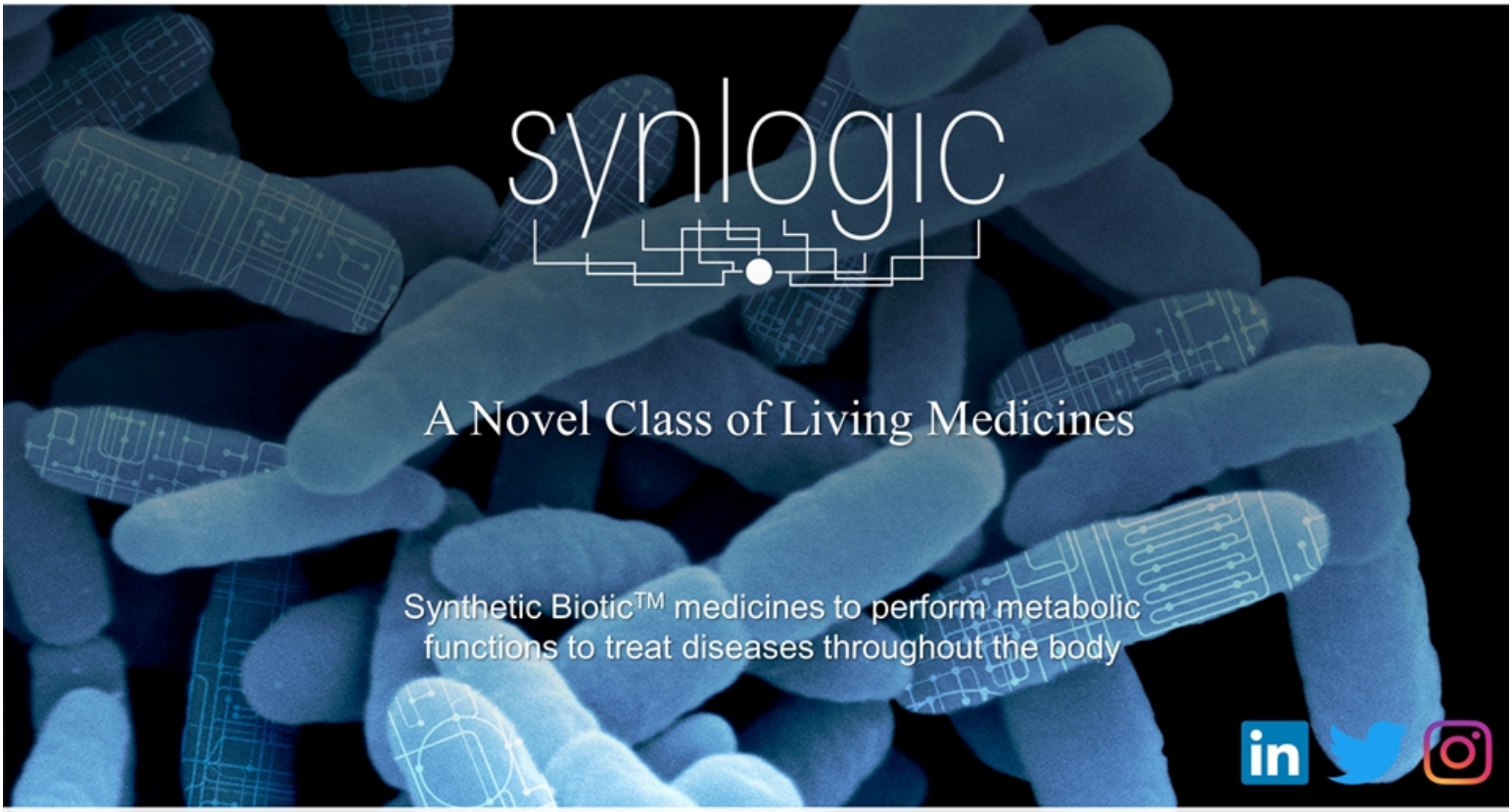
Filed by Mirna Therapeutics, Inc. Pursuant to Rule 425 under Securities Act of 1933, as amended and deemed filed pursuant to Rule 14a-12 under the Securities Exchange Act of 1934, as amended Subject Company: Mirna Therapeutics, Inc.
Subject Company's Commission File No.: 001-37566 Date: June 9, 2017



Synlogic Corporate Overview

JC Gutierrez-Ramos, President and CEO

June 2017

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, as they relate to Mirna, Synlogic or the management of either company, before or after the proposed merger, may identify forward-looking statements. Examples of forward-looking statements include, but are not limited to, statements relating to the timing and completion of the proposed merger; Mirna’s continued listing on the NASDAQ Global Market until closing of the proposed merger; the combined company’s listing on the NASDAQ Global Market after closing of the proposed merger; expectations regarding the capitalization, resources and ownership structure of the combined company; the approach Synlogic is taking to discover and develop novel therapeutics using synthetic biology; the adequacy of the combined company’s capital to support its future operations and its ability to successfully initiate and complete clinical trials; the nature, strategy and focus of the combined company; the difficulty in predicting the time and cost of development of Synlogic’s product candidates; the executive and board structure of the combined company; and expectations regarding voting by Mirna’s and Synlogic’s stockholders. Actual results could differ materially from those contained in any forward-looking statement as a result of various factors, including, without limitation: the risk that the conditions to the closing of the transaction are not satisfied, including the failure to timely or at all obtain stockholder approval for the transaction; uncertainties as to the timing of the consummation of the transaction and the ability of each of Mirna and Synlogic to consummate the transaction; risks related to Mirna’s ability to correctly estimate its operating expenses and its expenses associated with the transaction; the ability of Mirna or Synlogic to protect their respective intellectual property rights; unexpected costs, charges or expenses resulting from the transaction; potential adverse reactions or changes to business relationships resulting from the announcement or completion of the transaction; and legislative, regulatory, political and economic developments. 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 Mirna’s Quarterly Report on Form 10-Q filed with the SEC on May 9, 2017. Mirna and Synlogic can give no assurance that the conditions to the transaction will be satisfied. Except as required by applicable law, Mirna and Synlogic undertake no obligation to revise or update any forward-looking statement, or to make any other forward-looking statements, whether as a result of new information, future events or otherwise.

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Additional Information

This presentation is not intended to and does not constitute an offer to sell or the solicitation of an offer to subscribe for or buy or an invitation to purchase or subscribe for any securities or the solicitation of any vote in any jurisdiction pursuant to the proposed transaction or otherwise, nor shall there be any sale, issuance or transfer of securities in any jurisdiction in contravention of applicable law. No offer of securities shall be made except by means of a prospectus meeting the requirements of Section 10 of the United States Securities Act of 1933, as amended. Subject to certain exceptions to be approved by the relevant regulators or certain facts to be ascertained, the public offer will not be made directly or indirectly, in or into any jurisdiction where to do so would constitute a violation of the laws of such jurisdiction, or by use of the mails or by any means or instrumentality (including without limitation, facsimile transmission, telephone and the internet) of interstate or foreign commerce, or any facility of a national securities exchange, of any such jurisdiction.

In connection with the proposed transaction between Mirna and Synlogic, Mirna intends to file relevant materials with the SEC, including a registration statement that will contain a proxy statement and prospectus. MIRNA AND SYNLOGIC URGE INVESTORS AND STOCKHOLDERS TO READ THESE MATERIALS CAREFULLY AND IN THEIR ENTIRETY WHEN THEY BECOME AVAILABLE BECAUSE THEY WILL CONTAIN IMPORTANT INFORMATION ABOUT MIRNA, SYNLOGIC, THE PROPOSED TRANSACTION AND RELATED MATTERS. Investors and shareholders will be able to obtain free copies of the proxy statement, prospectus and other documents filed by Mirna with the SEC (when they become available) through the website maintained by the SEC at www.sec.gov. In addition, investors and stockholders will be able to obtain free copies of the proxy statement, prospectus and other documents filed by Mirna with the SEC by contacting Investor Relations by mail at Attn: Investor Relations, PO Box 163387, Austin, TX 78716. Investors and stockholders are urged to read the proxy statement, prospectus and the other relevant materials when they become available before making any voting or investment decision with respect to the proposed transaction.

Mirna and Synlogic, and each of their respective directors and executive officers and certain of their other members of management and employees, may be deemed to be participants in the solicitation of proxies in connection with the proposed transaction. Information about Mirna's directors and executive officers is included in Mirna's Annual Report on Form 10-K for the year ended December 31, 2016, filed with the SEC on March 15, 2017. Additional information regarding these persons and their interests in the transaction will be included in the proxy statement relating to the transaction when it is filed with the SEC. These documents can be obtained free of charge from the sources indicated above.

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Synthetic Biotics™: A Novel Class of Living Medicines

Synthetic

- **Engineered** bacteria
- With **designed genetic circuits**
- To **degrade metabolites** that induce disease or **synthesize substances** to treat disease

Biotics: *E. coli* Nissle as chassis:

- Widely-used beneficial, **oral probiotic**
- **Leverage the safety** of probiotic
- Found within natural human **microbiome**
- **Amenable to genetic manipulation**

Synthetic Biology + Bacteria = Synthetic Biotic Medicine

Therapeutic delivered locally to treat systemic diseases

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Transaction Overview

- Synlogic announced merger with Mirna Therapeutics to become Nasdaq listed company
  - The go forward company will operate as Synlogic, Inc.
  - Expected to close 3Q 2017 subject to the approval of the stockholders of each company and the satisfaction or waiver of other customary conditions
  - Expected ownership split subject to adjustment based on Mirna's net cash at closing
    - Synlogic Shareholders: Approximately 83%
    - Mirna Shareholders: Approximately 17%
- Synlogic funding expected to support operations through mid-2019. Includes:
  - $42M from Series C
  - Approximately $40M cash expected from merger at time of close
  - Synlogic existing cash at time of close

Synlogic Management Team: From Funding of Platform to Clinic in Less than Three Years

JC Gutierrez-Ramos, CEO
- Group SVP Biotherapeutics, Pfizer
- SVP, Head Immunoinflammation Center for Drug Discovery, GSK
- CSO & Site Head, Amgen Mountain View

Aoife Brennan, CMO
- VP, Rare Disease Innovation Unit, Biogen
- Medical Director, Tolerx

Todd Shegog, CFO
- SVP & CFO, Forum Pharmaceuticals
- SVP & CFO, Millennium Pharmaceuticals

Paul Miller, CSO
- VP, Infection iScience, AstraZeneca
- VP, Antibacterials Research Unit, Pfizer

Dean Falb, CTO
- Entrepreneur in Residence, Atlas Venture
- VP, R&D, Stryker Regenerative Medicine

Caroline Kurtz, Translational Science
- Vice President, GCC Platform Lead, Ironwood Pharmaceuticals
- Director, Infectious Diseases, Genzyme

Dick Schwartz, SVP, Manufacturing
- Chief, Vaccine Production Program Lab, NIH
- Senior Director, Process & Manufacturing Sciences, MedImmune

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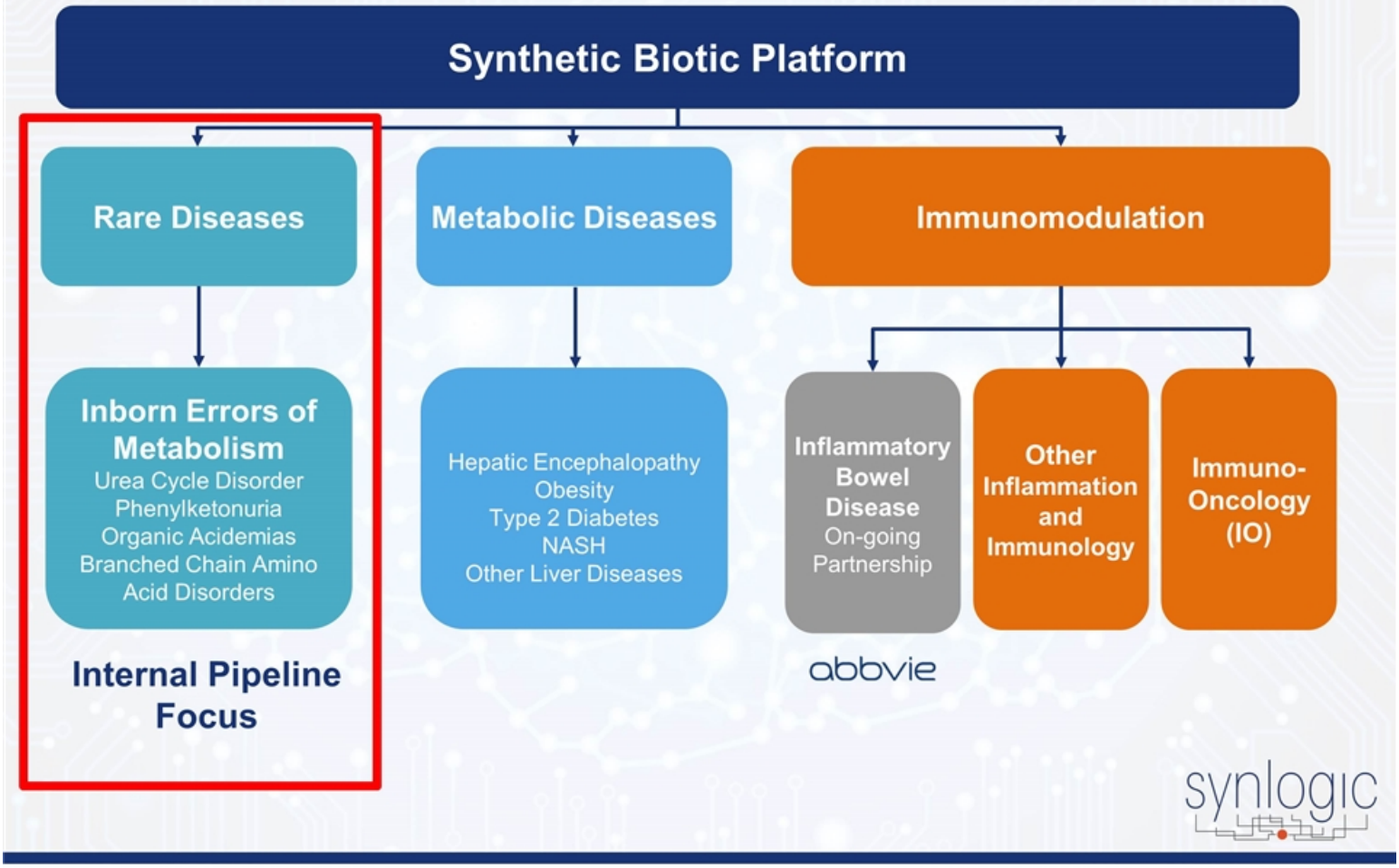
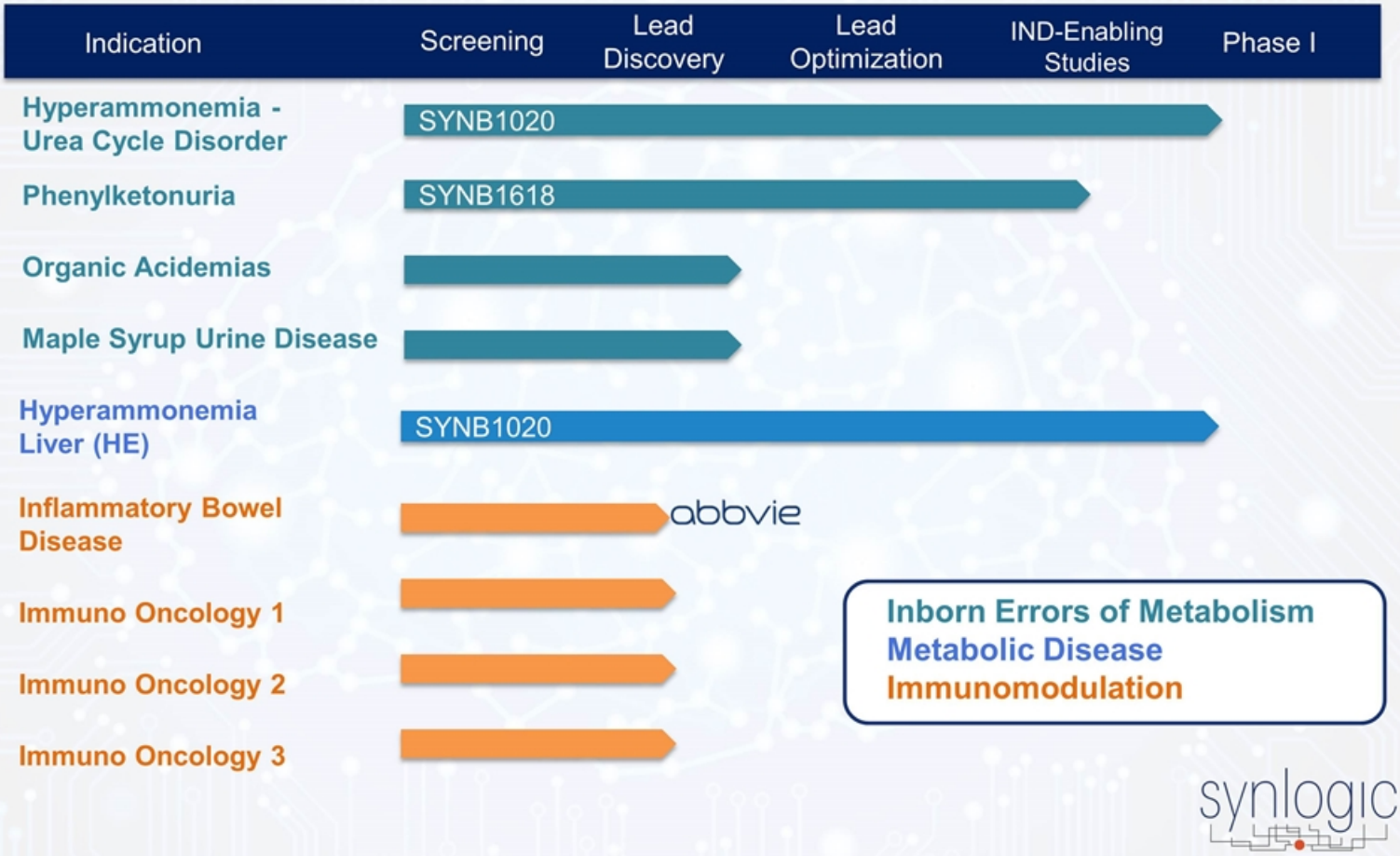
Synthetic Biotic Broad Platform and Pipeline Potential: Focus on Orphan Metabolic Diseases



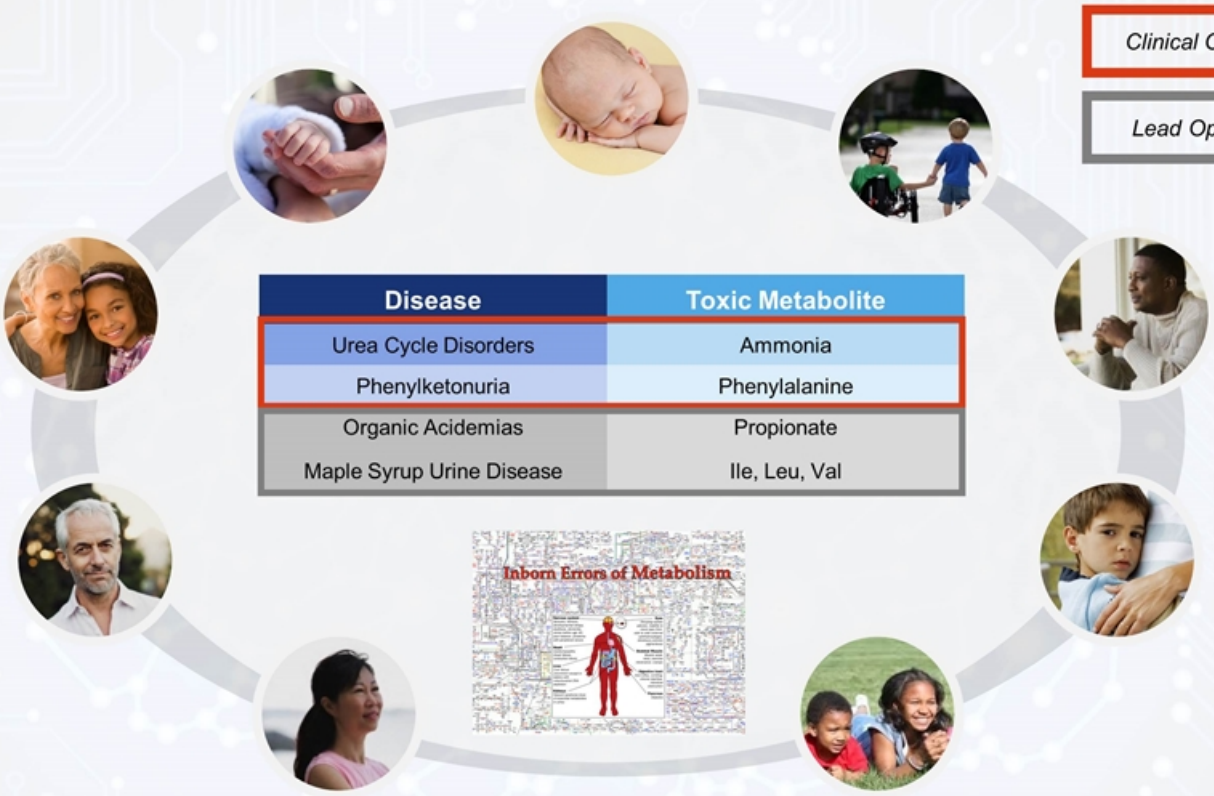
Synthetic Biotic Pipeline



Synlogic's Initial Focus: Inborn Errors of Metabolism

Clinical Candidates

Lead Optimization



Disease	Toxic Metabolite
Urea Cycle Disorders	Ammonia
Phenylketonuria	Phenylalanine
Organic Acidemias	Propionate
Maple Syrup Urine Disease	Ile, Leu, Val

~25K cases in the US

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SYNB1020 for Hyperammonemia Indications:
Urea Cycle Disorders (UCD) and Hepatic Encephalopathy (HE)

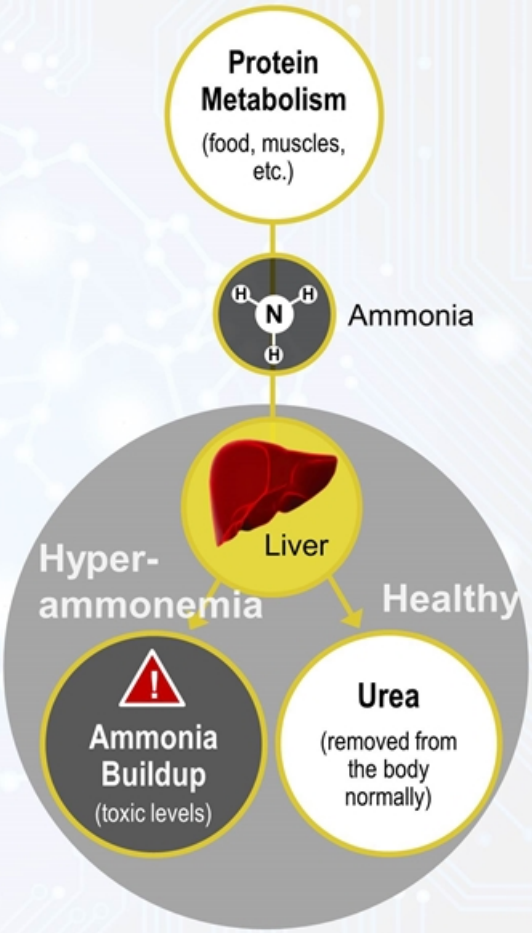
Urea Cycle Disorders:

2,000-3,000 patients with hereditary disorder (U.S.)

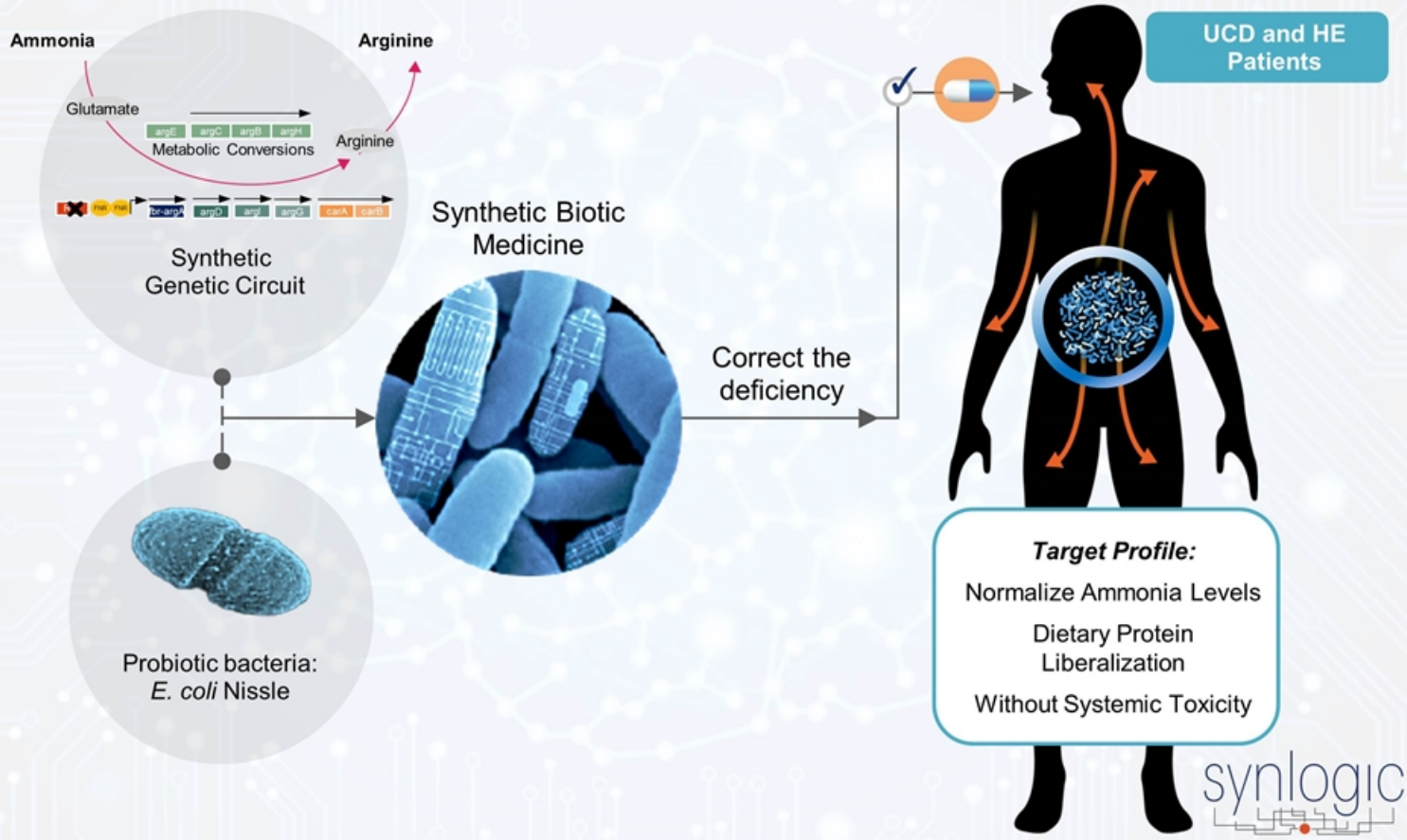
- Genetic defects in Urea Cycle
- Symptoms: vomiting, encephalopathy, respiratory stress, irreversible brain damage, coma, death
- Standard of care inadequate in that ammonia levels are not normalized and strict diet required. Best option is liver transplant
- Ravicti is a nitrogen-binding agent approved in 2013

Hepatic Encephalopathy:

- Sub-population of cirrhosis patients
- Symptoms: Neurological dysfunction that develops in association with liver disease: cognitive, intellectual, neuromuscular, emotional
- Episodes lead to hospitalization
- Rifaximin approved in 2010 for reduction in risk of overt HE recurrence

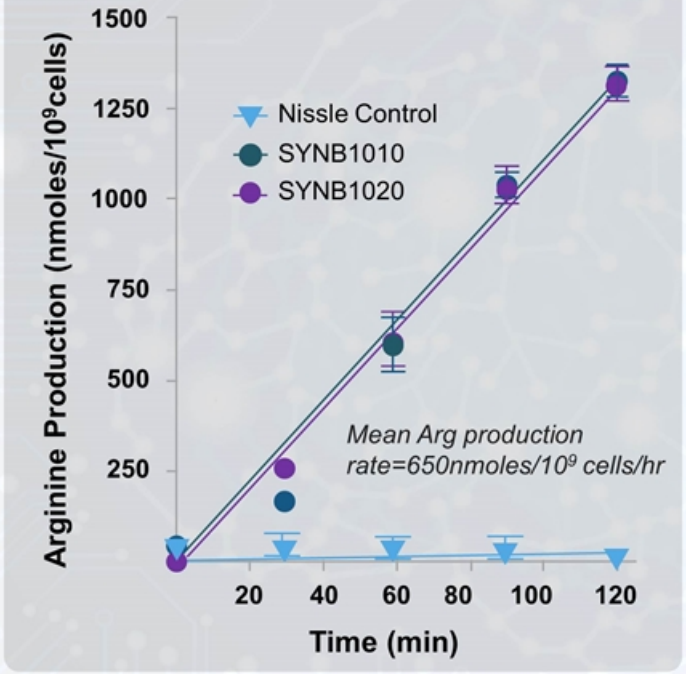


SYNB1020: Conversion of Toxic Ammonia into Beneficial Arginine for the Treatment of UCD and HE



Efficient Ammonia Conversion: *In Vitro* and *In Vivo*

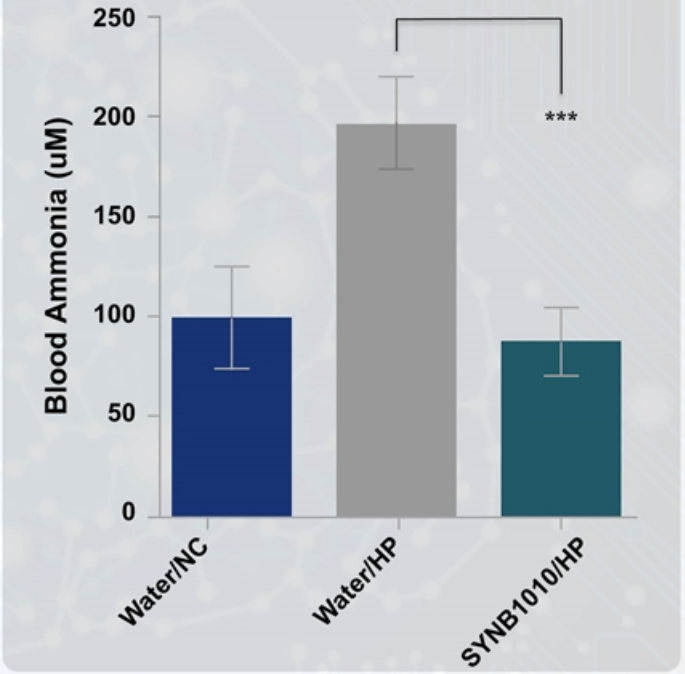
Ammonia to Arginine Conversion *in vitro*



Nissle – *E. coli Nissle 1917 Strep* resistant control strain
SYNB1010–arginine producing, Thy A auxotrophy, *Kan* resistant
SYNB1020-arginine producing, Thy A auxotrophy, clinical candidate

Blood Ammonia Reduced *in vivo*

(spf-ash hyperammonia/UCD model on High Protein Diet)



NC – Normal chow, HP – High protein chow
SYNB1010 – arg producing, Thy A auxotrophy, *Kan* resistant (a kanamycin resistant version of SYNB1020 clinical candidate)
*** Statistically significant

SYNB1020: Toxicology Package and Regulatory Path

Safety Toxicology

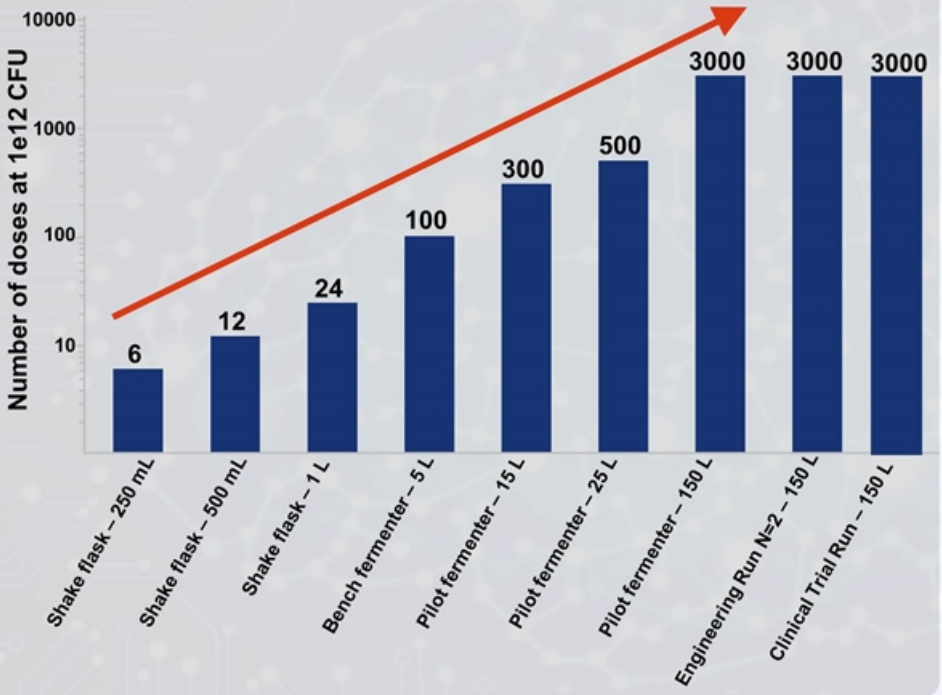
- **Toxicology program completed**
- **Clean safety profile**
- **No toxicity at highest feasible dose in two species**
- **No evidence of distribution outside the GI tract**

Regulatory

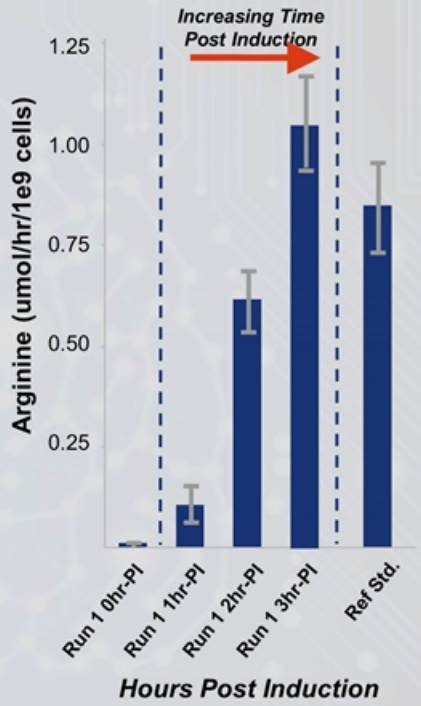
- **Orphan Drug Designation**
- **Pre-IND Meeting Feedback from FDA Office of Vaccines Research and Review**
  - No Recombinant DNA Advisory Committee (RAC)
  - CMC plan for the Phase 1/2 studies
  - Non-Clinical plan: dose selection; single species tox; single auxotrophy
  - Alignment with Phase 1 clinical plan: SAD/MAD in healthy volunteer
  - Lowering of blood ammonia level is an approvable end-point

From Flask to Industrial Fermenter at CMO:
Well-Controlled Process at 150L

Successful Scale-up to Biomass for Clinical Scale



Control of Activity During Manufacturing



SYNB1020: Phase 1 SAD/MAD in Healthy Volunteers Estimated Timing

- Estimated start mid-2017
- Traditional SAD/MAD design assessing safety, tolerability and kinetics in healthy volunteers across a range of doses
- Includes exploratory biomarkers in the context of controlled calorie and protein diet
  - Complete urine and fecal collection
  - Blood ammonia and amino acid profile analysis

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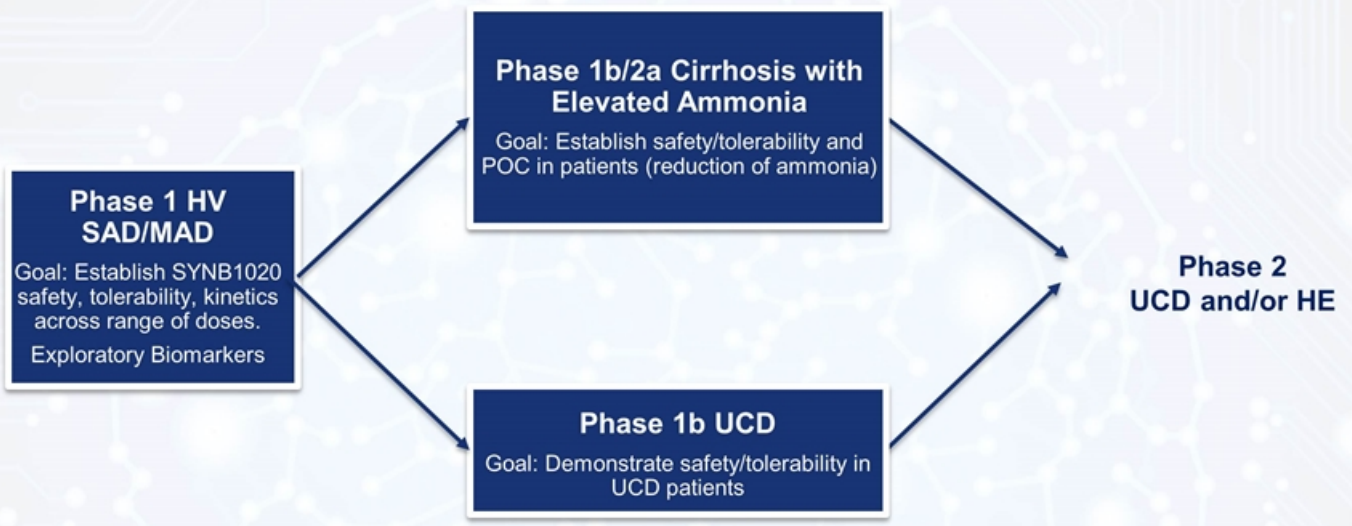
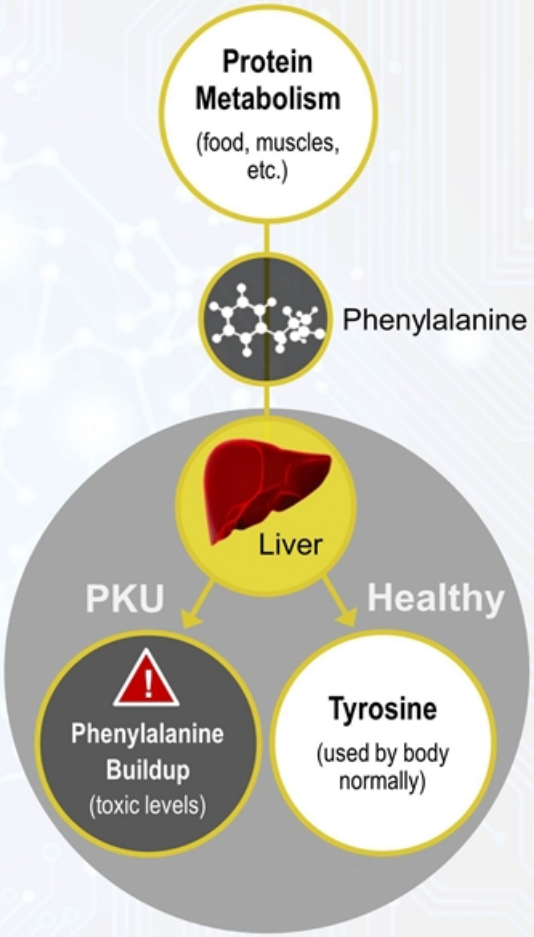
SYNB1020 Strategy in Hyperammonemia: Following Success in Healthy Volunteers, Two Patient Studies Planned



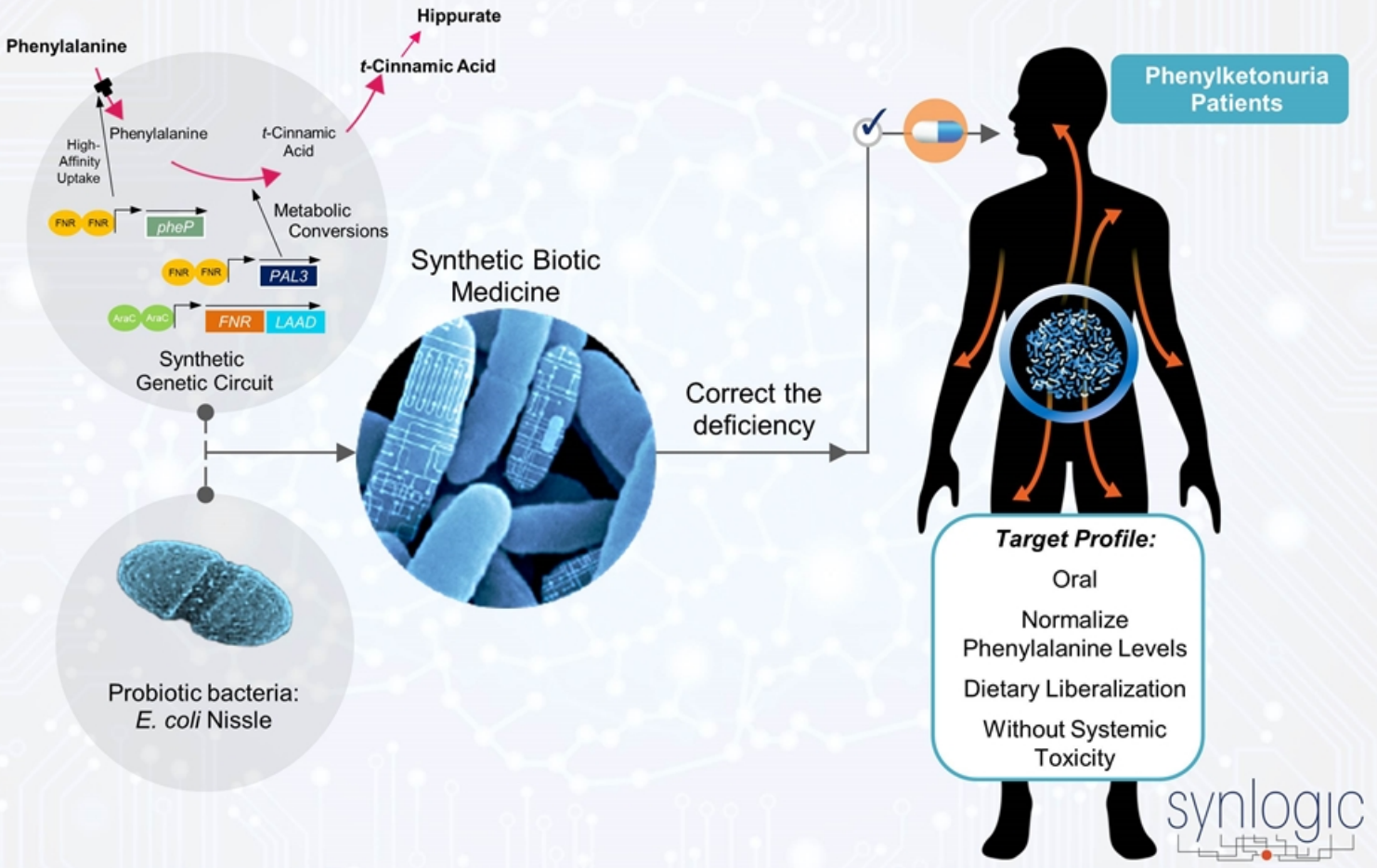
SYNB1618: Phenylketonuria (PKU) Overview

PKU disorders: 16,500 patients with hereditary disorder (U.S.)

- Genetic defect in phenylalanine hydrolase (PAH) enzyme
- Symptoms: mental retardation, convulsions, behavior problems, skin rash, musty body odor
- Kids maintained on very low protein diet (NO meat, dairy, dry beans, nuts, eggs)
- Kuvan, a cofactor for PAH enzyme, launched in 2007 for a segment of the patient population

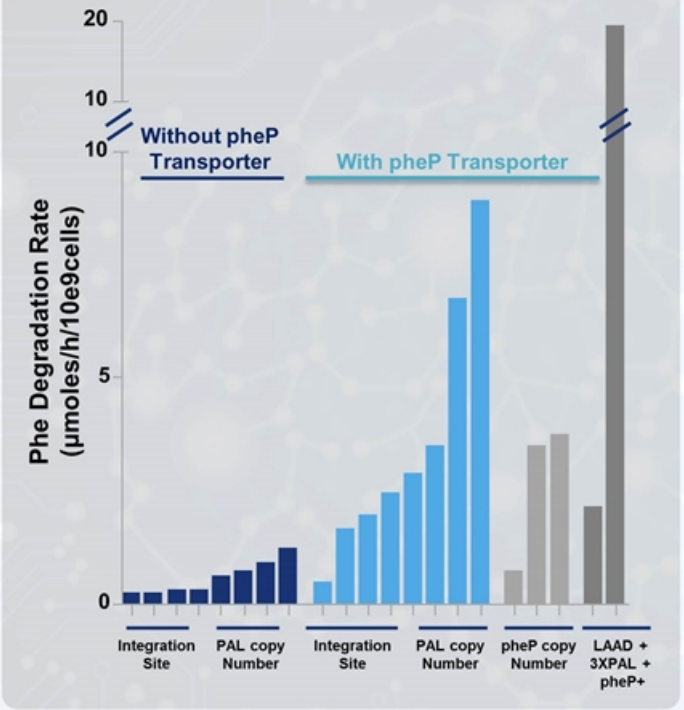


SYNB1618: Degradation of Toxic Phenylalanine for the Treatment of PKU

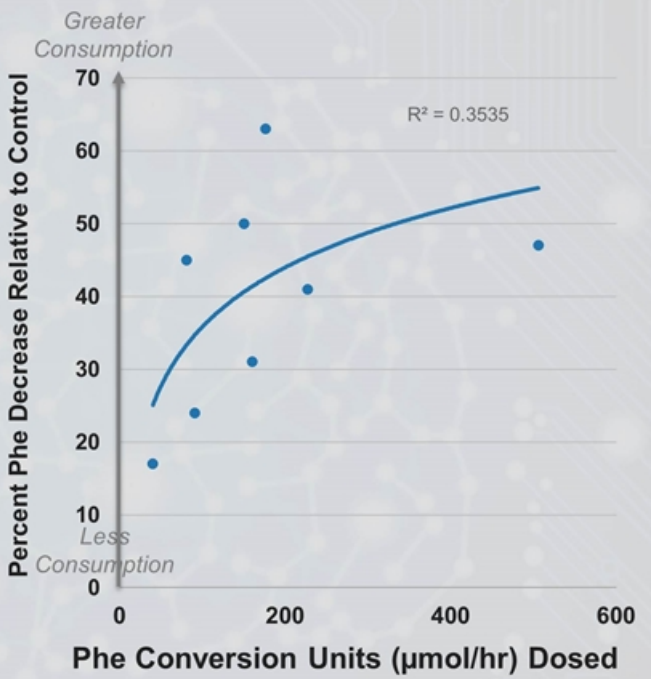


PKU: Efficient Phe Degradation *In Vitro* and *In Vivo*

Lead Optimization Based on Phe Degradation *in vitro*



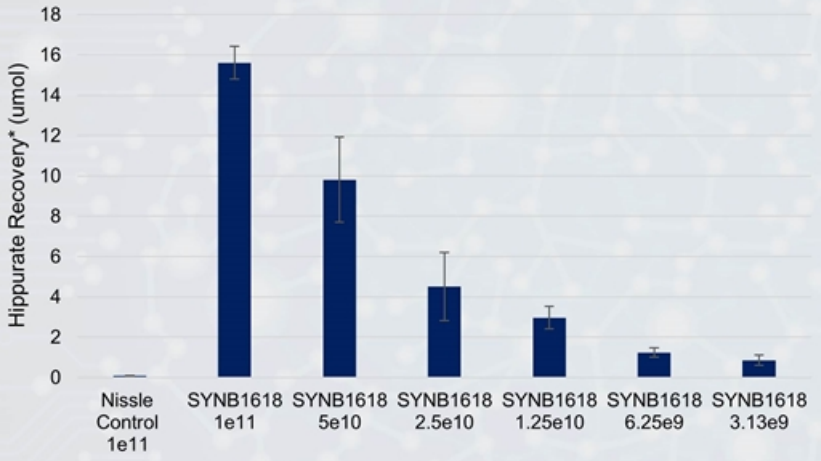
Blood Phe is Blunted in Activity Dependent Manner *in vivo* PKU Model



PAL – Convert Phe to TCA
pheP – Transport Phe into cell
LAAD – Convert Phe to PPA

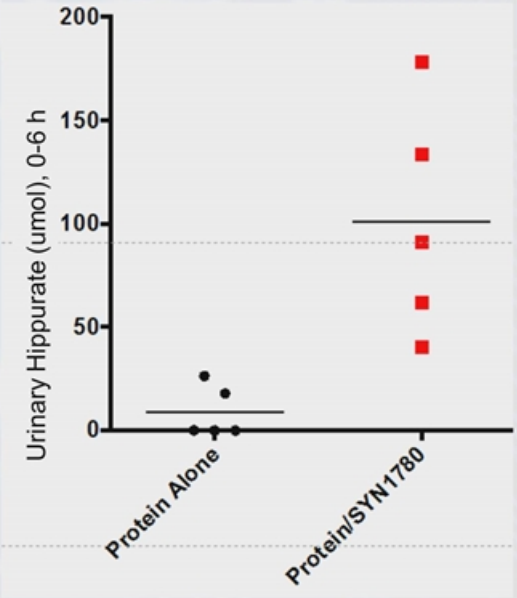
PKU: Urinary Hippurate as a Biomarker for Synthetic Biotic Program Activity

Increased Urinary Hippurate in Mice Following Treatment with Synthetic Biotic Program– Dose Response with Clinical Candidate



*Average quantity of hippurate recovered per cage

Increased Urinary Hippurate in NHP Following Treatment with Synthetic Biotic Program



SYNB1618: Planning Phase 1 SAD/MAD in Healthy Volunteers with Patient Cohort

- SYNB1618: Clinical Candidate for PKU
- Traditional SAD/MAD design assessing safety, tolerability and kinetics in healthy volunteers (HV) across a range of doses
- Includes a cohort of 8 PKU patients
- Proof of Mechanism: Hippurate production in HV
- Will assess reduction in plasma phenylalanine

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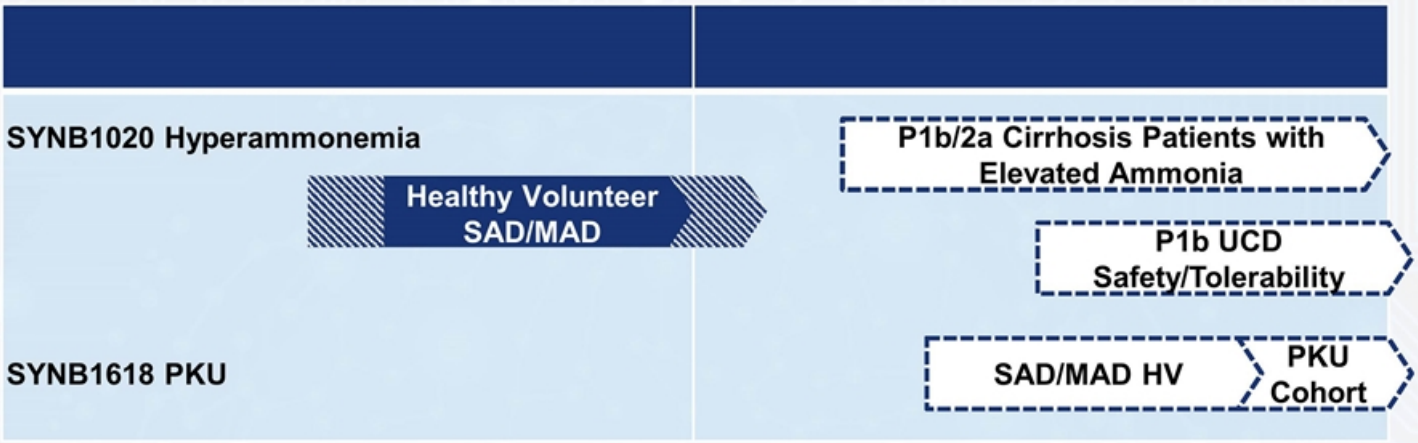
Key Inflection Points and Estimated Timing: SYNB1020 and SYNB1618



- SYNB1020 Estimated Timing:
  - Mid-2017: HV: Safety, tolerability, kinetics
  - First half of 2018: Cirrhosis patients with elevated ammonia initiates: Safety/tolerability and POC in patients (reduction of ammonia)
  - Mid 2018: UCD patient cohort initiates: Safety, tolerability
- SYNB1618 Estimated Timing:
  - First half of 2018: HV SAD/MAD, then initiate patient cohort
  - Evaluate Proof of Mechanism: Hippurate production
  - Evaluate Proof of Concept: Reduction of phenylalanine

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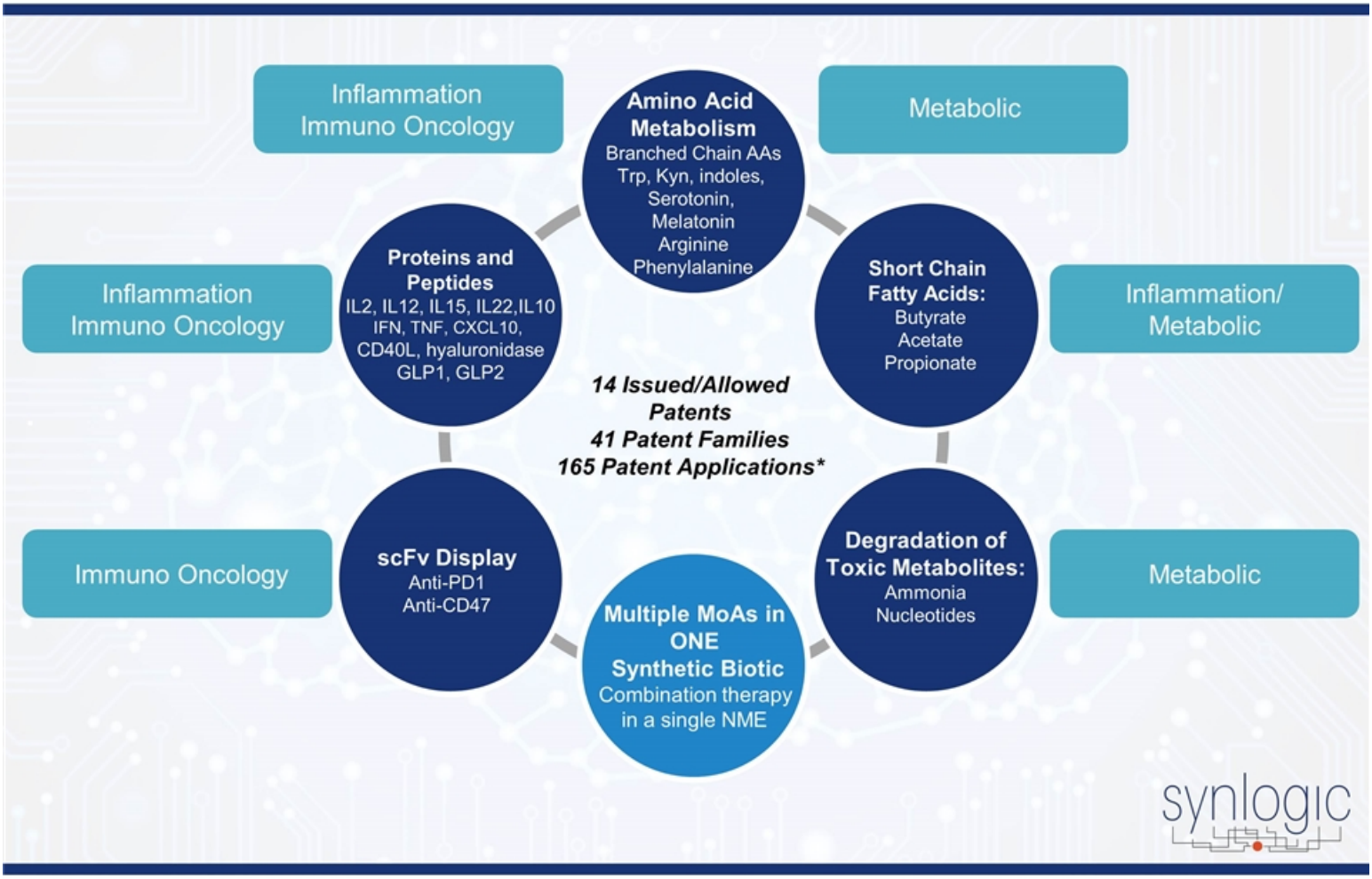
Synthetic Biotic Medicines: Applicability Beyond Rare Disease Across Multiple Pathways in Metabolic & Autoimmune Diseases and Immuno Oncology



* As of May 2017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Synlogic Overview

Novel Therapeutic Class

- **Synthetic Biotic Platform:** Leading in the use of synthetic biology to genetically reprogram beneficial probiotics to have transformative impact on treatment of human disease
- Simple, robust and rapid process for the creation of drug candidates
- Founded out of labs of James Collins and Timothy Lu at MIT

Robust Pipeline with Orphan Drug Programs

- SYNB1020 for Hyperammonemia including Urea Cycle Disorder (UCD) & Hepatic Encephalopathy (HE). Healthy volunteer study planned mid-2017
- SYNB1618 for Phenylketonuria (PKU): Planning IND

Broad Platform - Multiple Product Opportunities

- **AbbVie**: Inflammatory Bowel Disease (IBD) partnership
- **Broad Pipeline** with opportunities to partner in major indications- Immuno Oncology, Liver and Metabolic Diseases, Inflammation

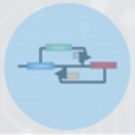
Dominant Synthetic Biotic IP Portfolio

As of May 2017

- 14 Issued/Allowed Patents
- 40 Patent Families
- 165 Pending Patent Applications

Strong Balance Sheet

- Raised ~$112M in three private rounds
- Investors include: Aju IB Investment, Ally Bridge Group, Atlas Venture, Deerfield Management, New Enterprise Associates (NEA), OrbiMed, Perceptive Advisors, Rock Springs Capital



Highly Experienced Management Team

- JC Gutierrez-Ramos, CEO
- Aoife Brennan, CMO
- Todd Shegog, CFO
- Paul Miller, CSO
- Dean Falb, CTO
- Richard Schwartz, SVP Manufacturing
- Caroline Kurtz, VP Translational Science