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): August 20, 2019

SYNLOGIC, INC.

(Exact name of registrant as specified in its charter)

Delaware (State or other jurisdiction of incorporation) 001-37566 (Commission File Number) 26-1824804 (IRS Employer Identification No.)

301 Binney St., Suite 402 Cambridge, MA (Address of principal executive offices)

02142 (Zip Code)

Registrant's telephone number, including area code: (617) 401-9975

Not applicable

(Former Name or Former Address, if Changed Since Last Report)

Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligation of the registrant under any of the following provisions (see General Instruction A.2. below):

| □ ' | Written communication | ns pursuant t | o Rule 425 | under the | Securities A | Act (17 | CFR 230.425) |
|-----|-----------------------|---------------|------------|-----------|--------------|---------|--------------|
|-----|-----------------------|---------------|------------|-----------|--------------|---------|--------------|

- ☐ Soliciting material pursuant to Rule 14a-12 under the Exchange Act (17 CFR 240.14a-12)
- ☐ Pre-commencement communications pursuant to Rule 14d-2(b) under the Exchange Act (17 CFR 240.14d-2(b))
- ☐ Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c))

Securities registered pursuant to Section 12(b) of the Act:

| Title of each class | Trading Symbol(s) | Name of each exchange on which registered |
|---------------------|-------------------|---|
| Common Stock | SYBX | The Nasdaq Capital Market |

Indicate by check mark whether the registrant is an emerging growth company as defined in Rule 405 of the Securities Act of 1933 (17 CFR §230.405) or Rule 12b-2 of the Securities Exchange Act of 1934 (17 CFR §240.12b-2).

Emerging Growth Company ⊠

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

Item 7.01. Regulation FD Disclosure.

On August 20, 2019, Synlogic, Inc. (the "Company") updated its investor presentation (the "Investor Presentation"), which the Company expects to use in connection with general corporate presentations and will be made available on the Company's website or distributed by the Company in hardcopy or electronic form.

A copy of the Company's updated Investor Presentation is attached as Exhibit 99.1 to this Current Report on Form 8-K. The Investor Presentation is current as of August 20, 2019, and the Company disclaims any obligation to update the Investor Presentation after such date.

In accordance with General Instruction B.2 on Form 8-K, the information set forth in this Item 7.01 and the Investor Presentation attached to this report as Exhibit 99.1 is "furnished" and shall not be deemed to be "filed" for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, or otherwise subject to the liabilities of that Section, nor shall such information be deemed incorporated by reference in any filing under the Securities Exchange Act of 1934, as amended, or the Securities Act of 1933, as amended.

Item 8.01. Other Events.

On August 20, 2019, Synlogic issued a press release announcing the discontinuation of its SYNB2010 program being evaluated in patients with cirrhosis and elevated blood ammonia for the treatment of hyperammonemia.

The full text of Synlogic's press release regarding the announcement is filed as Exhibit 99.2 to this Current Report on Form 8-K and is incorporated herein by reference.

Financial Statements and Exhibits.

(d) Exhibits

<u>Investor Presentation of Synlogic, Inc. dated August 20, 2019</u> <u>Press release dated August 20, 2019</u>

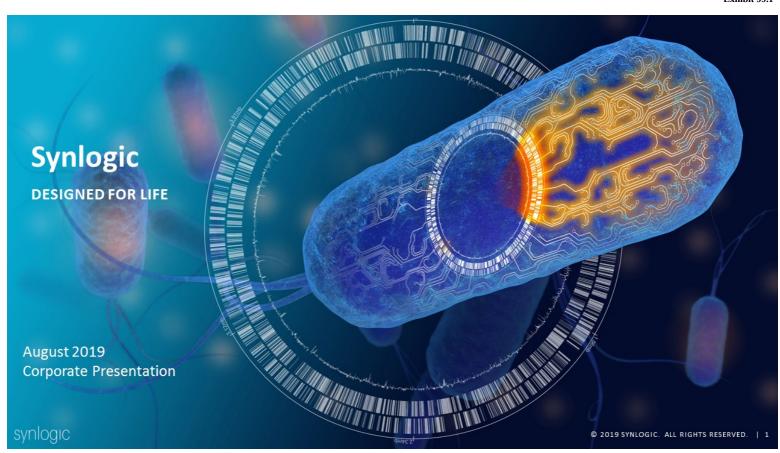
SIGNATURES

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.

SYNLOGIC, INC.

Date: August 20, 2019 By: /s/ Todd Sheg

By: /s/ Todd Shegog
Name: Todd Shegog
Title: Chief Financial Officer



Forward Looking Statements

This presentation contains "forward-looking statements" that involve substantial risks and uncertainties for purposes of the safe harbor provided by the Private Securities Litigation Reform Act of 1995. All statements, other than statements of historical facts, included in this presentation regarding strategy, future operations, future financial position, future revenue, projected expenses, prospects, plans and objectives of management are forward-looking statements. In addition, when or if used in this presentation, the words "may," "could," "should," "anticipate," "believe," "estimate," "expect," "intend," "plan," "predict" and similar expressions and their variants may identify forward-looking statements. Examples of forward-looking statements include, but are not limited to, the approach we are taking to discover and develop novel therapeutics using synthetic biology; statements regarding the potential of our platform to develop therapeutics to address a wide range of diseases, including: inborn errors of metabolism, inflammatory and immune disorders, and cancer; the future clinical development of Synthetic Biotic medicines; the potential of our technology to treat phenylketonuria; the expected timing of our anticipated clinical trial initiations; the benefit of orphan drug and fast track status; the adequacy of our capital to support our future operations and our ability to successfully initiate and complete clinical trials; the results of our collaborations; and the difficulty in predicting the time and cost of development of our product candidates. Actual results could differ materially from those contained in any forward-looking statement as a result of various factors, including, without limitation: the uncertainties inherent in the preclinical development process; our ability to protect our intellectual property rights; and legislative, regulatory, political and economic developments, as well as those risks identified under the heading "Risk Factors" in our filings with the SEC. The foregoing review of important factors that could cause actual events to differ from expectations should not be construed as exhaustive and should be read in conjunction with statements that are included herein and elsewhere, including the risk factors included in our annual report on Form 10-Q filed with the SEC on August 8, 2019, and in any subsequent filings we make with the SEC. The forward-looking statements contained in this presentation reflect our current views with respect to future events. We anticipate that subsequent events and developments will cause our views to change. However, while we may elect to update these forward-looking statements in the future, we specifically disclaim any obligation to do so. These forward-looking statements should not be relied upon as representing our view as of any date subsequent to the date hereof.





Synthetic Biotic™ Medicines A Novel Class of Engineered Living Medicines

SYNTHETIC

- Designed genetic circuits to execute biological functions
- · Degradation of disease-causing metabolites
- · Production of therapeutic molecules

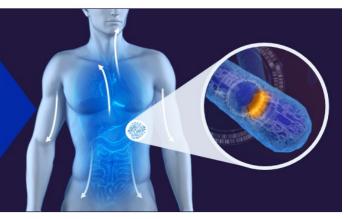
BIOTIC

- · Bacterial chassis
- Non-pathogenic
- Amenable to genetic manipulation

PATHWAYS, COMBINATIONS, BIOMARKERS

PROGRAMMABLE POTENCY AND CONTROL

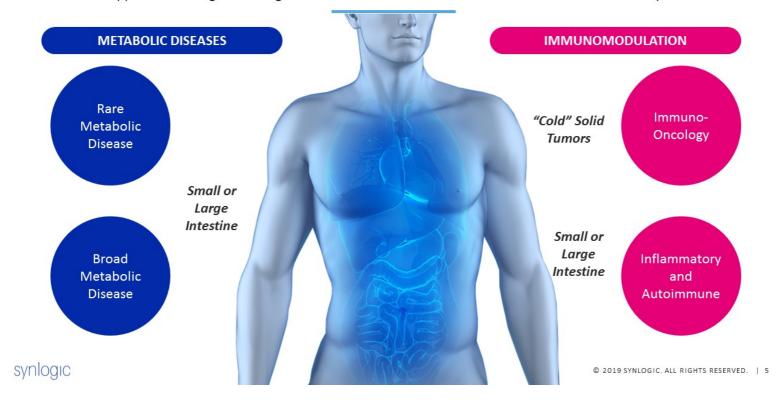
LOCAL ACTIVITY, REDUCED SYSTEMIC TOXICITY



synlogic

Synthetic Biotic Portfolio: Breadth and Potential

Initial Applications Designed to Target Different Sites of Action in Metabolic and Immunomodulatory Diseases



Investing in Development of a Robust Pipeline for a Range of Diseases

| | Research | IND-Enabling Studies | Phase 1 | Phase 2 |
|------------------------------------|----------|-------------------------|---------|---------|
| Phenylketonuria | SYNB1618 | | | |
| Additional Rare Metabolic Diseases | | | | |
| Inflammatory Bowel Disease | abb | ovie | | |
| Immuno-Oncology Solid Tumors | SYNB1891 | | | |
| Additional Oncology Applications | | | | |

Rare Metabolic Diseases Immunomodulation

synlogic



SYNB1618 for Phenylketonuria (PKU)

Goal: Managing Plasma Phe Levels

PKU is a rare inherited amino acid metabolism disorder

- · Causes build up of amino acid phenylalanine (Phe) in the body
- \bullet Today, less than half of adults are at or below target Phe levels of 120-360 μmol / L
- · If left untreated, symptoms include cognitive impairment, convulsions, behavioral problems, skin rash

Patients:

• 16,500 diagnosed in US, similar in EU5

Treatment:

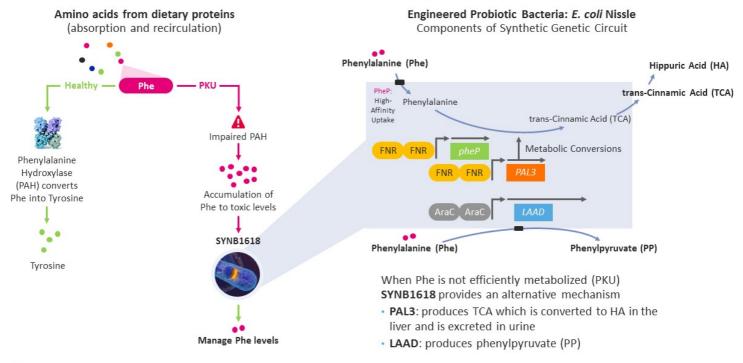
- · Phenylalanine is found in all proteins therefore low protein diet is followed (no meat, dairy, nuts, eggs)
- KUVAN® (sapropterin dihydrochloride): PAH cofactor. 20-40% of patients are responders
- Palynziq™ (pegvaliase-pqpz): injectable, pegylated, bacterial enzyme (phenylalanine ammonia-lyase or PAL) for treatment of adult patients

Target Profile to Address Unmet Need:

- Manage Phe below target levels to prevent irreversible cognitive damage
- Increase natural protein intake: classic PKU patients' natural protein intake is typically less than 10g
- · Oral dosing without systemic toxicity



SYNB1618 Mechanism of Action



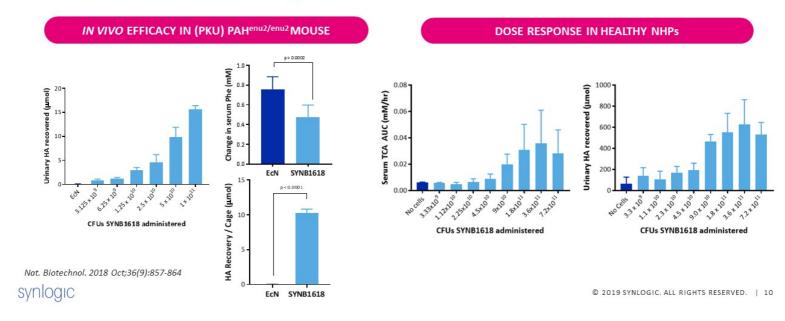
synlogic

SYNB1618 Preclinical Characterization

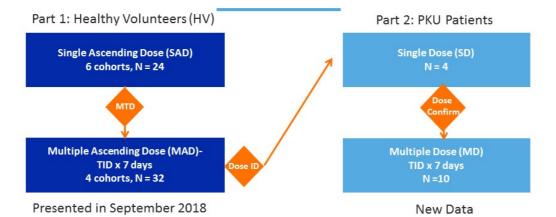
Biomarkers Demonstrate Activity of SYNB1618 in Mouse Model of PKU and Healthy NHPs



Development of synthetic live bacterial therapeutic for the human metabolic disease phenylketonuria *Vincent M Isabella et al, Synlogic, Inc.*



SYNB1618 Phase 1/2a Study Design



PKU Clinical Trial Design

- Randomized, double-blind placebo-controlled study at multiple sites in the US
- Primary outcome: establish safety/tolerability following single and multiple doses in HV and PKU patients
- Secondary outcome: SYNB1618 kinetics in feces
- Exploratory: change from baseline in plasma and urinary biomarkers of Phe metabolism



SYNB1618 in the Clinic: Safety

Phase 1/2a SAD/MAD Study Demonstrates Safety and Clearance in Healthy Volunteers and PKU Patients

56 healthy volunteers, 14 PKU patients Received at least one dose of SYNB1618 or placebo

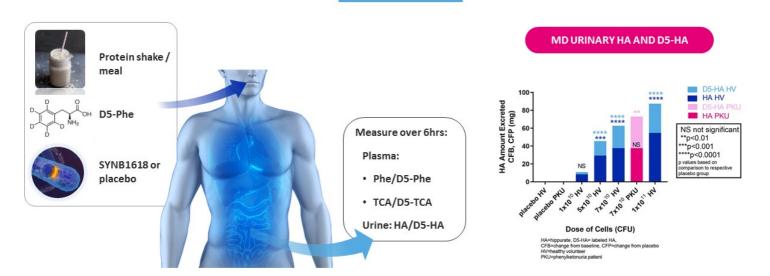
Adults
Age range: 18-62 yrs old

- ✓ There were no treatment-related serious adverse events, no systemic toxicity or infections
- ✓ Treatment-emergent adverse events were either mild or moderate in severity, and reversible. Most adverse events were GI-related
- \checkmark Single dose MTD in healthy volunteers was defined as 2x10¹¹ CFU. Doses above this level were associated with dose-limiting GI adverse events
- \checkmark Based on pharmacodynamic data and tolerability profile, a dose of $7x10^{10}$ CFU was identified for the second part of the study in PKU patients
- \checkmark Dose of 7x10¹⁰ CFU TID over seven days was well-tolerated in PKU patients. There were no discontinuations.
- ✓ All subjects cleared the bacteria (one PKU patient in follow-up). There was no evidence of colonization, and no subject required antibiotics



SYNB1618 in the Clinic: Activity

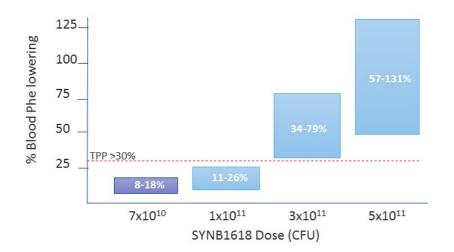
Statistically Significant and Equivalent Activity of SYNB1618 in Healthy Volunteers and Patients





Key: HA: Hippurate, D5-HA: labeled HA, CFB: change from baseline, CFP: change from placebo

Modeling: Potential For Phe Reduction in PKU Patients

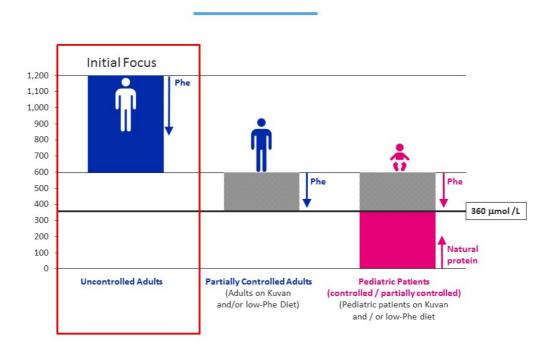


Ranges represent

- Low: PAL mechanism only (conservative)
- High: PAL + LAAD activity (estimates maximum with both pathways)

synlogic

SYNB1618 Potential to Address Unmet Need Across Patient Groups



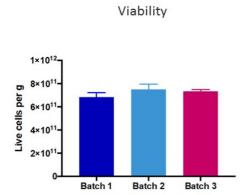


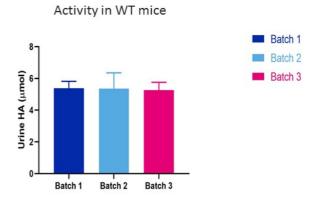
Development of Lyophilized SYNB1618

- Improved fermentation process enables production of a solid formulation of SYNB1618 with:
 - · Minimal impact on cell viability and activity
 - Similar activity to frozen liquid as measured by Phe consumption and biomarker production
 - · Improved quality attributes
 - · Patient and commercialization-friendly presentation
 - Stability profile at 2-8 °C and room temperature
- Process is robust and reproducible at 30 L production scale
- GMP cleanroom build-out has been completed, and lyophilized SYNB1618 material has been manufactured and released for clinical use

synlogic

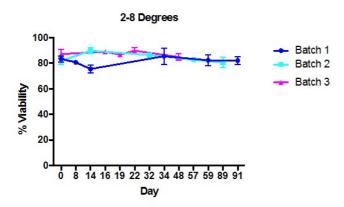
Batch to Batch Consistency of SYNB1618 Solid Formulation

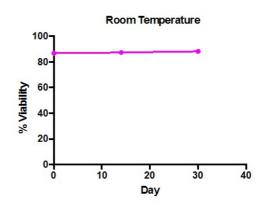






Stability of SYNB1618 Solid Formulation





synlogic

Upcoming Milestones and Path Forward

Established new solid formulation and manufacturing process



Completed EPO1 interactions with FDA to align on program plans (clinical, manufacturing, toxicology)



Completed Phase 1/2a study (healthy volunteers and PKU patients)



Initiate bridging study with solid formulation in Q3 2019



Phase 2 study in PKU patients to assess Phe lowering to start in 1H 2020



synlogic



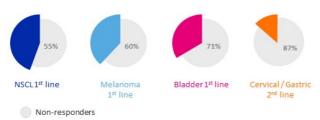
Synlogic Vision for Immuno-Oncology

Expand the Benefits of Immunotherapy Broadly Across Tumor Types

CHECKPOINT INHIBITORS HAVE TREATMENT FAILURES

For indications where immune checkpoint inhibitors are indicated, 55-87% of patients fail to respond

Failure Rates for Select FDA Approved CPI Monotherapy



Other tumors, where CPIs are not indicated, show littleto-no response to checkpoint inhibitors

Bacteria Recognized as **Earliest Immunotherapy**

profoundest secrets, and it is possible that she has given us a hint in which, if we will but follow, may lead us on to the



DR. WILLIAM B. COLEY

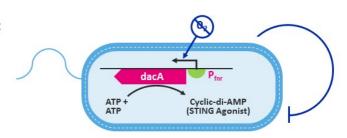
Enable broad response and remission through engagement of multiple immunomodulatory pathways to enhance tumor inflammation and promote robust T cell responses



Dual Innate Immune Activator: Synthetic Biotic Medicine Producing STING Agonist (SYNB1891)

- Synthetic biology applied to confer activities for efficacy and control for safety
- Designed as a dual innate immune activator: combined benefit of bacterial chassis and STING agonist
- The dacA gene is integrated into genome under the control of inducible promoter (P_{fnr}) to produce c-di-AMP (CDA)
- Dual biosafety feature via auxotrophies no proliferation in tumor, systemic circulation or environment
- · Learnings inform future combinations

ANAEROBIC ENVIRONMENT



Auxotrophies

- · Diaminopimelic acid (DAP)
- Thymidine

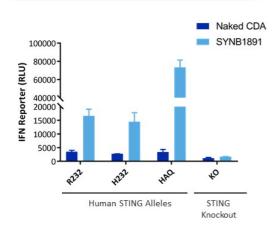
synlogic

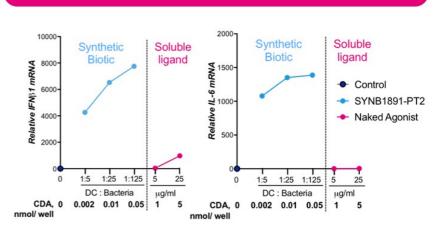
SYNB1891 In Vitro Characterization

Interferon Production Across Multiple Human STING Alleles – Activity Greater than Naked STING Agonist

REPORTER HUMAN MONOCYTIC LINE

HUMAN PRIMARY DENDRITIC CELLS





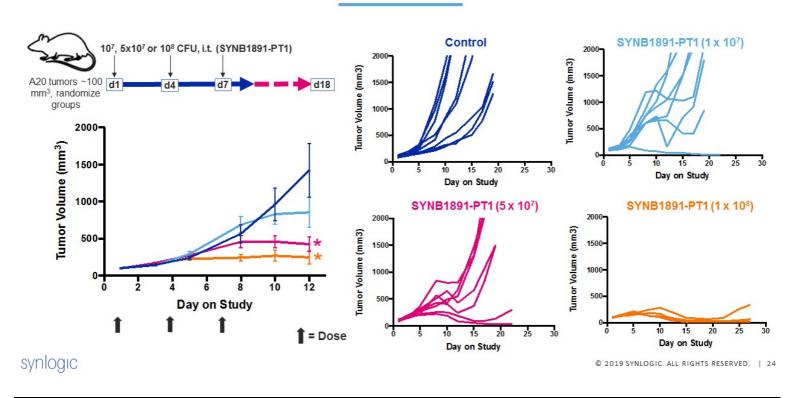


© 2019 SYNLOGIC. ALL RIGHTS RESERVED. | 23

.

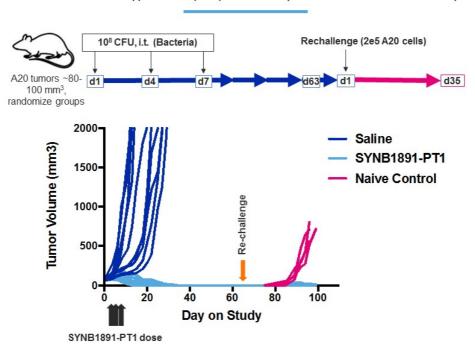
SYNB1891 In Vivo Characterization

Dose-dependent Anti-tumor Activity of SYNB1891 Prototype Strain (PT1) as a Single Agent



SYNB1891 In Vivo Characterization

SYNB1891 Prototype Strain (PT1) Leads to Systemic Anti-tumor Immunity



synlogic

Dual Innate Immune Activator SYNB1891

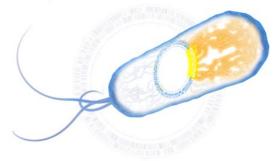
Designed to Locally Inflame the TME and Systemically Drive Tumor Antigen-Specific Immunity

PROGRESS TOWARDS THE CLINIC

- · Tumor Colonization without Leakage
- · Enhanced Activity vs. Naked STING Agonist
- Intracellular Activation of STING and Bacterial-Induced Immune Pathways Within APCs
- · Dose-dependent Anti-tumor Activity
- Immunological Memory
- · Atezolizumab supply agreement in place
- · IND Cleared by FDA
- Phase 1 monotherapy data expected in 2020

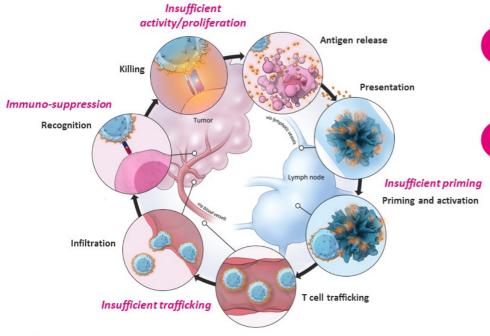
PROMISE OVER OTHER APPROACHES

- STING Agonism in Target Cells that Drive Efficacy
- Sparing Cells Where STING Agonism is Detrimental
- Activation of Multiple Innate Immune Pathways
- Low Systemic Risk





A Tumor Can Evade Multiple Critical Aspects of the Cancer-Immunity Cycle



MONOTHERAPIES OFTEN FAIL TO OVERCOME TUMOR EVASION MECHANISMS

Recognized Need to Combine Mechanisms to Broaden the Benefit of Immunotherapy

ENGINEER LIVING SOLUTIONS: SYNTHETIC BIOTIC MEDICINES

Rationally Designed for Combinatorial Effect

Locally Inflame the tumor microenvironment (TME)

Systemically Drive Tumor-Antigen Specific Immunity

In Situ Vaccination: Neo-antigen Priming and Sustained Immune Response

SYNIOGIC Adapted from Chen, Melman; Immunity 2013

Additional Synthetic Biotic Effectors

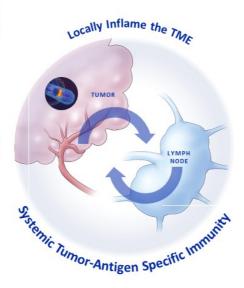
VISION: Rational Design to Locally Inflame the TME AND Systemically Drive Tumor-Antigen Specific Immunity

RELIEVE IMMUNOSUPRESSION

- Kyn Consumption
- · Ade Consumption
- · αPD-1 scFv

PROMOTE TRAFFICKING

- · Chassis effect
- CXCL10
- Hyaluronidase



PROMOTE AND SUSTAIN IMMUNE ACTIVATION

- IL-15; IL-12
- Arg Production
- 4-1BBL
- OX40L

PRIME FOR TUMOR-ANTIGEN-SPECIFIC VACCINATION

Chassis effect

TNFα

• 5FC→5FU

IFNy

STING
 αCD47 ScFv / Sirpα

• αCD40 scFv/CD40L • GM-CSF

synlogic

Broad Ambitions in Immuno-Oncology

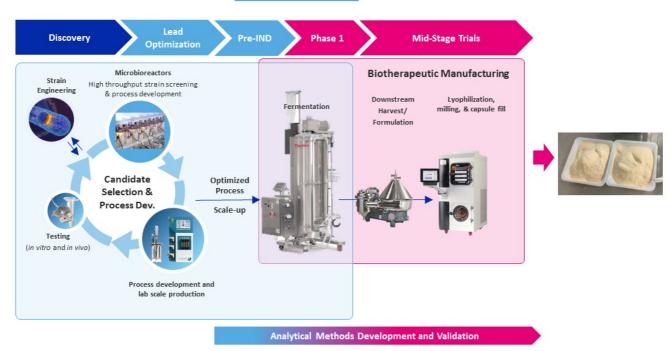
Vision: Expand and Exceed the Effect of Cancer Immunotherapies



synlogic

Synlogic Internal GMP Manufacturing Capabilities

In-house Process Development and Clinical Manufacturing for Early & Mid-Stage Trials



synlogic

Platform Collaboration to Accelerate Development of Synlogic's Synthetic Biotic Medicines





- Provides access to Ginkgo's industrial scale, highthroughput strain optimization and screening
- Enables screening and identification of higher quality optimized candidates, increasing potential for success
- Delivers novel tools for increased candidate potency
- Includes equity investment at a premium, extending runway through multiple milestones

Builds off validated pilot program initiated in 2017

2019 Progress and Milestones

SYNB1618 in PKU

- ✓ Completed Phase 1/2a study in healthy volunteers and patients, topline data presented
 - > Full data presentation Sept. 2019 (SSIEM)
 - ✓ Bridging study initiated

SYNB1020 in Hyperammonemia

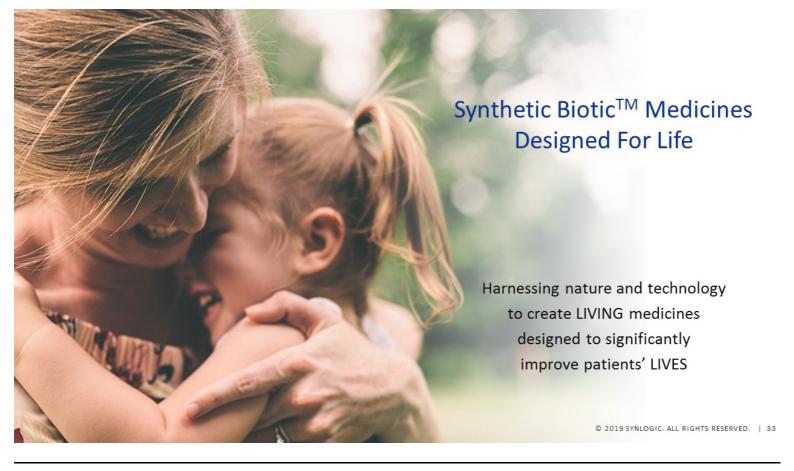
- ✓ Preclin. and HV clin. data published in Sci. Transl. Med.
- ✓ Completed Phase 1b/2a study in patients with cirrhosis (program discontinued)

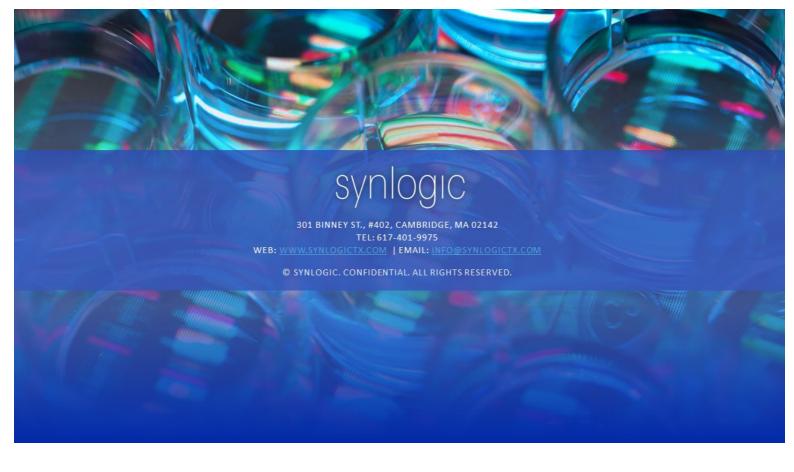
SYNB1891 in Immuno-Oncology

- ✓ IND Cleared by FDA
- ✓ Clinical trial material manufactured and CPI agreement in place
- ✓ Advance AbbVie collaboration establish Ginkgo collaboration
 - > Advance preclinical pipeline









Synlogic Discontinues Development of SYNB1020 to Treat Hyperammonemia

- SYNB1020 well tolerated in Phase 1b/2a study, but did not lower blood ammonia in patients with cirrhosis -
- Company will focus resources on advancement of SYNB1618, SYNB1891 and new early development programs -

CAMBRIDGE, Mass.—(BUSINESS WIRE)—August 20, 2019—Synlogic, Inc., (Nasdaq: SYBX), a clinical stage company applying synthetic biology to beneficial microbes to develop novel, living medicines, today announced that it is discontinuing development of SYNB1020, an early stage clinical product candidate for the treatment of hyperammonemia. The decision to discontinue the program was based on top-line data from an interim analysis of a randomized, double-blind, placebo-controlled Phase 1b/2a study of the Synthetic Biotic medicine in 23 patients with cirrhosis and elevated blood ammonia. The study was designed to evaluate the safety and tolerability of SYNB1020 treatment, as well as changes in blood ammonia levels and several exploratory endpoints associated with early stage hepatic encephalopathy (HE). SYNB1020 was well tolerated in patients with cirrhosis. Plasma and urinary nitrate increased in subjects treated with SYNB1020, indicating that the strain was active, but there was no evidence of blood ammonia lowering or changes in other exploratory endpoints relative to placebo.

"We are disappointed that results from our Phase 1b/2a study of SYNB1020 did not demonstrate an activity profile in ammonia lowering that warranted continued development of the program. We would like to thank the patients and investigators who participated in the clinical trial and contributed to this research," said Aoife Brennan, M.B., B.Ch., Synlogic's president and chief executive officer. "Moving forward, we will focus our resources on advancement of SYNB1618 for the treatment of phenylketonuria, SYNB1891 for the treatment of solid tumors and several new programs in early development."

Detailed results of the Phase 1b/2a study are expected to be presented at a future scientific or medical conference.

About Synlogic's Phase 1b/2a Trial of SYNB1020 in Patients with Cirrhosis

The study had two parts. First, an initial sentinel open-label cohort of six subjects with cirrhosis and a Model for End-Stage Liver Disease (MELD) score < 12 received orally administered SYNB1020 (5 x 10^{11} CFU TID) for six days. Subjects were admitted to an inpatient facility for a run-in diet, baseline assessments, safety monitoring, and collection of blood, urine, and fecal samples for the evaluation of safety, tolerability, pharmacokinetics and pharmacodynamics of treatment. The safety data were reviewed by a safety data monitoring committee and the second part of the trial was opened for enrollment.

The second part of the trial comprised a randomized, double-blinded, placebo-controlled study in patients with cirrhosis and hyperammonemia. Eligible subjects were admitted to an inpatient facility for a run-in diet period of five days and 24-hour ammonia profile (AUC), and those subjects with elevated plasma ammonia levels were randomized and received either placebo or orally administered SYNB1020 (5×10^{11} CFU TID) for six days. A total of 17 subjects entered Part 2 of the trial of which, eight subjects received placebo. The primary endpoint of the study was safety and tolerability. In addition, the study evaluated the effect of SYNB1020 administration on plasma ammonia levels as well as other exploratory endpoints, including levels of inflammatory markers II.-6, TNF-alpha, and endotoxin, and psychometric hepatic encephalopathy score (PHES).

About Synlogic

Synlogic is pioneering the development of a novel class of living medicines, Synthetic Biotic medicines, based on its proprietary drug development platform. Synlogic leverages the tools and principles of synthetic biology to genetically engineer probiotic microbes to perform or deliver critical functions missing or damaged due to disease. The company's lead program, SYNB1618, targets phenylketonuria (PKU). When delivered orally, Synthetic Biotic medicines can act from the gut to compensate for the dysfunctional metabolic pathway and have a systemic effect, with the potential to significantly improve symptoms of disease for affected patients. In addition, the company is developing SYNB1891 as an immunostimulatory approach for the treatment of advanced solid tumors. Further, the company is leveraging the broad potential of its platform to create Synthetic Biotic medicines for the treatment of other more common diseases, including inflammatory and immune disorders. Synlogic is collaborating with AbbVie to develop Synthetic Biotic-based treatments for inflammatory bowel disease (IBD). For more information, please visit www.synlogictx.com.

Forward-Looking Statements

This press release contains "forward-looking statements" that involve substantial risks and uncertainties for purposes of the safe harbor provided by the Private Securities Litigation Reform Act of 1995, including statements regarding Synlogic's plans and expectations for the development of SYNB1020 and its other product candidates. All statements, other than statements of historical facts, included in this press release regarding strategy, future operations, future financial position, future revenue, projected expenses, prospects, plans and objectives of management are forward-looking statements. In addition, when or if used in this press release, the words "may," "could," "should," "anticipate," "believe," "estimate," "expect," "intend," "plan," "predict" and similar expressions and their variants, as they relate to Synlogic may identify forward-looking statements. Examples of forward-looking statements, include, but are not limited to, statements regarding the potential of Synlogic's platform to develop therapeutics to address a wide range of diseases including: cancer, inborn errors of metabolism and inflammatory and immune disorders; the future clinical development of Synthetic Biotic medicines; the approach Synlogic is taking to discover and develop novel therapeutics using synthetic biology; and the expected timing of Synlogic's clinical trials and availability of clinical trial data. Actual results could differ materially from those contained in any forward-looking statement as a result of various factors, including: the uncertainties inherent in the preclinical development process; the ability of Synlogic to protect its intellectual property rights; and legislative, regulatory, political and economic developments, as well as those risks identified under the heading "Risk Factors" in Synlogic's filings with the SEC. The forward-looking statements contained in this press release reflect Synlogic's current views with respect to future events. Synlogic anticipates that subsequent events and developments wi

Contacts

MEDIA CONTACT:

Caroline Rufo, Ph.D. MacDougall Phone: 781-235-3060 Email: crufo@macbiocom.com

INVESTOR CONTACT:

Elizabeth Wolffe, Ph.D. Synlogic, Inc. Phone: 617-207-5509 Email: liz@synlogictx.com