

# Corporate Presentation

**FEBRUARY 2021**

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The information in this presentation contains forward-looking statements that are subject to certain risks and uncertainties that could cause actual results to materially differ. These risks and uncertainties include: Assembly Bio's ability to initiate and complete clinical studies involving its HBV therapeutic product candidates, including studies contemplated by Assembly Bio's clinical collaboration agreements, in the currently anticipated timeframes; safety and efficacy data from clinical studies may not warrant further development of Assembly Bio's product candidates; clinical and nonclinical data presented at conferences may not differentiate Assembly Bio's product candidates from other companies' candidates; continued development and commercialization of Assembly Bio's HBV product candidates, if successful, in the China territory will be dependent on, and subject to, Assembly Bio's collaboration agreement governing its activity in the China territory; Assembly Bio's ability to maintain financial resources necessary to continue its clinical studies and fund business operations; any impact that the COVID-19 pandemic may have on Assembly Bio's business and operations, including initiation and continuation of its clinical studies or timing of discussions with regulatory authorities; and other risks identified from time to time in Assembly Bio's reports filed with the U.S. Securities and Exchange Commission (the SEC). You are urged to consider statements that include the words may, will, would, could, should, might, believes, hopes, estimates, projects, potential, expects, plans, anticipates, intends, continues, forecast, designed, goal or the negative of those words or other comparable words to be uncertain and forward-looking. Assembly Bio intends such forward-looking statements to be covered by the safe harbor provisions contained in Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. More information about Assembly Bio's risks and uncertainties are more fully detailed under the heading "Risk Factors" in Assembly Bio's filings with the SEC, including its most recent Annual Report on Form 10-K, Quarterly Reports on Form 10-Q and Current Reports on Form 8-K. Except as required by law, Assembly Bio assumes no obligation to update publicly any forward-looking statements, whether as a result of new information, future events or otherwise.



# Assembly Biosciences: Leading Innovation in HBV Therapeutics

## Major Global Health Need

- >270M people infected worldwide and ~1M deaths annually
- Significant need for finite and curative therapies



## Industry-Leading HBV Expertise

- World-class team with expertise in hepatitis drug development



## Broad R&D Pipeline

- Most advanced portfolio of core inhibitors (CI)
- Emerging research stage pipeline beyond core inhibitors



## Resourced for Success

- \$216.4 million in cash\*
- Sufficient to fund operations into 2023



# HBV is a Major Global Public Health Problem

Prevalence: **270M<sup>1</sup>**

Diagnosed  
**30M<sup>1</sup>**



Treated  
**5M<sup>1</sup>**

Up to 1M people die each year from HBV-related causes

Treatments are life-long and reduce but do not eliminate the virus, resulting in very low cure rates

Opportunity to improve outcomes and increase number of patients diagnosed and treated, with development of finite and curative therapies

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**No new MOAs approved for HBV in >25 years**

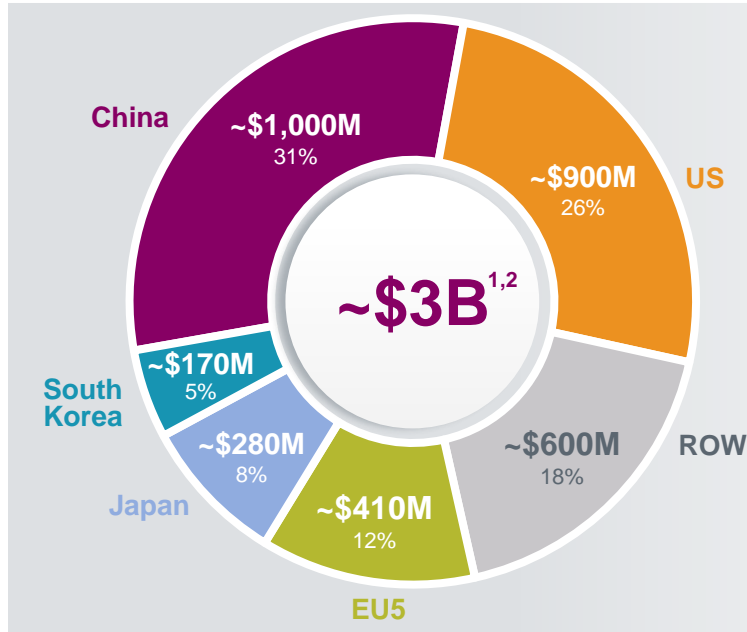
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# HBV is a Compelling Commercial Opportunity

\$3B Global HBV Market, Historically

## Global HBV Gross Sales by Key Country



- **Strong volume growth** has continued
  - ~35% increase in unit volumes from 2017 to 2019<sup>1</sup>
- **Concentrated commercial opportunity**
  - >80% of opportunity stems from 9 countries (China, US, and EU5, Japan and South Korea)
- **Significant market expansion potential**
  - With finite and curative therapies



# Assembly's Vision and Path to Finite and Curative HBV Therapeutics

## Singular Focus on Cure

- Finite and curative therapies represent the greatest unmet medical need for HBV patients

## Leading Portfolio of Core Inhibitors

- Deep pipeline of potent CIs, including the most advanced and potential best-in-class compounds
- Focused development plans enable data-driven selection of optimal CI for combinations

## Proof-of-Concept Combinations

- Initiated studies for triple combinations with RNAi and IFN
- Potential for additional combination studies or arms exploring CI + NrtI backbone with other mechanisms

## Strong Research Engine Expanding Beyond CIs

- cccDNA disruptor research collaboration
- Discovery efforts on two novel undisclosed targets

**Expertise, Focus, Resources and Collaborations to Succeed**



# Key Components to Drive Our HBV Strategy

1

## More Potent Next Generation Core Inhibitors

### 2158 & 3733

- 2158 – Phase 2
- 3733 – Phase 1
- 4<sup>th</sup> core inhibitor candidate to be nominated in H1'21

2

## Combination Studies

### VBR+NrtI + 3<sup>rd</sup> MOA

- VBR+NrtI + RNAi: Phase 2 initiated
- VBR+NrtI + IFN: Phase 2 initiated

3



## Expanded Research Engine

### Novel Targets

- Core Protein cccDNA Disruptor
- Multiple differentiated undisclosed targets



# Broad HBV Clinical & Research Stage Portfolio

Drug Candidate	Discovery & Optimization	IND Enabling	Phase 1	Phase 2	Phase 3	China Rights	Worldwide Rights
Vebicorvir (VBR, ABI-H0731)	TRIPLE COMBO TRIAL (VBR+NrtI+RNAi <sup>1</sup> )					 BeiGene	 assemblybio
	TRIPLE COMBO TRIAL (VBR+NrtI+IFN)						
ABI-H2158 (2158)							
ABI-H3733 (3733)							
4 <sup>th</sup> Core Inhibitor Candidate							
Core Protein cccDNA Disruptor <sup>2</sup>							
Undisclosed Target 1							
Undisclosed Target 2							

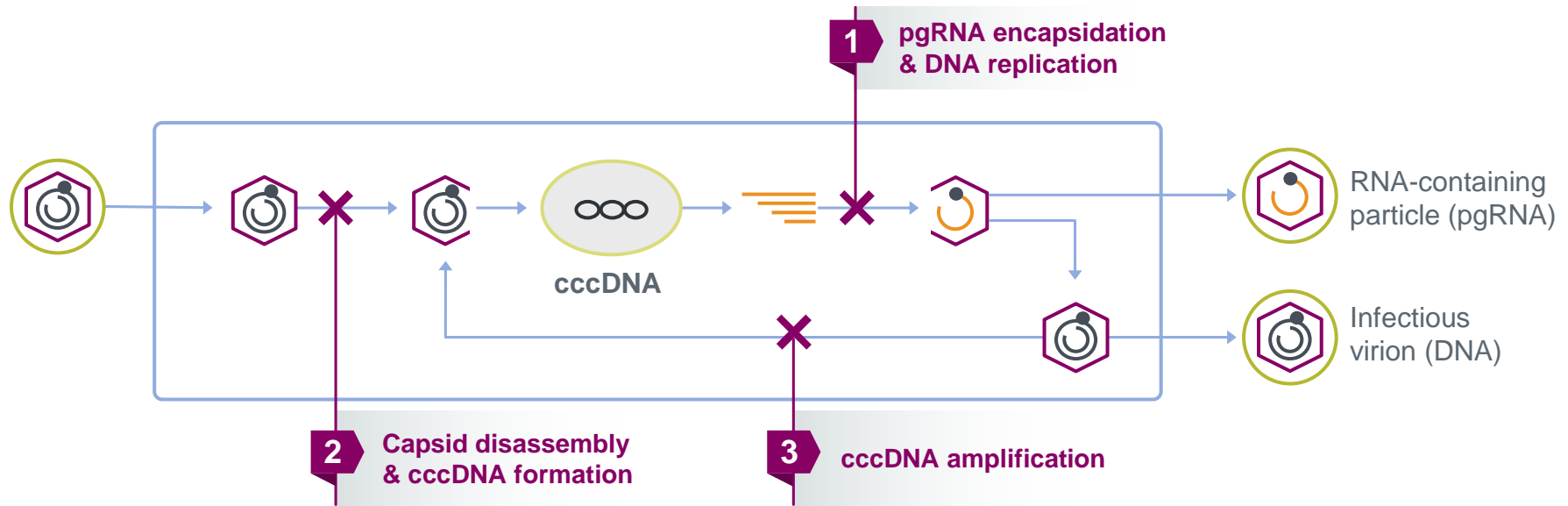
HBV





# Clinical Progress of Vebicorvir (VBR)

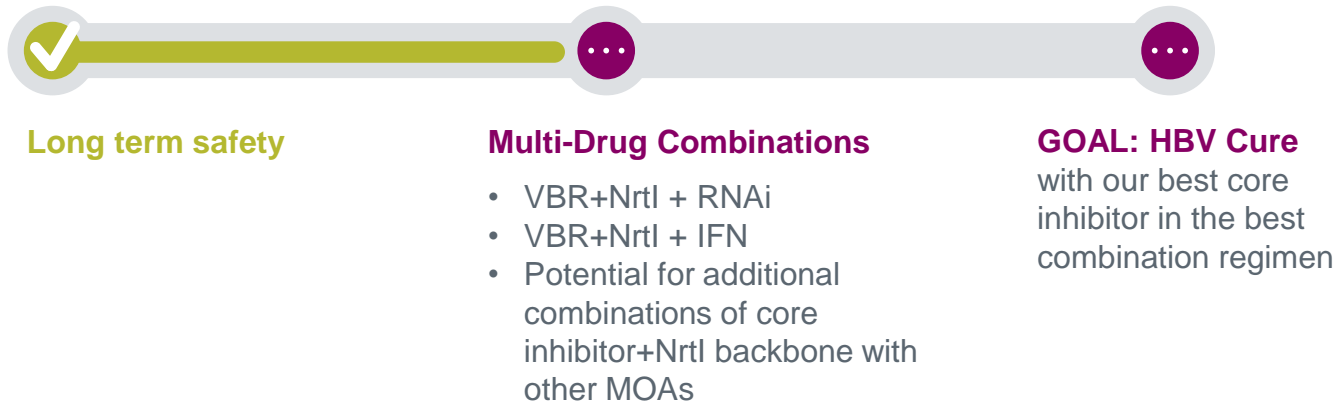
# Core Inhibitor: Multiple Mechanisms of Action



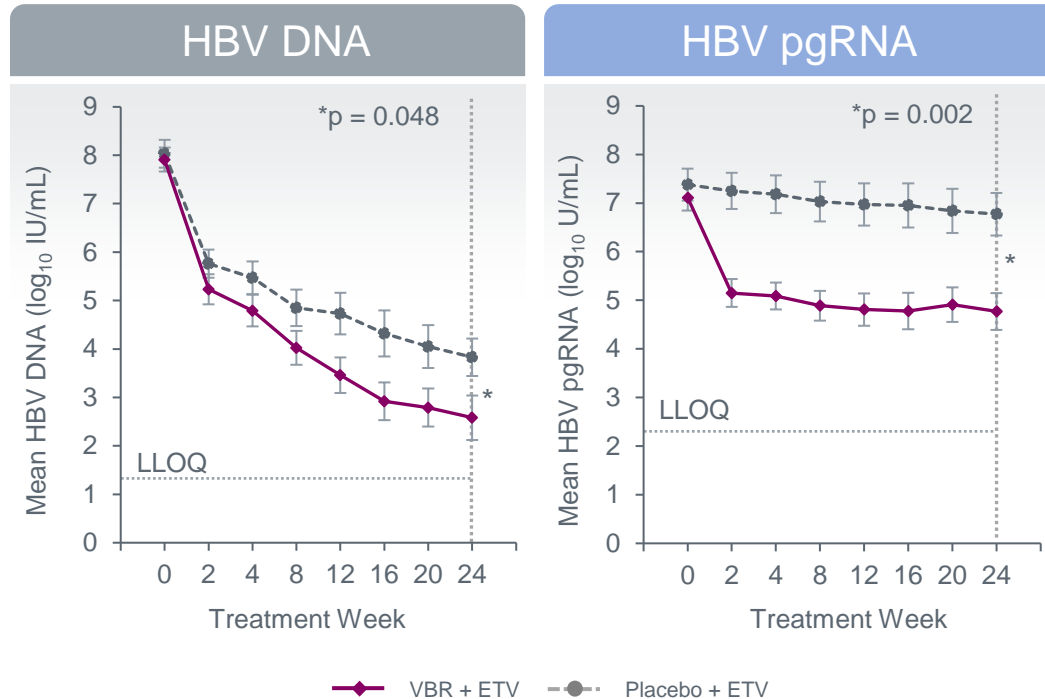
- Core inhibitors target multiple steps of the HBV replication cycle to suppress HBV DNA, pgRNA, and cccDNA
- Combination of a core inhibitor and a NrtI will be the backbone for finite and curative regimens



# Core Inhibitors: Clinical Progress and Path to Cure



# Vebicorvir + Nrtl Results in Greater Viral Suppression



In the Phase 2 program, including Studies 201, 202 and 211, VBR + Nrtl led to greater viral suppression than Nrtl alone across patient populations including:

- Treatment-naïve HBeAg positive patients (shown at left)
- Virologically-suppressed HBeAg negative patients as assessed by Assembly Bio's more sensitive HBV nucleic acid assays

HBV DNA LLOQ=20 IU/mL. HBV pgRNA LLOQ=135 U/mL Standard error shown in the plot.  
731, ABI-H0731; ETV, entecavir; PBO, placebo.

# VBR + Nrtl Has a Favorable Safety Profile

**The Phase 2 program, including Studies 201, 202 and 211, included 95 patients treated with VBR+Nrtl for up to 1.5 years**

AEs and laboratory abnormalities were mostly Grade 1 or 2, did not increase with time and were similar between placebo+Nrtl and VBR+Nrtl

Rash reported with VBR was predominantly Grade 1, not associated with systemic involvement and resolved without dosing interruption

No increased ALT and/or AST indicative of hepatotoxicity



# Next Generation Core Inhibitors

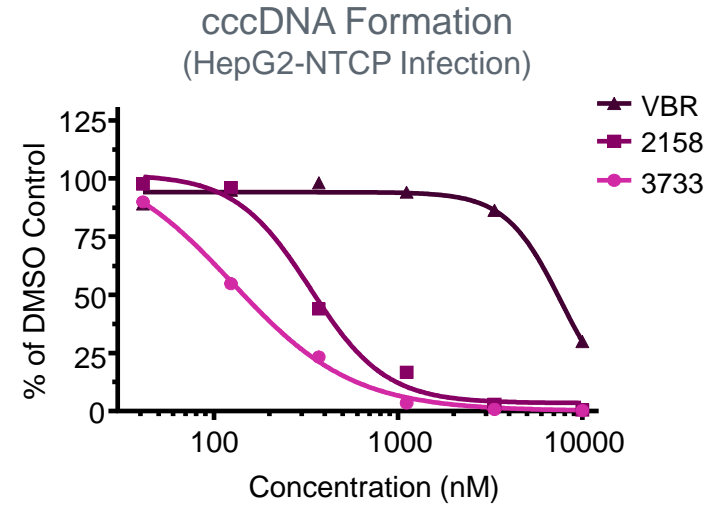
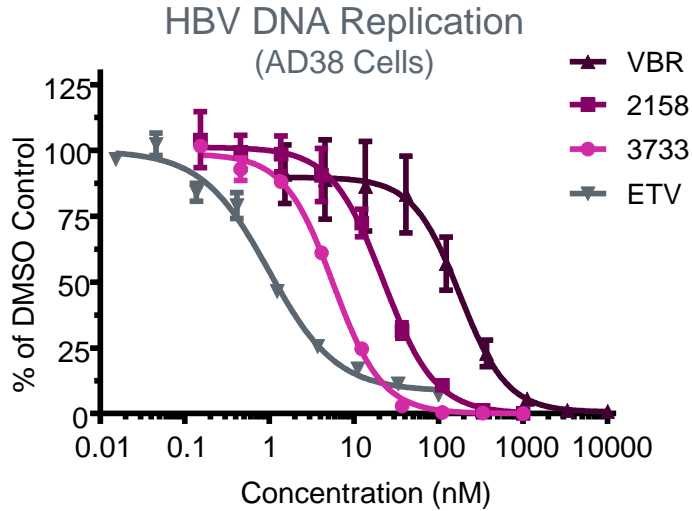
# Developing Next Generation CIs and Optimizing Profile

Best core inhibitor = Achieves most complete viral suppression with optimized profile

- 2158 - Phase 2 development
- 3733 - Phase 1 development
- 4<sup>th</sup> CI to be nominated in H1 2021 targeting best-in-class profile:
  - <10 nM potency against **both** cccDNA formation and production of new virions
  - Pan-genotypic
  - Once-a-day dosing
  - Low dose, suitable for co-formulation
  - Complementary with other MOAs
  - Safe and low potential for DDIs

Assembly Bio to make data-driven decisions to choose the CI with the best profile to become the antiviral backbone (+NrtI) of finite and curative regimens

# Potency of VBR, 2158, 3733, and ETV *in vitro*



	VBR	2158	3733	ETV
HepAD38 DNA replication, EC <sub>50</sub> (nM)	173±40	22±2	5.7±0.2	0.98±0.06
HepG2-NTCP infection cccDNA formation, EC <sub>50</sub> (nM)	5447	334	125	>>1000





# Relative Potency of Assembly Core Inhibitors

Human Plasma				
	HBV DNA EC <sub>50</sub> (nM)	C <sub>min</sub> Total/ Protein adjusted HBV DNA EC <sub>50</sub>	cccDNA EC <sub>50</sub> (nM)	C <sub>min</sub> Total/ Protein adjusted cccDNA EC <sub>50</sub>
Vebicorvir 300 mg	154	3	2210	0.2
2158 300 mg	41	19	204	4
3733 300 mg	12	28 <sup>1</sup>	62	6 <sup>1</sup>
<b>4<sup>th</sup> core inhibitor target</b>	<b>&lt;5</b>	<b>&gt;50</b>	<b>&lt;10</b>	<b>&gt;25</b>

Data do not take into account liver enrichment of compounds. Liver concentrations of VBR, 2158, and 3733 are predicted to be enhanced 18-fold, 5-fold, and 6-fold, respectively, compared to plasma based on preclinical PK studies

- Vebicorvir achieves potency and plasma exposure to drive potent antiviral activity; goal is to increase exposure & potency to drive greater inhibition of cccDNA formation



# ABI-H2158: Data from Phase 1b Dose-Ranging Study

**Safety:** Favorable safety profile when administered orally once daily for 14 days

**Efficacy:** Potent antiviral activity

	ABI-H2158 (PO QD x 14 days)			Placebo (n=6)
	2158 100 mg (n=7)	2158 300 mg (n=7)	2158 500 mg (n=7)	
HBV DNA Mean Change from Baseline to Day 15 (log <sub>10</sub> IU/mL), (Range)	-2.3 (-1.7 to -3.0)	-2.5 (-0.8 to -3.3)	-2.7 (-1.7 to -3.2)	-0.08 (-0.3 to 0.1)
pgRNA Mean Change from Baseline to Day 15 (log <sub>10</sub> U/mL), (Range)	-2.1 (-1.5 to -2.7)	-2.3 (-1.4 to -3.2)	-2.1 (-1.3 to -3.5)	-0.08 (-0.2 to -0.1)
C <sub>max</sub> , µg/mL	3.39	8.80	10.42	-
AUC <sub>0-24</sub> , h•µg/mL	46.12	112.70	120.70	-



# ABI-H2158: Ongoing Phase 2 Clinical Trial



**ABI-H2158 300 mg QD + ETV QD (n=60)**

**Placebo QD + ETV QD (n=20)**

Evaluate changes in DNA, pgRNA and viral antigens and compare to VBR



Interim data expected in H2 2021



Potential to incorporate modified stopping criteria and evaluate off-treatment response



## Combination Studies

***Core Inhibitor + Nrtl as Backbone  
+ Additional MOA***

# Combination Approaches to Achieve Finite and Curative Regimens

**PHASE 2 STUDIES WITH 2 POTENT ANTIVIRALS**  
Optimized CI and Nrtl as backbone



**EXPLORATORY PROOF-OF-CONCEPT STUDIES**  
Multi-Mechanism Combinations in Different Populations



**FURTHER DEVELOPMENT**  
Phase 3 Registrational Program



RNAi

PHASE 2



IFN

PHASE 2



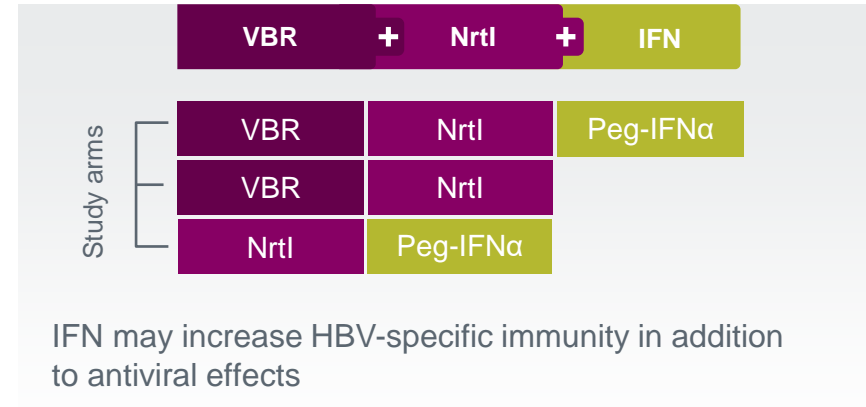
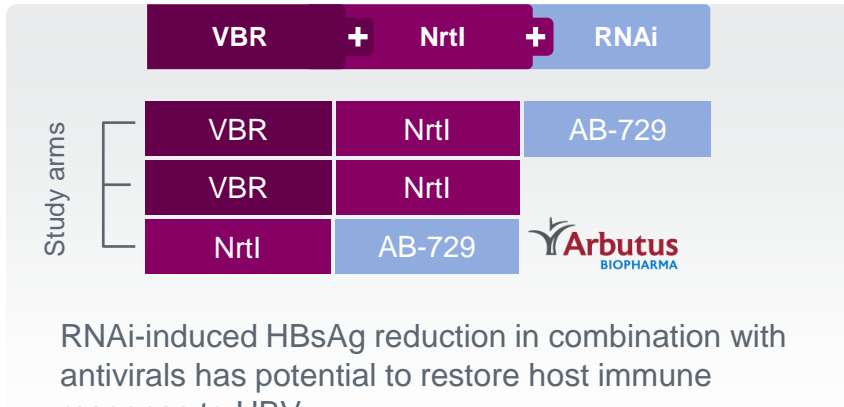
**Other mechanisms**  
(e.g., Core Protein  
cccDNA Disruptor)

R&D PLANNED PROGRAMS



# Initiated Two Phase 2 Triple Combination Clinical Studies

## VBR+Nrtl+3<sup>rd</sup> Mechanism of Action



- Evaluating safety and on-treatment response of the 3-drug vs 2-drug combinations
  - Opportunity to incorporate modified stopping criteria to assess off-treatment response
- Potential for Additional Multi-Drug Combinations**



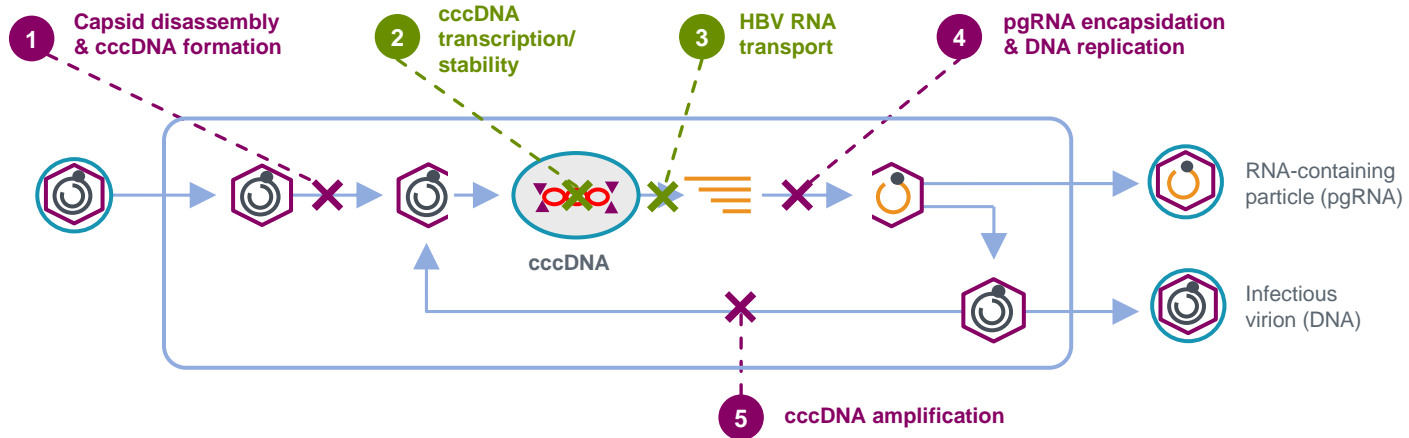
# Expanded Research Engine

*Beyond Core Inhibitors*

# Novel Target: HBV Core Protein cccDNA Disruptor

**Goal:** Target intra-nuclear HBV core protein – cccDNA interaction (not affected by current core inhibitors)

**Effect:** Disrupt HBV transcription (reduce antigen, enhance immunity) and potentially stability of cccDNA

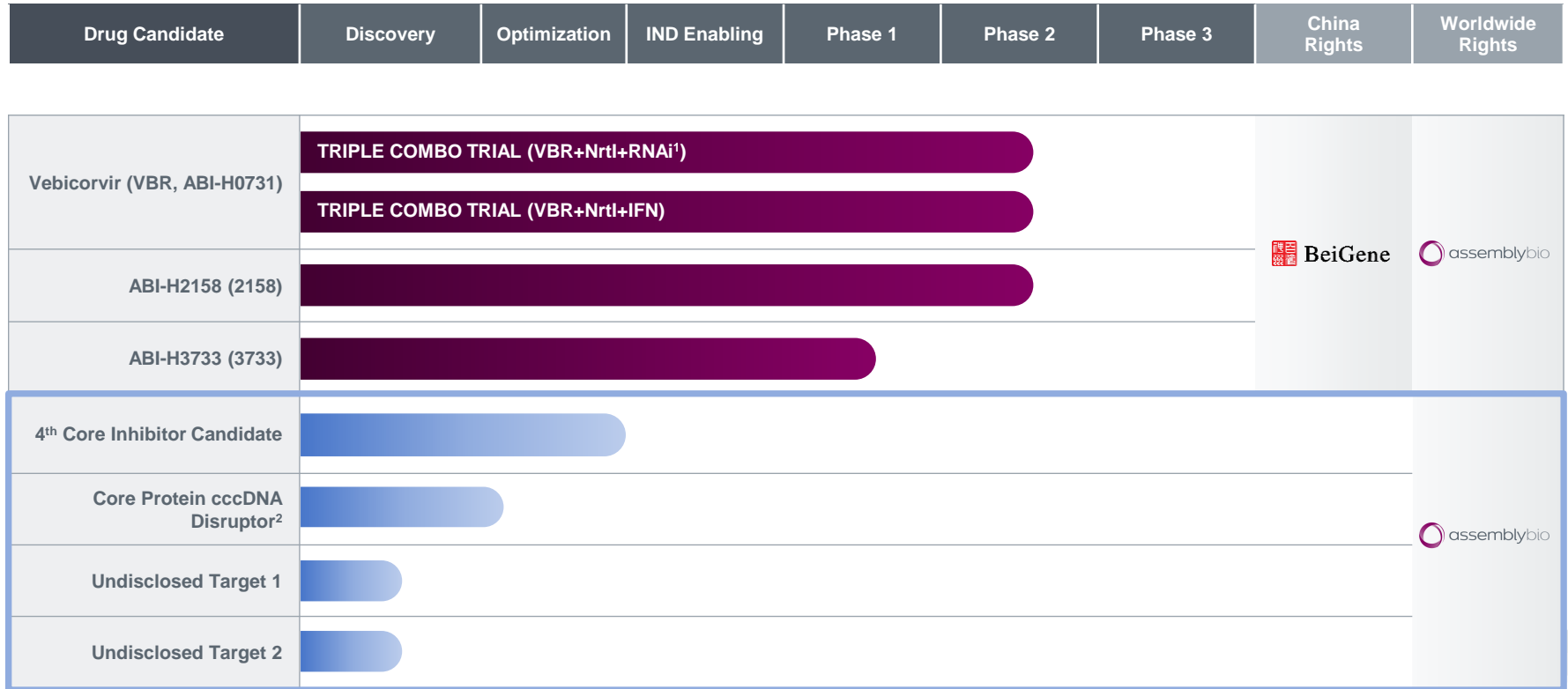


Target for current core inhibitors

Opportunity for novel inhibitors



# Expanding Research Stage Portfolio



# Key Objectives and Anticipated Progress through 2022

2021

- ✓ Initiate Triple Combo Study – RNAi
- ✓ Initiate Triple Combo Study - IFN
- ☐ Nominate 4<sup>th</sup> core inhibitor
- ☐ Interim Phase 2 data for 2158

2022

- Interim Phase 2 data – VBR+NrtI + IFN
- Interim Phase 2 data – VBR+NrtI + RNAi
- IND for 4<sup>th</sup> core inhibitor
- Additional Phase 2 data for 2158

## Strong Balance Sheet

\$216M in cash (as of 12/31/20) extending runway into 2023



Nasdaq: ASMB