generation bio™

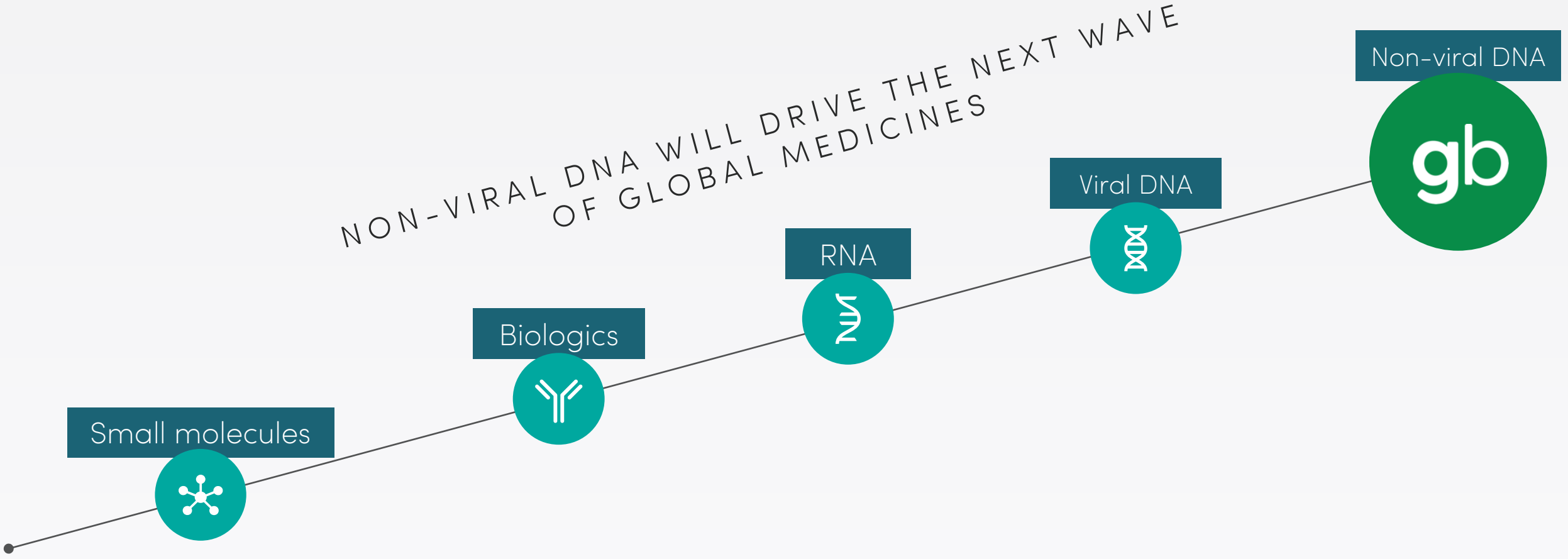
We're pushing the limits of genetic medicine

And our goal is no limits

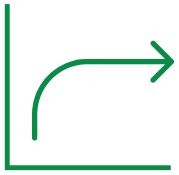
Forward Looking Statements

Any statements in this presentation about future expectations, plans and prospects for the company, including statements about our strategic plans or objectives, our technology platform, including our rapid enzymatic synthesis (RES) technology, our research and clinical development plans, and our preclinical data and other statements containing the words "believes," "anticipates," "plans," "expects," and similar expressions, constitute forward-looking statements within the meaning of The Private Securities Litigation Reform Act of 1995. Actual results may differ materially from those indicated by such forward-looking statements as a result of various important factors, including: uncertainties inherent in the identification and development of product candidates, including the conduct of research activities, the initiation and completion of preclinical studies and clinical trials and clinical development of the company's product candidates; uncertainties as to the availability and timing of results from preclinical studies and clinical trials; whether results from preclinical studies will be predictive of the results of later preclinical studies and clinical trials; uncertainties regarding the RES manufacturing process; expectations for regulatory approvals to conduct trials or to market products; challenges in the manufacture of genetic medicine products; whether the company's cash resources are sufficient to fund the company's operating expenses and capital expenditure requirements for the period anticipated; the impact of the COVID-19 pandemic on the company's business and operations; as well as the other risks and uncertainties set forth in the "Risk Factors" section of our most recent annual report on Form 10-K and quarterly report on Form 10-Q, which are on file with the Securities and Exchange Commission, and in subsequent filings the company may make with the Securities and Exchange Commission. In addition, the forward-looking statements included in this presentation represent the company's views as of the date hereof. The company anticipates that subsequent events and developments will cause the company's views to change. However, while the company may elect to update these forward-looking statements at some point in the future, the company specifically disclaims any obligation to do so. These forward-looking statements should not be relied upon as representing the company's views as of any date subsequent to the date on which they were made.

We are the **new modality leader for non-viral DNA therapeutics**

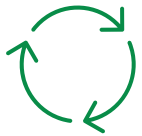


Our goal is **to deliver lifelong, titratable gain of function genetic medicines on a disruptive global scale**



DURABLE

Gene expression for the life of the cell



REDOSABLE

Extend therapeutic benefit over the long term

TITRATABLE

Expression levels can be adjusted to meet each patient's need

SCALABLE

Manufacturing to support hundreds of millions of doses globally

Building a **transformative global genetic medicines company**

New modality leader

Leading the rare disease field to durable cures

HEMOPHILIA A

30K

U.S. PATIENTS

Rare disease innovator

Developing a deep rare disease portfolio

RARE LIVER DISEASES

100K

U.S. PATIENTS

Prevalent disease disruptor

Global impact through proprietary & partnered programs

PREVALENT DISEASES

>100M

U.S. PATIENTS

Developing the preeminent portfolio of non-viral DNA therapeutics targeted to the liver & other tissues

Our **3 proprietary non-viral genetic medicine platform technologies**

3 CORE TECHNOLOGIES
TO ENABLE NON-VIRAL DNA THERAPEUTICS

MULTIPLE MODALITIES

ceDNA
CLOSED-ENDED DNA

- High payload capacity
- Durable expression
- Enables gene transfer and gene editing

31 PATENT FAMILIES

Patent family numbers current as of January 6, 2023

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31 PATENT FAMILIES

GLOBAL SCALE

RES
LARGE SCALE RES MANUFACTURING

- Cell-free ceDNA production process
- Scalable for hundreds of millions of doses
- Unlocks structural DNA innovation

2 PATENT FAMILIES

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2 PATENT FAMILIES

MULTIPLE TISSUES

ctLNP
CELL-TARGETED LNP DELIVERY

- Biological cell-targeting
- Potential to reach multiple tissues & cell types
- Highly specific, redosable delivery of DNA, RNA

18 PATENT FAMILIES

ceDNA accesses the nucleus to enable durable gene expression

MULTIPLE MODALITIES

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CLOSED-ENDED DNA

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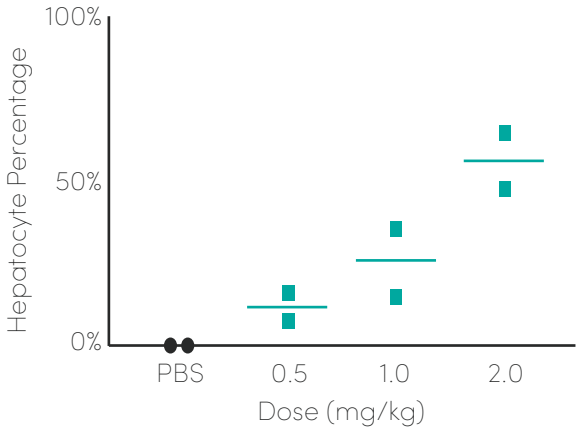
31 PATENT FAMILIES

HARNESSING THE POWER OF THE NUCLEUS

Nuclear uptake

Dose-dependent transduction of hepatocytes

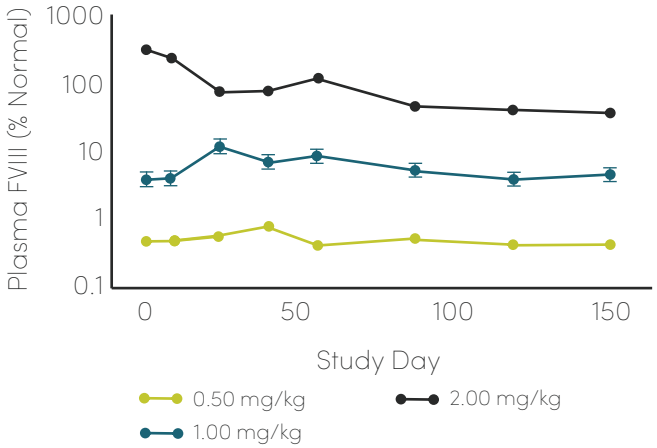
Percent sense probe positive, nuclei



Durable expression

Factor VIII stable through day 140

Immunocompetent hemophilia A mouse model



Modalities

Gene replacement
Durably express full transgene

Gene editing
DNA template for gene insertion/correction

Unique RES process builds scale for rare & prevalent diseases

GLOBAL SCALE

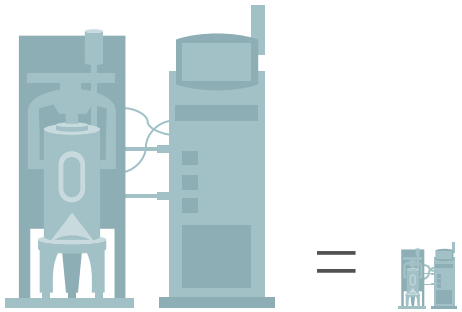
RES
LARGE SCALE RES MANUFACTURING

- Cell-free ceDNA production process
- Scalable for hundreds of millions of doses
- Unlocks structural DNA innovation

2 PATENT FAMILIES

RAPID ENZYMATIC SYNTHESIS MATCHES SCALE OF PLATFORM POTENTIAL

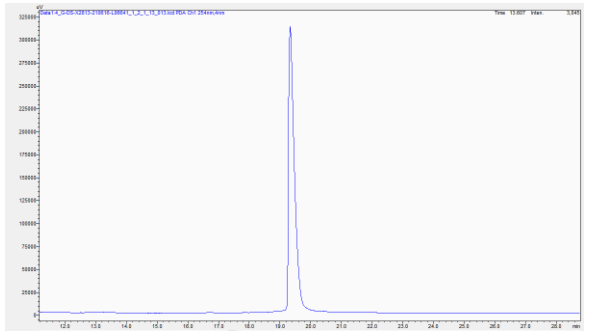
cGMP Efficiency
Flexible, modular cGMP manufacturing at scale



500L bioreactor ceDNA output w/ Sf9-cell production

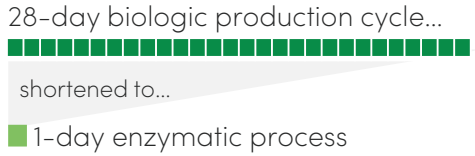
= 10L bioreactor output w/ RES

Quality
Consistent purity



IEX chromatography for ceDNA drug substance

Speed
Robust, short cycle times



ENABLES
4-week research cycle, accelerates preclinical R&D

Our proprietary **ctLNP system unlocks two significant opportunities for genetic medicine**

MULTIPLE TISSUES

ctLNP
CELL-TARGETED LNP DELIVERY

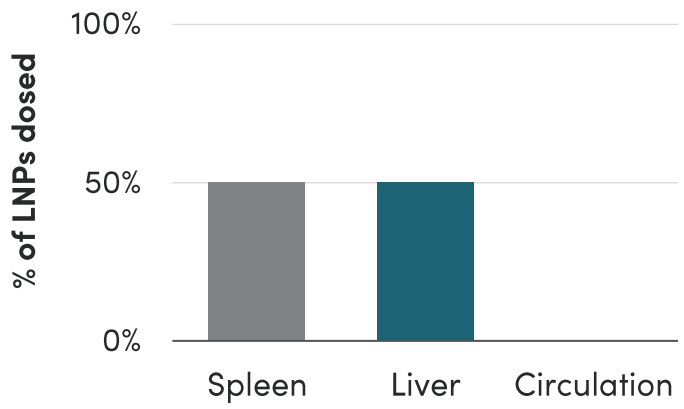
- Biological cell-targeting
- Potential to reach multiple tissues & cell types
- Highly specific, redosable delivery of DNA, RNA

18 PATENT FAMILIES

RNA DELIVERY TO SPLEEN/LIVER

Standard LNPs
50/50 to spleen & liver

Standard LNP
typical biodistribution profile



TWO OPPORTUNITIES FOR ctLNPs

Cell-targeted LNP delivery
could bypass the limitations of standard LNPs

DNA delivery to the liver
- **Opportunity** – liver as biofactory, and liver as therapeutic target
- **Challenge** - immune stimulation

DNA & RNA delivery beyond the liver
- **Opportunity** – redosable genetic medicines for extra-hepatic targets
- **Challenge** – active LNP uptake by spleen & liver prevents access

Patent family numbers current as of January 6, 2023

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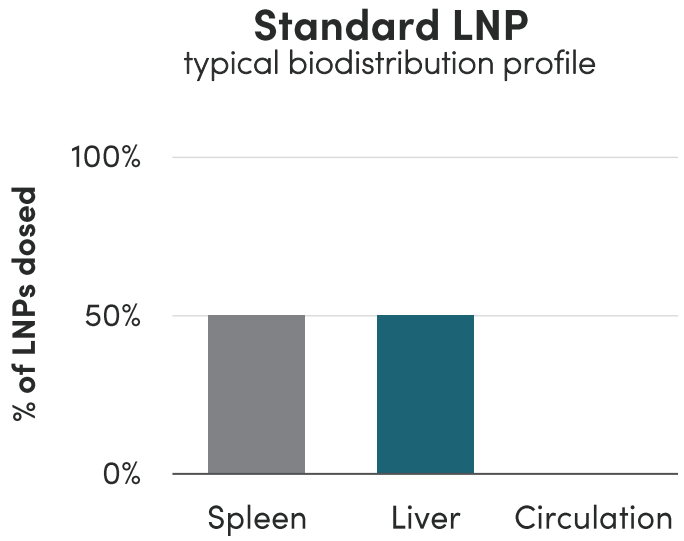

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generation bio™

Patent family numbers current as of January 6, 2023

ctLNP is engineered for highly specific delivery of ceDNA to the liver

MULTIPLE TISSUES

ctLNP
CELL-TARGETED LNP DELIVERY

- Biological cell-targeting
- Potential to reach multiple tissues & cell types
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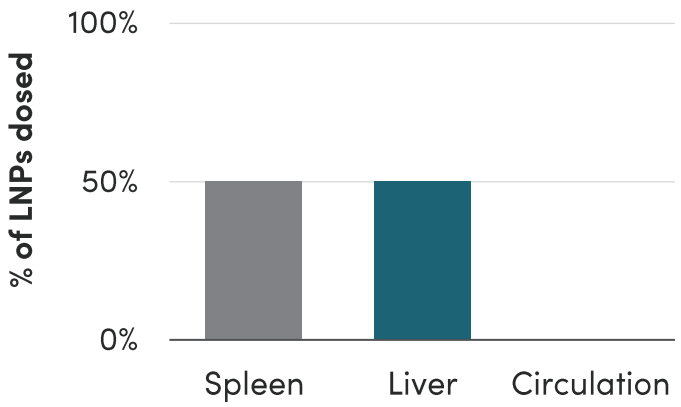
18 PATENT FAMILIES

UNIQUE BIOLOGICAL CELL-SPECIFIC LNP TARGETING

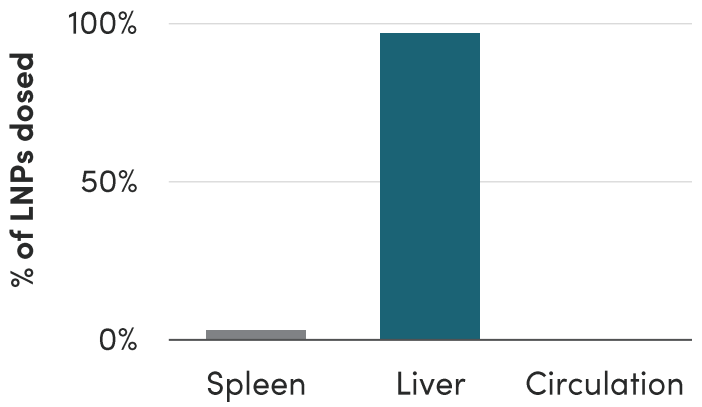
Standard LNPs
50/50 to spleen & liver

Standard LNP
typical biodistribution profile



Liver ctLNP (GalNAc)
Specific hepatocyte delivery

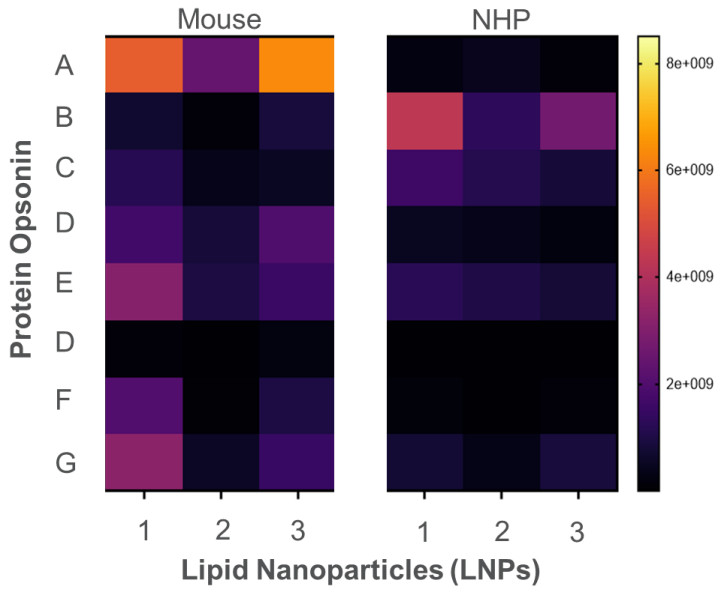
Liver ctLNP
target biodistribution profile



Deep understanding of serum profile leads to **novel liver ctLNP with reduced immune stimulation**

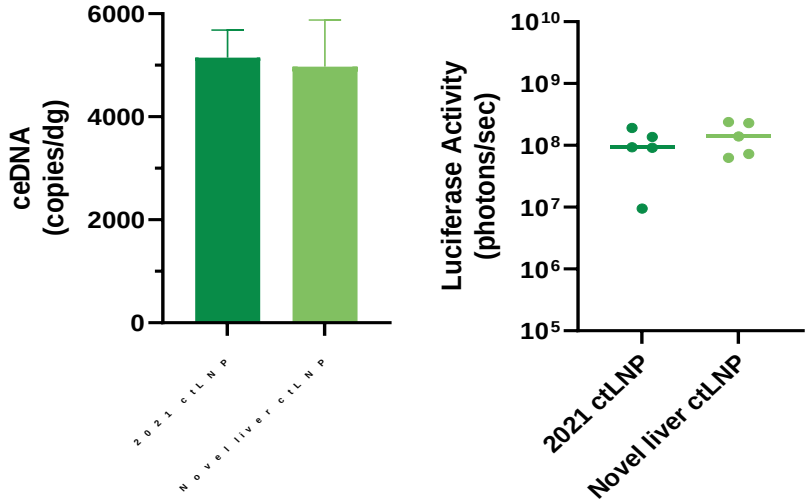
PRESERVED ON-TARGET ACTIVITY WITH REDUCED OFF-TARGET IMMUNE CELL ACTIVATION

Serum protein binding heat map



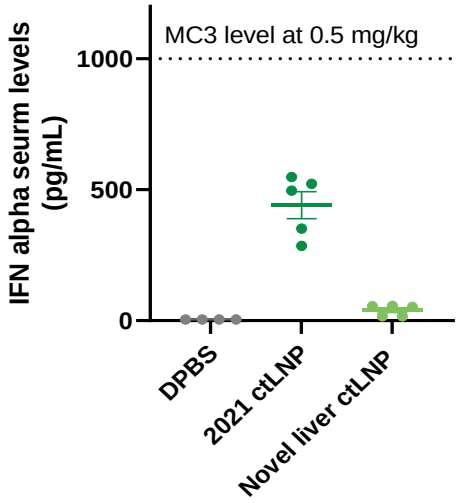
Novel liver ctLNP has similar on-target delivery & expression

compared to 2021 ctLNP formulation



Novel liver ctLNP shows reduced cytokine response

suggests reduced immune cell uptake compared to 2021 ctLNP



2021 ctLNP & novel liver ctLNP dosed at 2.0mg/kg in each experiment

We aim to **transform the therapeutic landscape for Hemophilia A**

OVERCOMING THE LIMITATIONS OF CURRENT THERAPIES

PATIENTS

- **Titration** to target expression level for each patient
- **Dosing in childhood** before disease progression
- **Redosing** to extend benefit over a lifetime

PHYSICIANS

- **Extend genetic medicine to all Hemophilia A patients**
- **Rescue** for undertreated AAV patients

PAYERS

- **More predictable** clinical outcome
- **Reimbursement** in current paradigm

HEMOPHILIA A

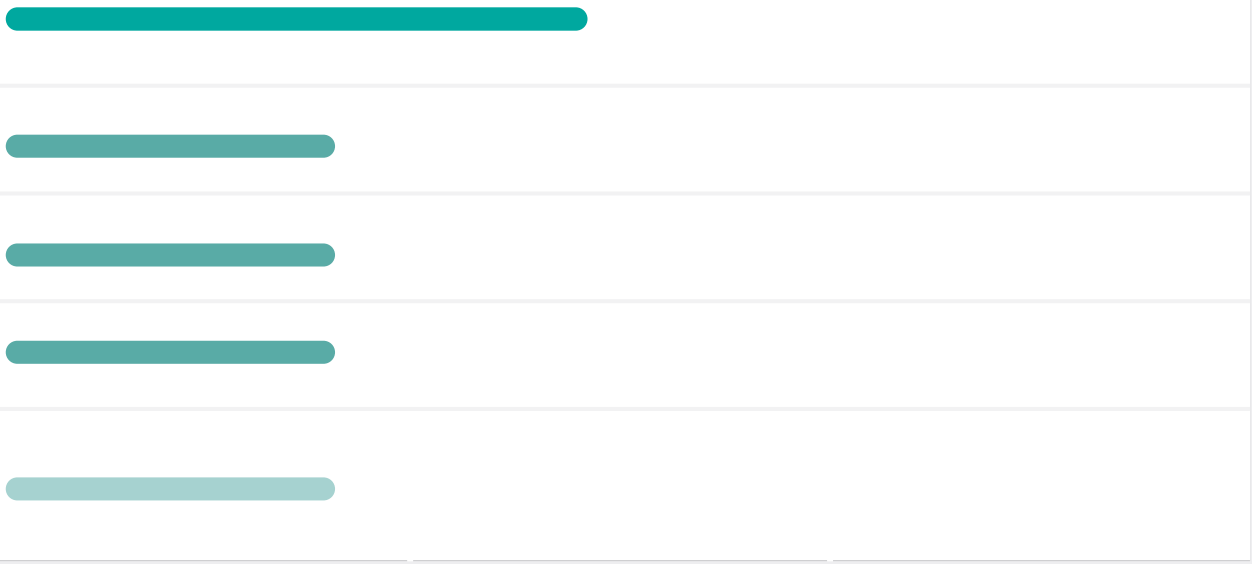
- ✓ Clear pre-clinical biomarkers
- ✓ Established regulatory path
- ✓ Large global market
- ✓ Significant unmet need

30K
U.S. PATIENTS

Hemophilia A is the entry point for a large liver pipeline

CORE LIVER PORTFOLIO

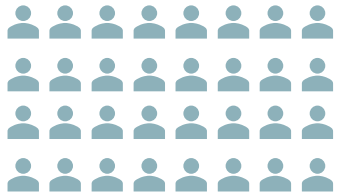
STRATEGIC STAGE	TIMING	PROGRAM	EARLY RESEARCH	PRE-CLINICAL DEVELOPMENT	CLINICAL DEVELOPMENT
NEW MODALITY LEADER	NEAR-TERM	Hemophilia A			
RARE DISEASE INNOVATOR	MID-TERM	PKU			
		Wilson			
		Gaucher			
PREVALENT DISEASE DISRUPTOR	LONG-TERM	ETAP*			

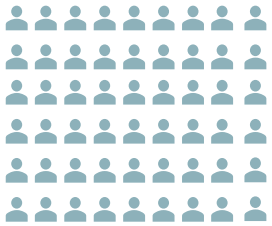


*Endogenous Therapeutic Antibody Production

Our **liver pipeline is designed to extend from rare to prevalent diseases**

	NEW MODALITY LEADER	RARE DISEASE INNOVATOR	PREVALENT DISEASE DISRUPTOR
	NEAR-TERM	MID-TERM	LONG-TERM
CORE LIVER PORTFOLIO	Hemophilia A	PKU Wilson Gaucher	ETAP*
	30K U.S. PATIENTS	RARE LIVER DISEASES 100K U.S. PATIENTS	PREVALENT LIVER DISEASES >100M U.S. PATIENTS





*Endogenous Therapeutic Antibody Production

Our proprietary **ctLNP system unlocks two significant opportunities for genetic medicine**

MULTIPLE TISSUES

ctLNP
CELL-TARGETED LNP DELIVERY

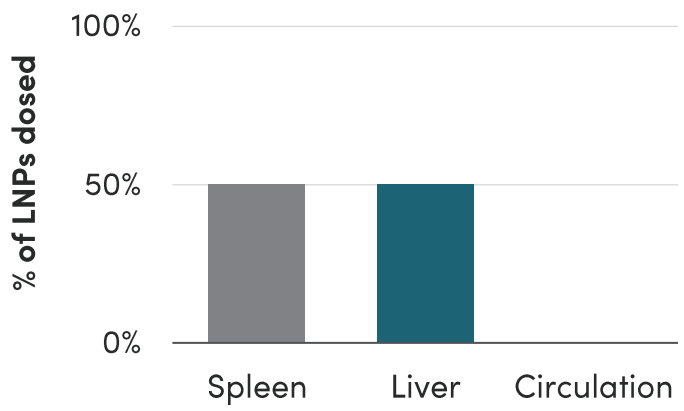
- Biological cell-targeting
- Potential to reach multiple tissues & cell types
- Highly specific, redosable delivery of DNA, RNA

18 PATENT FAMILIES

RNA DELIVERY TO SPLEEN/LIVER

Standard LNPs
50/50 to spleen & liver

Standard LNP
typical biodistribution profile



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DNA & RNA delivery beyond the liver
- **Opportunity** – redosable genetic medicines for extra-hepatic targets
- **Challenge** – active LNP uptake by spleen & liver prevents access

Stealth LNP biodistribution profile is key to **accessing tissues & cell types beyond the liver**

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CELL-TARGETED LNP DELIVERY

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- Highly specific, redosable delivery of DNA, RNA

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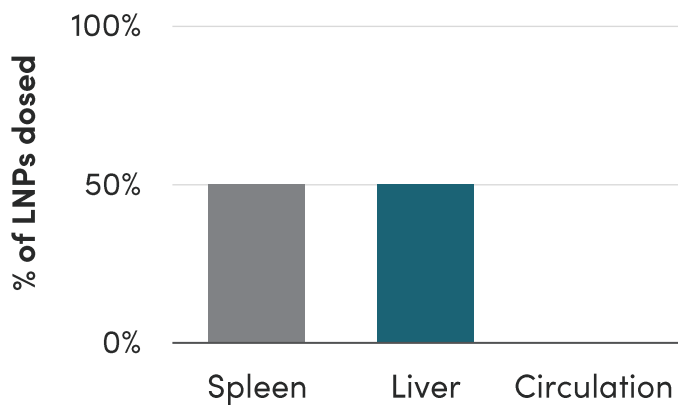
STEALTH LNP PERSISTS IN CIRCULATION

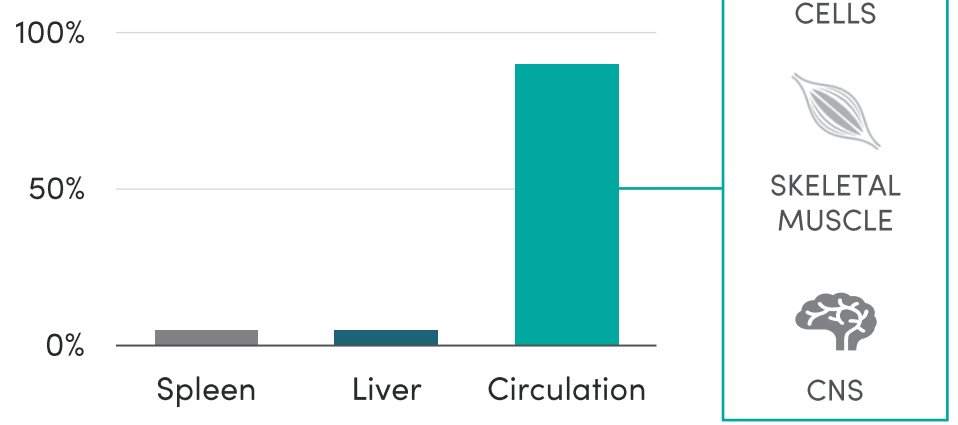
Standard LNPs
50/50 to spleen & liver

Standard LNP
typical biodistribution profile



Stealth LNPs
Base composition engineered to avoid spleen & liver uptake

Stealth LNP
target biodistribution profile



Patent family numbers current as of January 6, 2023

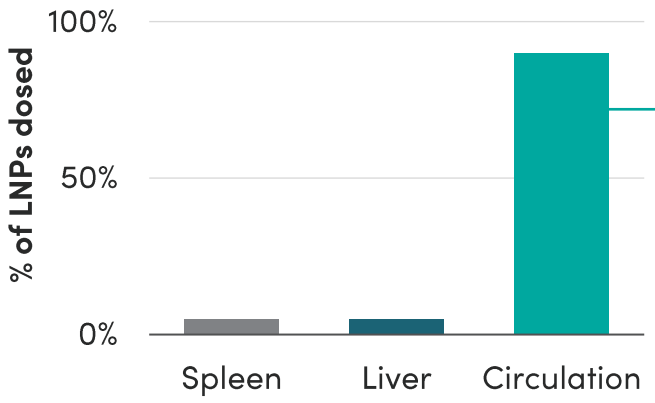
Deep understanding of serum profile leads to **novel stealth LNPs that avoid uptake by spleen & liver**

STEALTH LNP IN CIRCULATION BECOMES AVAILABLE FOR TARGETING

ctLNP w/o GalNAc

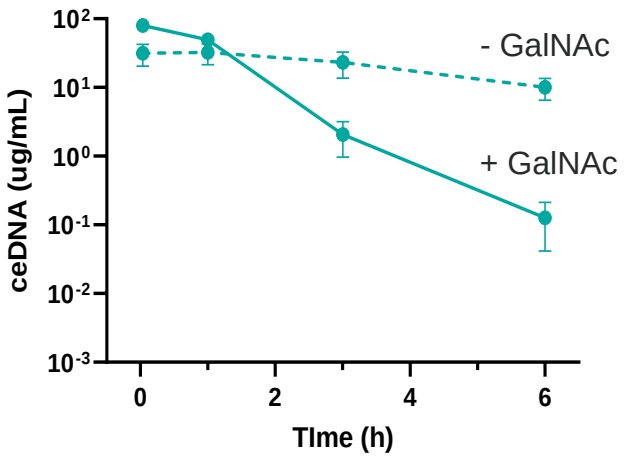
Base stealth composition engineered to avoid spleen & liver uptake

Stealth LNP
target biodistribution profile



Long half-life w/o GalNAc

Available for targeting to non-liver tissues



Priorities for new tissues

- POC for targeted delivery to immune cells
- Establish immune cell program POC
- Explore potential for partnerships to accelerate and extend portfolio beyond the liver

Non-liver targets offer significant pipeline value expansion

THERAPEUTIC AREA	NEW MODALITY LEADER	RARE DISEASE INNOVATOR	PREVALENT DISEASE DISRUPTOR
	NEAR-TERM	MID-TERM	LONG-TERM
LIVER	Hemophilia A	PKU Wilson Gaucher	ETAP*
NON-LIVER	Targeted delivery optimization	Immune cells	New tissues

*Endogenous Therapeutic Antibody Production

2023 priorities are **NHP POC for the liver pipeline and developing targeting for non-liver cell-types & tissues**

THERAPEUTIC AREA	NEW MODALITY LEADER Leading the next wave of genetic medicines	RARE DISEASE INNOVATOR Rapid platform leverage to expand rare disease portfolio	2023 PRIORITIES
LIVER	Hemophilia A	PKU Wilson Gaucher	❑ Achieve NHP Factor VIII expression & tolerability profile supportive of DC
NON-LIVER	Targeted delivery optimization	Immune cells	❑ Demonstrate POC for extra-hepatic ctLNP targeting

WELL-CAPITALIZED TO DELIVER: $301M* CASH BALANCE PROVIDES RUNWAY INTO 2025

generation bio™

*Cash balance as of September 30, 2022

generation bio™

We're pushing the limits of genetic medicine

And our goal is no limits