

The background features a large, glowing blue cell-like structure with a complex circuitry pattern. A circular DNA map is overlaid on the cell, showing various genomic regions with labels such as 13.91mb, 12.34mb, 11.56mb, and 9.12mb. The overall theme is the integration of biology and technology.

# Synlogic

DESIGNED FOR LIFE

September 2019  
Corporate Presentation

# Forward Looking Statements

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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.



A close-up photograph of a woman with long brown hair and a young girl with brown hair in a ponytail. They are both smiling and hugging each other. The woman is on the left, and the girl is on the right. They are outdoors, with a blurred green background. The image is used as a background for the text.

# Synthetic Biotic™ Medicines Designed For Life

Harnessing nature and technology  
to create LIVING medicines  
designed to significantly  
improve patients' LIVES

# 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

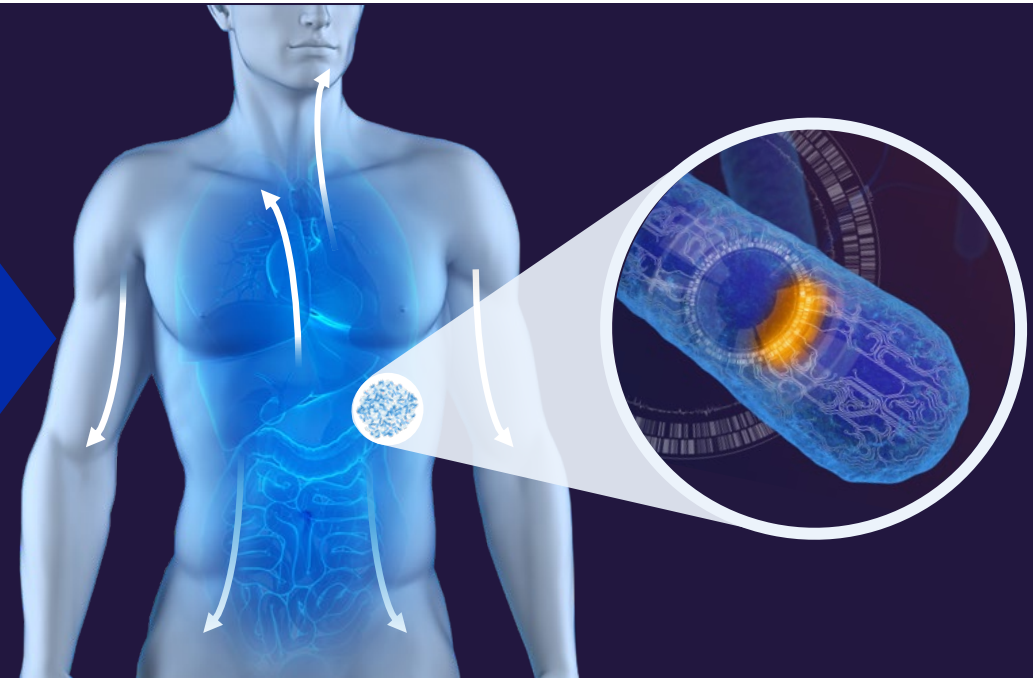
### BIOTIC

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

PATHWAYS, COMBINATIONS, BIOMARKERS

PROGRAMMABLE POTENCY AND CONTROL

LOCAL ACTIVITY, REDUCED SYSTEMIC TOXICITY



# Synthetic Biotic Portfolio: Breadth and Potential

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

## METABOLIC DISEASES

Rare  
Metabolic  
Disease

Broad  
Metabolic  
Disease

*Small or  
Large  
Intestine*

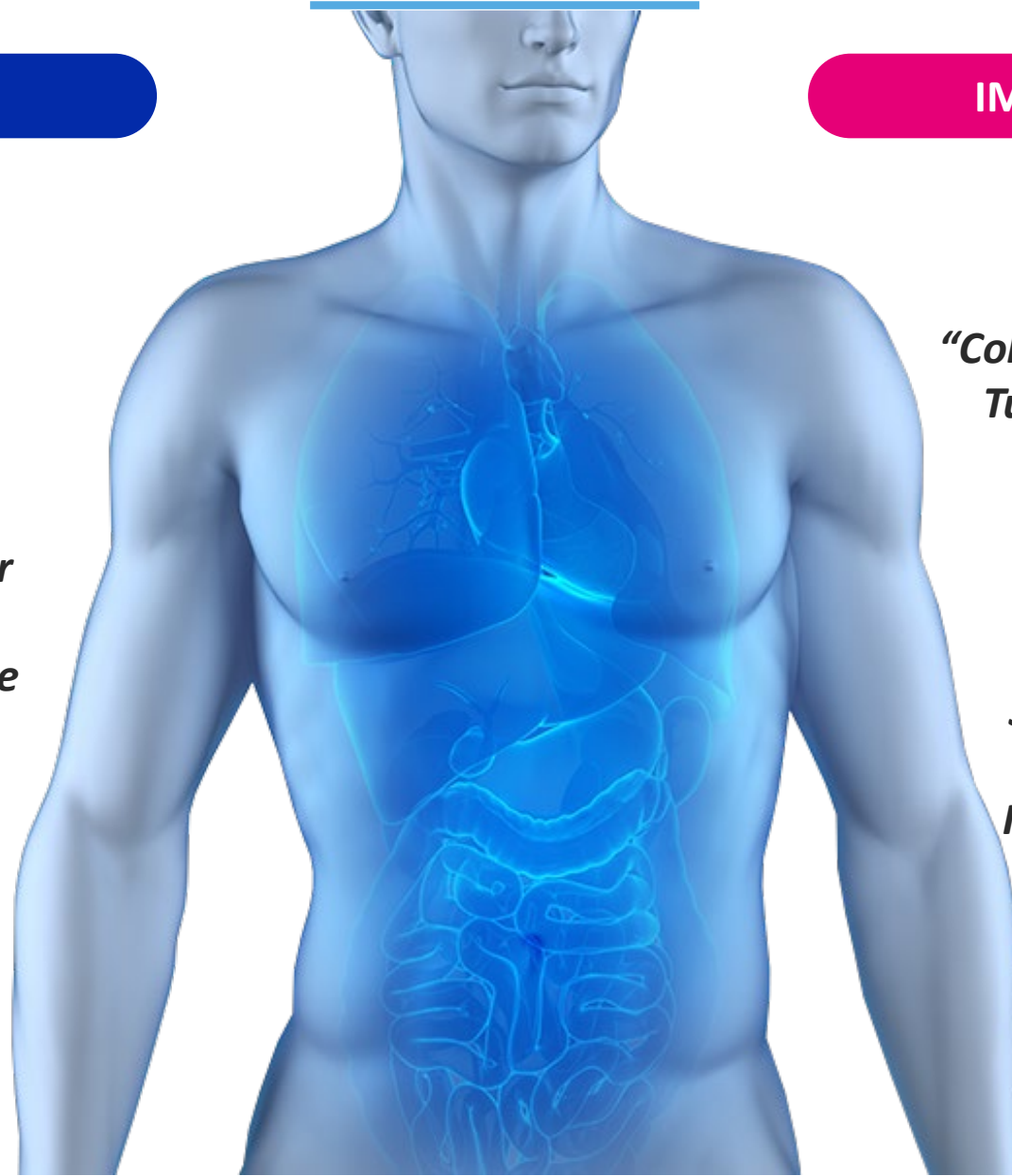
## IMMUNOMODULATION

*“Cold” Solid  
Tumors*

Immuno-  
Oncology

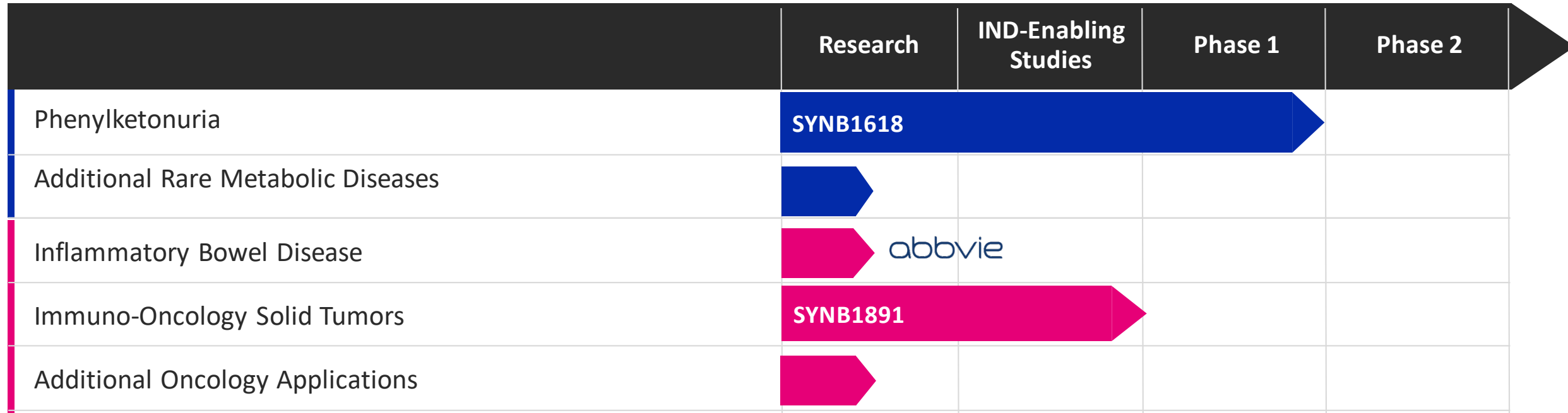
*Small or  
Large  
Intestine*

Inflammatory  
and  
Autoimmune





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



Rare Metabolic Diseases

Immunomodulation

# Metabolic Disease Pipeline

# 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
- Today, less than half of adults are at or below target Phe levels of 120-360  $\mu\text{mol} / \text{L}$
- If left untreated, symptoms include cognitive impairment, convulsions, behavioral problems, skin rash

### Patients:

- 16,500 diagnosed in US, similar in EU5

### Treatment:

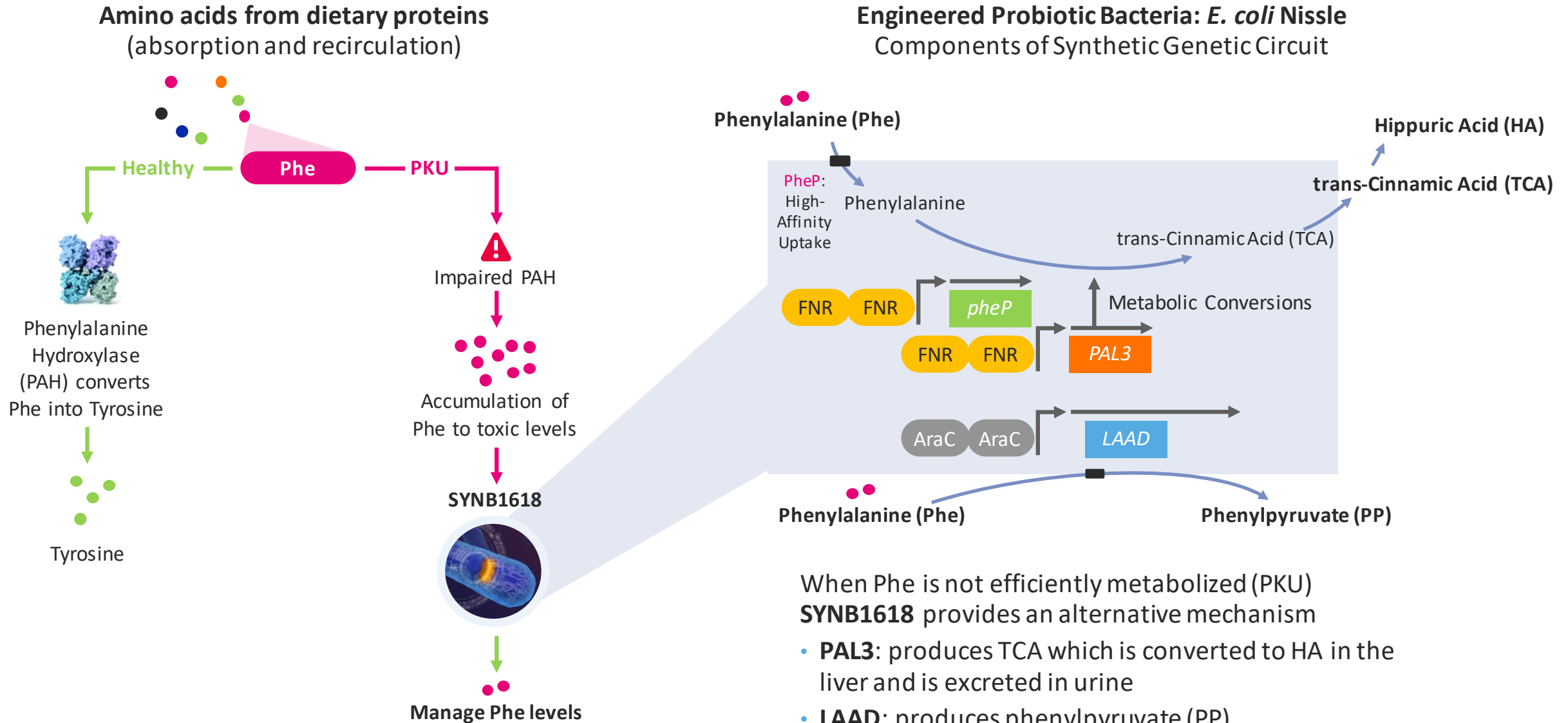
- Phenylalanine is found in all proteins therefore low protein diet is followed (no meat, dairy, nuts, eggs)
- KUVAN<sup>®</sup> (sapropterin dihydrochloride): PAH cofactor. 20-40% of patients are responders
- Palynziq<sup>™</sup> (pegvaliase-pqpz): injectable, pegylated, bacterial enzyme (phenylalanine 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



# SYNB1618 Preclinical Characterization

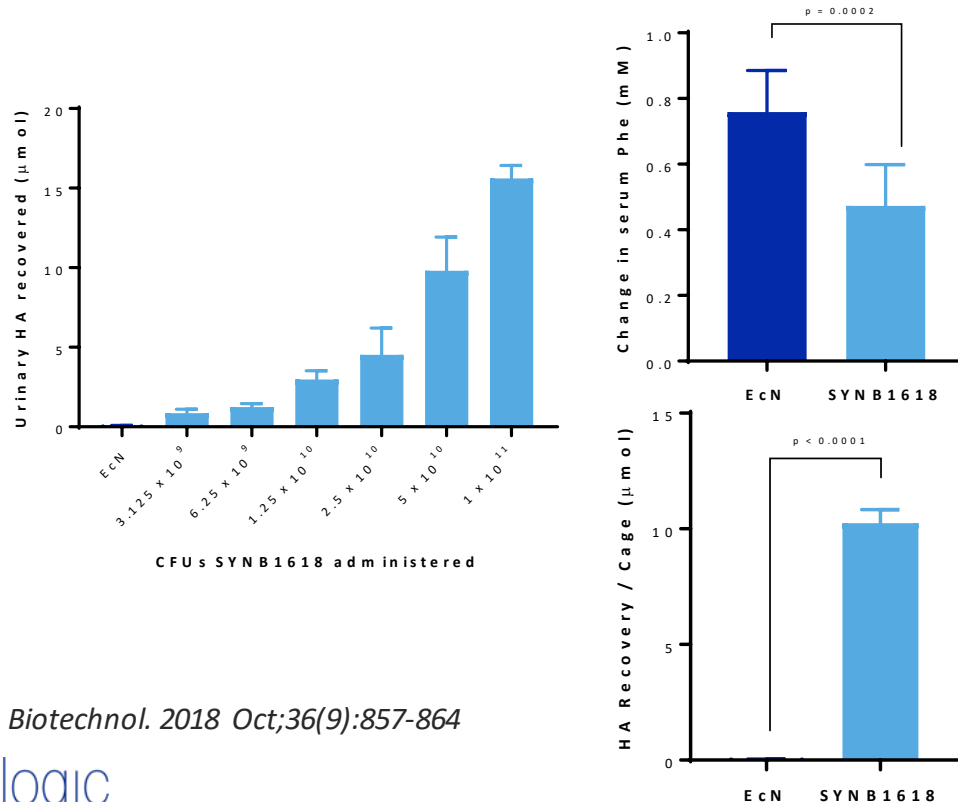
Biomarkers Demonstrate Activity of SYNB1618 in Mouse Model of PKU and Healthy NHPs

**nature  
biotechnology**

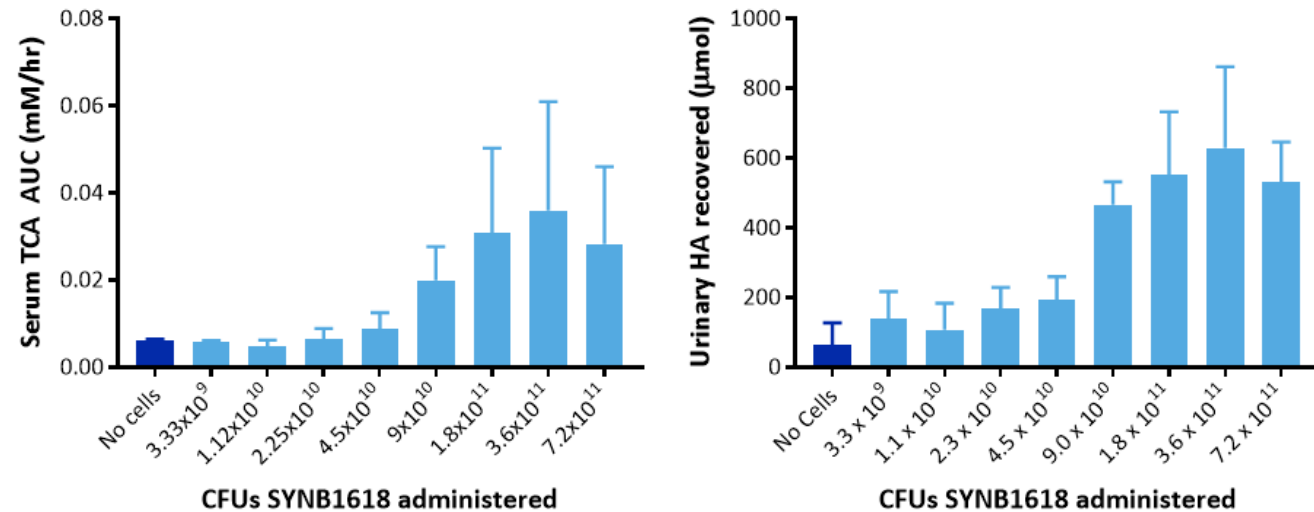
Development of synthetic live bacterial therapeutic for the human metabolic disease phenylketonuria

*Vincent M Isabella et al, Synlogic, Inc.*

## IN VIVO EFFICACY IN (PKU) PAH<sup>enu2/enu2</sup> MOUSE

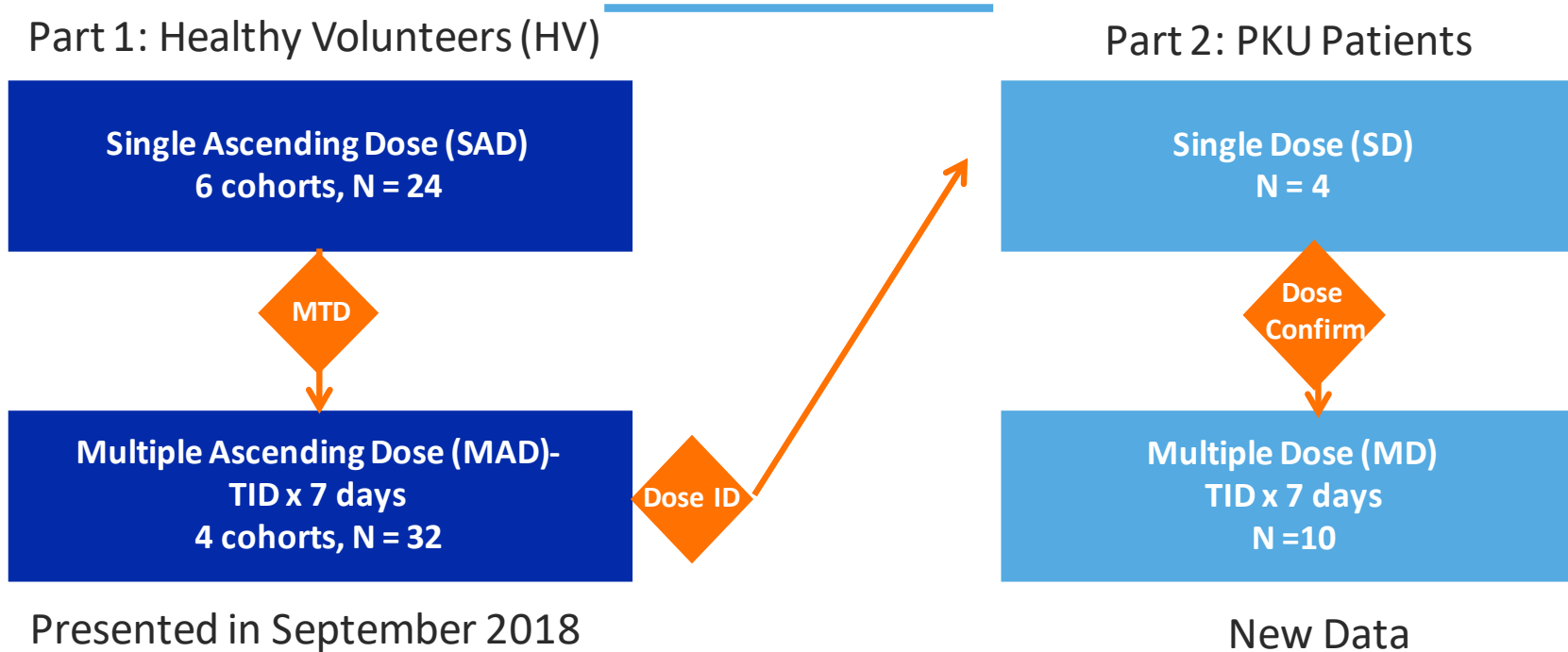


## DOSE RESPONSE IN HEALTHY NHPs



*Nat. Biotechnol. 2018 Oct;36(9):857-864*

# 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

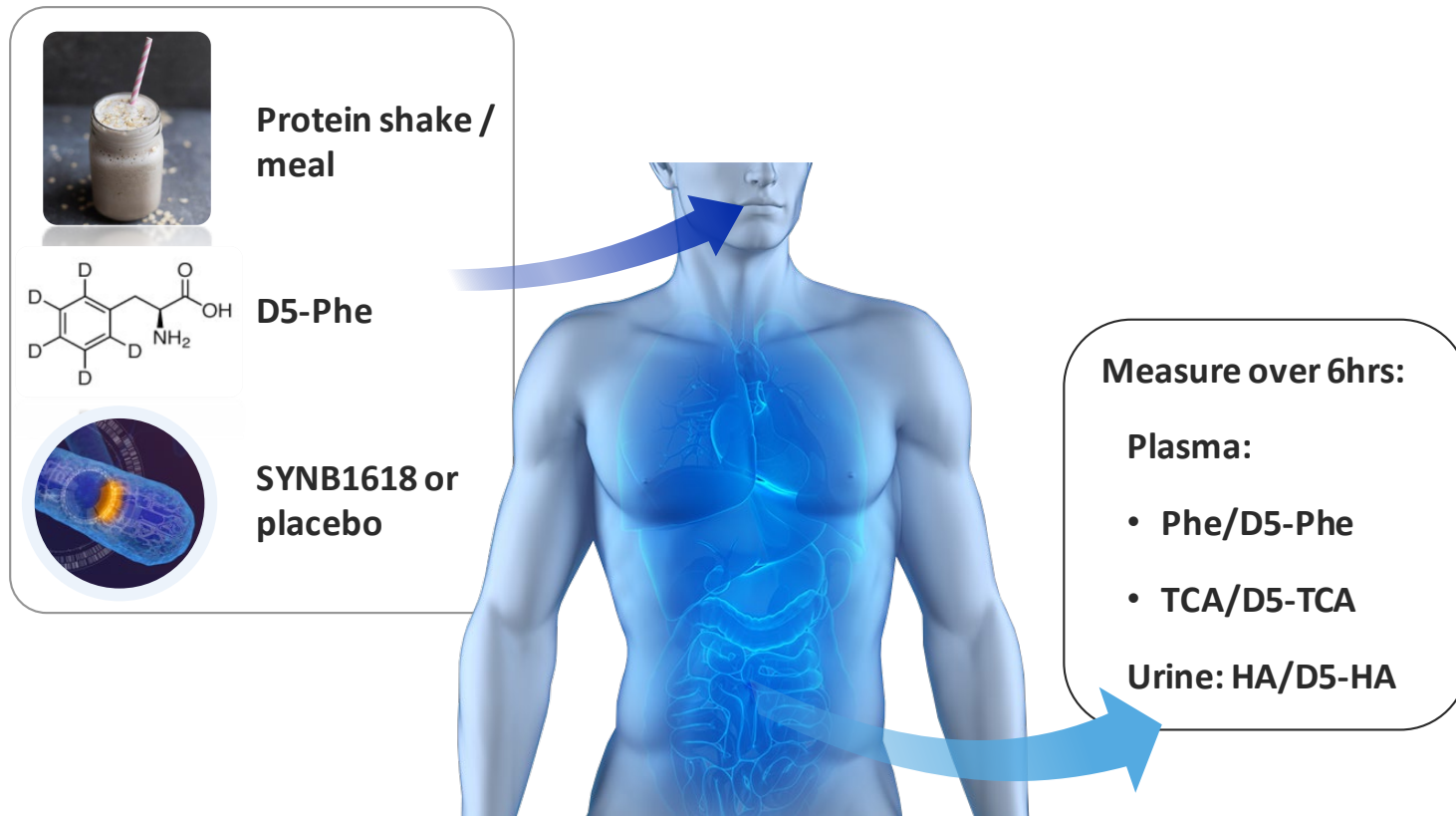
Received at least one dose  
of SYNB1618 or placebo

Adults  
Age range: 18-62 yrs old

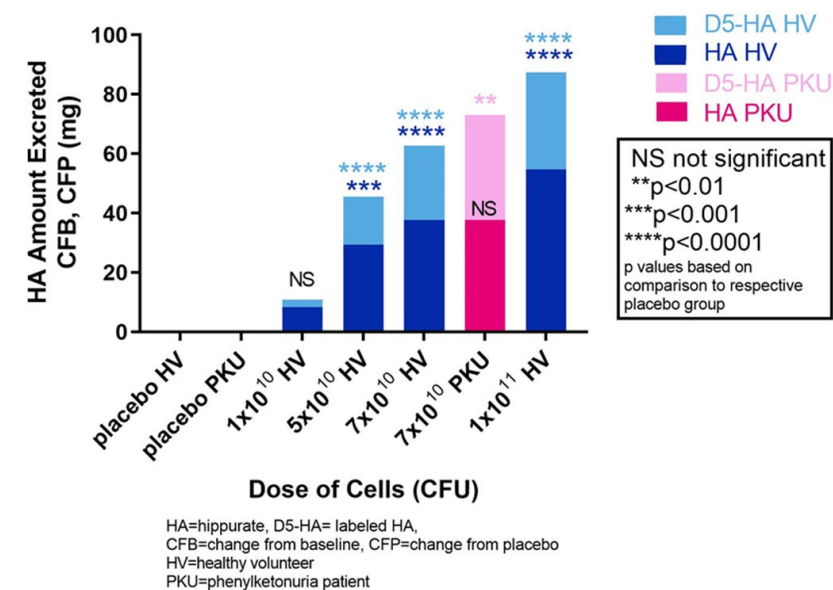
- ✓ There were no treatment-related serious adverse events, no systemic toxicity or infections
- ✓ Treatment-emergent adverse events were either mild or moderate in severity, and reversible. Most adverse events were GI-related
- ✓ Single dose MTD in healthy volunteers was defined as  $2 \times 10^{11}$  CFU. Doses above this level were associated with dose-limiting GI adverse events
- ✓ Based on pharmacodynamic data and tolerability profile, a dose of  $7 \times 10^{10}$  CFU was identified for the second part of the study in PKU patients
- ✓ Dose of  $7 \times 10^{10}$  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

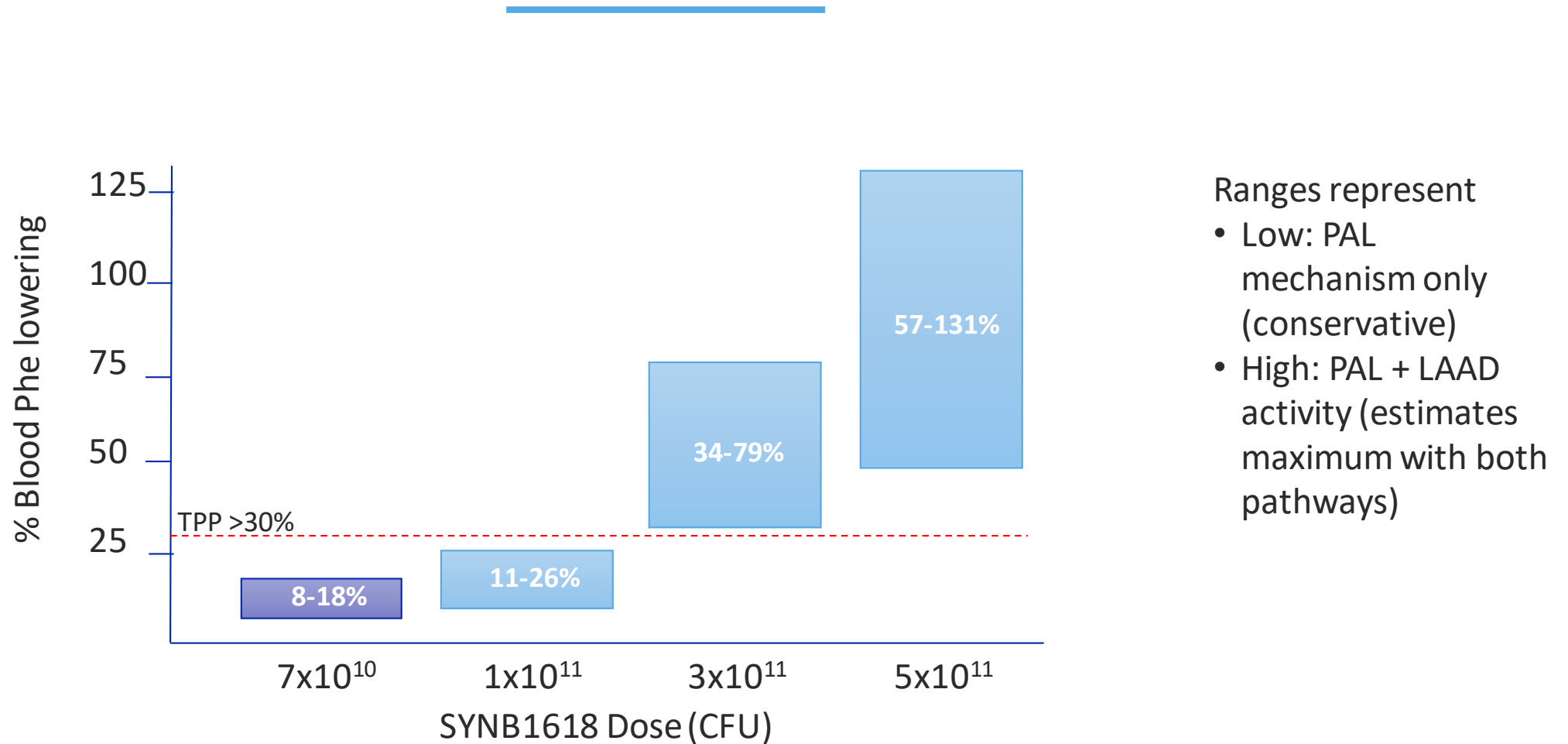
Statistically Significant and Equivalent Activity of SYNB1618 in Healthy Volunteers and Patients



## MD URINARY HA AND D5-HA

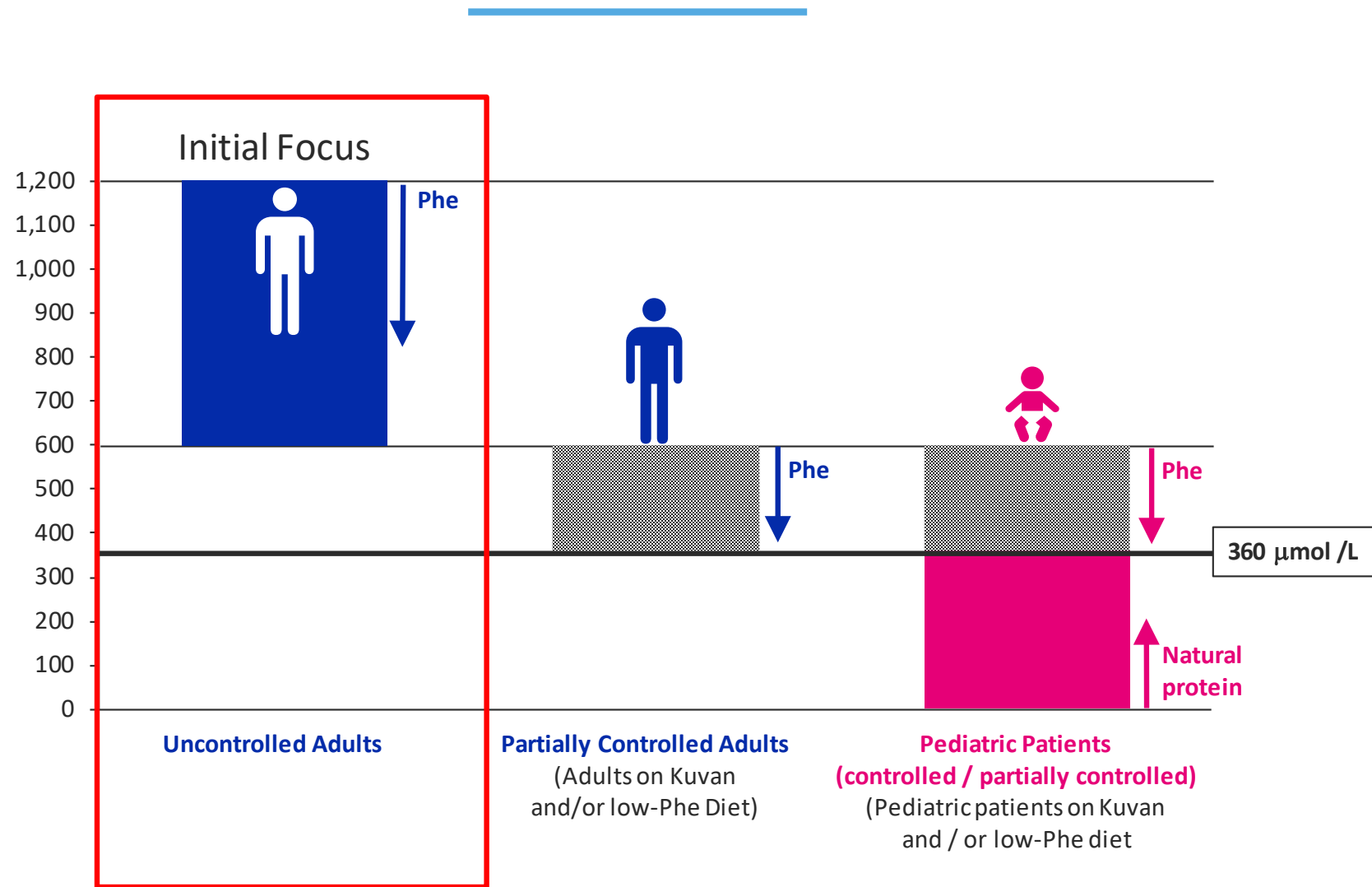


# Modeling: Potential For Phe Reduction in PKU Patients





# SYNB1618 Potential to Address Unmet Need Across Patient Groups



# Development of Lyophilized SYN1618

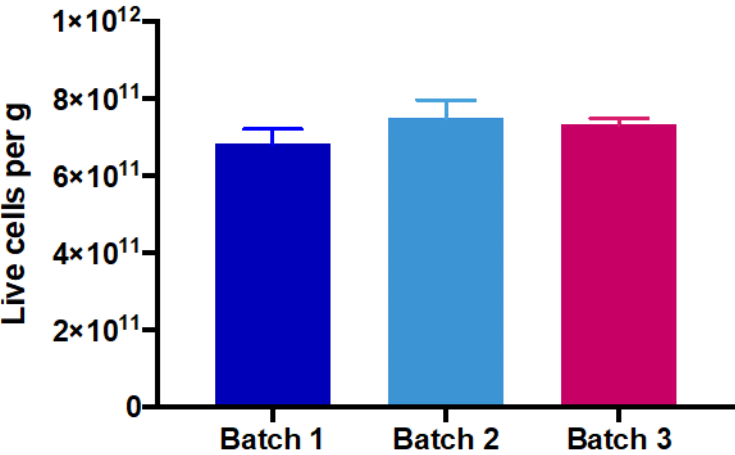
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- Improved fermentation process enables production of a solid formulation of SYN1618 with:
  - Minimal impact on cell viability and activity
  - Similar activity to frozen liquid as measured by Phe consumption and biomarker production
  - Improved 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 SYN1618 material has been manufactured and released for clinical use
- Bridging study ongoing in healthy volunteers

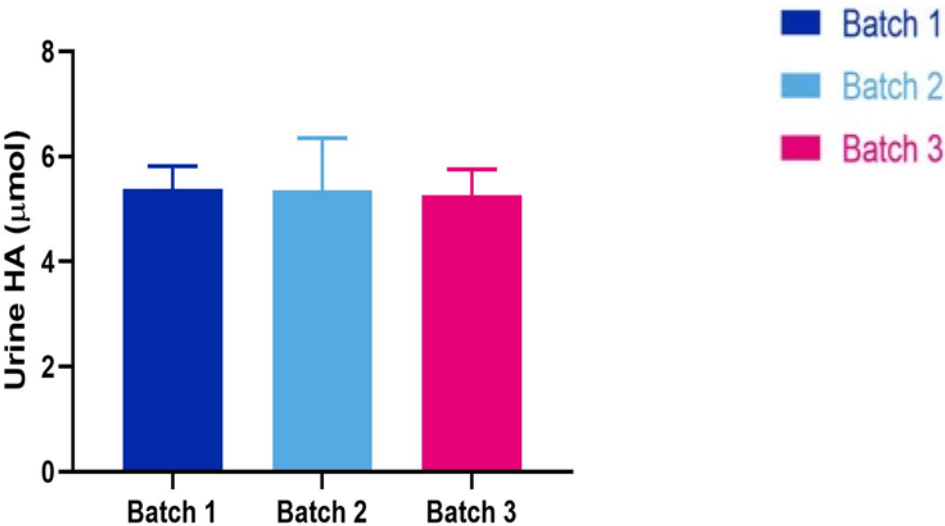
# Batch to Batch Consistency of SYNB1618 Solid Formulation



Viability



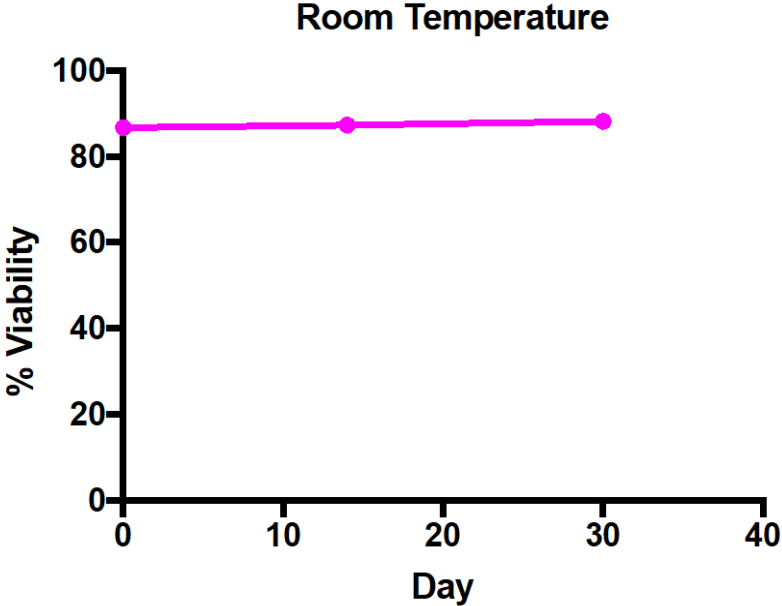
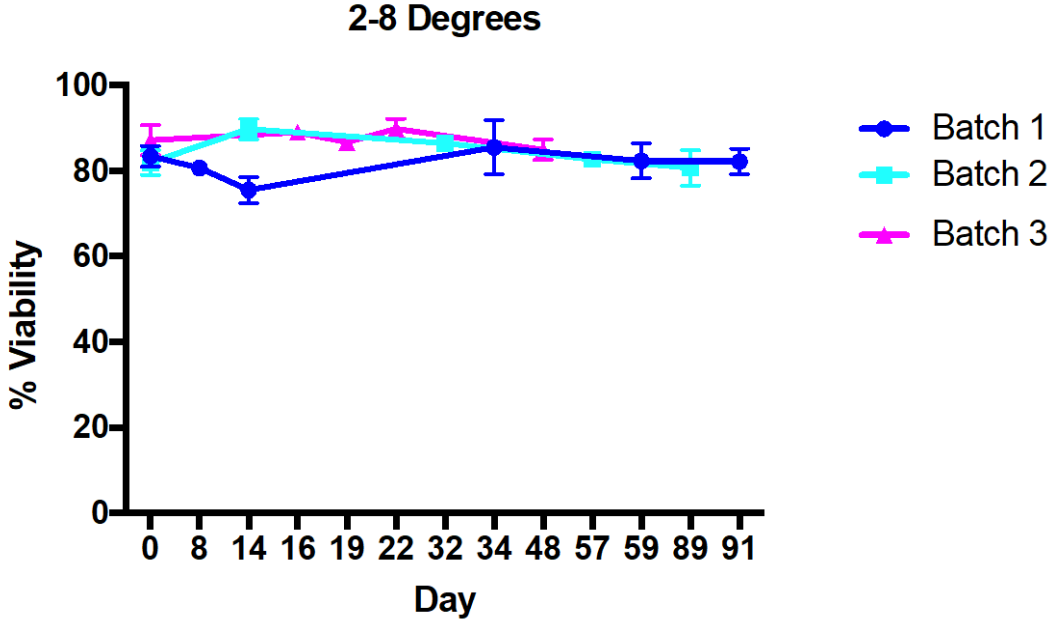
Activity in WT mice



- Batch 1
- Batch 2
- Batch 3



# Stability of SYN1618 Solid Formulation



# Upcoming Milestones and Path Forward

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Established new solid formulation and manufacturing process



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



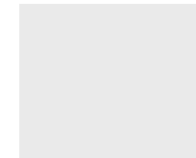
Completed Phase 1/2a study (healthy volunteers and PKU patients)



Initiate bridging study with solid formulation in Q3 2019



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



# Immuno-Oncology Pipeline



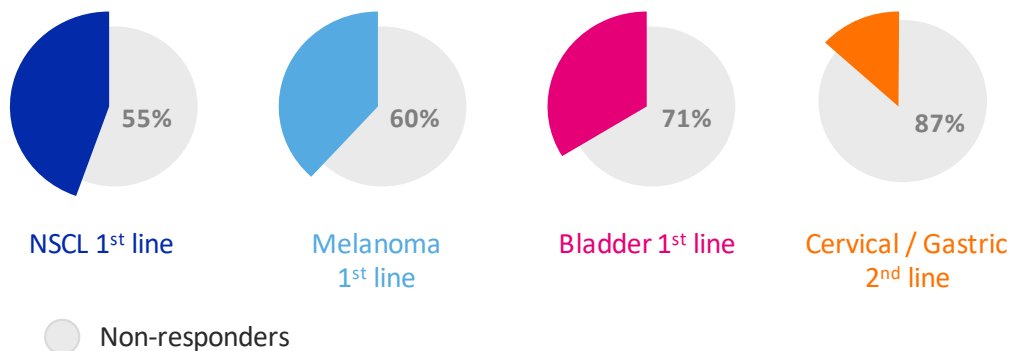
# Synlogic Vision for Immuno-Oncology

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 little-to-no response to checkpoint inhibitors

## Bacteria Recognized as Earliest Immunotherapy

“Nature often gives us hints to her 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 solution of this difficult problem.”

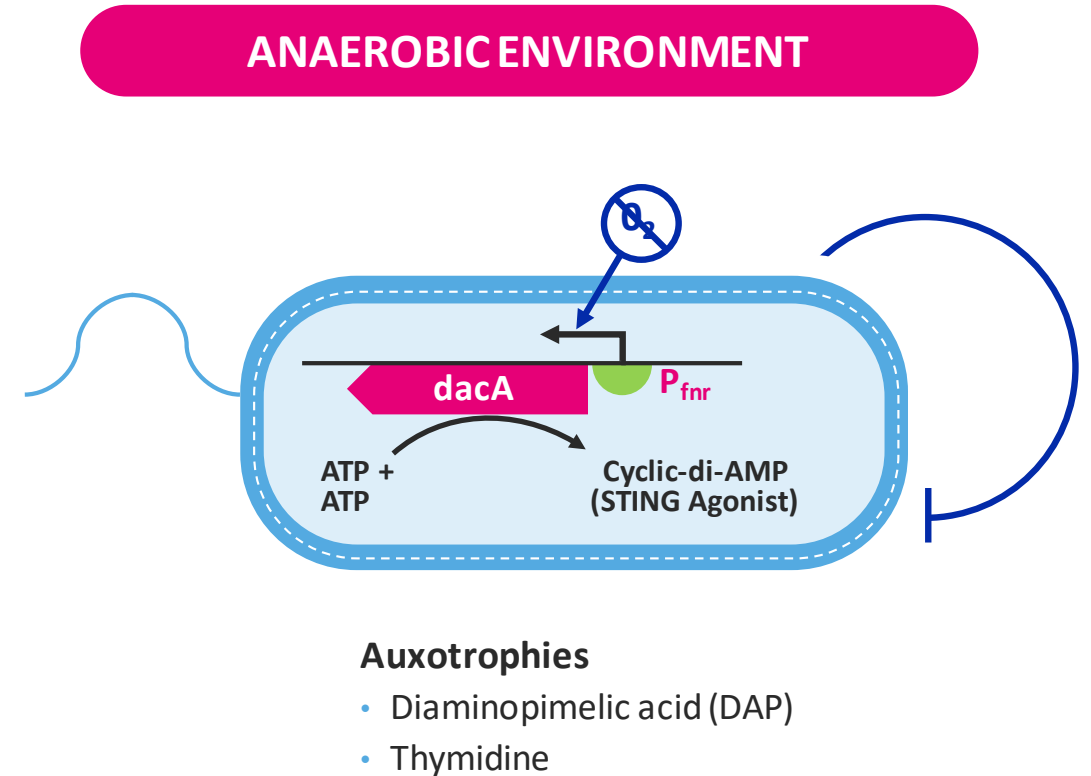


DR. WILLIAM B. COLEY  
IMMUNO-ONCOLOGY PIONEER

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

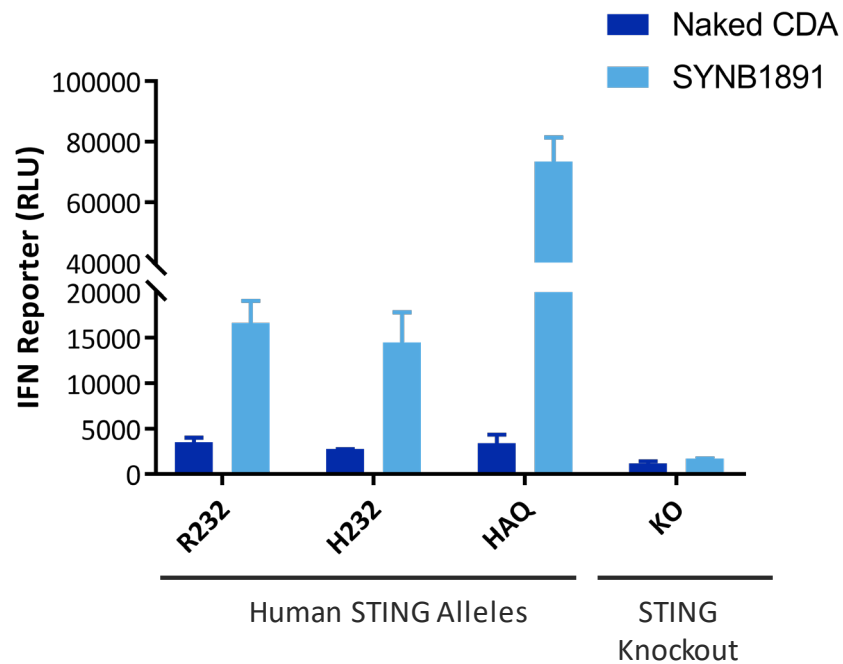




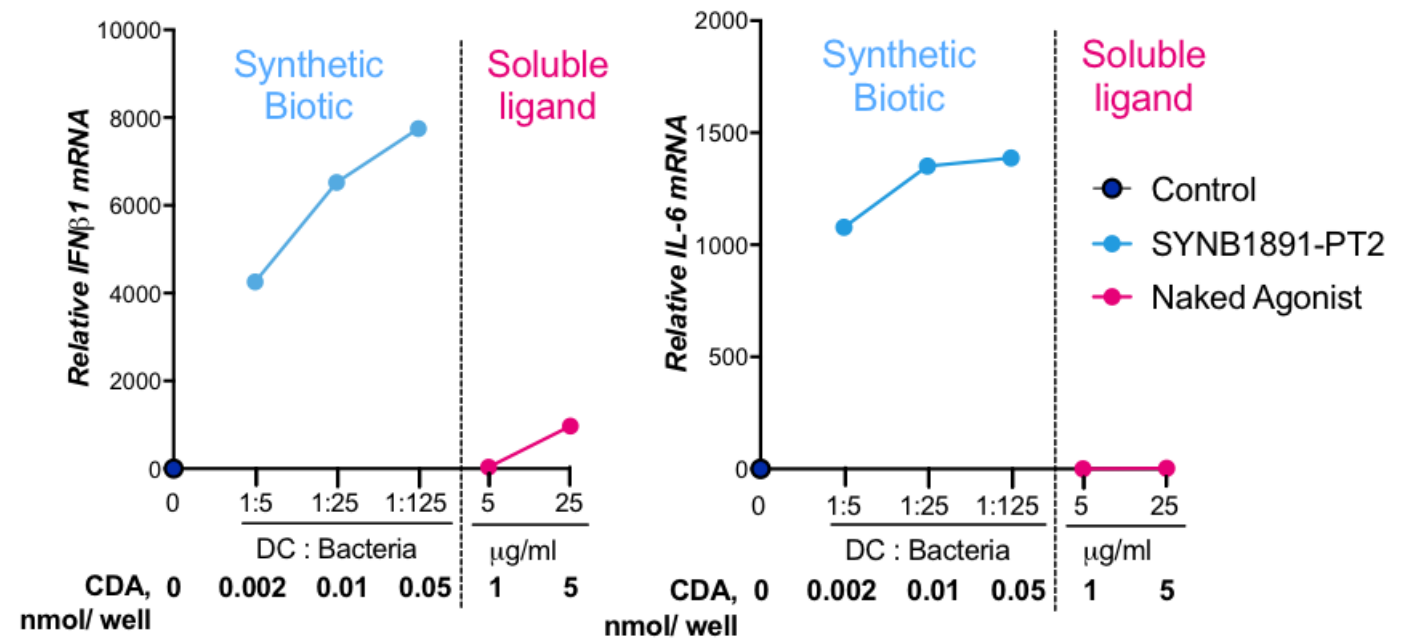
# SYNB1891 *In Vitro* Characterization

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

## REPORTER HUMAN MONOCYTIC LINE



## HUMAN PRIMARY DENDRITIC CELLS



# SYNB1891 *In Vivo* Characterization

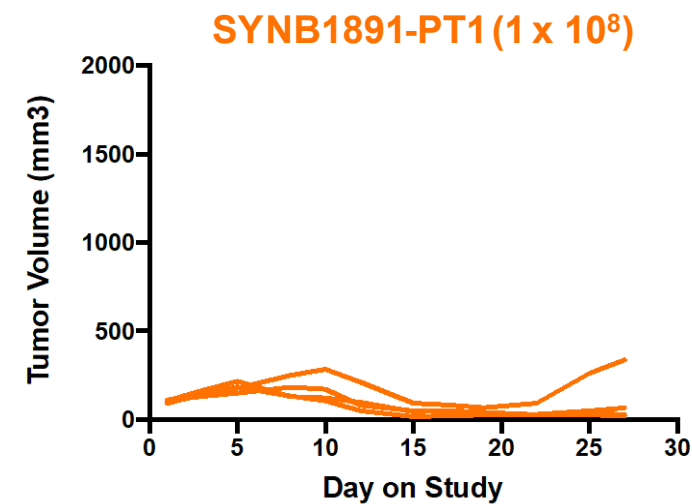
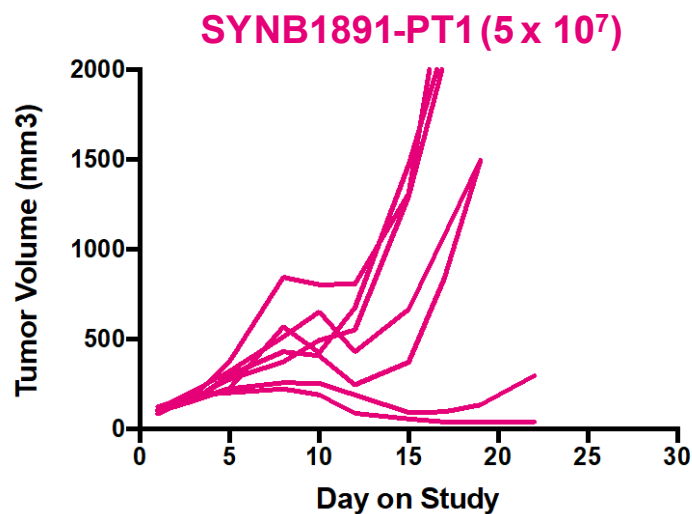
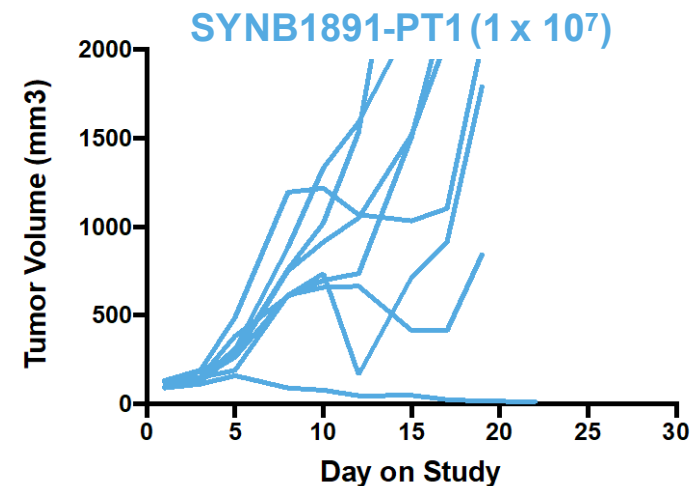
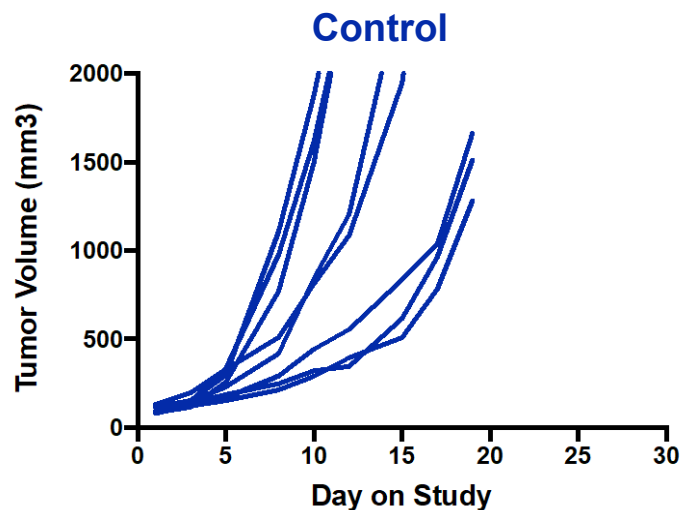
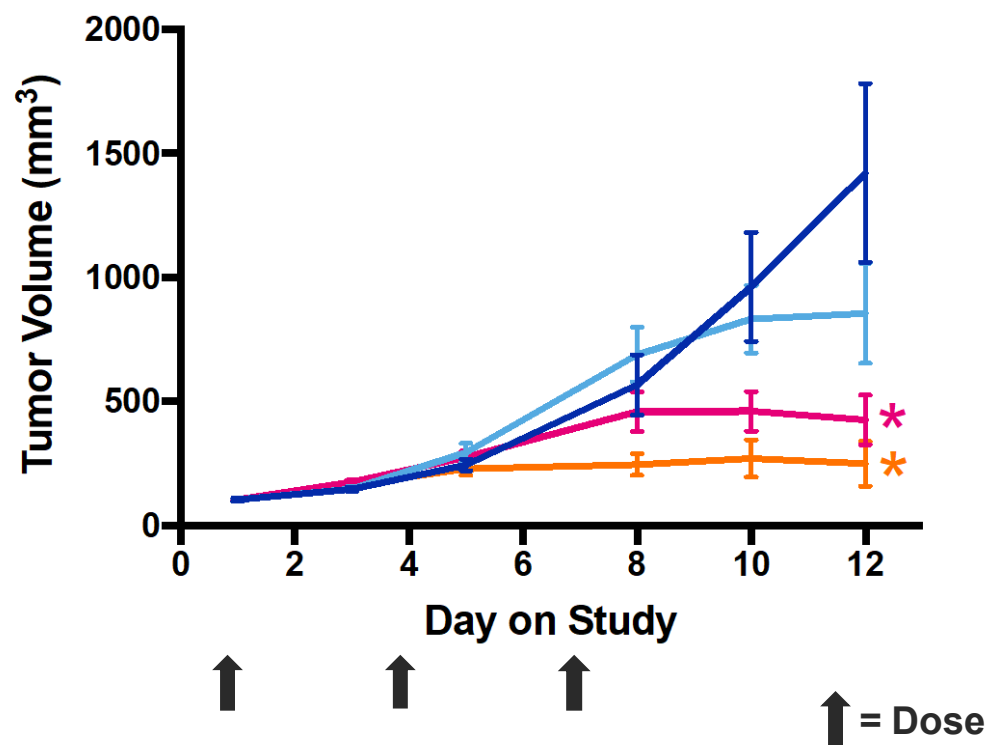
## Dose-dependent Anti-tumor Activity of SYNB1891 Prototype Strain (PT1) as a Single Agent



$10^7$ ,  $5 \times 10^7$  or  $10^8$  CFU, i.t. (SYNB1891-PT1)

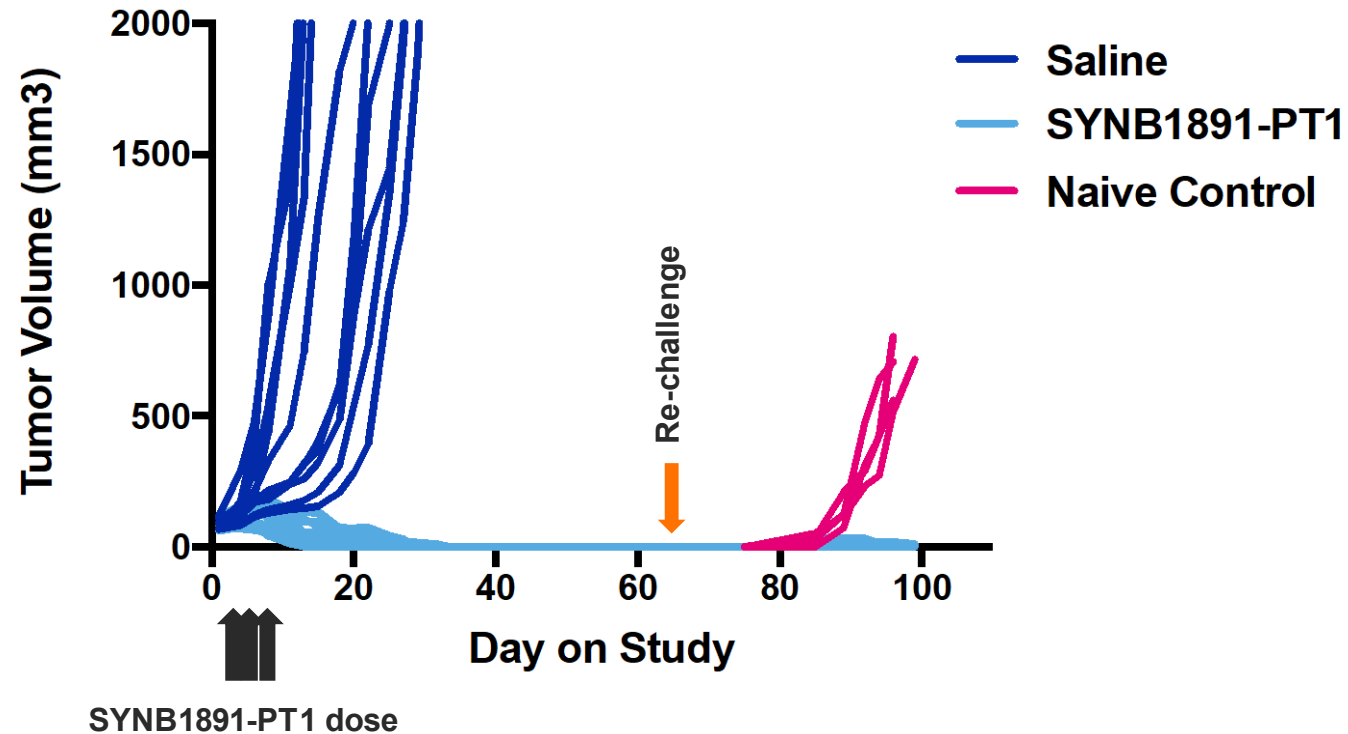
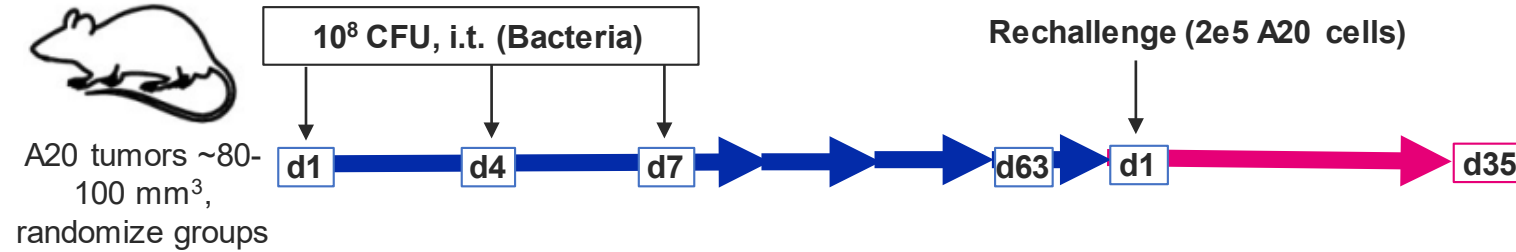
A20 tumors ~100 mm<sup>3</sup>, randomize groups

d1 d4 d7 d18



# SYNB1891 *In Vivo* Characterization

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



# Dual Innate Immune Activator SYNBI1891

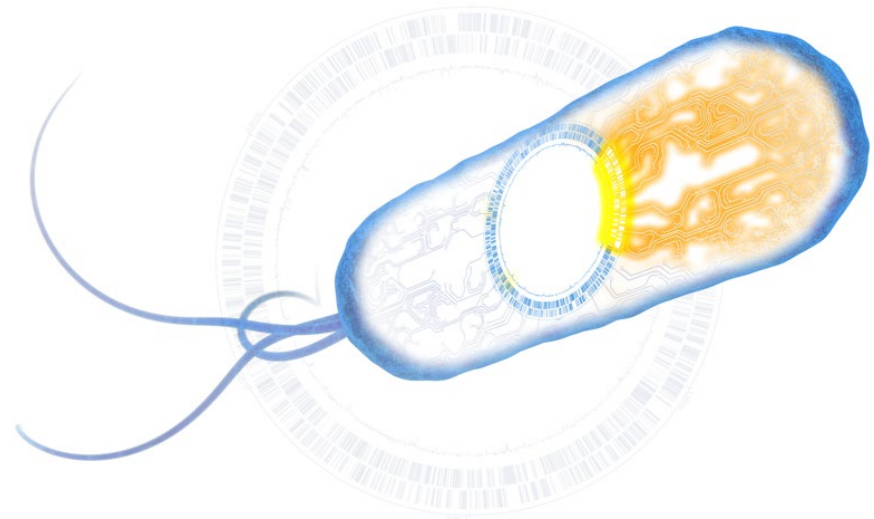
Designed to Locally Inflamm the TME and Systemically Drive Tumor Antigen-Specific Immunity

## PROGRESS TOWARDS THE CLINIC

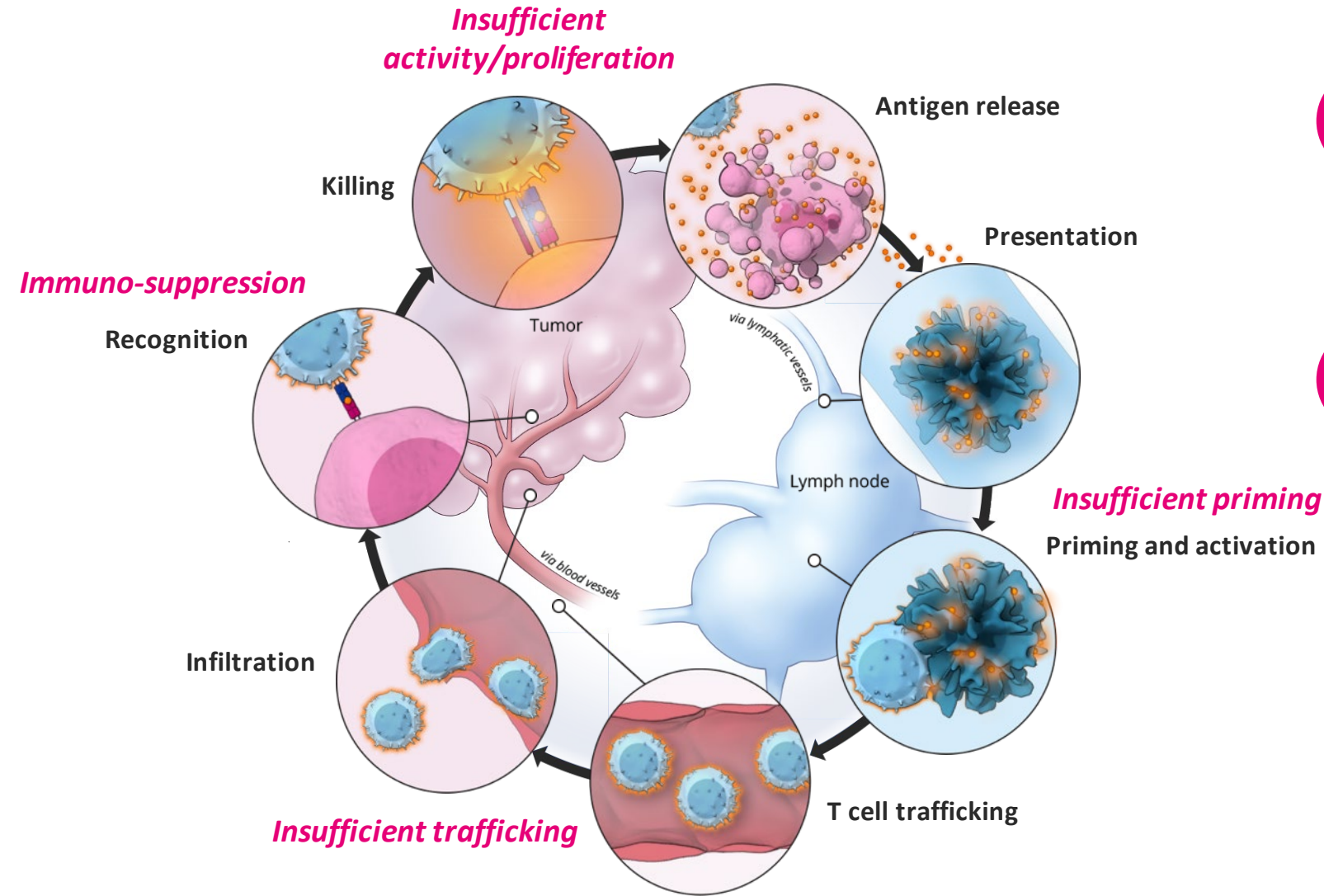
- Tumor Colonization without Leakage
- Enhanced Activity vs. Naked STING Agonist
- Intracellular Activation of STING and Bacterial-Induced Immune Pathways Within APCs
- Dose-dependent Anti-tumor Activity
- Immunological Memory
- Atezolizumab supply agreement in place
- IND Cleared by FDA
- Phase 1 monotherapy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

Systemically Drive Tumor-Antigen Specific Immunity

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



# Additional Synthetic Biotic Effectors

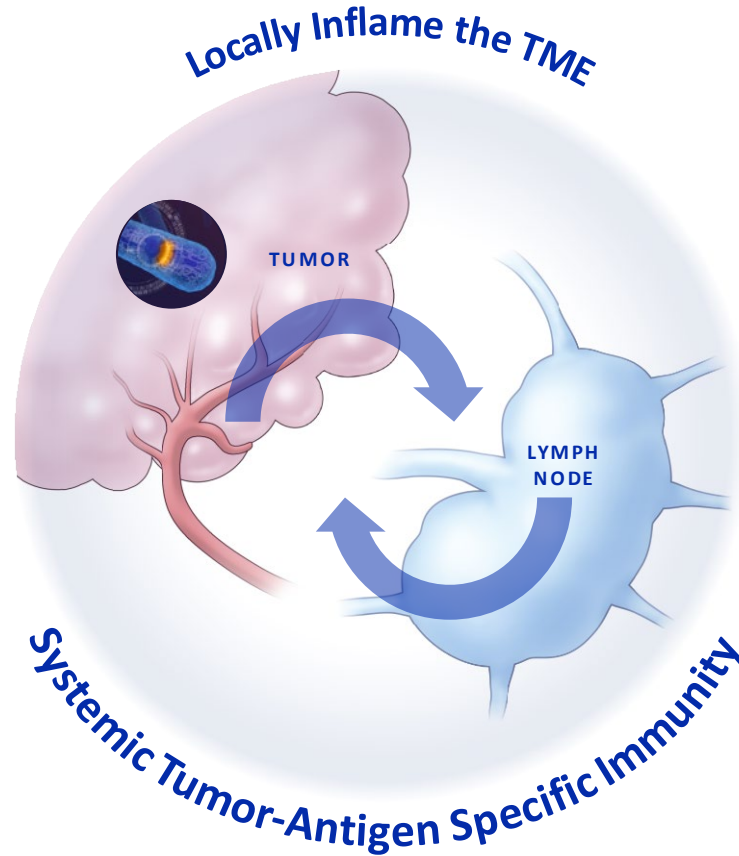
VISION: Rational Design to Locally Inflamm the TME AND Systemically Drive Tumor-Antigen Specific Immunity

## RELIEVE IMMUNOSUPPRESSION

- Kyn Consumption
- Ade Consumption
- $\alpha$ PD-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
- 5FC  $\rightarrow$  5FU
- STING
- $\alpha$ CD40 scFv/CD40L
- TNF $\alpha$
- IFN $\gamma$
- $\alpha$ CD47 ScFv / Sirp $\alpha$
- GM-CSF

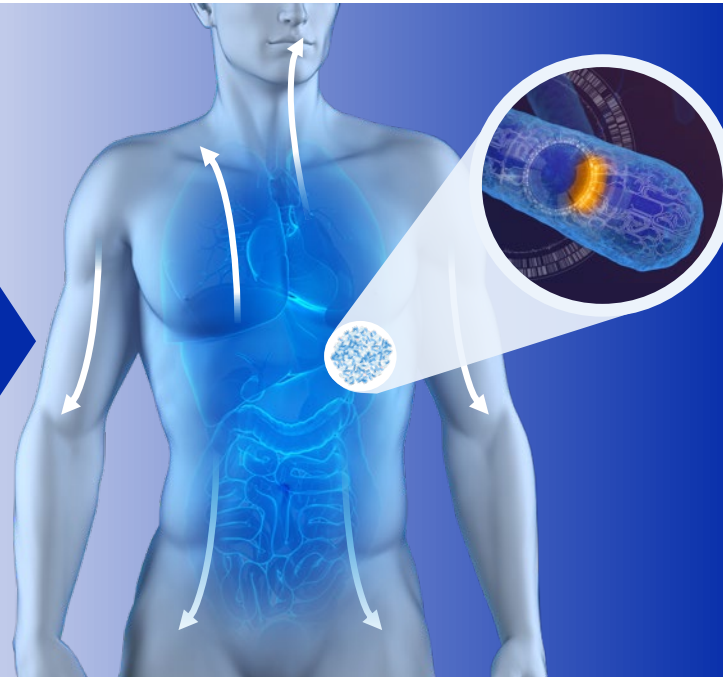
# Broad Ambitions in Immuno-Oncology

Vision: Expand and Exceed the Effect of Cancer Immunotherapies

**SYNB1891**

**DISCOVERY PORTFOLIO**

**INTRATUMORAL**



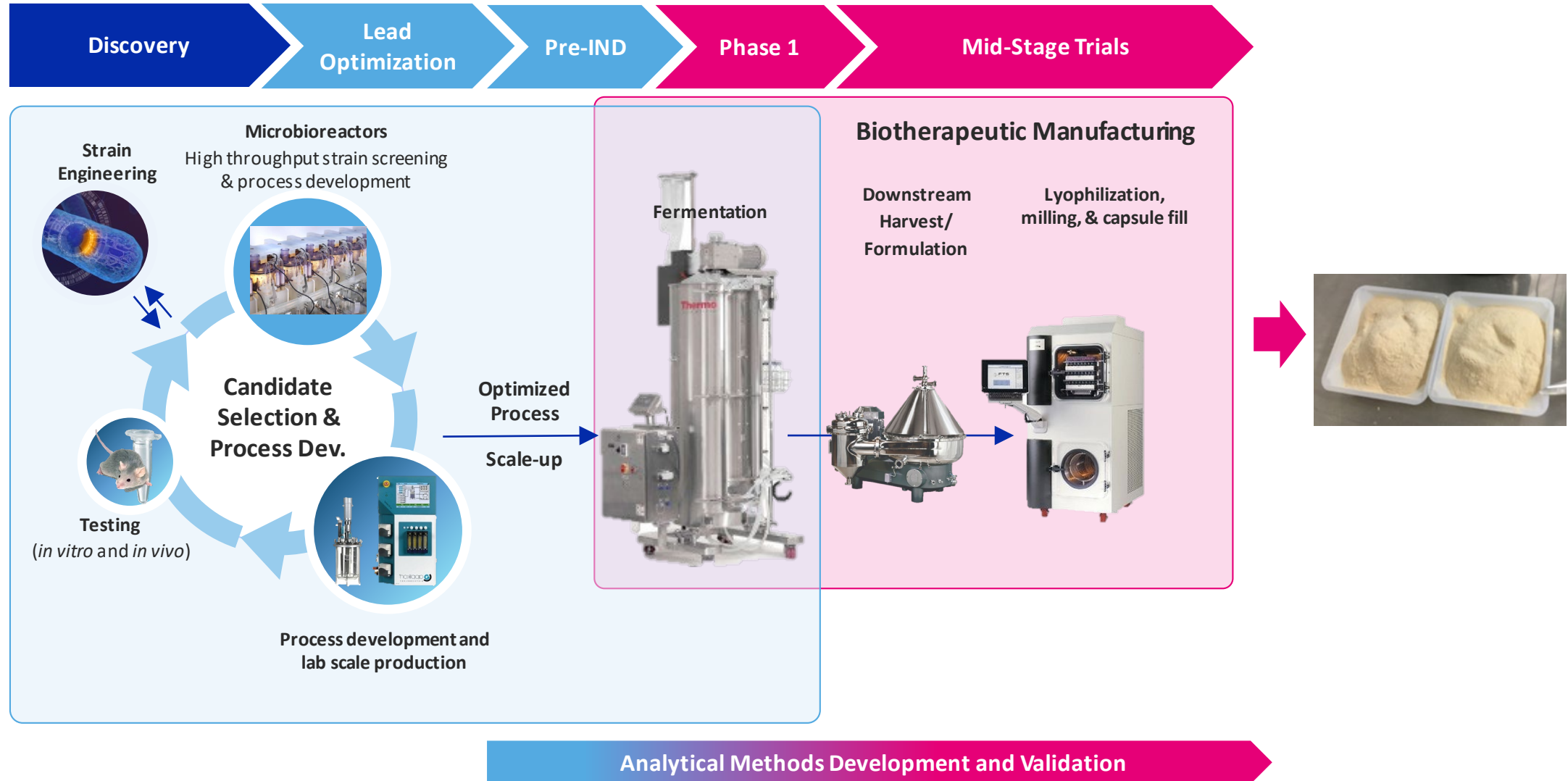
**COMBINATIONS**

**HARNESS THE MICROBIOME**

**ORAL**

# Synlogic Internal GMP Manufacturing Capabilities

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



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

synlogic



- Provides access to Ginkgo's industrial scale, high-throughput 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

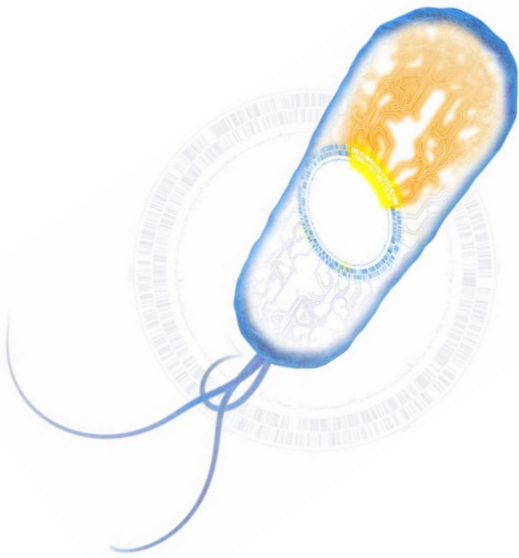
# 2019 Progress and Milestones

## SYNB1618 in PKU

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

## 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**





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