Corporate Overview

Creating New Medicines From GalXC™ RNAi Technology Platform

August 2021

Dicerna™

Forward-Looking Statements

This presentation has been prepared by Dicerna Pharmaceuticals, Inc. ("we," "us," "our," "Dicerna," or the "Company") and includes forward-looking statements. Forward-looking statements are subject to risks and uncertainties that could cause actual results to differ materially from those expressed or implied in such statements. Examples of forward-looking statements include, among others, statements we make regarding: (i) the therapeutic and commercial potential of nedosiran as well as those of RG6346, belcesiran (formerly DCR-A1AT), DCR-AUD and our GalXC™ and GalXC Plus™ RNAi technology; (ii) our research and development plans and timelines for nedosiran as well as those for RG6346, belcesiran, DCR-AUD, GalXC and GalXC-Plus; (iii) our regulatory pathways, plans and timelines for nedosiran as well as those for RG6346, belcesiran, DCR-AUD, GalXC and GalXC-Plus; (iv) the Company's strategy, business plans and focus; (v) the Company's expectations about our cash, cash equivalents and held-to-maturity investments; (vi) the potential of Dicerna's technology and drug candidates, including our pipeline expansion efforts and expectations; and (vii) the Company's collaborations with Novo Nordisk A/S; Roche; Eli Lilly and Company; Alexion Pharmaceuticals, Inc.; Boehringer Ingelheim International GmbH; and Alnylam Pharmaceuticals, Inc. The process by which an early-stage investigational therapy such as nedosiran and an early-stage platform such as GalXC could potentially lead to an approved product is long and subject to significant risks. Applicable risks and uncertainties include, but are not limited to, those risks identified under the heading "Risk Factors" included in the Company's most recent Form 10-K filing and in subsequent filings with the Securities and Exchange Commission. These risks and uncertainties include, among others, the potential for additional or future data to alter initial, interim and preliminary results of clinical trials; positive data from preclinical studies and earlier clinical trials may not be predictive of results from subsequent preclinical studies and clinical trials; the results of clinical trials may produce negative, inconclusive or uncompetitive results; possible safety, efficacy concerns could emerge as new data are generated in R&D and/or clinical trials; the impact to, and potential for delays in, the current and future conduct of the business of the Company, its clinical programs and operations as a result of the COVID-19 pandemic; the cost, timing and results of preclinical studies and clinical trials and other development activities; the likelihood of Dicerna's clinical programs being executed within timelines provided; our reliance on the Company's contract research and manufacturing organizations; the unpredictability of timely enrollment of subjects and patients to advance Dicerna's clinical trials; the unpredictability of the duration and results of the regulatory review of Investigational New Drug (IND) applications and Clinical Trial Applications (CTAs) necessary to continue to advance and progress the Company's clinical programs and the regulatory review of submissions relevant to regulatory agencies for marketing approvals, including New Drug Applications (NDAs); market acceptance for approved products and innovative therapeutic treatments; competition; the possible impairment of, inability to obtain and costs of obtaining needed intellectual property rights; that the Company may not realize the intended benefits of its collaborations; general business, financial and accounting risks; and the risks and potential outcomes from litigation.

Dicerna is providing this information as of this date and does not undertake any obligation to update or revise it, whether as a result of new information, future events or circumstances or otherwise. Additional information concerning Dicerna and its business may be available in press releases or other public announcements and public filings made after the date of this information.

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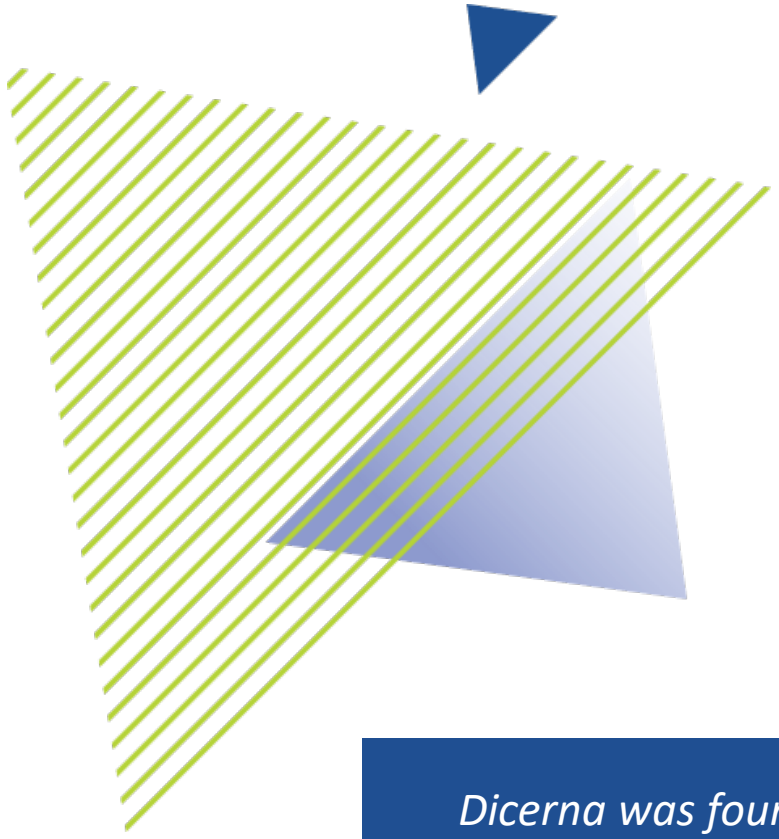
The RNAi Modality Has Come of Age

RNAi Has Been Successful Where Traditional Modalities Have Not



Gene Targeting Across Multiple Tissue Types

Approved Products in Multiple Disease Areas

Simple & Convenient Dosing Regimens

Multiple Committed Large Pharmas

Dicerna was founded to specialize in RNAi
Partner of Choice: Several large pharmas have chosen Dicerna for RNAi collaboration

RNAi Delivery Is Extending to Multiple Tissues Beyond the Liver

The Future Is Bright

Liver	Rare disease, HBV, cholesterol, NASH, cardiometabolic diseases, AUD and more
Central Nervous System	Alzheimer's, Parkinson's, frontotemporal dementia, Huntington's, spinal cord injury, other rare diseases and more
Muscle	Myotonic dystrophy, other rare diseases
Adipose	Diabetes, obesity, rare diseases and more
Tumor-Associated Immune Cells	Immuno-oncology
Additional Tissues	Diseases of the lung, eye, kidney, etc.

Dicerna Is an Engine of Discovery and Development

Proprietary and Collaboration Program Portfolios Provide for Consistent Funding Stream

Core Clinical Pipeline

Current pipeline yields multiple major milestones over next year+

- **Nedosiran:** A differentiated potential therapy for primary hyperoxaluria (PH)
- **RG6346**: Potential best-in-class therapeutic with strong and durable HBsAg reduction for treatment of chronic hepatitis B virus (HBV) infection
- **Belcesiran**: Targeting alpha-1 antitrypsin deficiency-associated liver disease (AATLD)
- **DCR-AUD**: Targeting *ALDH2* for alcohol use disorder (AUD)

Shots on Goal

- **20+** discovery programs in multiple tissue types
- **7** programs in IND-enabling studies
- **2nd** partner compound already in clinic

De-Risked Technology Platform

- Supported by multiple clinical programs
- Validated by multiple major pharma collaborations
- Delivery to multiple tissues: liver, nervous system, muscle, adipose, tumor-associated immune cells and more

Milestone-Rich 2021

Key data readouts, NDA filing, clinical entries and collaboration payments

- **$709.6M** in cash, cash equivalents and held-to-maturity investments at 6/30/2021
- $180 million cash payment received in April 2021 as upfront for sale of royalty interest
- Expected cash runway into 2025

Core and Collaborative Development-Stage Programs

Fifteen Programs Have Entered Development, Many More Are in Discovery Stage

TARGET INDICATION	COMPOUND (GENE TARGET)	PRECLINICAL	PHASE 1	PHASE 2	PHASE 3	DICERNA PRODUCT RIGHTS	PARTNER
Primary Hyperoxaluria 1, 2 & 3	Nedosiran (*LDHA*)					100% global	
Chronic Hepatitis B	RG6346 (*HBV*)					U.S. opt-in	Roche
AAT Liver Disease	Belcesiran (*SERPINA1*)					100% U.S. (Alnylam ex-U.S. opt-in)	Alnylam
Alcohol Use Disorder	DCR-AUD (*ALDH2*)					100% global	
Cardiometabolic	LY3561774 (*ANGPTL3*)					Milestone/royalty	Lilly
Cardiometabolic	LY3819469 (*LPA*)					Milestone/royalty	Lilly
Cardiometabolic	DCR-CM4					Milestone/royalty	Lilly
Cardiometabolic	DCR-CM3					Milestone/royalty	Lilly
Complement-mediated	DCR-COMP1 (*C3*)					Milestone/royalty	Alexion
Complement-mediated	DCR-COMP2 (*CFB*)					Milestone/royalty	Alexion
Cardiometabolic	DCR-NOVO1					Opt-in to co-dev. and co-comm.	novo nordisk
Cardiometabolic	DCR-NOVO2					Opt-in to co-dev. and co-comm.	novo nordisk
Nonalcoholic Steatohepatitis	DCR-LIV2					Milestone/royalty	Boehringer Ingelheim
Undisclosed GalXC-Plus						100% global	
Undisclosed GalXC-Plus						100% global	

Anticipated Timing: *IND/CTA filings for DCR-CM4 and DCR-CM3 are the responsibility of Lilly and are at their discretion. Dicerna estimates IND timing for DCR-CM4 in Q1'22.*
Dicerna intends to deliver IND-supporting packages to Alexion for DCR-COMP1 and DCR-COMP2 in Q4'21 and Q1'22, respectively; IND/CTA filings are the responsibility of Alexion and are at their discretion.

With 20+ discovery-stage programs in multiple tissues

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De-Risked RNAi Technologies: GalXC™ & GalXC Plus™

Delivery to Liver, Central Nervous System and Multiple Other Tissue Types

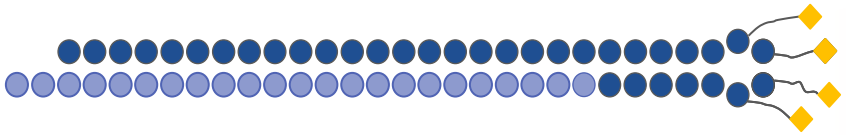
GalXC RNAi technology offers excellent pharmacological properties to de-risk development

- Sequence-specificity to silence only the targeted gene in only the delivery tissues
- Long duration of action – weeks to months – enables convenient dosing regimens
- Off-target activity and side effects are generally not observed
- Ability to address previously "undruggable" target classes

GalXC-Plus builds on GalXC's favorable preclinical and clinical characteristics + additional remarkable flexibility for medicinal chemistry optimization and expansion into new therapeutic areas

GalXC™

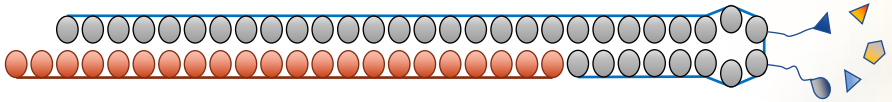
Proprietary technology enabling subcutaneous delivery of GalNAc-mediated RNAi therapies that are designed to bind specifically to receptors on liver cells.



GalNAc liver delivery

GalXC Plus™

Comprising new, proprietary technological advances that extend our RNAi silencing expertise beyond the liver to address new tissues and disease areas.



Including alternative nucleic acid structures

Various ligands

Enables delivery to multiple tissues including CNS, muscle, adipose tissue, tumors and more

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Key Value Drivers

- **Core Clinical Programs**
  - Nedosiran for primary hyperoxaluria (PH)
  - RG6346 for chronic hepatitis B virus (HBV)
  - Belcesiran for alpha-1 antitrypsin deficiency-associated liver disease (AATLD)
  - DCR-AUD for alcohol use disorder (AUD)
- **Collaborative Programs**
  - Roche and Novo opt-in programs
- **Extrahepatic Discovery Efforts**
- **Team and Balance Sheet**

Nedosiran for the Treatment of Primary Hyperoxaluria (PH)

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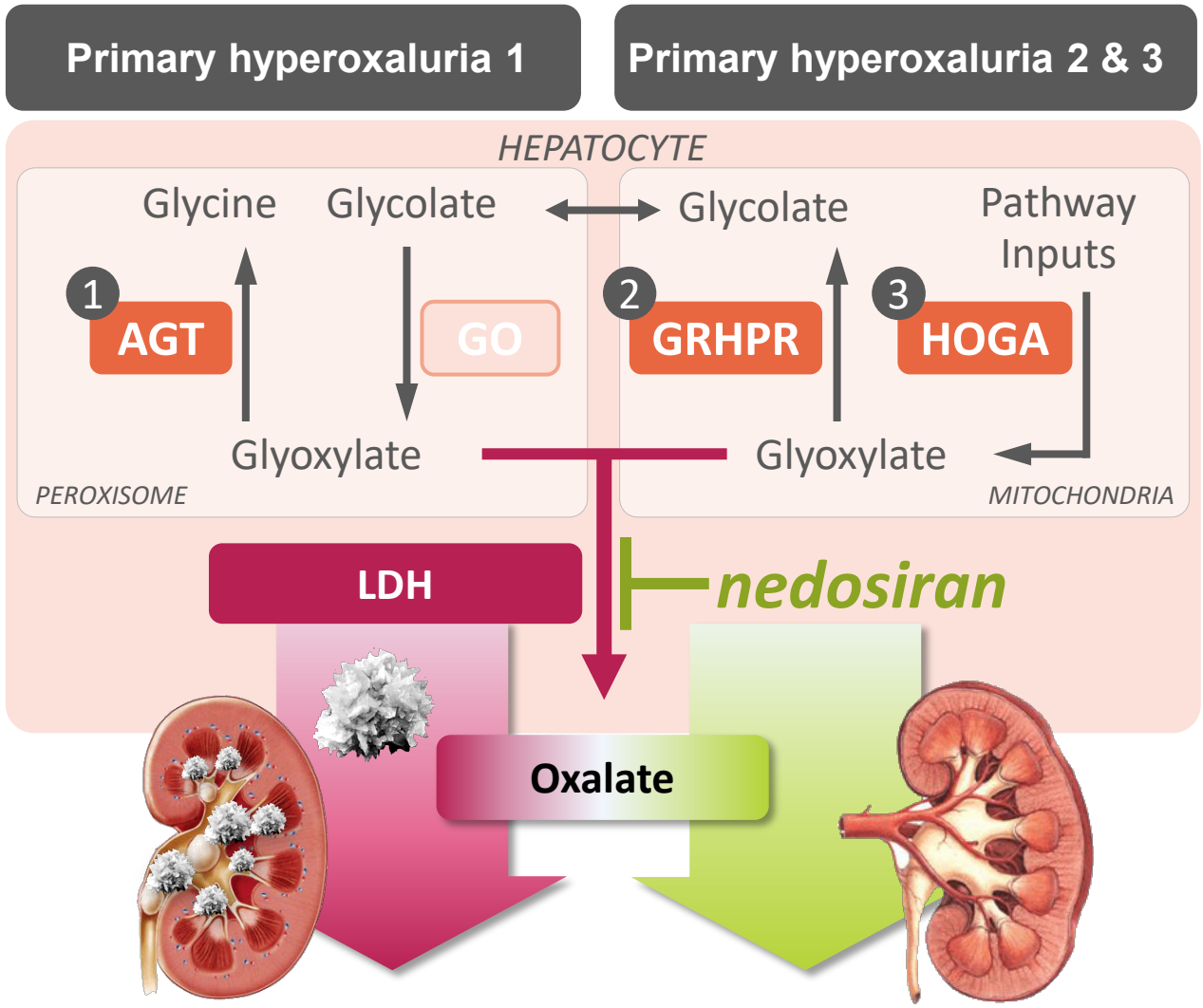
Primary Hyperoxaluria Disease Biology

A Family of Ultra-Rare, Life-Threatening Genetic Disorders Resulting in Renal Complications

- Standard published PH biochemical models link the three types of PH to the same liver metabolic pathway
- In each case, the glyoxylate intermediate is believed to be converted to oxalate by LDH
- Published animal model data, and early clinical results, are supportive of this model for PH1 and PH2
- Abnormal production and accumulation of oxalate leads to:
  - Recurrent kidney stones
  - Nephrocalcinosis
  - Chronic kidney disease that may progress to end-stage renal disease
  - Systemic oxalosis, impacting diverse tissues
- Nedosiran silences *LDHA*, believed to be the ultimate step in the oxalate production pathway



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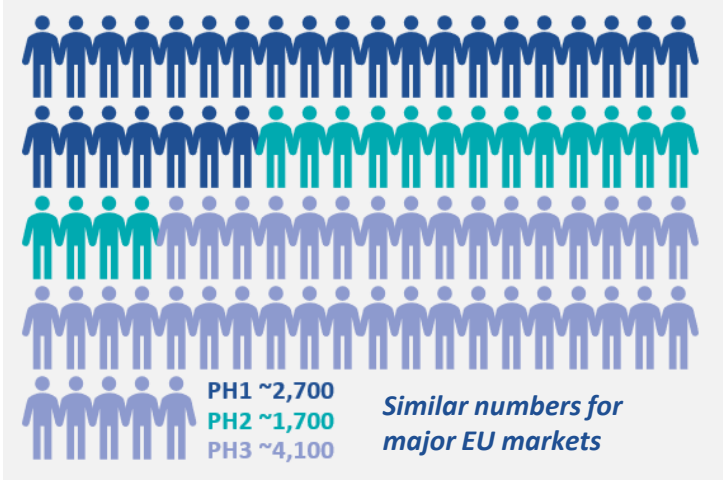
The Primary Hyperoxalurias

An Ultra-Rare Disease With an Evolving State of the Science

- A family of three closely-related ultra-rare genetic diseases
  - PH type 1
  - PH type 2
  - PH type 3
- All subtypes of PH are associated with high urinary oxalate levels, resulting in potentially severe health and quality-of-life consequences
  - Frequent kidney stones
  - Progression to end-stage renal disease

Expected U.S. Prevalence[1,2]



Estimated PH Diagnosis Rates

	PH1	PH2	PH3
Current Diagnosis Projections^	~40% – 50%	~10%	~7%

Prevalence based on PH mutant alleles found in the National Heart, Lung, and Blood Institute Exome Sequencing Project (NHLBI ESP) and calculated according to Hardy-Weinberg equilibrium for each PH type using the sum of all alternate PH1, PH2 or PH3 alleles (known, or known and scored as pathogenic) and all wild type alleles.

1. *Hopp K, et al. J Am Soc Nephrol. 2015;26(10):2559-2570.*
2. *U.S. Census Bureau population on a date: February 20, 2020. United States Census Bureau website, 2020.*

^ Sources: Dicerna internal estimates PH claims/registry analysis and scientific advisors. Analysts' projections

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PHYOX2™ Baseline Characteristics

Category or Statistic	Nedosiran (n = 23)	Placebo (n = 12)
Mean Age (years) / 6-11 (years)	23.7 / 3 (13.0%)	23.6 / 2 (16.7%)
PH Type 1 / 2	18 (78.3%)/5 (21.7%)	11 (91.7%)/ 1 (8.3%)
White	15 (65.2%)	10 (83.3%)
Weight (kg), Mean(SD)	64.93 (19.3)	72.75 (27.3)
Baseline eGFR (mL/min/1.73 m^2), Mean(SD)	89.5 (37.5)	82.0 (30.0)
Chronic Kidney Disease Stage		
Stage 1	12 (52.2%)	5 (41.7%)
Stage 2	8 (34.8%)	2 (16.7%)
Stage 3A	0	2 (16.7%)
Stage 3B	3 (13.0%)	2 (16.7%)
Missing	0	1 (8.3%)
24-Hr Urinary Oxalate (mmol/day), Mean(SD)	1.330 (0.465)	1.965 (0.706)
High Baseline Urinary Oxalate*	7 (30.4%)	10 (83.3%)
Baseline Plasma Oxalate (µmol/L), Mean(SD)	7.9 (5.1)	8.8 (5.1)
Mean Time Since PH Diagnosis (years)	7.089	7.351

*High baseline Uox defined as ≥1.6 mmol/24h on at least one baseline value

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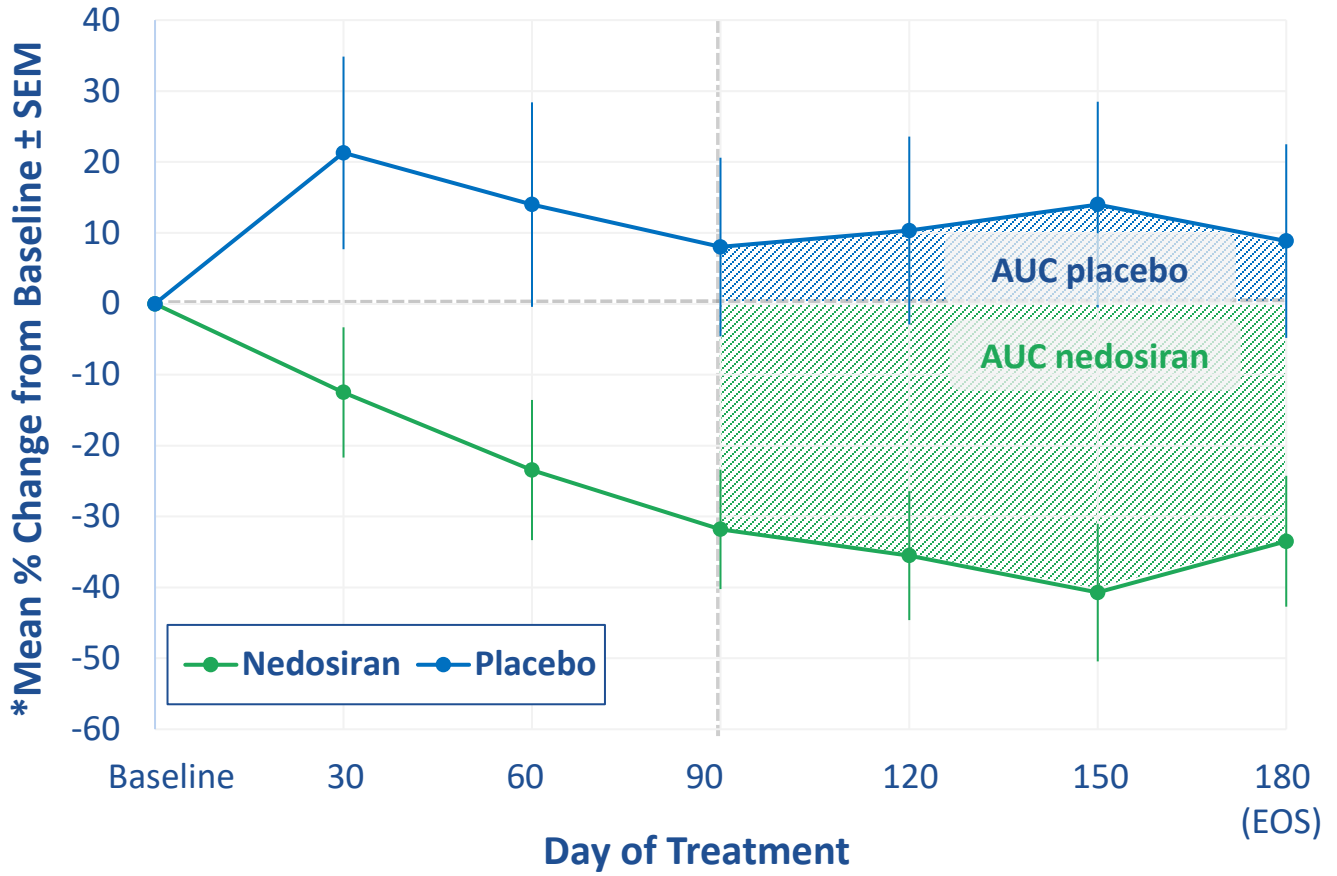
PHYOX2 Met Primary Endpoint Achieving a Significant Reduction in Uox

Mean $AUC_{24\text{-hour Uox}}$ (Day 90 to Day 180)

Overall mITT Population[1] (PH1 + PH2)

Standardized AUC24-hour Uox from Day 90 to Day 180**	Nedosiran (n=22)	Placebo (n=12)
n	22	12
LS Mean (SE)	3507.4 (788.49)	-1664.4 (1189.96)
95% CI for LS Mean	(1961.7, 5053.1)	(-3997.2, 668.4)
LS Mean Difference from Placebo (SE)	5171.7 (1144.07)	
95% CI for Difference from Placebo	(2929.3, 7414.2)	
P-value for Difference from Placebo [2]	**<0.0001**	

[1] mITT Population = All participants in the ITT population who have at least one efficacy assessment after the Day 90 dosing visit.
[2] P-value for testing difference from placebo



*LS means from MMRM model using time point estimates
** Multiple imputation (MI) under the missing at random (MAR) assumption was used to handle missing 24-hr Uox data

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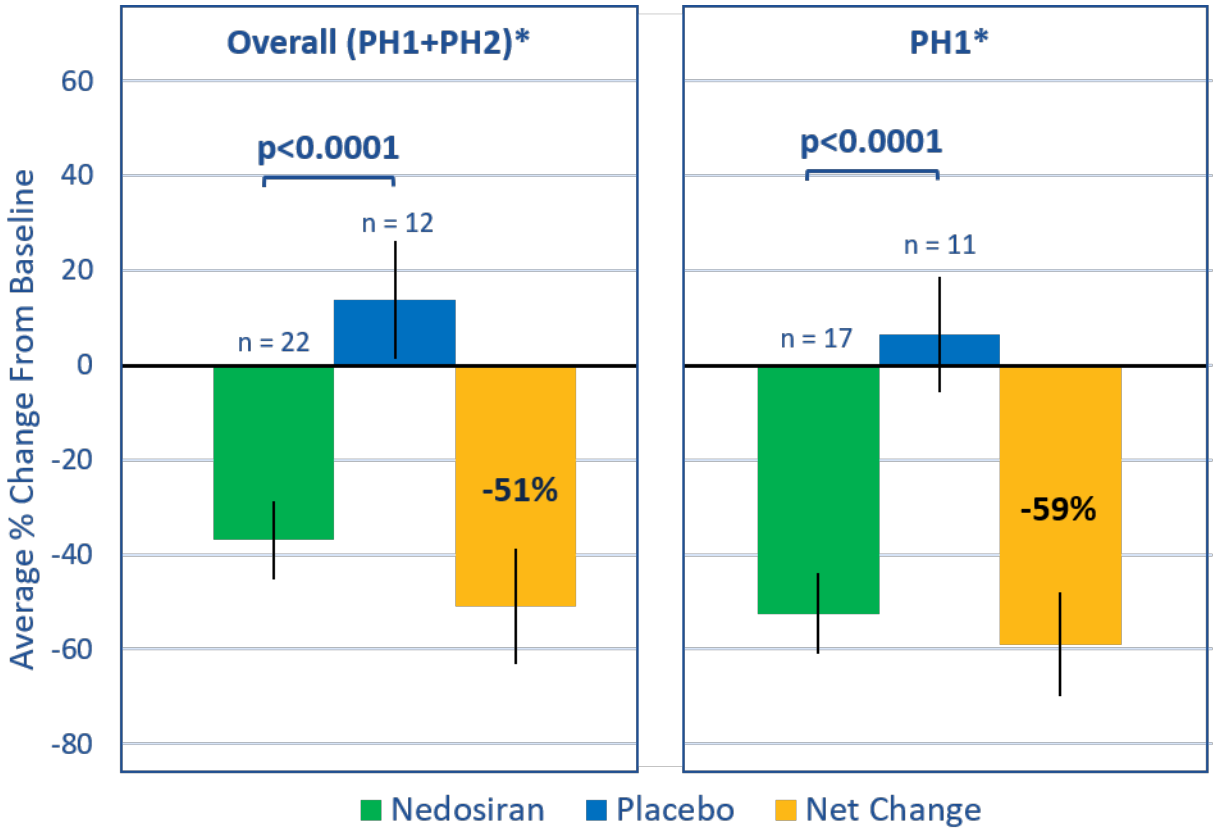
Nedosiran Achieved Primary and Key Secondary Endpoints in PHYOX2

Robust Efficacy Seen in PH1 Participants

PRIMARY ENDPOINT

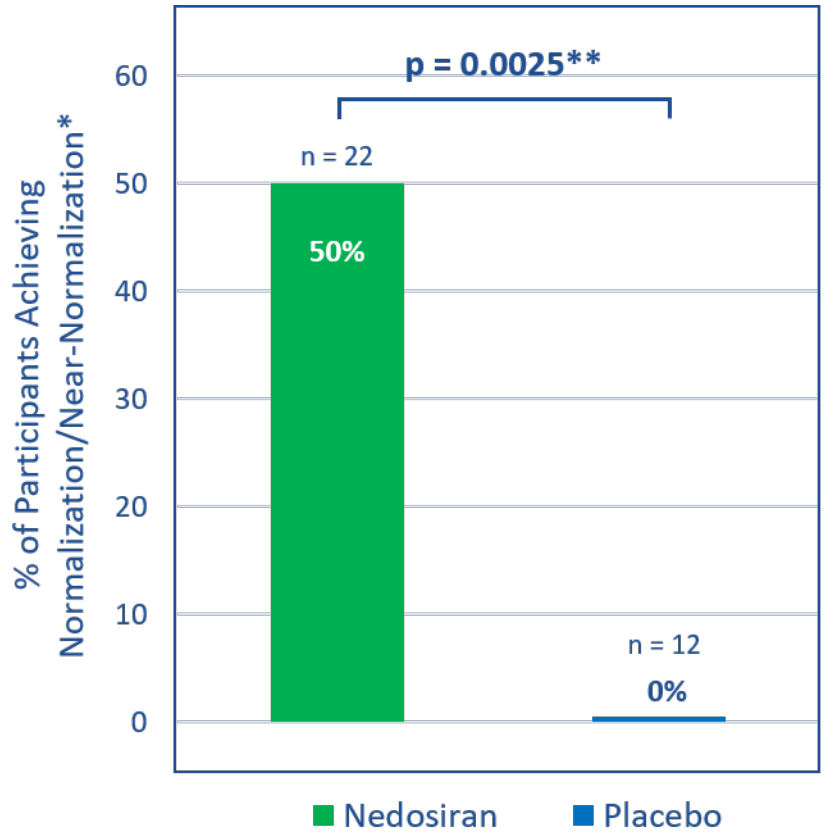
Average % Δ from Baseline in 24hr Uox Between Days 90 - 180



* Overall and PH1 data based on restricted maximum likelihood based MMRM approach

KEY SECONDARY ENDPOINT

Participants Reaching Normal/Near-Normal ≥2 Consecutive Visits



*24-hour Uox values are considered normalized if the value <0.46 mmol/24 hours (upper limit of assay normal-ULN), and near-normalized if the value is (1.3xULN) ≥0.46 to <0.6 mmol/24 hours

** p-value for one-sided test

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Additional PHYOX2 Subgroup Analysis: Normalization/Near-Normalization and Uox Changes in PH1 Participants

	Nedosiran (n = 17)	Placebo (n = 11)	p-value***
Normalized* (at Day 180)	43.8% **	0% **	0.0174
Near-Normalized + Normalized* (at Day 180)	81.3%**	0%**	<0.0001
Normalized* (≥1 visit)	65%	9%	0.0047
Maximal Uox % Reduction (at any time point), Mean (SD)	68% (14.6)	31% (30.2)	0.0004

* 24-hour Uox values are considered normalized if the value <0.46 mmol/24 hours (upper limit of assay normal-ULN), and near-normalized if the value is (1.3XULN) ≥0.46 to <0.6 mmol/24 hours
** Excludes 1 participant in each arm who did not complete the trial
*** p-values for one-sided test

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Treatment-Emergent Adverse Events and Laboratory Findings

- Two discontinuations, both due to SAEs (1 nedosiran and 1 placebo)
- Three total SAEs were reported (1 nedosiran and 2 placebo):
  - One participant with fluctuating tachycardia on nedosiran (considered not to be related to study drug by two external cardiology experts)
  - Two participants on placebo with SAEs related to underlying PH (elevated creatinine and renal colic/kidney stone)
- Injection-site reactions (ISRs):
  - 2 participants (8.7%) with 11 events of mild protocol-defined ISRs *
  - Erythema at injection site was most common AE, 5 participants on nedosiran (21.7%) and 0 participants on placebo
- Two reported AEs of CK elevation (1 nedosiran and 1 placebo)
- No other clinically significant laboratory findings
- Kidney stone-related adverse events reported in 3 participants on nedosiran (13%) and 5 participants on placebo (41.7%)

Most Common Treatment-Emergent Adverse Events (≥3 participants)

AE term	Nedosiran n, (%) n = 23	Placebo n, (%) n = 12
Erythema at injection site	5 (21.7%)	0
Kidney stone-related events	3 (13%)	5 (41.7%)
Nausea	4 (17.4%)	1 (8.3%)
Headache	4 (17.4%)	3 (25%)
Abdominal cramp	3 (13%)	2 (16.7%)

* Signs or symptoms at the injection site with a time to onset of 4 or more hours from the time of study intervention administration

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PHYOX2 Summary of Top-Line Data and Nedosiran Next Steps

PHYOX2 Data to Support NDA Submission for Treatment of PH1

- PHYOX2
  - Nedosiran achieved the primary and key secondary endpoints with a statistically significant reduction in Uox
  - Robust Uox reduction seen in the PH1 subpopulation
  - PH2 results inconsistent with prior experience
  - Nedosiran was generally well tolerated, and its AE profile was consistent with previous studies
  - We expect these results to support marketing authorization applications for PH1 in the U.S. and other major markets
- Planned Next Steps
  - Complete PHYOX4 in PH3 and announce results in October
  - Submit NDA to FDA for nedosiran in PH1 in Q4 2021
  - Continue PHYOX7 and PHYOX8 to support label expansion
  - Continue to evaluate PH2 data to determine next steps
  - Pursue commercial out-licensing opportunities to make nedosiran available across all major markets including U.S., if approved

RG6346 for the Treatment of Chronic Hepatitis B Virus (HBV) Infection

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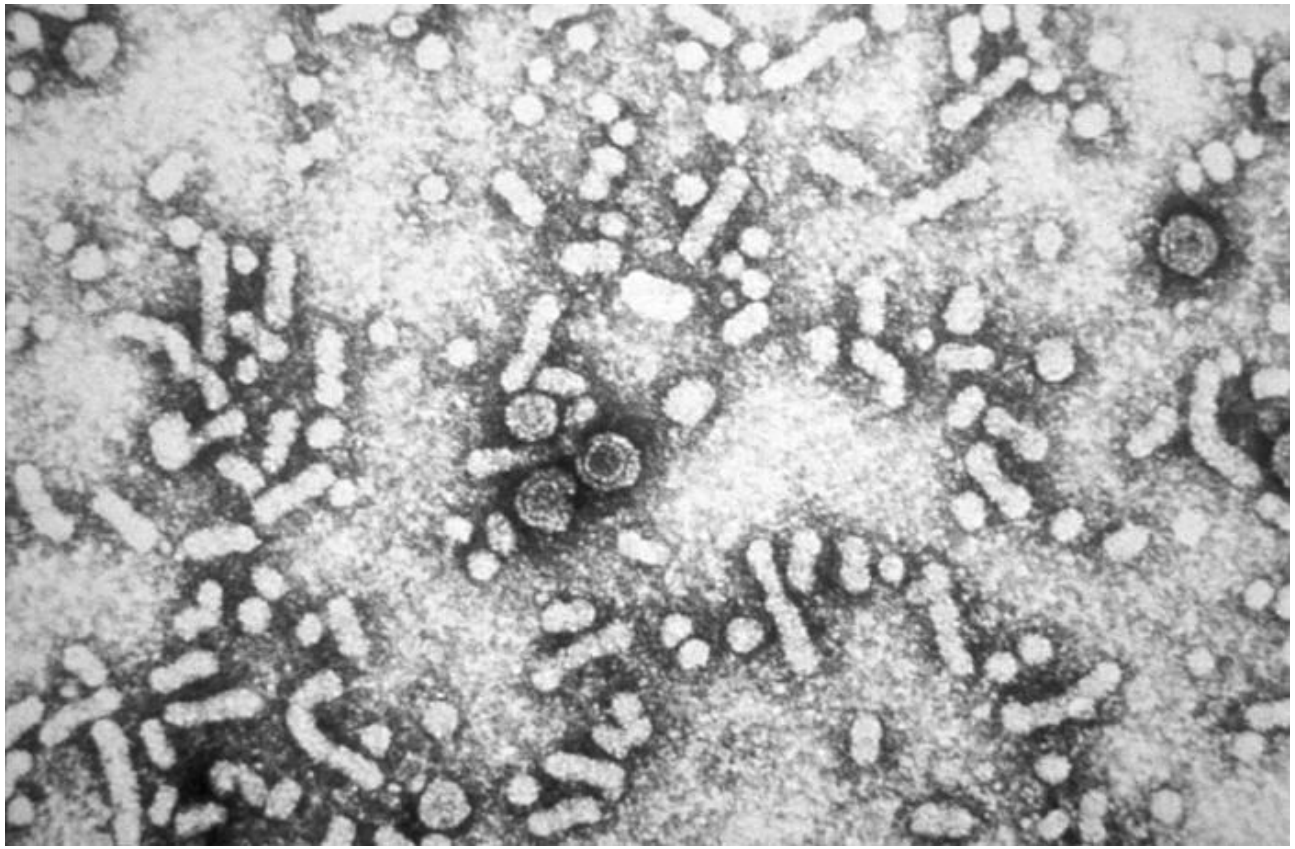
The Disease: Chronic HBV Is a Severe, Global Unmet Medical Need

- Significant worldwide prevalence: ~300 million infected, >880,000 deaths per year
- Current treatments are rarely effective in achieving functional cures
- Collaborating with Roche
- Roche initiated RG6346 in Phase 2 combination clinical study with multiple additional mechanisms in March 2021:
  - Nucleos(t)ide (NUC), Interferon, TLR7 agonist, core inhibitor (CpAM)
- Dicerna "opt-in" to co-fund development for enhanced U.S. economics and co-commercialization rights
- ***Multi-billion $ opportunity***



HBV "decoy" particles and filaments (HBV S Antigen) and infectious viral particles from patient blood

Clinicaltrials.gov NCT04225715

Sources: Polaris Observatory Collaborators. Global prevalence, treatment, and prevention of hepatitis B virus infection in 2016: a modelling study. The Lancet Gastroenterology and Hepatology. Volume 3, Issue 6, June 2018, Pages 383-403. Hepatitis B Foundation. Facts and Figures. Available at: http://www.hepb.org/what-is-hepatitis-b/what-is-hepb/facts-and-figures/. Accessed on May 3, 2021

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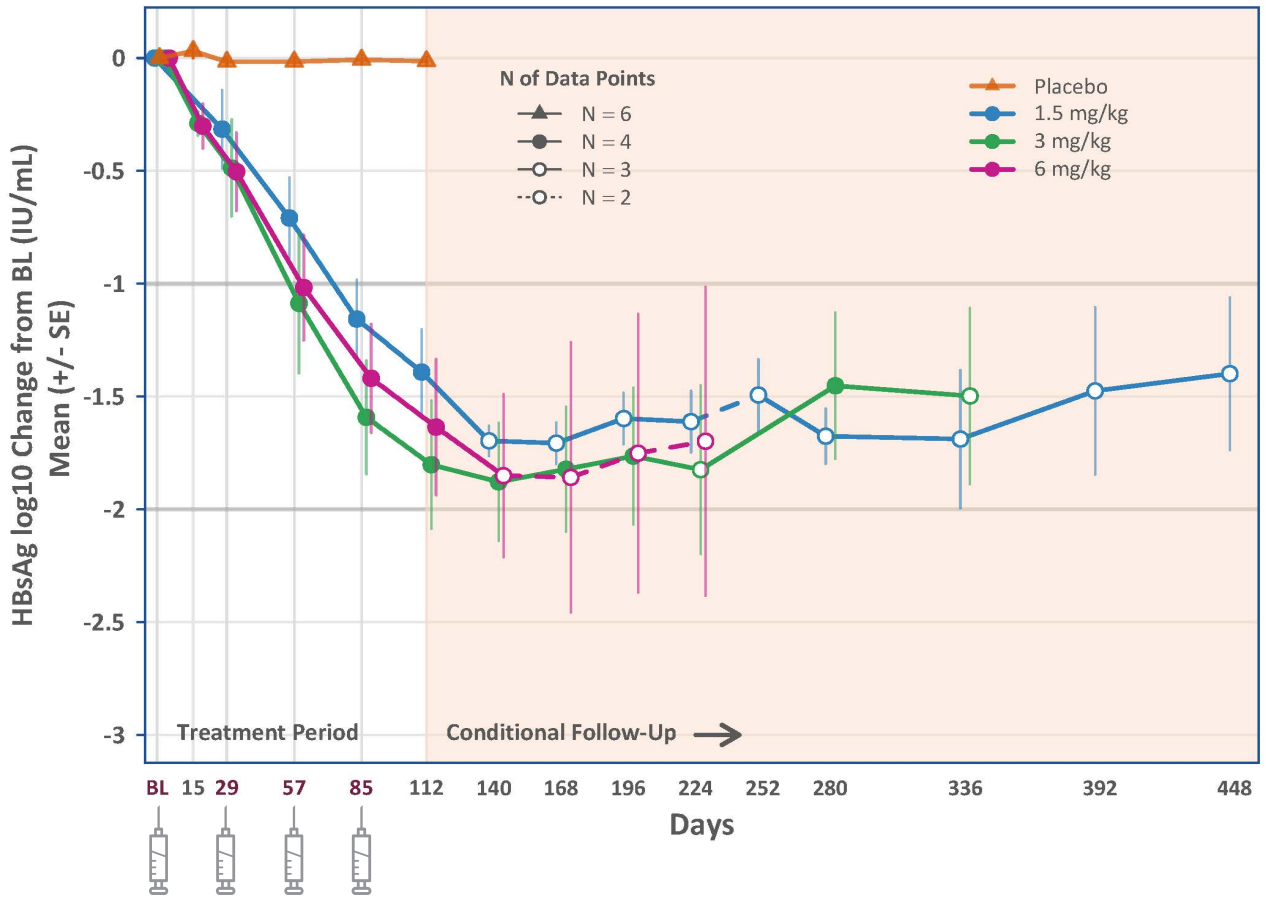
The Data: Reductions in HBsAg Levels Ongoing One Year After Last Dose

NUC-Suppressed Chronic HBV Participants (Group C) Given 4 Monthly Doses

Phase 1 Data:

- 1.8 log_{10} mean reduction (IU/ml) of hepatitis B surface antigen (HBsAg)
  (3 mg/kg and 6 mg/kg cohorts)
- 2.7 log_{10} maximum reduction of HBsAg
  (participant in 3 mg/kg cohort)
- 75% achieved ≥1.5 log_{10} reduction of HBsAg
  (9 of 12 participants)
- 92% achieved ≥1.0 log_{10} reduction of HBsAg
  (11 of 12 participants)
- 58% achieved HBsAg levels below 100 IU/ml
  (7 of 12 participants)
- 1.40 log_{10} mean HBsAg reduction (IU/ml) at Day 448 in longest-observed cohort
  (1.5 mg/kg cohort, n=3)

Mean HBsAg log_{10} IU/mL Change From Baseline



Four monthly injections RG6346 or placebo

There were no serious adverse events (SAEs) reported for participants treated with RG6346 in this trial, and there were no dose-limiting toxicities or safety-related discontinuations (data presented at AASLD's The Liver Meeting® Digital Experience™ 2020, Nov. 16, 2020). For more information, including additional safety results from the Phase 1 trial, see the poster and presentation from the AASLD conference.

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Belcesiran for the Treatment of Alpha-1 Antitrypsin (AAT) Deficiency-Associated Liver Disease (AATLD)

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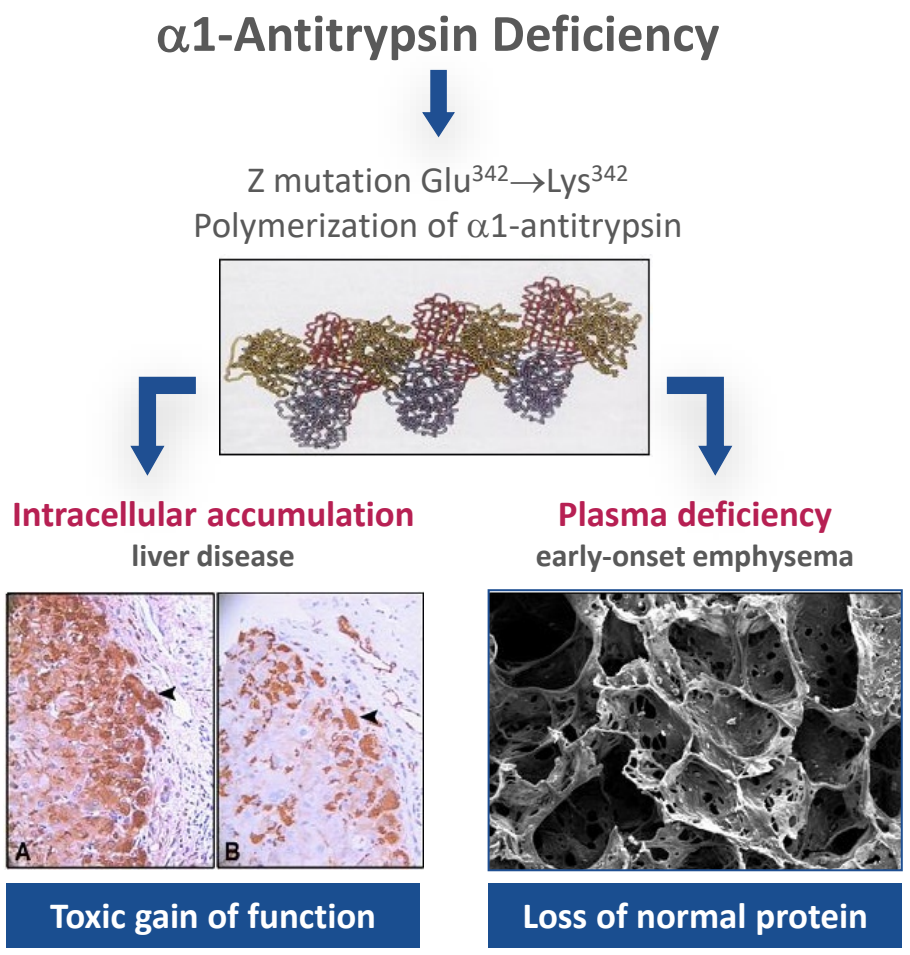
Belcesiran for AAT Deficiency-Associated Liver Disease (AATLD)

Significant Opportunity In a Rare, Genetic Condition That Can Lead to Liver Disease

- Z-allele of *SERPINA1* gene produces abnormal AAT protein that may lead to chronic liver disease culminating in cirrhosis, liver failure, cancer. No available treatment other than liver transplant
  - Lung disease may develop from lack of normal protein, which may be treated by protein replacement therapy
- Approx. 120,000 individuals in Europe and 63,000 individuals in the U.S. carry the ZZ genotype[1]
  - ~10% or more of these individuals may have AATLD[2,3] but the condition is believed to be underrecognized and underdiagnosed[4]
- Belcesiran (formerly DCR-A1AT) Phase 2 initiated for the treatment of AATLD
- Phase 1 ongoing; interim data reported July 2021
- Dicerna driving global development through approval
  - Alnylam can opt-in to ex-U.S. commercial rights post-pivotal data



Janciauskiene et al. 2013: Acute Phase Proteins

1. Blanco et al. 2017; 2. Tanash & Piitulainen 2019; 3. Clark et al., 2018; 4. Strnad et al., 2020; Narayanan & Mistry 2020

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Interim Phase 1 Data: Belcesiran Was Well Tolerated and Demonstrated Dose-Dependent AAT Knockdown

- Phase 1: Safety, tolerability, pharmacokinetics and pharmacodynamics of a single sc injection of belcesiran 0.1, 1.0, 3.0, 6.0 or 12.0 mg/kg compared to placebo (n=6 per cohort; 2:1 randomization) in adult HVs
  - Mean maximum serum AAT reductions from baseline achieved for doses greater than 0.1 mg/kg were: 50% (1.0 mg/kg), 69% (3.0 mg/kg) and 80% (6.0 mg/kg)
  - In four HVs receiving 6.0 mg/kg, max AAT reductions of 91%, 87%, 79% and 62% were observed
    - HV with 62% reduction had concomitant skin infection (unrelated to belcesiran) and markedly elevated levels of C-reactive protein (CRP); both CRP and AAT are known to increase in the presence of infection[1]
  - No serious AEs reported and all TEAEs were mild except for three, which were moderate and determined to be unrelated to belcesiran
  - No clinically significant changes in lung function or laboratory tests were reported during the treatment periods for any of the belcesiran dose cohorts included in this analysis
- Final 12.0 mg/kg dose cohort is ongoing
- Dicerna plans to present additional results from all Phase 1 dose cohorts at upcoming medical congress, subject to abstract acceptance

1. Sanders, et al 2018

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DCR-AUD for the Treatment of Alcohol Use Disorder (AUD)

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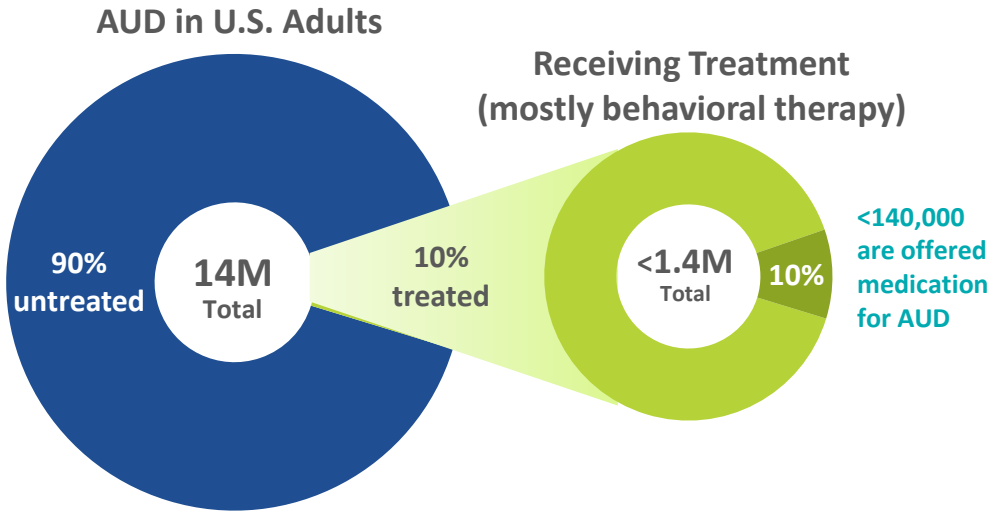
Developing DCR-AUD for the Treatment of Alcohol Use Disorder (AUD)

A Significant Unmet Need for an Underdiagnosed Disorder Affecting Millions

The Impact and Opportunity

- AUD: A disorder characterized by the inability to stop or control alcohol use despite social, occupational or health consequences
- ~95,000 deaths each year in U.S. due to alcohol-related causes
- ~283 million people globally have an alcohol use disorder



- Large opportunity exists for new therapies that are safe, effective, facilitate compliance and are complementary to widely used behavioral therapy

A New Potential Therapeutic Approach to Treating AUD

- DCR-AUD is designed to silence selectively *ALDH2* in the liver
  - *ALDH2* encodes a key enzyme in alcohol metabolism
  - Naturally occurring *ALDH2* mutations dramatically reduce the risk of AUD in humans
- Qualities of RNAi match the needs of AUD
  - Monthly or longer duration with easy, subcutaneous dosing for improved compliance
  - High gene target and liver specificity to reduce off-target effects
  - High tolerability observed in programs to date
- Phase 1 to provide go/no-go insights
  - FDA IND clearance July 2021; Phase 1 initiation expected in Q3 2021; initial data expected in 1H 2022
  - Safety, tolerability, PK and PD study of single ascending doses of DCR-AUD in healthy volunteers
  - Will assess interaction between DCR-AUD, alcohol consumption using standardized Ethanol Interaction Assessments
- We believe DCR-AUD may potentially be a game-changer in the improvement of treatment outcomes for those with AUD

NIAAA Alcohol Facts and Statistics, Oct 2020; 2018 National Survey on Drug Use and Health; https://www.cdc.gov/features/costsofdrinking/index.html; Grant et al., JAMA Psychiatry 2015; https://www.census.gov/quickfacts/fact/table/US/PST045219; World Health Organization Global Status Report on Alcohol and Health 2018

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Corporate Collaborations

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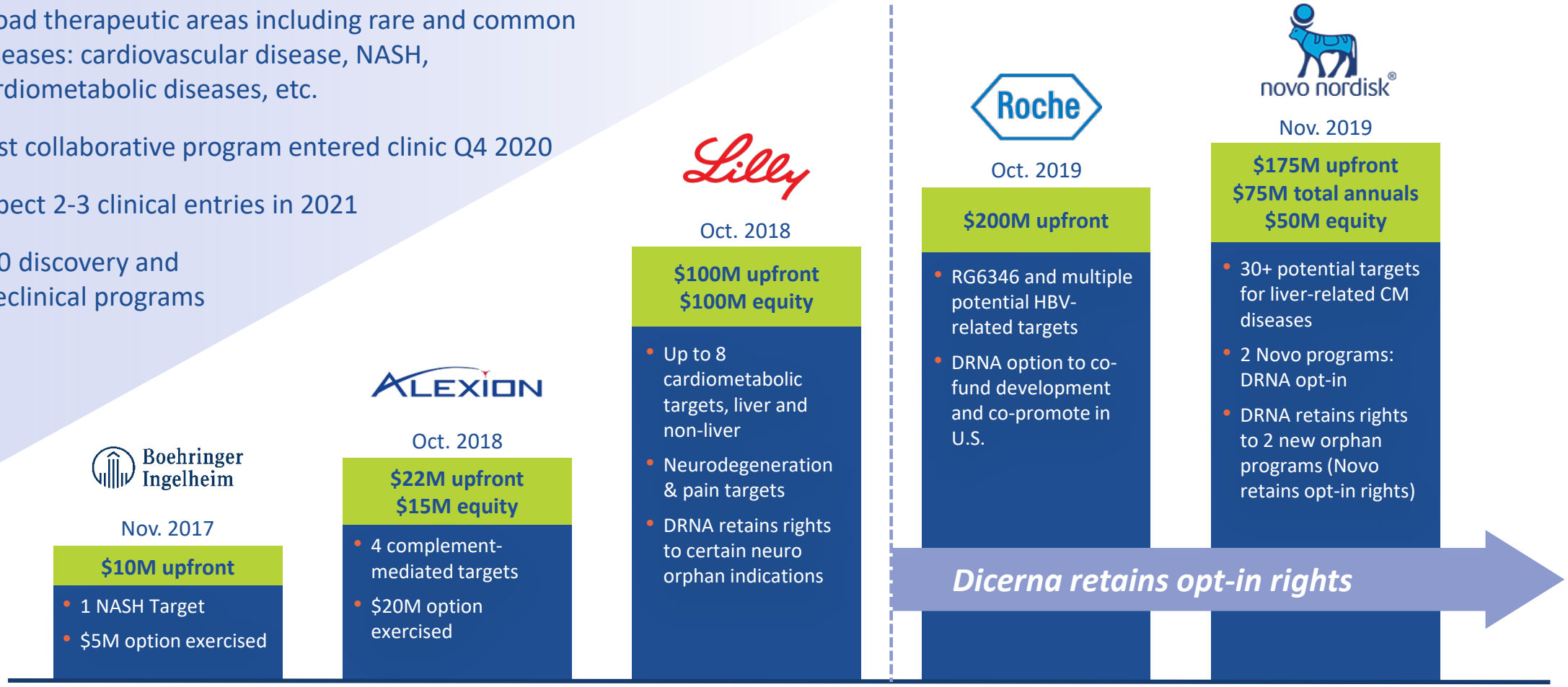
Successfully Executing on High-Value Collaboration Strategy

Expect To Receive $83 Million in Payments in 2021

- Broad therapeutic areas including rare and common diseases: cardiovascular disease, NASH, cardiometabolic diseases, etc.
- First collaborative program entered clinic Q4 2020
- Expect 2-3 clinical entries in 2021
- >20 discovery and preclinical programs



>$500 million in upfront and milestone payments received to date

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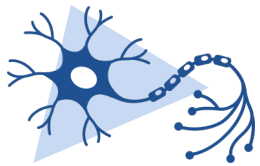
GalXC Plus™

Extrahepatic Platform

Dicerna™

GalXC Plus™: Broad Opportunity in Tissues Beyond the Liver

Future Pipeline and Collaborations to Include Delivery Beyond Liver

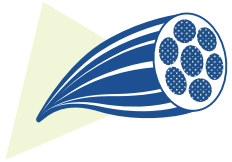


partnered with Lilly

Neurodegeneration & Pain

Up to **99%** gene silencing in non-human primate models from a single dose

Rare diseases and large-market neurodegeneration opportunities

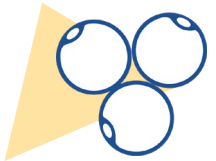


100% Dicerna™ owned technology

Muscle Tissue

Up to **85%** gene silencing in non-human primate models from a single subcutaneous dose

Specific orphan indications in discovery



100% Dicerna™ owned technology

Adipose Tissue

Up to **85%** gene silencing in non-human primate models from a single subcutaneous dose

Orphan and large-market metabolic opportunities

Optimization ongoing in additional tissues, including tumor-associated immune cells and more

Dicerna TIDES Europe Presentation, Nov. 10, 2020

Management Team

Leading Experts in RNAi Technology, Clinical, Regulatory and Commercial Operations

- Dicerna founder
- Sirna Therapeutics
- Whitehead/Broad Institute
- Ph.D., UC Berkeley

Douglas M. Fambrough, Ph.D.
President and Chief Executive Officer

- Joined Dicerna in 2012
- VP, BD of MannKind Corp
- Pfizer, Pharmacia

Jim Weissman
EVP, Chief Operating Officer

- Joined Dicerna in 2020
- CMO & Global Head Med. Affairs, Novartis Pharma
- M.D., All India Institute of Medical Sciences

Shreeram Aradhye, M.D.
EVP, Chief Medical Officer

- Joined Dicerna in 2008
- VP, Research & Technology, Genta
- Cofounder, Oasis Biosciences
- Ph.D., UC Berkeley

Bob D. Brown, Ph.D.
EVP R&D, Chief Scientific Officer

- Joined Dicerna in 2020
- Deputy Head Legal M&A, Novartis
- VP, GC for Europe, Bausch
- JD, Georgetown University

Ling Zeng, J.D.
Chief Legal Officer & Secretary

- Joined Dicerna in 2019
- Global Head Commercial, Momenta
- US Head Commercial Ops, Shire
- MBA, Harvard University

Rob Ciappenelli
Chief Commercial Officer

- Joined Dicerna in 2020
- CFO, KSQ Therapeutics
- CFO, Paratek
- MBA, Columbia University

Douglas Pagán
Chief Financial Officer

- Joined Dicerna in 2016
- Sirna Therapeutics
- Ribozyme Pharmaceuticals
- Ph.D., Oregon Health Sciences

Jennifer Lockridge, Ph.D.
SVP, Program Development

- Joined Dicerna in 2017
- General Manager, Oligo manufacturing Agilent
- Eyetech

James Powell
SVP, Technical Operations

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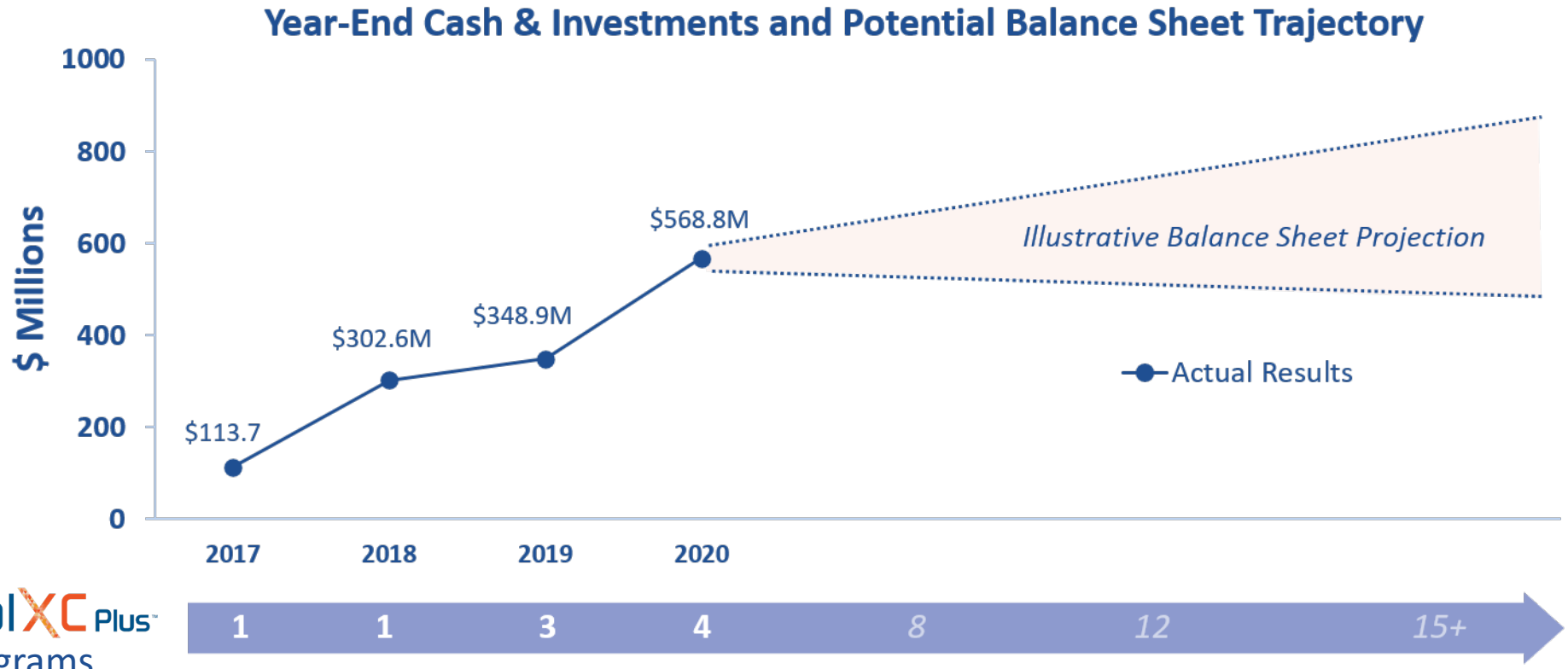
Strong Balance Sheet

Dicerna's Business Model Has Potential to Fund Robust Pipeline Growth



Expect balance sheet to remain strong due to product revenue, payments from existing collaborations, new collaborations, and asset monetization

(does not include any proceeds from potential follow-on stock offerings)

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Target Milestones To Drive Momentum in 2021

Focused on Execution

- **Nedosiran for PH**
  - ☑ Complete pivotal enrollment
  - ☑ Top-line PHYOX2 pivotal data mid-year 2021
  - ☐ PHYOX4 data in PH3 Q3 2021
  - ☐ NDA submission Q4 2021
  - ☐ Seek global commercialization partner(s)
- **RG6346 for HBV**
  - ☑ Phase 2 initiation Q1 2021
- **Belcesiran for AATLD**
  - ☑ Phase 2 initiation 1H 2021
  - ☑ Phase 1 data mid-year 2021

- **DCR-AUD**
  - ☑ Unveiling Q1 2021
  - ☑ IND filing mid-year 2021
  - ☐ Initiate Phase 1 study Q3 2021
- **Collaborative pipeline – additional clinical entries**
- **GalXC-Plus: CNS and other non-liver candidates**

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