date in Section 1 of the Patent License Agreement.

"**Fair Market Value**" means the cash consideration an unaffiliated, unrelated buyer would pay in an arm's length sale of a substantially identical item sold in the same quantity, under the same terms, and at the same time and place.

"**Field**" means the field indicated as the Field identified in Section 1 of the Patent License Agreement.

"**Government**" means any agency, department or other unit of the United States of America or the State of Texas.

"**Gross Consideration**" means all cash and non-cash consideration (e.g., securities).

"**Licensed Process**" means a method or process whose practice or use is covered by a Valid Claim.

"**Licensed Product**" means any product or component (i) whose manufacture, use, sale, offer for sale or import is covered by any Valid Claim, or incorporates non-patentable know how related to the Patent Rights (ii) which is made using a Licensed Process or another Licensed Product.

"**Licensed Service**" means performance of a service for any consideration using a Licensed Product, or the practice of a Licensed Process. For clarity, research and development of Licensed Products by Licensee, its Affiliates, or a Sublicensee does not constitute a Licensed Service.

"**Licensee**" means the Party identified as the Licensee in Section 1 of the Patent License Agreement.

"**Licensor**" means the Party identified as the Licensor in Section 1 of the Patent License Agreement.

"**Milestone Fees**" means all fees identified as Milestone Fees in Section 3.1(b) of the Patent License Agreement.

"**Net Product Sales**" means the Gross Consideration from the Sale of Licensed Products less the following items directly attributable to the Sale of such Licensed Products that are specifically identified on the invoice for such Sale and borne by the Licensee, Affiliates, or Sublicensees as the seller: (a) discounts and rebates actually granted; (b) sales, value added, use and other taxes and government charges actually paid, excluding income taxes; (c) import and export duties actually paid; (d) freight, transport, packing and transit insurance charges actually paid or allowed; and (e) other amounts actually refunded, allowed or credited due to rejections or returns, but not exceeding the original invoiced amount.

Additionally, if Licensee, its Affiliates or Sublicensees use a Licensed Product or a Licensed Process for its own internal purposes or otherwise in a situation that does not involve a Sale for which a royalty is paid under Section 3.2, then Net Product Sales shall also include an amount equal to the customary sale price charged to a third party for the same Licensed Product or Licensed Process, except for a reasonable quantity used internally solely for testing or quality control purposes, marketing or demonstration purposes, or seeking governmental approval (e.g., U.S. Food and Drug Administration clinical trial). If there is no customary sale price, then the Net Product Sales shall be an amount equal to the Fair Market Value.

"**Net Service Sales**" means the Gross Consideration received from the Sale of Licensed Services less the following items, directly attributable to the Sale of such Licensed Services that are specifically identified on the invoice for such Sale and borne by the Licensee, Affiliates, or Sublicensees as the seller: (a) discounts and rebates actually granted; (b) sales, value added, use and other taxes and government charges actually paid, excluding income taxes; and (c) other amounts actually refunded, allowed or credited due to rejections or re-works, but not exceeding the original invoiced amount.

"**Non-Royalty Sublicensing Consideration**" means the Gross Consideration received by the Licensee or its Affiliate from a Sublicensee in consideration of the grant of a sublicense under the Patent Rights (including, without limitation, license or option or distribution fees, fees to maintain license rights, and bonus/milestone payments), but excluding amounts received as running royalties, a profit share, or other revenue sharing based on Net Product Sales or Net Service Sales for which Licensor receives a running royalty under Section 3.2. For the avoidance of doubt, Non-Royalty Sublicensing Consideration shall not include bona fide: (a) running royalties received by Licensee or an Affiliate based on Net Product Sales or Net Service Sales that are royalty-bearing to Licensor under Section 3.2, (b) purchase price for Licensee's stock or other securities not in excess of Fair Market Value, and (iii) amounts paid and used exclusively for research and development of Licensed Products or Licensed Services by Licensee.

"**Patent License Agreement**" means the particular Patent License Agreement to which these Terms and Conditions are attached and incorporated into by reference.

"**Patent Rights**" means the Licensor's rights in (a) the patents and patent applications listed in Section 1 of the Patent License Agreement; (b) all non-provisional patent applications that claim priority to any provisional application listed in Section 1 of the Patent License Agreement; and (c) all divisionals, continuations, and such claims of continuations-in-part as are entitled to claim priority to the aforesaid patents and/or patent applications, and all reissues, reexaminations, extensions of, and foreign counterparts; and (d) any patents that issue with respect to the aforesaid patent applications. From time to time during the term of the Agreement, upon written agreement by both parties, Licensee and Licensor shall update the list of all patent applications and patents within the Patent Rights.

"**Prosecution Counsel**" means the law firm or attorney who is handling the prosecution of the Patent Rights. Prosecution Counsel as of the Effective Date is identified in Section 1 of the Patent License Agreement.

"**Quarterly Payment Deadline**" means the day that is 30 days after the last day of any particular Contract Quarter.

"**Sell, Sale or Sold**" means any transfer or other disposition of Licensed Products or Licensed Services for which consideration is received by Licensee, its Affiliates or Sublicensees. A Sale of Licensed Products or Licensed Services will be deemed completed at the time Licensee or its Affiliate or its Sublicensee receives such consideration.

"**Sublicense Agreement**" means any agreement or arrangement pursuant to which Licensee (or an Affiliate or Sublicensee) grants to any third party any license rights of Licensee under the Agreement.

"**Sublicense Fee**" means the fee specified in Section 3.1(d) of the Patent License Agreement.

"**Sublicensee**" means any entity to whom an express sublicense has been granted under the Patent Rights. For clarity, a third party wholesaler or distributor who has no significant responsibility for marketing and promotion of the Licensed Product or Licensed Services within its distribution territory or field (i.e., the third party simply functions as a reseller), and who does not pay any consideration to Licensee or an Affiliate for such wholesale or distributor rights, shall not be deemed a Sublicensee; and the resale by such a wholesaler or distributor shall not be treated as royalty bearing Net Sales by a Sublicensee provided that a royalty is being paid by Licensee for the initial transfer to the wholesaler or distributor pursuant to Section 3.2. This definition does not limit Licensee's rights to grant or authorize sublicenses under the Agreement.

"**Territory**" means the territory so indicated as the Territory in Section 1 of the Patent License Agreement.

"**Valid Claim**" means a claim of (i) an issued and unexpired patent included within the Patent Rights unless the claim has been held unenforceable or invalid by the final, un-reversed, and un-appealable decision of a court or other government body of competent jurisdiction, has been irretrievably abandoned or disclaimed, or has otherwise been finally admitted or determined to be invalid, un-patentable or unenforceable, whether through reissue, reexamination, disclaimer or otherwise, or (ii) a pending patent application within the Patent Rights to the extent the claim continues to be prosecuted in good faith.

2. License Grant and Commercialization

2.1 Grant

(a) Licensor grants to Licensee a royalty-bearing exclusive license under Patent Rights to manufacture, have manufactured, distribute, have distributed, use, offer for Sale, Sell, lease, loan and/or import Licensed Products in the Field in the Territory and to perform Licensed Services in the Field in the Territory.

(b) This grant is subject to (i) the payment by Licensee to Licensor of all consideration required under the Agreement, (ii) any rights of, or obligations to, the Government as set forth in Section 11.2 (Government Rights), and (iii) rights retained by Licensor to:

(1) Publish the scientific findings from research related to the Patent Rights; and

(2) Manufacture, have manufactured, and use the Patent Rights for teaching, research, patient care, education, and other educationally-related purposes; and

(3) Grant rights to, and transfer material embodiments of, the Patent Rights to other academic institutions or non-profit research institutions for the purposes identified in clauses (1) and (2) above.

(c) Licensor reserves all rights not expressly granted in the Agreement and disclaims the grant of any implied rights to Licensee.

2.2 Affiliates

Licensee may extend the license granted herein to any Affiliate provided that the Affiliate agrees in writing to be bound by the Agreement to the same extent as Licensee. Licensee agrees to deliver such written agreement to Licensor within 30 calendar days following execution.

2.3 Sublicensing

Licensee has the right to grant Sublicense Agreements under the Patent Rights consistent with the terms of the Agreement, subject to the following:

(a) A Sublicense Agreement shall not exceed the scope and rights granted to Licensee hereunder. Sublicensee must agree in writing to be bound by the applicable terms and conditions of the Agreement and shall indicate that Licensor is a third party beneficiary and entitled to enforce the terms and conditions of the Sublicense Agreement applicable to the Agreement. In the event of termination of the Agreement, continued sublicense rights shall be governed by Section 7.5(a) (Effect of Termination). Licensee may grant a Sublicensee the right to grant further sub-Sublicense Agreements, in which case such sub-Sublicense Agreements shall be treated as "Sublicense Agreements" and such sub-Sublicensees shall be treated as "Sublicensees" for purposes of the Agreement.

(b) Licensee shall deliver to Licensor a true, complete, and correct copy of each Sublicense Agreement granted by Licensee, Affiliate or Sublicensee, and any modification or termination thereof, within 30 days following the applicable execution, modification, or termination of such Sublicense Agreement. If the Sublicense Agreement is not in English, Licensee shall provide Licensor an accurate English translation in addition to a copy of the original agreement.

(c) Notwithstanding any such Sublicense Agreement, Licensee will remain primarily liable to Licensor for all of the Licensee's duties and obligations contained in the Agreement, including without limitation the payment of running royalties due under Section 3.2 whether or not paid to Licensee by a Sublicensee. Any act or omission of a Sublicensee that would be a breach of the Agreement if performed by Licensee will be deemed to be a breach by Licensee unless Licensee complies with the remaining provisions of this paragraph. Each Sublicense Agreement will contain a right of termination by Licensee in the event that the Sublicensee breaches the payment or reporting

obligations affecting Licensor or any other terms and conditions of the Sublicense Agreement that would constitute a breach of the Agreement if such acts were performed by Licensee. In the event of a Sublicensee breach, and if after a reasonable opportunity to cure as provided in any such Sublicense Agreement (not to exceed 30 days for a payment breach and 60 days for a non-payment breach), such Sublicensee fails to cure such Sublicensee breach, then the Licensee will terminate the Sublicense Agreement within 30 days thereafter, with copy of such written notice of termination to Licensor, unless agreed to in writing otherwise by Licensor.

2.4 Diligent Commercialization

Licensee by itself or through its Affiliates and Sublicensees will use diligent efforts to make Licensed Products or Licensed Services commercially available in the Field in the Territory. Without limiting the foregoing, Licensee will (a) maintain a reasonably funded, ongoing and active research, development, manufacturing, regulatory, marketing or sales program required to make License Products or Licensed Services commercially available, and (b) fulfill the milestone events specified in Section 2.4 of the Patent License Agreement by the deadlines indicated therein and (c) use diligent and commercially reasonable efforts to perform and complete the plans described in the annual report submitted pursuant to Section 4.2 (Annual Written Progress Report). If the obligations under this Section 2.4 are not fulfilled, Licensor may treat such failure as a breach in accordance with Section 7.3(b).

3. Compensation

In consideration of rights granted to Licensee, Licensee will pay Licensor the following fees and royalties. All fees and royalties are not refundable and are not creditable against other fees and royalties. Each payment will reference the Patent License Agreement number and will be sent to Licensor's payment and accounting contact in Section 18 (Notices) of the Patent License Agreement.

3.1 Non-Royalty Payments due from Licensee

(a) *Patent Expenses*. Licensee will reimburse Licensor for the past patent expenses stated in Section 3.1(a) of the Patent License Agreement within 15 days after the Effective Date. The stated amount is the current estimate for past patent expenses based on invoices received by the Licensor through the stated date. Licensee's obligations to pay all past and future patent expenses pursuant to Section 6 (Patent Expenses and Prosecution) will not be limited by such amount.

(b) *Milestone Fees*. Licensee will pay Milestone Fees indicated in Section 3.1(b) of the Patent License Agreement by the Quarterly Payment Deadline for the Contract Quarter in which the milestone events set forth in Section 3.1(b) of the Patent License Agreement are achieved.

(c) *Scheduled License Fees*. Licensee will pay license fees in the amounts set forth in Sections 3.1(c) of the Patent License Agreement in accordance with the stated schedule.

(d) *Sublicense Fees*. Licensee will pay Sublicense Fees indicated in Section 3.1(d) of the Patent License Agreement on or before the Quarterly Payment Deadline for the Contract Quarter.

(e) *Assignment Fee*. Licensee will pay the assignment fee set forth in Section 3.1(e) of the Patent License Agreement within 15 days of the assignment of the Agreement.

3.2 Royalties

Licensee will pay a running royalty at the rate set forth in Section 3.2 of the Patent License Agreement on Net Product Sales and Net Service Sales in each Contract Quarter, payable on or before the Quarterly Payment Deadline for such Contract Quarter, subject to the following:

(a) No more than one royalty shall be paid to Licensor hereunder with respect to the Sale of any one unit of Licensed Product or Licensed Service, whether or not more than one patent or Valid Claim is applicable to the Licensed Product or Licensed Service, or the development, manufacture, or performance thereof.

(b) No royalty shall be payable under this Section 3.2 with respect to (i) Sales to an Affiliate or Sublicensee of a particular unit of Licensed Product that is used by such Affiliate or Sublicensee to perform a Licensed Service if Licensor is paid a royalty on the Sale of such Licensed Service, (ii) the Sale of Licensed Products between or among Licensee, its Affiliates, and Sublicensees for re-sale purposes, provided Licensor is paid a royalty with respect to the re-sale, or (iii) payments that constitute Non-Royalty Sublicensing Consideration.

3.3 Minimum Royalties and Sublicense Fees

If royalties and Sublicense Fees paid to Licensor do not reach the minimum royalty amounts stated in Section 3.3 of the Patent License Agreement for the specified periods, Licensee will pay Licensor on or before the Quarterly Payment Deadline for the last Contract Quarter in the stated period an additional amount equal to the difference between the stated minimum royalty amount and the actual royalties and Sublicense Fees paid to Licensor.

3.4 Non-cash Consideration

If Licensee receives or anticipates receipt of non-cash consideration from Sales or Sublicenses, the manner in which Licensor will receive its compensation under the Agreement with respect to such non-cash consideration will be negotiated in good faith and timely agreed to by the Parties.

4. Reports and Plans

The reports specified in this Section 4 will be sent to Licensor's payment and reporting contact identified in Section 18 (Notices) of the Patent License Agreement. If Licensor requests to have information submitted in a particular format, Licensee will use reasonable efforts to comply with such request.

4.1 Quarterly Payment and Milestone Reports

On or before each Quarterly Payment Deadline, Licensee will deliver to Licensor a true and accurate report, certified by an officer of Licensee, giving such particulars of the business conducted by Licensee, its Affiliates and its Sublicensees (including copies of reports provided by Sublicensees and Affiliates to Licensee) during the preceding Contract Quarter under the Agreement as necessary for Licensor to account for Licensee's payments hereunder, even if no payments are due. The reports shall continue to be delivered after the termination or expiration of the Agreement until such time as all Licensed Products permitted to be Sold after termination or expiration have been Sold or destroyed. Licensee shall provide information in sufficient detail to enable the royalties payable hereunder to be determined and to calculate all of the amounts payable under the Agreement. The report shall include:

(a) The name of the Licensee, the Patent License Agreement number, and the period covered by the report;

(b) The name of any Affiliates and Sublicensees whose activities are also covered by the report;

(c) Identification of each Licensed Product and Licensed Service for which any royalty payments have become payable;

(d) Net Product Sales and Net Service Sales segregated on a product-by-product basis, and a country-by-country basis, or an affirmative statement that no Sales were made. The report shall also itemize the permitted deductions from the Gross Consideration used to arrive at the resulting Net Product Sales and Net Service Sales, on a product-by-product and country-by-country basis;

(e) The applicable royalty rate;

(f) An affirmative statement of whether any milestones with deadlines in that Contract Quarter under Section 2.4 and any milestones under Section 3.1(b) were met or not, and the resulting Milestone Fee payable;

(g) Non-Royalty Sublicensing Consideration received by Licensee segregated on a Sublicense-by-Sublicense basis, or an affirmative statement that none was received;

(h) If any consideration was received in currencies other than U.S. dollars, the report shall describe the currency exchange calculations; and

(i) Any changes in accounting methodologies used to account for and calculate the items included in the report since the previous report.

4.2 Annual Written Progress Report and Commercialization Plan

Within 45 days following the end of each Contract Year, Licensee will deliver to Licensor a true and accurate written progress report and commercialization plan, certified by an officer of Licensee, that summarizes (i) Licensee's efforts and accomplishments during the Contract Year to diligently commercialize Licensed Products and Licensed Services, and (ii) Licensee's development and commercialization plans with respect to Licensed Products and Licensed Services for the next Contract Year. The report shall also cover such activities by Affiliates and Sublicensees. The report shall contain the following information to the extent relevant to the activities under the Agreement:

(a) The name of the Licensee, the Patent License Agreement number, the names of any Affiliates and Sublicensees, and the products and services being developed and/or commercialized;

(b) The progress toward completing and the plans for completing the applicable milestone events pursuant to Sections 2.4 and 3.1(b);

(c) The research and development activities, including status and plans for obtaining any necessary governmental approvals, performed during the past year, and the plans for research and development activities for the next year; and

(d) The marketing activities for the past year and planned for the next year, and Licensee's internal estimate for Sales for the next year.

4.3 Government and Economic Development Reporting

If Licensor requests, Licensee will provide information for Licensor's Government and economic development reporting purposes, including the following:

(a) Number and geographic location of new full-time employees created during the past Contract Year; total number and geographic location of full-time employees of Licensee at the end of such Contract Year;

(b) Dollar amount of new equity financing received by Licensee during the past Contract Year, and current capitalization, including number and class of outstanding securities;

(c) Location and square footage of facilities; and

(d) Other information required under Federal and state law.

This information shall be treated as Licensee's Confidential Information; provided that Licensor is entitled to combine such information with similar information from other Licensor licensees and publicly report such combined aggregate information, without identifying Licensee's separate specific applicable numbers. If and when Licensee has more than 200 full-time employees, then no further economic development reports will be required from Licensee.

5. Payment, Records, and Audits

5.1 Payments

All amounts referred to in the Patent License Agreement are expressed in U.S. dollars without deductions for taxes, assessments, fees, or charges of any kind. Each payment will reference the agreement number set forth at the beginning of the Patent License Agreement. All payments to Licensor will be made in U.S. dollars by check or wire transfer (Licensee to pay all wire transfer fees) payable to the payee identified in Section 18 of the Patent License Agreement and sent to the payment and reporting contact in Section 18 (Notices) of the Patent License Agreement.

5.2 Sales Outside the U.S.

If any currency conversion shall be required in connection with the calculation of payments hereunder, such conversion shall be made using the rate used by Licensee for its financial reporting purposes in accordance with Generally Accepted Accounting Principles (or foreign equivalent) or, in the absence of such rate, using the average of the buying and selling exchange rate for conversion between the foreign currency and U.S. Dollars, for current transactions as reported in *The Wall Street Journal* on the last business days of the Contract Quarter to which such payment pertains. Licensee may not make any tax withholdings from payments to Licensor, but Licensor agrees to supply to Licensee, upon written request, appropriate evidence from appropriate U.S. governmental agencies showing that Licensor is a resident of the United States of America for purposes of the U.S. income tax laws and is tax-exempt under such income tax laws.

5.3 Late Payments

Amounts that are not paid when due will accrue a late charge from the due date until paid, at a rate equal to 1.0% per month (or the maximum allowed by law, if less).

5.4 Records

For a period of six years after the Contract Quarter to which the records pertain, Licensee agrees that it and its Affiliates and Sublicensees will each keep complete and accurate records of their Sales, Net Product Sales, Net Service Sales, Milestone Fees, and Non-Royalty Sublicensing Consideration in sufficient detail to enable such payments to be determined and audited.

5.5 Auditing

Licensee and its Affiliates will permit Licensor or its representatives, at Licensor's expense, to periodically examine books, ledgers, and records during regular business hours, at Licensee's or its Affiliate's place of business, on at least 30 days advance notice, to the extent necessary to verify any payment or report required under the Agreement. For each Sublicensee, Licensee shall obtain such audit rights for Licensor or itself. If Licensee obtains such audit rights for itself, it will promptly conduct an audit of the Sublicensee's records upon Licensor's request, and Licensee will furnish to Licensor a copy of the findings from such audit. No more than one audit of Licensee, each Affiliate, and each Sublicensee shall be conducted under this Section 5.5 in any calendar year. If any amounts due Licensor have been underpaid, then Licensee shall immediately pay Licensor the amount of such underpayment plus accrued interest due in accordance with Section 5.3. If the amount of underpayment is equal to or greater than 5% of the total amount due for the records so examined, Licensee will pay the cost of such audit. Such audits may, at Licensor's sole discretion, consist of a self-audit conducted by Licensee at Licensee's expense and certified in writing by an authorized officer of Licensee. All information examined pursuant to this Section 5.5 shall be deemed to be the Confidential Information of the Licensee. Further, whenever Licensee and/or its Affiliates and Sublicensees has its books and records audited by an independent certified public accountant, Licensee and/or its Affiliates and Sublicensees will, within 30 days of the conclusion of such audit, provide Licensor with a written statement of said auditor, setting forth the calculation of amounts due to Licensor over the time period audited, as determined from the books and records of the Licensee, Affiliate or Sublicensee; but said auditor does not need to give any audit opinion with said statement.

6. Patent Expenses and Prosecution

6.1 Patent Expenses

Licensee shall pay for all past documented, out-of-pocket expenses incurred by Licensor for filing, prosecuting, enforcing, defending and maintaining Patent Rights and related patent searches through the Effective Date of the Agreement, including those identified in Section 3.1(a) of the Patent License Agreement, and all such future expenses incurred by Licensor, for so long as, and in such countries as the Agreement remains in effect. Licensee will pay all patent expenses (except for the payment called for under Section 3.1(a)), including past expenses that have not been invoiced as of the date indicated in Section 3.1(a) of the Patent License Agreement and future expenses, within 30 days after Licensee's receipt of an invoice. At the election of Licensor, Licensee will either pay Prosecution Counsel directly for patent expenses or will reimburse Licensor for such patent expenses. Patent expense payment delinquencies (whether owed directly to Prosecution Counsel or to Licensor) will be considered a payment default under Section 7.3(a).

6.2 Direction of Prosecution

Licensor will confer with Licensee to develop a strategy for the prosecution and maintenance of Patent Rights. Licensor will request that copies of all documents prepared by the Prosecution Counsel for submission to governmental patent offices be provided to Licensee for review and comment prior to filing, to the extent practicable under the circumstances. At its discretion, Licensor may allow Licensee to instruct Prosecution Counsel directly, provided, that (a) Licensor will maintain final authority in all decisions regarding the prosecution and maintenance of the Patent Rights, (b) Licensor may revoke this authorization to instruct Prosecution Counsel directly at any time, and (c) the Prosecution Counsel remains counsel to the Licensor with an appropriate contract (and shall not jointly represent Licensee unless requested by Licensee and approved by Licensor, and an appropriate engagement letter and conflict waiver are in effect). If Licensee wishes to instruct Prosecution Counsel directly or change Prosecution

Counsel, Licensee may request to do so by following the Licensor's procedures for such. Licensor reserves in its sole discretion the ability to change Prosecution Counsel and to approve or disapprove any requested changes by Licensee. The Parties agree that they share a common legal interest to get valid enforceable patents and that Licensee will maintain as privileged all information received pursuant to this Section.

6.3 Ownership

All patent applications and patents will be in the name of Licensor (and any co-owner identified in Section 1 of the Patent License Agreement) and owned by Licensor (and such co-owner, if any). No payments due under the Agreement will be reduced as the result of co-ownership interests in the Patent Rights by Licensee or any other party.

6.4 Foreign Filings

In addition to the U.S., the Patent Rights shall, subject to applicable bar dates, be pursued in such foreign countries as Licensee so designates in writing to Licensor in sufficient time to reasonably enable the preparation of such additional filings, and in those foreign countries in which Licensor has filed applications prior to the Effective Date. If Licensee does not choose to pursue patent rights in a particular foreign country and Licensor chooses to do so, Licensor shall so notify Licensee and thereafter said patent application or patent shall no longer be included in the Patent Rights and Licensee shall have no further rights thereto. Licensor shall have the right to make alternative arrangements with Licensee for upfront payment of foreign patent expenses.

6.5 Withdrawal from Paying Patent Costs

If at any time Licensee wishes to cease paying for any costs for a particular Patent Right or for patent prosecution in a particular jurisdiction, Licensee must give Licensor at least 60 days prior written notice and Licensee will continue to be obligated to pay for the patent costs which reasonably accrue during said notice period. Thereafter, said patent application or patent shall no longer be included in the Patent Rights and Licensee shall have no further rights thereto.

6.6 U.S. Patent and Trademark Office Entity Size Status

Licensee represents that as of the Effective Date the entity size status of Licensee in accordance with the regulations of the U.S. Patent and Trademark Office is as set forth in Section 1 of the Patent License Agreement. Licensee will inform Licensor in writing on a timely basis of any change in its U.S. Patent and Trademark Office entity size status.

7. Term and Termination

7.1 Term

Unless earlier terminated as provided herein, the term of the Agreement will commence on the Effective Date and continue until the last date of expiration or termination of the Patent Rights.

7.2 Termination by Licensee

Licensee, at its option, may terminate the Agreement by providing Licensor written notice of intent to terminate, which such termination effective will be 60 days following receipt of such notice by Licensor.

7.3 Termination by Licensor

Licensor, at its option, may immediately terminate the Agreement, or any part of Patent Rights, or any part of Field, or any part of Territory, or the exclusive nature of the license grant, upon delivery of written notice to Licensee of Licensor's decision to terminate, if any of the following occur:

(a) Licensee becomes in arrears in any payments due under the Agreement, and Licensee fails to make the required payment within 30 days after delivery of written notice from Licensor; or

(b) Licensee is in breach of any non-payment provision of the Agreement, and does not cure such breach within 60 days after delivery of written notice from Licensor; or

(c) Licensor delivers notice to Licensee of three or more actual breaches of the Agreement in any 12-month period, even in the event that Licensee cures such breaches in the allowed period; or

(d) Licensee or its Affiliate or Sublicensee initiates any proceeding or action to challenge the validity, enforceability, or scope of one or more of the Patent Rights, or assist a third party in pursuing such a proceeding or action.

7.4 Other Conditions of Termination

The Agreement will terminate:

(a) Immediately without the necessity of any action being taken by Licensor or Licensee, (i) if Licensee becomes bankrupt or insolvent, or (ii) Licensee's Board of Directors elects to liquidate its assets or dissolve its business, or (iii) Licensee ceases its business operations, or (iv) Licensee makes an assignment for the benefit of creditors or (v) if the business or assets of Licensee are otherwise placed in the hands of a receiver, assignee or trustee, whether by voluntary act of Licensee or otherwise; or

(b) At any time by mutual written agreement between Licensee and Licensor.

7.5 Effect of Termination

If the Agreement is terminated for any reason:

(a) All rights and licenses of Sublicensees shall terminate upon termination of the Agreement; provided however, if the Sublicense Agreement is for all of the Field for all of the Territory, and the Sublicensee is in good standing and agrees in writing to assume all of the obligations of Licensee and provides Licensor with written notice thereof within 30 days after termination of the Agreement, then such Sublicense Agreement shall survive; and

(b) Licensee shall cease making, having made, distributing, having distributed, using, selling, offering to sell, leasing, loaning and importing any Licensed Products and performing Licensed Services by the effective date of termination; and

(c) Licensee shall tender payment of all accrued royalties and other payments due to Licensor as of the effective date of termination; and

(d) Nothing in the Agreement will be construed to release either Party from any obligation that matured prior to the effective date of termination; and

(e) The provisions of Sections 8 (Confidentiality), 9 (Infringement and Litigation), 11 (Representations and Disclaimers), 12 (Limit of Liability), 13 (Indemnification), 14 (Insurance), 17 (Use of Name), 18 (Notices), and 19 (General Provisions) will survive any termination or expiration of the Agreement. In addition, the provisions of Sections 3 (Compensation), 4.1 (Quarterly Payment and Milestone Reports), 5 (Payment, Records and Audits), and 6.1 (Patent Expenses) shall survive with respect to all activities and payment obligations accruing prior to the termination or expiration of the Agreement.

8. Confidentiality

8.1 Definition

"**Confidential Information**" means all information that is of a confidential and proprietary nature to Licensor or Licensee and provided by one Party to the other Party under the Agreement.

8.2 Protection and Marking

Licensor and Licensee each agree that all Confidential Information disclosed in tangible form, and marked "confidential" and forwarded to one by the other, or if disclosed orally, is designated as confidential at the time of disclosure and within thirty (30) days after disclosure shall be furnished to recipient in written or electronic form conspicuously marked as, "Confidential" by discloser: (i) is to be held in strict confidence by the receiving Party, (ii) is to be used by and under authority of the receiving Party only as authorized in the Agreement, and (iii) shall not be disclosed by the receiving Party, its agents or employees without the prior written consent of the disclosing Party or as authorized in the Agreement. Licensee has the right to use and disclose Confidential Information of Licensor reasonably in connection with the exercise of its rights under the Agreement, including without limitation disclosing to Affiliates, Sublicensees, potential investors, acquirers, and others on a need to know basis, if such Confidential Information is provided under conditions which reasonably protect the confidentiality thereof. Each Party's obligation of confidence hereunder includes, without limitation, using at least the same degree of care with the disclosing Party's Confidential Information as it uses to protect its own Confidential Information, but always at least a reasonable degree of care.

8.3 Confidentiality of Terms of Agreement

Each Party agrees not to disclose to any third party the terms of the Agreement without the prior written consent of the other Party hereto, except each Party may disclose the terms of the Agreement: (a) to advisors, actual or potential Sublicensees, acquirers or investors, and others on a need to know basis, in each case, under appropriate confidentiality obligations substantially similar to those of this Section 8; and (b) to the extent necessary to comply with applicable laws and court orders (including, without limitation, The Texas Public Information Act, as may be amended from time to time, other open records laws, decisions and rulings, and securities laws, regulations and guidance). If the Agreement is not for all fields of use, then Licensor may disclose the Field to other potential third party licensees. Notwithstanding the foregoing, the existence of the Agreement shall not be considered Confidential Information.

8.4 Disclosure Required by Court Order or Law

If the receiving Party is required to disclose Confidential Information of another Party hereto, or any terms of the Agreement, pursuant to the order or requirement of a court, administrative agency, or other governmental body or applicable law, the receiving Party may disclose such Confidential Information or terms to the extent required, provided that the receiving Party shall use reasonable efforts to provide the disclosing Party with reasonable advance notice thereof to enable the disclosing Party to seek a protective order and otherwise seek to prevent such disclosure. To the extent that Confidential Information so disclosed does not become part of the public domain by virtue of such disclosure, it shall remain Confidential Information protected pursuant to Section 8.

8.5 Copies

Each Party agrees not to copy or record any of the Confidential Information of the other Party, except as reasonably necessary to exercise its rights or perform its obligations under the Agreement, and for archival and legal purposes.

8.6 Continuing Obligations

Subject to the exclusions listed in Section 8.7, the Parties' confidentiality obligations under the Agreement will survive termination of the Agreement and will continue for a period of five years thereafter.

8.7 Exclusions

Information shall not be considered Confidential Information of a disclosing Party under the Agreement to the extent that the receiving Party can establish by competent written proof that such information:

(a) Was in the public domain at the time of disclosure; or

(b) Later became part of the public domain through no act or omission of the recipient Party, its employees, agents, successors or assigns in breach of the Agreement; or

(c) Was lawfully disclosed to the recipient Party by a third party having the right to disclose it not under an obligation of confidentiality; or

(d) Was already known by the recipient Party at the time of disclosure; or

(e) Was independently developed by the recipient Party without use of the disclosing Party's Confidential Information.

8.8 Copyright Notice

The placement of a copyright notice on any Confidential Information will not be construed to mean that such information has been published and will not release the other Party from its obligation of confidentiality hereunder

9. Infringement and Litigation

9.1 Notification

If either Licensor's designated office for technology commercialization or Licensee becomes aware of any infringement or potential infringement of Patent Rights, each Party shall promptly notify the other of such in writing.

9.2 Licensee's Enforcement Rights

Licensee shall enforce the Patent Rights against any infringement by a third party. Licensee shall be responsible for payment of all fees and expenses associated with such enforcement incurred by Licensee and incurred by Licensor in providing cooperation or joining as a party as provided in Section 9.4. Licensee agrees to pay Licensor a percentage

equivalent to the Sublicense Fee rate set forth in Section 3.1(d) of the Patent License Agreement on any monetary recovery, including any punitive damages, in excess of Licensee's documented, third-party expenses in enforcing the Patent Rights and amounts reimbursed Licensor under this Section 9.2.

9.3 Licensor's Enforcement Rights

If Licensee does not file suit within six months after a written request by Licensor to initiate an infringement action, then Licensor shall have the right, at its sole discretion, to bring suit to enforce any Patent Right licensed hereunder against the infringing activities, with Licensor retaining all recoveries from such enforcement. If Licensor pursues such infringement action, Licensor may, as part of the resolution of such efforts, grant non-exclusive license rights to the alleged infringer notwithstanding Licensee's exclusive license rights.

9.4 Cooperation between Licensor and Licensee

In any infringement suit or dispute, the Parties agree to cooperate fully with each other. At the request of the Party bringing suit, the other Party will permit reasonable access after reasonable advance notice to all relevant personnel, records, papers, information, samples, specimens, etc., during regular business hours.

If it is necessary to name Licensor as a party in such action, then Licensee must first obtain Licensor's prior written permission, which permission shall not be unreasonably withheld, provided that Licensor shall have reasonable prior input on choice of counsel on any matter where such counsel represents Licensor, and Licensee and such counsel agree to follow all required procedures of the Texas Attorney General regarding retention of outside counsel for state entities.

10. Export Compliance

Licensee understands that the Arms Export Control Act (AECA), including its implementing International Traffic In Arms Regulations (ITAR), and the Export Administration Act (EAA), including its Export Administration Regulations (EAR), are some (but not all) of the laws and regulations that comprise the U.S. export laws and regulations. Licensee further understands that the U.S. export laws and regulations include (but are not limited to): (a) ITAR and EAR product/service/data-specific requirements; (b) ITAR and EAR ultimate destination-specific requirements; (c) ITAR and EAR end user-specific requirements; (d) Foreign Corrupt Practices Act; and (e) anti-boycott laws and regulations. Licensee will comply with all then-current applicable export laws and regulations of the U.S. Government (and other applicable U.S. laws and regulations) pertaining to the Licensed Products and Licensed Services (including any associated products, items, articles, computer software, media, services, technical data, and other information). Licensee certifies that it will not, directly or indirectly, export (including any deemed export), nor re-export (including any deemed re-export) the Licensed Products and Licensed Services (including any associated products, items, articles, computer software, media, services, technical data, and other information) in violation of applicable U.S. laws and regulations. Licensee will include a provision in its agreements, substantially similar to this Section 10, with its Sublicensees, third party wholesalers and distributors, and physicians, hospitals or other healthcare providers who purchase a Licensed Product, requiring that these parties comply with all then-current applicable U.S. export laws and regulations and other applicable U.S. laws and regulations.

11. Representations and Disclaimers

11.1 Licensor Representations

Except for the rights, if any, of the Government as set forth in Section 11.2, Licensor represents and warrants to Licensee that to the knowledge of Licensor's designated office for technology commercialization (i) Licensor is the owner or agent of the entire right, title, and interest in and to Patent Rights (other than the right, title and interest of any joint owner identified in Section 1 of the Patent License Agreement), (ii) Licensor has the right to grant licenses hereunder, and (iii) Licensor has not knowingly granted and will not knowingly grant licenses or other rights under the Patent Rights that are in conflict with the terms and conditions in the Agreement and (iv) Licensor is not aware of any infringement related to the Patent Rights.

11.2 Government Rights

Licensee understands that Patent Rights may have been developed under a funding agreement with Government and, if so, that Government may have certain rights relative thereto. The Agreement is made subject to the Government's rights under any such agreement and under any applicable Government law or regulation. To the extent that there is a conflict between any such agreement, such applicable law or regulation and the Agreement, the terms of such Government agreement, and applicable law or regulation, shall prevail. Licensee agrees that, to the extent required by U.S. laws and regulations, Licensed Products used or Sold in the U.S. will be manufactured substantially in the U.S., unless a written waiver is obtained in advance from the U.S. Government.

11.3 Licensor Disclaimers

EXCEPT AS SPECIFICALLY SET FORTH IN SECTION 11.1, LICENSEE UNDERSTANDS AND AGREES THAT LICENSOR MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, AS TO THE LICENSED PRODUCTS OR LICENSED SERVICES, OR AS TO THE OPERABILITY OR FITNESS FOR ANY USE OR PARTICULAR PURPOSE, MERCHANTABILITY, SAFETY, EFFICACY, APPROVABILITY BY REGULATORY AUTHORITIES, TIME AND COST OF DEVELOPMENT, PATENTABILITY, AND/OR BREADTH OF PATENT RIGHTS. LICENSOR MAKES NO REPRESENTATION AS TO WHETHER ANY PATENT WITHIN PATENT RIGHTS IS VALID, OR AS TO WHETHER THERE ARE ANY PATENTS NOW HELD, OR WHICH WILL BE HELD, BY OTHERS OR BY LICENSOR THAT MIGHT BE REQUIRED FOR USE OF PATENT RIGHTS IN FIELD. NOTHING IN THE AGREEMENT WILL BE CONSTRUED AS CONFERRING BY IMPLICATION, ESTOPPEL OR OTHERWISE ANY LICENSE OR RIGHTS TO ANY PATENTS OR TECHNOLOGY OF LICENSOR OTHER THAN THE PATENT RIGHTS, WHETHER SUCH PATENTS ARE DOMINANT OR SUBORDINATE TO THE PATENT RIGHTS. LICENSOR HAS NO OBLIGATION TO FURNISH TO LICENSEE ANY KNOW-HOW, TECHNOLOGY OR TECHNOLOGICAL INFORMATION.

11.4 Licensee Representation

By execution of the Agreement, Licensee represents, acknowledges, covenants and agrees (a) that Licensee has not been induced in any way by Licensor or its employees to enter into the Agreement, and (b) that Licensee has been given an opportunity to conduct sufficient due diligence with respect to all items and issues pertaining to this Section 11 (Representations and Disclaimers) and all other matters pertaining to the Agreement; and (c) that Licensee has adequate knowledge and expertise, or has utilized knowledgeable and expert consultants, to adequately conduct the due diligence, and (c) that Licensee accepts all risks inherent herein. Licensee represents that it is a duly organized, validly existing entity of the form indicated in Section 1 of the Patent License Agreement, and is in good standing under the laws of its jurisdiction of organization as indicated in Section 1 of the Patent License Agreement, and has all necessary corporate or other appropriate power and authority to execute, deliver and perform its obligations hereunder.

12. Limit of Liability

IN NO EVENT SHALL LICENSOR, THE UNIVERSITY SYSTEM IT GOVERNS, ITS MEMBER INSTITUTIONS, INVENTORS, REGENTS, OFFICERS, EMPLOYEES, STUDENTS, AGENTS OR AFFILIATED ENTERPRISES, BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, INCIDENTAL, EXEMPLARY, OR PUNITIVE DAMAGES (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF PROFITS OR REVENUE) ARISING OUT OF OR IN CONNECTION WITH THE AGREEMENT OR ITS SUBJECT MATTER, REGARDLESS OF WHETHER ANY SUCH PARTY KNOWS OR SHOULD KNOW OF THE POSSIBILITY OF SUCH DAMAGES. OTHER THAN FOR CLAIMS AGAINST LICENSEE FOR INDEMNIFICATION (SECTION 13) OR FOR MISUSE OR MISAPPROPRIATION OR INFRINGEMENT OF LICENSOR'S INTELLECTUAL PROPERTY RIGHTS, LICENSEE WILL NOT BE LIABLE TO LICENSOR FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL OR PUNITIVE DAMAGES (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF PROFITS OR REVENUE) ARISING OUT OF OR IN CONNECTION WITH THE AGREEMENT OR ITS SUBJECT MATTER, REGARDLESS OF WHETHER LICENSEE KNOWS OR SHOULD HAVE KNOWN OF THE POSSIBILITY OF SUCH DAMAGES.

13. Indemnification

13.1 Indemnification Obligation

Subject to Section 13.2, Licensee agrees to hold harmless, defend and indemnify Licensor, the university system it governs, its member institutions, its Regents, officers, employees, students and agents ("Indemnified Parties") from and against any liabilities, damages, causes of action, suits, judgments, liens, penalties, fines, losses, costs and expenses (including, without limitation, reasonable attorneys' fees and other expenses of litigation) (collectively "Liabilities") resulting from claims or demands brought by third parties against an Indemnified Party on account of any injury or death of persons, damage to property, or any other damage or loss arising out of or in connection with the Agreement or the exercise or practice by or under authority of Licensee, its Affiliates or their Sublicensees, or third party wholesalers or distributors, or physicians, hospitals or other healthcare providers who purchase a Licensed Product, of the rights granted hereunder.

13.2 Conditions of Indemnification

Licensee shall have no responsibility or obligation under Section 13.1 for any Liabilities to the extent caused by the gross negligence or willful misconduct by Licensor. Obligations to indemnify, and hold harmless under Section 13.1 are subject to: (a) to the extent authorized by the Texas Constitution and the laws of the State of Texas, and subject to the statutory duties of the Texas Attorney General, the Indemnified Party giving Licensee control of the defense and settlement of the claim and demand; and (b) to the extent authorized by the Texas Constitution and the laws of the State of Texas and subject to statutory duties of the Texas Attorney General, the Indemnified Party providing assistance reasonably requested by Licensee, at Licensee's expense.

14. Insurance

14.1 Insurance Requirements

Prior to any Licensed Product being used or Sold (including for the purpose of obtaining regulatory approvals), and prior to any Licensed Service being performed by Licensee, an Affiliate, or by a Sublicensee, and for a period of five years after the Agreement expires or is terminated, Licensee shall, at its sole cost and expense, procure and maintain commercial general liability insurance in commercially reasonable and appropriate amounts for the Licensed Product being used or Sold or the Licensed Service being performed. Licensee shall use commercially reasonable efforts to have Licensor, the university system it governs, its member institutions, Regents, officers, employees, students and agents named as additional insureds. Such commercial general liability insurance shall provide, without limitation: (i) product liability coverage; (ii) broad form contractual liability coverage for Licensee's indemnification under the Agreement; and (iii) coverage for litigation costs.

14.2 Evidence of Insurance and Notice of Changes

Upon request by Licensor, Licensee shall provide Licensor with written evidence of such insurance. Additionally, Licensee shall provide Licensor with written notice of at least 60 days prior to Licensee cancelling, not renewing, or

materially changing such insurance.

15. Assignment

The Agreement may not be assigned by Licensee without the prior written consent of Licensor, which consent will not be unreasonably withheld. A merger or other transaction in which the equity holders of Licensee prior to such event hold less than a majority of the equity of the surviving or acquiring entity shall be considered an assignment of the Agreement. For any permitted assignment to be effective, (a) Licensee must be in good standing under this Agreement, (b) the Licensee must pay Licensor the assignment fee pursuant to Section 3.1(e), and (c) the assignee must assume in writing (a copy of which shall be promptly provided to Licensor) all of Licensee's interests, rights, duties and obligations under the Agreement and agree to comply with all terms and conditions of the Agreement as if assignee were an original Party to the Agreement.

16. Governmental Markings

16.1 Patent Markings

Licensee agrees that all Licensed Products Sold by Licensee, Affiliates, or Sublicensees will be legibly marked with the number of any applicable patent(s) licensed hereunder as part of the Patent Rights in accordance with each country's patent marking laws, including Title 35, U.S. Code, or if such marking is not practicable, shall so mark the accompanying outer box or product insert for Licensed Products accordingly.

16.2 Governmental Approvals and Marketing of Licensed Products and or Licensed Services

Licensee will be responsible for obtaining all necessary governmental approvals for the development, production, distribution, Sale, and use of any Licensed Product or performance of any Licensed Service, at Licensee's expense, including, without limitation, any safety studies. Licensee will have sole responsibility for any warning labels, packaging and instructions as to the use and the quality control for any Licensed Product or Licensed Service.

16.3 Foreign Registration and Laws

Licensee agrees to register the Agreement with any foreign governmental agency that requires such registration; and Licensee will pay all costs and legal fees in connection with such registration. Licensee is responsible for compliance with all foreign laws affecting the Agreement or the Sale of Licensed Products and Licensed Services to the extent there is no conflict with United States law, in which case United States law will control.

17. Use of Name

Licensee will not use the name, trademarks or other marks of Licensor (or the name of the university system it governs, its member institutions, any of its Regents or employees) without the advance written consent of Licensor. Licensor may use Licensee's name and logo for annual reports, brochures, website, and internal reports without prior consent.

18. Notices

Any notice or other communication of the Parties required or permitted to be given or made under the Agreement will be in writing and will be deemed effective when sent in a manner that provides confirmation or acknowledgement of delivery and received at the address set forth in Section 18 of the Patent License Agreement (or as changed by written notice pursuant to this Section 18). Notices required under the Agreement may be delivered via E-mail provided such notice is confirmed in writing as indicated.

Notices shall be provided to each Party as specified in the "Contact for Notice" address set forth in Section 18 of the Patent License Agreement. Each Party shall update the other Party in writing with any changes in such contact information.

19. General Provisions

19.1 Binding Effect

The Agreement is binding upon and inures to the benefit of the Parties hereto, their respective executors, administrators, heirs, permitted assigns, and permitted successors in interest.

19.2 Construction of Agreement

Headings are included for convenience only and will not be used to construe the Agreement. The Parties acknowledge and agree that both Parties substantially participated in negotiating the provisions of the Agreement; therefore, both Parties agree that any ambiguity in the Agreement shall not be construed more favorably toward one Party than the other Party, regardless of which Party primarily drafted the Agreement.

19.3 Counterparts and Signatures

The Agreement may be executed in multiple counterparts, each of which shall be deemed an original, but all of which taken together shall constitute one and the same instrument. A Party may evidence its execution and delivery of the Agreement by transmission of a signed copy of the Agreement via facsimile or email.

19.4 Compliance with Laws

Licensee will comply with all applicable federal, state and local laws and regulations, including, without limitation, all export laws and regulations.

19.5 Governing Law

The Agreement will be construed and enforced in accordance with laws of the U.S. and the State of Texas, without regard to choice of law and conflicts of law principles.

19.6 Modification

Any modification of the Agreement will be effective only if it is in writing and signed by duly authorized representatives of both Parties. No modification will be made by email communications.

19.7 Severability

If any provision hereof is held to be invalid, illegal or unenforceable in any jurisdiction, the Parties hereto shall negotiate in good faith a valid, legal and enforceable substitute provision that most nearly reflects the original intent of the Parties, and all other provisions hereof shall remain in full force and effect in such jurisdiction and shall be construed in order to carry out the intentions of the Parties hereto as nearly as may be possible. Such invalidity, illegality or unenforceability shall not affect the validity, legality or enforceability of such other provisions in any other jurisdiction, so long as the essential essence of the Agreement remains enforceable.

19.8 Third Party Beneficiaries

Nothing in the Agreement, express or implied, is intended to confer any benefits, rights or remedies on any entity, other than the Parties and their permitted successors and assigns. However, if there is a joint owner of any Patent Rights identified in Section 1 of the Patent License Agreement (other than Licensee), then Licensee hereby agrees that the following provisions of these Terms and Conditions extend to the benefit of the co-owner identified therein

(excluding the Licensee to the extent it is a co-owner) as if such co-owner was identified in each reference to the Licensor: the retained rights under clause (b) of Section 2.1; Section 11.3 (Licensor Disclaimers); Section 12 (Limitation of Liability); Section 13 (Indemnification); Section 14.1 (Insurance Requirements); Section 17 (Use of Name); and Section 19.10 (Sovereign Immunity, if applicable).

19.9 Waiver

Neither Party will be deemed to have waived any of its rights under the Agreement unless the waiver is in writing and signed by such Party. No delay or omission of a Party in exercising or enforcing a right or remedy under the Agreement shall operate as a waiver thereof.

19.10 Sovereign Immunity

Nothing in the Agreement shall be deemed or treated as any waiver of Licensor's sovereign immunity.

19.11 Entire Agreement

The Agreement constitutes the entire Agreement between the Parties regarding the subject matter hereof, and supersedes all prior written or verbal agreements, representations and understandings relative to such matters.

19.12 Claims Against Licensor for Breach of Agreement

Licensee acknowledges that any claim for breach of the Agreement asserted by Licensee against Licensor shall be subject to Chapter 2260 of the Texas Government Code and that the process provided therein shall be Licensee's sole and exclusive process for seeking a remedy for any and all alleged breaches of the Agreement by Licensor or the State of Texas.

19.13 Grant of Security Interest

Licensee hereby grants to Licensor a security interest in and to Licensee's rights under the Patent License Agreement, as collateral security for the payment by Licensee of any and all sums which may be owed from time to time by Licensee to Licensor. Licensor shall have all rights of a secured party as specified in the Texas Uniform Commercial Code relative to this security interest and the enforcement thereof. Licensee hereby authorizes Licensor to file with the appropriate governmental agencies appropriate UCC-1 financing statements to evidence this security interest.

— END OF EXHIBIT A —

Exhibit 10.2

SPONSORED RESEARCH AGREEMENT NO. UTA12-000950

This Sponsored Research Agreement ("Agreement") is made between The University of Texas at Austin, Austin, Texas ("University"), an institution of higher education created by the Constitution and law of the State of Texas under The University of Texas System ("System") and Synthetic Biologics, Inc. a Nevada corporation with its principal place of business at 617 Detroit Street, Suite 100, Ann Arbor, MI 48104 ("Sponsor").

RECITALS

A. Sponsor desires that University perform certain research work hereinafter described and is willing to advance funds to sponsor such research;

B. Sponsor desires to obtain certain rights to patents and technology developed during the course of such research with a view to profitable commercialization of such patents and technology for the Sponsor's benefit; and

C. University is willing to perform such research and to grant rights to such patents and technology;

NOW THEREFORE, in consideration of the mutual covenants and promises herein contained, the University and Sponsor agree as follows:

1. EFFECTIVE DATE

This Agreement shall be effective as of December 1, 2012 (the "Effective Date").

2. RESEARCH PROGRAM

2.1 University will use reasonable efforts to conduct the Research Program and Proposed Allocation of Research Responsibilities described in Attachment A ("Research Program"), and will furnish the facilities necessary to carry out said Research Program. The University's proposed responsibilities under the Research Program will be under the direction of Dr. Jennifer Maynard ("Principal Investigator"), or (his or her) successor as mutually agreed to by the parties and will be conducted by the Principal Investigator at the University.

2.2 The Research Program shall be performed during the period from the Effective Date through and including December 31, 2015 (the "Termination Date"). Sponsor shall have the option of extending the Research Program under mutually agreeable support terms.

2.3 Sponsor understands that University's primary mission is education and advancement of knowledge, and consequently the Research Program will be designed to carry out that mission. As of the execution of this agreement, the research program objectives and the proposed allocation of research responsibilities are outlined in Attachment A. It is understood that the program directions may change from time to time, and that the outlines in Attachment A serve only as guidelines that may be changed by mutual agreement of the Parties. University does not guarantee specific results, and the Research Program will be conducted only on a reasonable efforts basis.

2.4 University will keep accurate scientific records relating to the Research Program and will make such records available to Sponsor or its authorized representative throughout the Term of the Agreement during normal business hours upon reasonable notice.

2.5 Sponsor understands that University may be involved in similar research on behalf of itself and others. University shall be free to continue such research provided that it is conducted separately from the Research Program hereinafter defined, and Sponsor shall not gain any rights via this Agreement to such other research.

2.6 University does not guarantee that any patent rights will result from the Research Program, that the scope of any patent rights obtained will cover Sponsor's commercial interests, or that any such patent rights will be free of dominance by other patents, including those based upon inventions made by other inventors in The University of Texas System independent of the Research Program.

3. FIXED PRICE

3.1 For the performance by University of its obligations under this Agreement, Sponsor will pay the University the fixed fees set forth below during the term of the Agreement to conduct the Research Program. Sponsor authorizes a total fixed price of $303,287 for Year 1. Beginning with Year 2, each year of the Research Program, with the values stipulated below, shall be subsequently authorized by Sponsor, in its sole discretion, via a separate written amendment to this Agreement. Notwithstanding anything to the contrary herein, University's efforts shall only be provided within the level of payments made under this Agreement and University shall have no obligation to continue performance of the Research Program beyond the payments actually received. Payments shall be made as follows, subject to the terms of Section 10.5 of this Agreement:

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a) Year 1: $303,287 in equal quarterly installments, the first installment within 30 days following Sponsor's execution of the Agreement and each subsequent quarterly installment on or prior to April 1, 2013, July 1, 2013, October 1, 2013;

b) Year 2: $316,438 in equal quarterly installments , the first installment on January 2, , 2014 and each subsequent quarterly installment on or prior to April 1, 2014, July 1, 2014 and October 1, 2014;

c) Year 3: $328,758 in equal quarterly installments , the first installment on January 2, 2015 and each subsequent quarterly installment on or prior April 1, 2015, July 1, 2015 and October 1, 2015.

Payments should be made within 30 days of the receipt of an invoice and payable to The University of Texas at Austin, **make reference to the Principal Investigator, Agreement number and title of the Research Program funded under this Agreement**, and submitted to the address in Article 3.4.

3.2 University shall maintain all Research Program funds in a separate account and shall expend such funds for wages, supplies, equipment, travel, and other operational expenses in connection with the Research Program.

3.3 University shall retain title to all equipment purchased and/or fabricated by it with funds provided by Sponsor under this Agreement.

3.4

Checks shall be made payable to University and sent to:	Invoices shall be sent to Sponsor at:
The University of Texas at Austin	
Office of Accounting – SPAA	Synthetic Biologics, Inc.
P.O. Box 7159	617 Detroit Street, Suite 100
Austin, Texas 78713-7159	Ann Arbor, Michigna 48104nd
(512) 471-6231	Attn: C. Evan Ballantyne, CFO
Tax ID #: 746000203	Phone: 734-332-7800Fax: 734-332-7878

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4. CONSULTATION AND REPORTS

4.1 Sponsor's designated representative ("Designated Representative") for consultation and communications with the Principal Investigator shall be Michael Kaleko, M.D., Ph.D. or such other person as Sponsor may from time to time designate in writing to University and the Principal Investigator.

4.2 During the term of the Agreement, Sponsor's representatives may consult informally with University's representatives regarding the project, both personally and by telephone. Access to work carried on in University laboratories in the course of these investigations shall be entirely under the control of University personnel but shall be made available on a reasonable basis.

4.3 The Principal Investigator will make up to 2 in person oral report(s) semi-annually each year as requested by Sponsor's Designated Representative. Semi-annually, the Principal Investigator and Sponsor's Designated Representative shall review and suggest reasonable changes to the research plan based upon the outcome of research results and anticipated priorities for the ongoing research objectives. The Principal Investigator shall also submit a comprehensive final report within ninety (90) days of the end of each anniversary and termination of the Agreement which shall consist of a report of all activities undertaken and accomplishments achieved through the Research Program, in a 4-page format that contains a summary and discussion of each objective, progress, challenges and plans.

5. PUBLICITY

Neither party shall make reference to the other in a press release or any other written statement in connection with work performed under this Agreement, if it is intended for use in the public media without the other party's prior consent, except as required by the Texas Public Information Act or other law or regulation including S.E.C. regulations, NYSE MKT rules and regulations or as otherwise mutually agreed to in advance in writing by University and Sponsor. University, however, shall have the right to acknowledge Sponsor's support of the investigations under this Agreement in scientific or academic publications and other scientific or academic communications, without Sponsor's prior approval. In any statements, the scope and nature of participation shall be described accurately and appropriately.

6. PUBLICATION AND ACADEMIC RIGHTS

6.1 University and the Principal Investigator have the right to publicly present, publish or otherwise publicly disclose information gained in the course of this Agreement, except for Sponsor's confidential information ("Confidential Information") as may be furnished to University pursuant to Article 12 of this Agreement. In order to avoid loss of patent rights as a result of premature public disclosure of patentable information, University will submit any prepublication materials, whether written or oral, to Sponsor for review and comment thirty (30) days in advance of its planned submission for publication. If the University or Principal Investigator wishes to make an oral presentation, it will provide the Sponsor with a summary of such presentation at least thirty (30) calendar days before such oral presentation. Sponsor shall notify University within ten (10) days of receipt of such materials whether it, in good faith, determines that patentable subject matter or Confidential Information may be disclosed. If it is determined by the Sponsor that patent applications should be filed in advance of the proposed publication, the publishing party shall delay its publication or presentation for a period not to exceed sixty (60) calendar days from the Sponsor's receipt of the proposed publication or presentation to allow time for the filing of patent applications covering patentable subject matter. The University shall proceed to file such patent applications in a timely manner that shall be prior to the expiration of the sixty (60) day period. In the event that the delay needed to complete the filing of any necessary patent application will exceed the sixty (60) day period, the Sponsor will discuss the need for obtaining an extension of the publication delay beyond the sixty (60) day period. If it is determined in good faith by a party that Confidential Information or proprietary information of such party is being disclosed, the parties shall consult in good faith to arrive at an agreement on mutually acceptable modifications to the proposed publication or presentation to avoid such disclosure. University shall have final authority to determine the scope and content of any publications, subject to the preceding review process.

6.2 It is understood that the University investigators may discuss the research being performed under this Agreement with other investigators but shall not reveal information which is Sponsor's Confidential Information, as may be furnished to University pursuant to Article 12 of this Agreement. In the event any joint inventions result, University shall grant to Sponsor the rights outlined in Article 7 to this Agreement, to the extent these are not in conflict with obligations to another party as a result of the involvement of the other investigator(s). In this latter case, University shall, in good faith, exercise reasonable efforts to enable Sponsor to obtain rights to the joint invention.

7. PATENTS, COPYRIGHTS AND TECHNOLOGY RIGHTS

7.1 **New Inventions under Agreement Within the Field of Patent & Technology License Agreement**. All inventions conceived and reduced to practice in the performance of the Research Program in the Field as defined by Section 20.1(b) of the PLA (as hereinafter defined) shall be subject to that certain Patent & Technology License Agreement No. PM1300101 ("PLA"), between the Board of Regents of The University of Texas System and Sponsor.

7.2 **New Inventions under Agreement Outside the Field of Patent & Technology License Agreement**. Title to all inventions conceived and reduced to practice solely by University in the performance of the research performed hereunder shall reside in University, title to all inventions conceived and reduced to practice solely by Sponsor shall reside in Sponsor, and title to all inventions conceived and reduced to practice jointly by Sponsor and University shall reside jointly in Sponsor and University. University agrees to grant to Sponsor an option to negotiate, a royalty-bearing license, to make, use, or sell under any invention made and conceived during the term of this Agreement directly resulting from the performance of research hereunder that is outside the Field as defined by Section 20.1(b) of the PLA to the extent that University is legally able to do so. University reserves for itself a royalty-free, irrevocable license to make and use such University inventions for its own research and educational purposes. If such invention is made resulting from the research, the Principal Investigator shall submit an invention disclosure (http://www.otc.utexas.edu/InventorForms.jsp) to University's Office of Technology Commercialization ("OTC"). The OTC will then forward the invention disclosure to Sponsor. Sponsor shall then have thirty (30) days from receipt of such disclosure of any invention to notify University of its desire to enter into such a license agreement, and a license agreement shall be negotiated in good faith within a period not to exceed sixty (60) days from Sponsor's notification to University of its desire to enter into a license agreement, or such period of time as the parties shall mutually agree. In the event that Sponsor and University fail to enter into an agreement during that period of time, then the rights to such inventions shall be disposed of in accordance with University policies, with no obligation to Sponsor. Sponsor agrees to pay a reasonable royalty for the use of the invention to be negotiated in good faith. Until any such invention has been presented as set forth above, University shall not offer rights to that invention to any third party.

In the event Sponsor elects to exercise its option as to any invention, in accordance with the procedures detailed above, it shall be obligated to pay all patent expenses for such invention. This shall include, but not be limited to, the cost of any prior activities investigating patentability of said invention before exercise of the option, such as search and opinion for patentability, that may have been performed by University pursuant to its arrival at a judgment of commercially exploitable status. It is contemplated that, in the majority of instances, Sponsor will be asked to determine whether it will exercise its option prior to the filing of the first patent application.

8. LIABILITY

8.1 Sponsor agrees to indemnify and hold harmless System, University, their Regents, officers, agents and employees from any liability, loss or damage they may suffer as a result of claims, demands, costs or judgments against them arising out of the activities to be carried out pursuant to the obligations of this Agreement, including but not limited to the use by Sponsor of the results obtained from the activities performed by University under this Agreement; provided, however, that the following is excluded from Sponsor's obligation to indemnify and hold harmless:

(a) the negligent failure of University to substantially comply with any applicable FDA or other governmental requirements; or

(b) the negligence or willful malfeasance of any Regent, officer, agent or employee of University or System.

8.2 Both parties agree that upon receipt of a notice of claim or action arising out of the activities to be carried out pursuant to the project described in Attachment A, the party receiving such notice will notify the other party promptly. Sponsor agrees, at its own expense, to provide attorneys to defend against any actions brought or filed against University, System, their Regents, officers, agents and/or employees with respect to the subject of the indemnity contained herein, whether such claims or actions are rightfully brought or filed; and subject to the statutory duty of the Texas Attorney General, University agrees to cooperate with Sponsor in the defense of such claim or action.

9. INDEPENDENT CONTRACTOR

For the purposes of this Agreement and all services to be provided hereunder, the parties shall be, and shall be deemed to be, independent contractors and not agents or employees of the other party. Neither party shall have authority to make any statements, representations or commitments of any kind, or to take any action which shall be binding on the other party, except as may be expressly provided for herein or authorized in writing.

10. TERM AND TERMINATION

10.1 This Agreement shall commence on the Effective Date and extend until the end of the Research Program as described hereinabove, unless sooner terminated in accordance with the provisions of this Article 10.

10.2 This Agreement may be terminated by the written agreement of both parties.

10.3 In the event that either party shall be in default of its material obligations under this Agreement and shall fail to remedy such default within sixty (60) days after receipt of written notice thereof, this Agreement may be terminated at the option of the party not in default upon expiration of the sixty (60) day period.

10.4 This Agreement shall terminate automatically and immediately if Sponsor becomes bankrupt or insolvent and/or enters receivership or trusteeship, whether by voluntary act of Sponsor or otherwise.

10.5 The Sponsor shall have the right, in its sole discretion, to terminate this Agreement, effective any time from and after the one year anniversary date of the execution of this Agreement, upon no less than ninety days prior written notice which notice may be given at any time commencing ninety days prior to such one year anniversary.

10.5 Termination or cancellation of this Agreement shall not affect the rights and obligations of the parties accrued prior to termination. Upon termination by Sponsor at any time prior to December 31, 2014, other than a termination by Sponsor under Section 10.3 due to a breach by the University , the total amount to be paid by Sponsor to University under this Agreement including amounts payable under Section 3.1 of this Agreement shall be limited to the payment by Sponsor of all reasonable expenses incurred by University prior to such termination date and all non-cancellable expenses committed to be expended by University prior to the effective termination date, including salaries for appointees for the lesser of (a) the remainder of their appointment in the case of salaries or (b) December 31, 2014 ; provided, however that in no event shall Sponsor be responsible in any year for the payment of any amount in excess of the amounts set forth in clauses (a) and (b) in Section 3.1 . University shall use its best effort to mitigate any expenses to be incurred by Sponsor upon a termination. Upon termination by Sponsor effective at any time after December 31, 2014 or termination by Sponsor under Section 10.3 due to a breach by the University, the total amount to be paid by Sponsor to University under this Agreement including amounts payable under Section 3.1 of this Agreement shall be limited to the payment by Sponsor of all reasonable expenses incurred by University prior to the effective date of such termination for services performed by the University prior to the effective date provided that such amount does not exceed the amount set forth in clause (c) of Section 3.1 and Sponsor shall have no obligation for payment of any expenses incurred by University after the effective date of such termination or incurred by University or committed by University to be expended prior to the effective date of such termination for services to be performed after the effective date of such termination.

10.6 Any provisions of this Agreement which by their nature extend beyond termination shall survive such termination.

11. ATTACHMENT A

Attachment A is incorporated and made a part of this Agreement for all purposes.

12. CONFIDENTIALITY

12.1 The Parties may wish, from time to time, in connection with work contemplated under this Agreement, to disclose Confidential Information to each other. Each party will use reasonable efforts to prevent the disclosure of any of the other party's Confidential Information to third parties for a period of five (5) years from the Effective Date of this Agreement, provided that the recipient party's obligation hereunder shall not apply to Information that:

(1) is not disclosed in writing and marked with an appropriate confidentiality legend or, if disclosed orally or visually, is not identified as confidential at the time of oral or visual disclosure and subsequently reduced to writing and labeled with an appropriate confidentiality legend, with a copy provided to the recipient party, within thirty (30) days of disclosure;

(2) is already in the recipient party's possession at the time of disclosure thereof;

(3) is or later becomes part of the public domain through no fault of the recipient party;

(4) is received from a third party having no obligations of confidentiality to the disclosing party;

(5) is independently developed by the recipient party; or

(6) is required by law or regulation to be disclosed.

12.2 In the event that information is required to be disclosed pursuant to subsection (6), the party required to make disclosure shall notify the other to allow that party to assert whatever exclusions or exemptions may be available to it under such law or regulation.

13. GENERAL

13.1 This Agreement may not be assigned by either party without the prior written consent of the other party; provided, however, that subject to the approval of University, which may not be unreasonably withheld, Sponsor may assign this Agreement to any purchaser or transferee of all or substantially all of Sponsor's assets or stock upon prior written notice to University; provided, however, that such assignee shall have expressly assumed all of the obligations and liabilities of Sponsor under this Agreement, and provided, further that, University may assign its right to receive payments hereunder.

13.2 This Agreement constitutes the entire and only agreement between the parties relating to the Research Program, and all prior negotiations, representations, agreements and understandings are superseded hereby. No agreements altering or supplementing the terms hereof may be made except by means of a written document signed by the duly authorized representatives of the parties. Terms and conditions which may be set forth (front, reverse, attached or incorporated) in any purchase order issued by Sponsor in connection with this Agreement shall not apply, except for informational billing purposes; i.e., reference to purchase order number, address for submission of invoices, or other invoicing items of a similar informational nature.

13.3 Any notice required by this Agreement by Articles 7, 8 or 10 shall be given prepaid, first class, certified mail, return receipt requested, addressed in the case of University to:

The University of Texas System, O.G.C.

201 West 7th Street

Austin, Texas 78701

Attention: Intellectual Property Section

Phone: (512) 499-4462

FAX: (512) 499-4523

Vice President for Research

The University of Texas at Austin

P.O. Box 7996, Mail Code G1400

Austin, Texas 78713

Attention: Technology Licensing Specialist

Phone: (512) 471-2995

FAX: (512) 475-6894

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or in the case of the Sponsor to:

Synthetic Biologics, Inc.

617 Detroit Street, Suite 100

Ann Arbor, MI 48104

Attn: C. Evan Ballantyne , CFO

Phone: 734-332-7800

FAX: 734-332-7878

E-Mail: eballantyne@syntheticbiologics.com

or at such other addresses as may be given from time to time in accordance with the terms of this notice provision.

Notices and other communications regarding the day-to-day administration and operations of this Agreement shall be mailed (or otherwise delivered), addressed in the case of University to:

The University of Texas at Austin

Office of Industry Engagement

North Office Building-A, Suite 5.2

Post Office Box 7727, MC A9300

Austin, Texas 78713-7727

Attention: Bill Catlett, Director

Phone: (512) 471-3866

FAX: (512) 471-7839

E-mail: industry@austin.utexas.edu

with a copy to:

Dr. Jennifer Maynard

The University of Texas at Austin

Department of Chemical Engineering

1 University Station, C0400

Austin, Texas 78712

Phone: 512.471.9188

E-Mail: maynard@che.utexas.edu

or in the case of Sponsor to:

Synthetic Biologics, Inc.

155 Gibbs Street, Suite 421Rockville, Maryland 20850

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Attn: Michael Kaleko, M.D., Ph.D.

Phone: 301-658-6850

FAX: 301-658-6865

E-Mail: mkaleko@syntheticbiologics.com

13.4 This Agreement shall be governed by, construed, and enforced in accordance with the internal laws of the State of Texas.

13.5 Sponsor acknowledges that this Agreement and the performance thereof are subject to compliance with any and all applicable United States laws, regulations, or orders, including those that may relate to the export of technical data, and Sponsor agrees to comply with all such laws, regulations and orders, including, if applicable, all requirements of the International Traffic in Arms Regulations and/or the Export Administration Act, as may be amended. Sponsor further agrees that if the export laws are applicable, it will not disclose or re-export any technical data received under this Agreement to any countries for which the United States government requires an export license or other supporting documentation at the time of export or transfer, unless Sponsor has obtained prior written authorization from the U.S. Office of Export Control or other authority responsible for such matters.

13.6 If any provision contained in this Agreement is held invalid, unenforceable or contrary to laws then the validity of the remaining provisions of this Agreement shall remain in full force. In such instance, Parties shall use their best efforts to replace the invalid provision(s) with legally valid provisions having an economic effect as close as possible to the original intent of Parties.

IN WITNESS WHEREOF, the parties have caused this Agreement No. UTA12-000950 to be executed by their duly authorized representatives.

THE UNIVERSITY OF TEXAS AT AUSTIN	SPONSOR
By: /s/ Bill Catlett Bill Catlett	By: /s/ Jeffrey Riley Jeffrey Riley
Title: Director-Office of Industry Engagement	Title: Chief Executive Officer
Date: 12.19.2012	Date: 12/19/12

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ATTACHMENT A – RESEARCH PROGRAM AND

PROPOSED ALLOCATION OF RESEARCH RESPONSIBILITIES

To be determined and separately provided by the University at a later date.

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Exhibit 99.1

Synthetic Biologics and Intrexon Corporation Initiate Development of

Monoclonal Antibodies for Whooping Cough (Pertussis)

-- The University of Texas at Austin to Join in Pertussis Research Efforts --

For Immediate Release

Rockville, MD, and San Francisco, CA, December 20, 2012 – Synthetic Biologics, Inc. (NYSE MKT: SYN), a developer of synthetic biologics and innovative medicines for serious infections and diseases, and Intrexon Corporation, a leading synthetic biology company that utilizes its proprietary technologies to provide control over cellular function, announced today that they have initiated development of a monoclonal antibody (mAb) therapy for the treatment of pertussis, more commonly known as whooping cough. Each year, *Bordetella pertussis (B. pertussis)* infection causes an estimated 294,000 deaths worldwide, primarily among young, unvaccinated children.[1] Recent reports indicate that the pertussis vaccine introduced in the 1990s does not provide long-term protection and, as a result, whooping cough cases are increasing to a 60-year high in the U.S.[2],[3] To aid in the management of the rising number of pertussis cases, Synthetic Biologics intends to develop a mAb therapy, SYN-005, designed to neutralize the pertussis toxin, thereby reducing the mortality rate in infants and potentially shortening the chronic cough in adults.

The initiation of mAb development for the treatment of pertussis is the second of three infectious disease indications Synthetic Biologics intends to pursue as part of its August 2012 collaboration with Intrexon. To further the development of this potential therapy for pertussis, Synthetic Biologics has entered into an agreement with The University of Texas at Austin to license the rights to certain research and pending patents related to pertussis antibodies. These research efforts are being conducted at the Cockrell School of Engineering in the laboratory of Assistant Professor, Jennifer A. Maynard, Ph.D., the Laurence E. McMakin, Jr. Centennial Faculty Fellow in the McKetta Department of Chemical Engineering. Dr. Maynard brings to the project her expertise in defining the key neutralizing epitopes of pertussis toxin to optimize the potential efficacy of antibody therapeutics.

Dr. Maynard stated, “I am very excited to be working with Synthetic Biologics on the development of this important new treatment for whooping cough, with the potential to protect infants from this devastating disease, and to treat adults who suffer from the disease later in life.”

B. pertussis is a gram-negative bacterium that infects the respiratory tract of humans, causing uncontrollable, violent coughing. Antibiotic treatment does not have a major effect on the course of pertussis, because while it can eliminate the *B. pertussis* bacteria from the respiratory tract, it does not neutralize the pertussis toxin. Infants with pertussis often require hospitalization in pediatric intensive care units, frequently necessitating mechanical ventilation. Pertussis in adults generally leads to a chronic cough referred to as the "cough of 100 days." The increased incidence of pertussis is associated with exposure of unvaccinated and under-vaccinated individuals, especially infants who are not yet fully vaccinated and individuals whose immunity has diminished over time, as well as individuals who are carriers with bacteria present in their lungs but may or may not have the active disease. Unlike antibiotics, SYN-005 will be designed to neutralize the pertussis toxin and reverse the course of the disease.

"We are pleased to begin work on a mAb therapy to treat pertussis with our infectious disease collaborator, Intrexon, as well as with the experts at The University of Texas at Austin. Dr. Maynard has been researching and developing specific pertussis toxin targets for more than five years and her experience should accelerate our development timelines," said Jeffrey Riley, Chief Executive Officer of Synthetic Biologics, Inc. "A steady increase in outbreaks of pertussis has become a serious threat to some of the most vulnerable members of our society, especially infants, and to individuals who are unvaccinated or whose vaccine failed to provide lasting immunity. Across the nation this year, doctors have reported twice as many cases of pertussis as there were in 2011. The risk to individuals and to public health caused by outbreaks of pertussis support the pursuit of a new therapeutic option such as our mAb therapy."

Collaboration with Intrexon

In August 2012, Synthetic Biologics entered into a worldwide exclusive channel collaboration with Intrexon for the development and commercialization of mAb therapies to treat certain infectious diseases. Under this collaboration, the Company intends to utilize Intrexon's comprehensive suite of proprietary technologies, including the mAbLogix™ and LEAP™ platforms, to develop mAbs to specifically and rapidly neutralize/clear pathogens that cause infectious diseases. While the Synthetic Biologics has initiated mAb development for two of three initial targets, *Acinetobacter* infection and pertussis, the collaboration may optionally be expanded to include up to a total of eight infectious disease indications.

About Monoclonal Antibodies (mAbs)

Acting as the body's army, antibodies are proteins, generally found in the bloodstream, that provide immunity in detecting and destroying pathogens, such as viruses, bacteria and toxins. MAbs can be designed and produced as therapeutic agents, utilizing protein engineering and recombinant production technologies. The mAbs being developed under the Synthetic Biologics' collaboration with Intrexon are intended to supplement a patient's own immune system by providing the means to specifically and rapidly neutralize and/or clear specific pathogens and toxins of interest in a process known as "passive immunity." Many pathogens that cause infectious diseases are innately resistant to, or over time have developed increased resistance to, antibiotics and other drugs. Synthetic Biologics intends to utilize Intrexon's comprehensive suite of proprietary mAb design and recombinant protein production technologies to efficiently create a potent candidate mAb (SYN-005) for human testing and use to specifically treat pertussis.

About Intrexon Corporation

Intrexon Corporation is a privately held biotechnology company focused on the industrial engineering of synthetic biology. Intrexon is deploying its extensive capabilities to rapidly design and produce novel and enhanced biological products and processes across multiple industry sectors, including: human therapeutics, protein production, industrial products, agricultural biotechnology, and animal science. The Company's advanced bioindustrial engineering platform enables Better DNA™ technology by combining revolutionary DNA control systems with corresponding advancements in modular transgene design, assembly, and optimization to enable unprecedented control over the function and output of living cells. More information about the Company is available at www.dna.com.

About Synthetic Biologics, Inc.

Synthetic Biologics is a biotechnology company focused on the development of product candidates for serious infections and diseases. Synthetic Biologics is developing a biologic for the prevention of *C. diff* infection, and a series of monoclonal antibodies (mAbs) for the treatment of serious infectious diseases, including *Acinetobacter* and pertussis. The Company is also developing a synthetic DNA-based therapy for the treatment of pulmonary arterial hypertension (PAH) in collaboration with Intrexon. In addition, the Company is developing a drug candidate for the treatment of relapsing-remitting multiple sclerosis (MS) and cognitive dysfunction in MS, and designing a clinical development pathway for the treatment of amyotrophic lateral sclerosis (ALS). For more information, please visit Synthetic Biologics' website at www.syntheticbiologics.com.

mAbLogix™ and LEAP™ 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 Synthetic Biologics' intent to develop and commercialize multiclonal antibody therapies for the treatment of infectious diseases such as pertussis, the timeline for such development, its use of Intrexon's technologies and the intended results of such use, the opportunity presented by the number of affected patients, the anticipated results to be derived from the mAb research conducted at The University of Texas at Austin and the potential expansion of the Intrexon collaboration. 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 of Synthetic Biologics' monoclonal antibodies for the treatment of infectious diseases to be successfully developed or commercialized, a failure of the Intrexon's intellectual property to create potent candidate mAbs, an inability to obtain regulatory approval of the infectious disease product candidates, a failure of the results of clinical trials to support the efficacy or safety of product candidates, a failure of the preclinical or clinical trials to proceed on schedules that are consistent with Synthetic Biologics' current expectations or at all, Synthetic Biologics' inability to protect its intellectual property and freedom to operate without interference of the patents of others, inability to maintain the effectiveness of the exclusive collaboration agreement, its reliance on third parties to develop its product candidates, the insufficiency of existing capital reserves to fund continued operations for a particular amount of time and uncertainties regarding Synthetic Biologics' ability to obtain additional financing to support its operations thereafter 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.

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[1] World Health Organization. Pertussis: immunization surveillance, assessment and monitoring. http://www.who.int/immunization_monitoring/diseases/pertussis/en/index.html.

[2] Misegades LK, Winter K, Harriman K, Talarico J, Messonnier NE, Clark TA, Martin SW, Association of childhood pertussis with receipt of 5 doses of pertussis vaccine by time since last vaccine dose, California, 2010. JAMA, 2012 Nov 28;308(20):2126-32.

[3] Centers for Disease Control and Prevention. Pertussis Epidemic – Washington, 2012. Morbidity and Mortality Weekly Report. July 20, 2012.