We're pushing the limits of genetic medicine

And our goal is no limits

April 2024

generation bio™

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, technology platform, research and clinical development plans, and 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 our novel technologies, including our immune-quiet DNA; uncertainties regarding the rapid enzymatic synthesis manufacturing process; 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; 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.

Breakthrough delivery and cargo platforms enable three development areas

Leading *in vivo* T cell targeted delivery collaboration funded by Moderna

Building own *in vivo* sickle cell program by targeted delivery to HSCs*

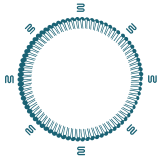
iqDNA cargo enables heme A program and expands T cell & HSC opportunities

Low COGS drive scale, market uptake and share

Cash runway to 2H 2027 to focus on building clinical programs

*Hematopoietic stem cells

Two novel platforms – delivery and cargo – drive differentiated therapeutic opportunities



ctLNP

CELL-TARGETED DELIVERY

REDOSABLE

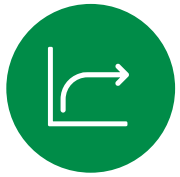
HIGHLY SELECTIVE

MULTI-TISSUE

In vivo delivery
to previously unreachable
cell types and tissues

iqDNA

IMMUNE-QUIET CARGO



DURABLE

TITRATABLE

GAIN OF FUNCTION

Express or replace large genes

ctLNP drives differentiated *in vivo* T cell and HSC programs; iqDNA expands this opportunity and enables hemophilia A program

CELL TYPE	CARGO	INDICATION	PARTNER
In vivo T cells	mRNA	Undisclosed	m
	iqDNA	Undisclosed*	
In vivo HSCs	mRNA (editing)	Sickle cell / β-thalassemia	
	iqDNA	Undisclosed	
Hepatocytes	iqDNA	Hemophilia A Undisclosed*	
Expansion Areas			

*Moderna has an option to license two iqDNA programs in immune cells, two programs in immune cells, and one addition program in either cell type.

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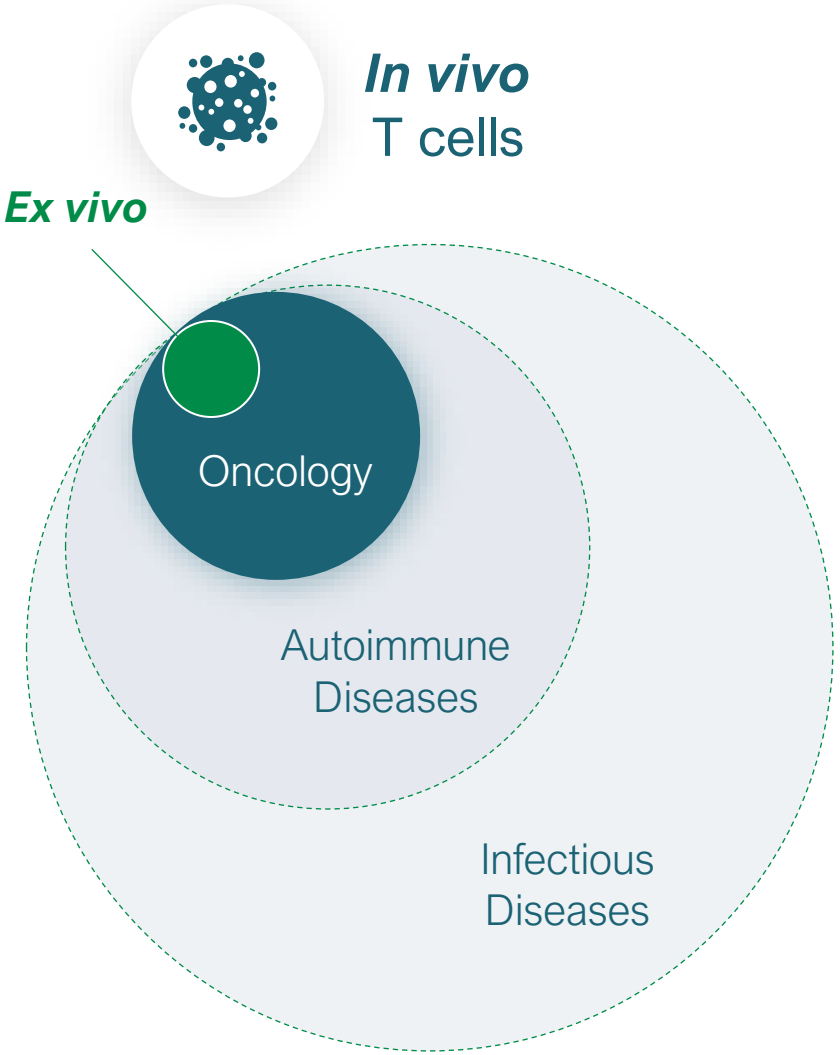
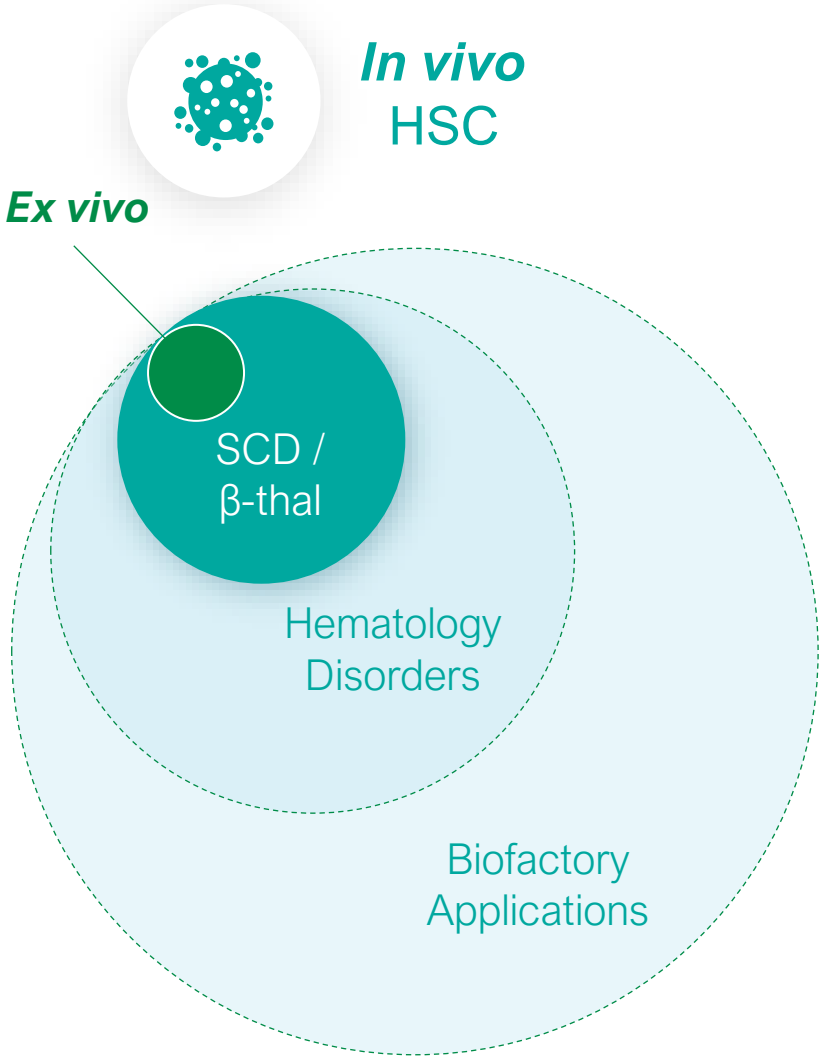
Highly selective, potent ctLNP delivery is an ideal *in vivo* therapeutic approach for T cells and HSCs

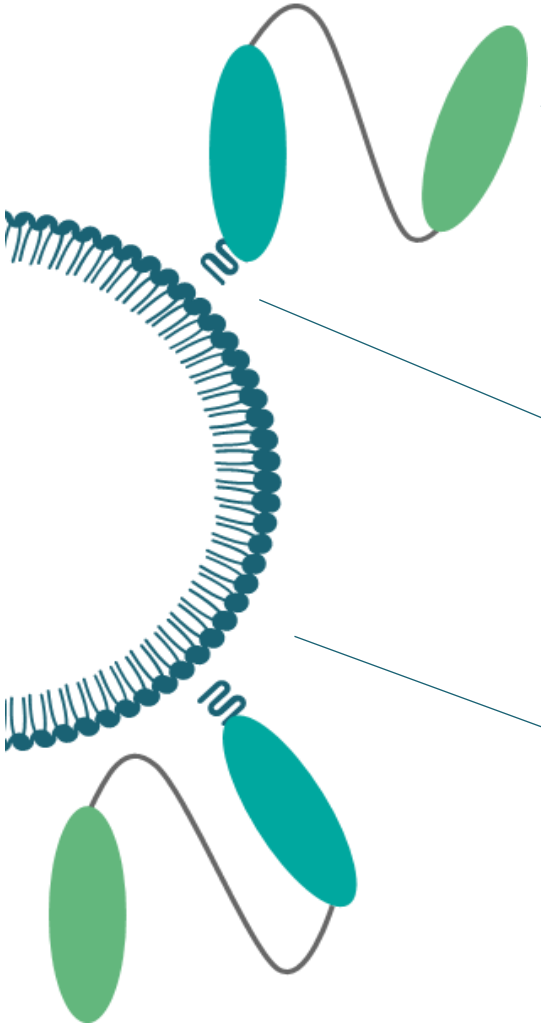
Cell therapy has significant limitations *ex vivo*	We aim to modify target cells *in vivo*
CONDITIONING	**NO CONDITIONING**
MONTHS-LONG WAIT	**ON DEMAND**
ONE CHANCE	**REDOSABLE**
LIMITED ACCESS	**WIDELY ACCESSIBLE**
HIGH COST	**LOW COST**

Redosable *in vivo* therapeutic profile expands the opportunity for T cells and HSCs, and drives growth into new areas





ctLNP is a modular proprietary platform based on stealth, linker, and targeting



LIGAND BIOLOGY

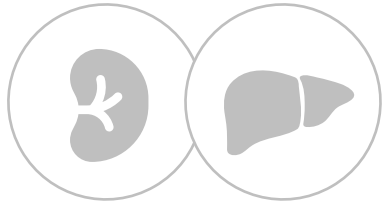
HIGHLY POTENT SELECTIVE TARGETING

LINKER BIOCONJUGATION

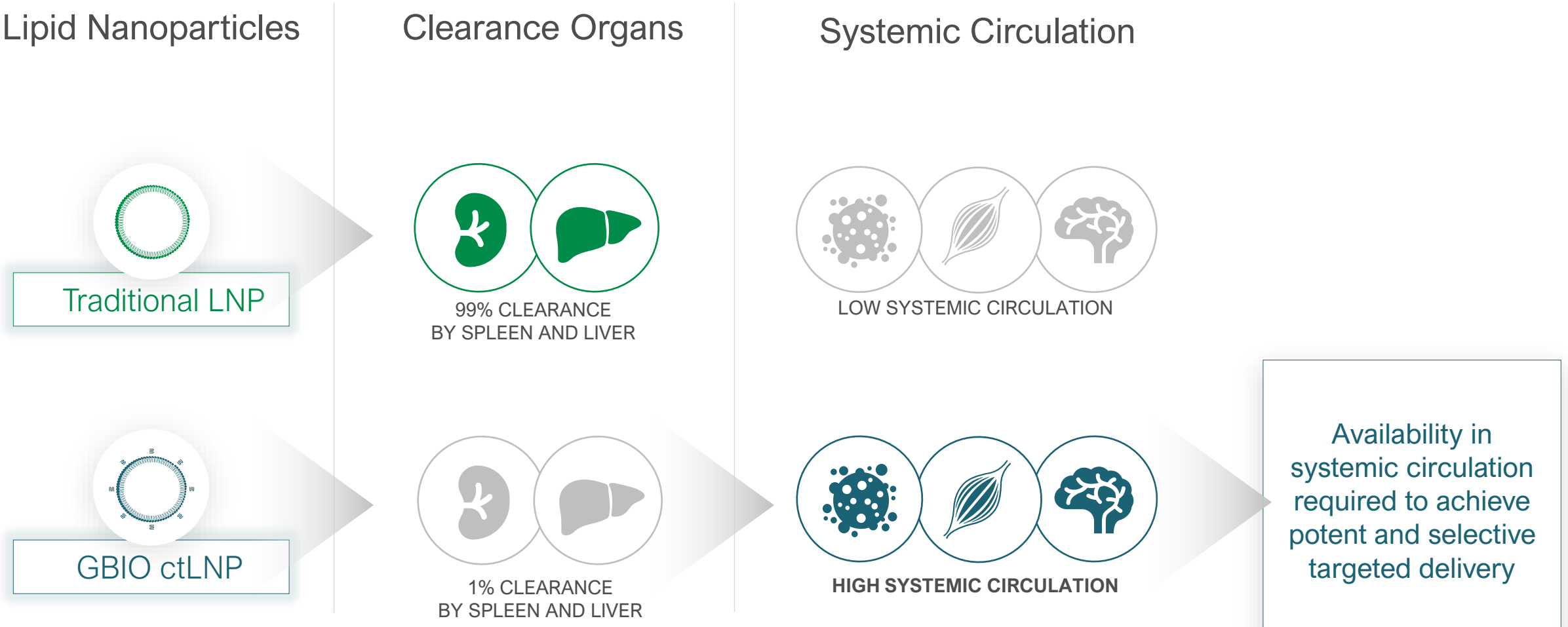
LINKER ENABLES MODULAR LIGAND ATTACHMENT

CORE STEALTH LNP

AVOIDS CLEARANCE, HIGH CONCENTRATION IN CIRCULATION

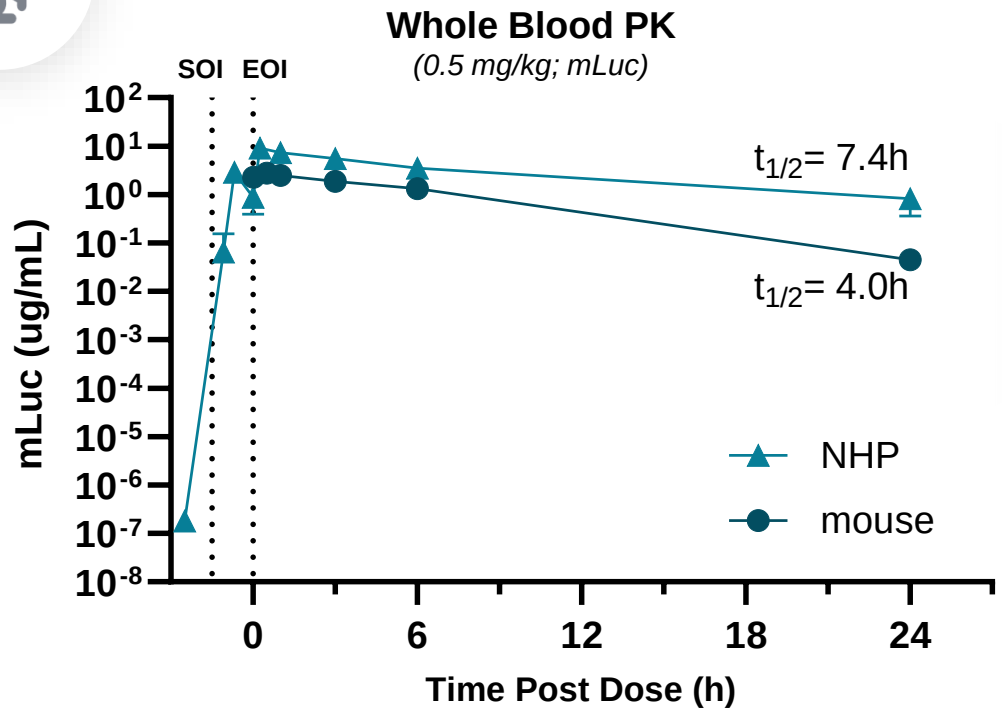


ctLNP avoids liver and spleen clearance, enables a platform approach to targeting previously unreachable cell types and tissues

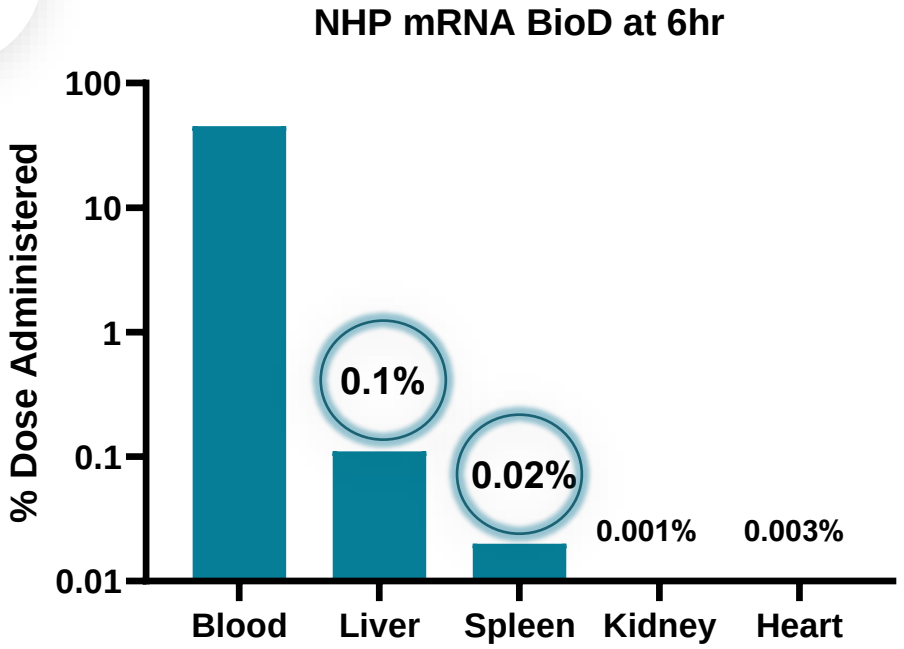


Untargeted ctLNP carrying mRNA demonstrates prolonged circulation and avoids clearance by liver and spleen in NHP

Long circulation time in NHP

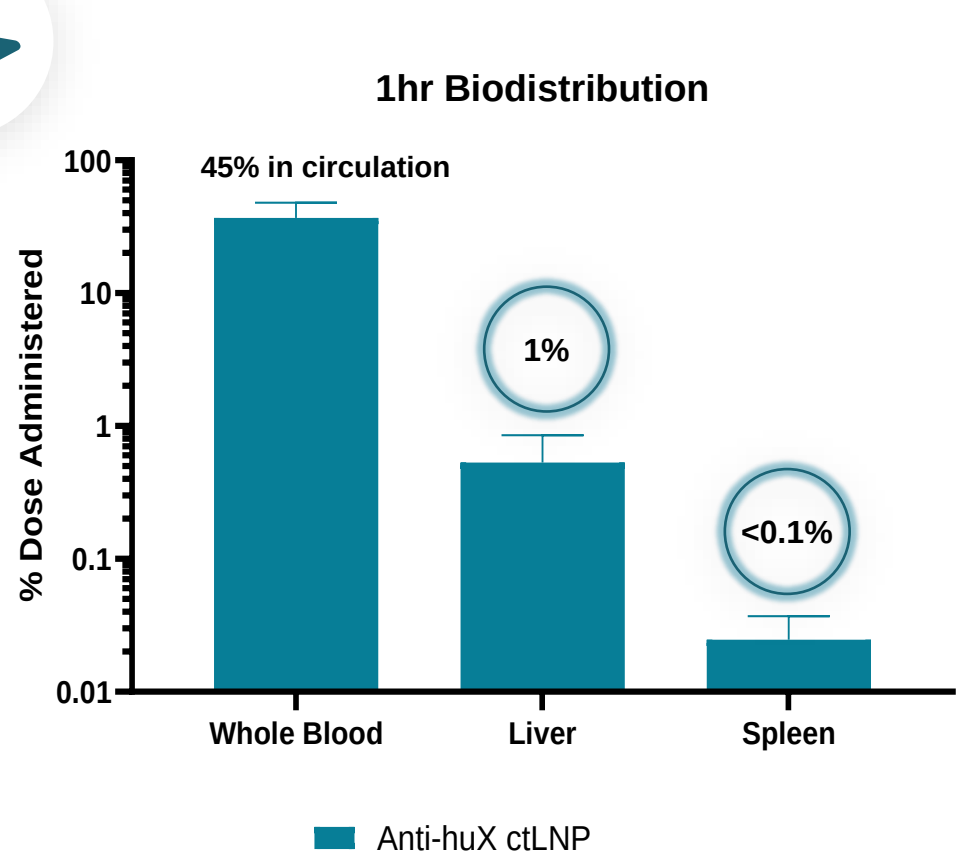


Majority of drug remains in circulation, avoiding clearance by liver or spleen

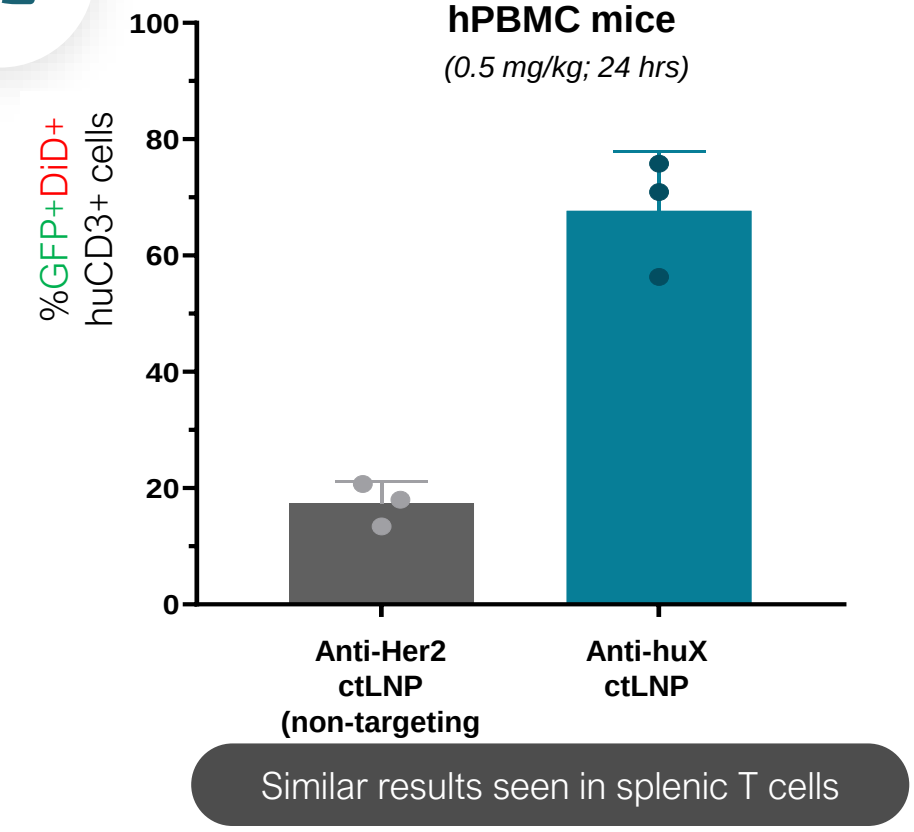


T cell ctLNP with ligand avoids clearance by liver and spleen and demonstrates efficient T cell uptake and expression *in vivo*

T cell ctLNP avoids clearance organs



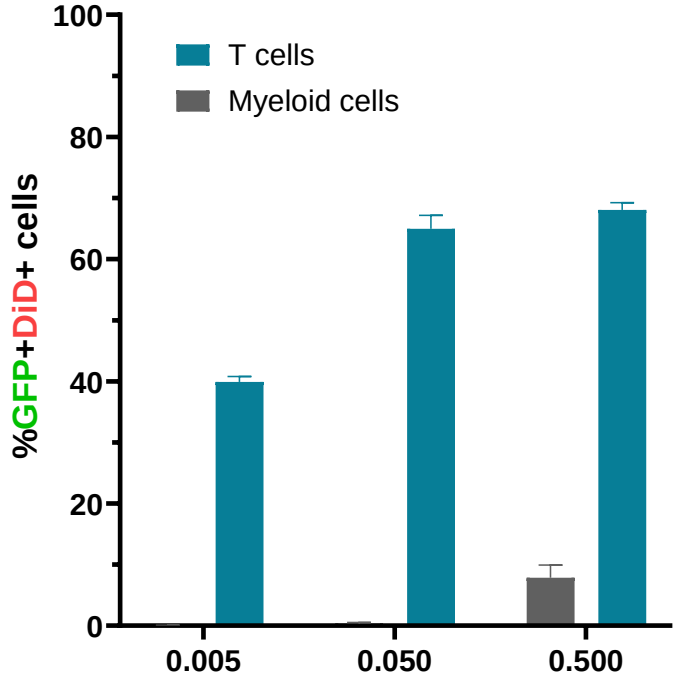
High expression in circulating T cells



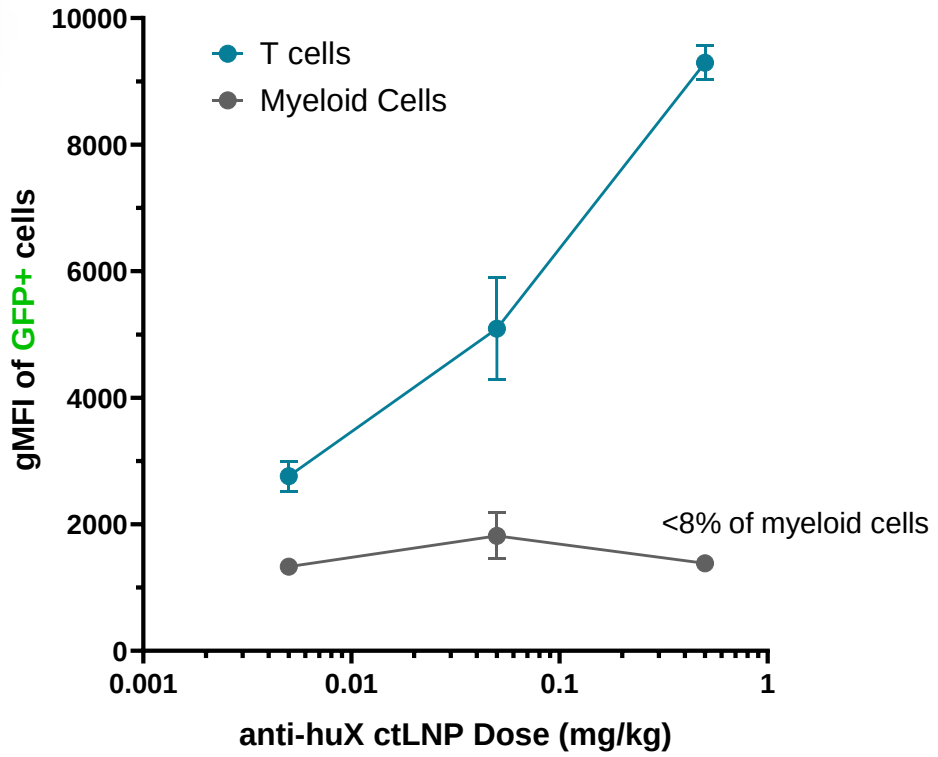
Similar results seen in splenic T cells

T cell ctLNP demonstrates potent and selective uptake and expression across a dose range *in vivo*

Efficient dose-dependent T cell transduction

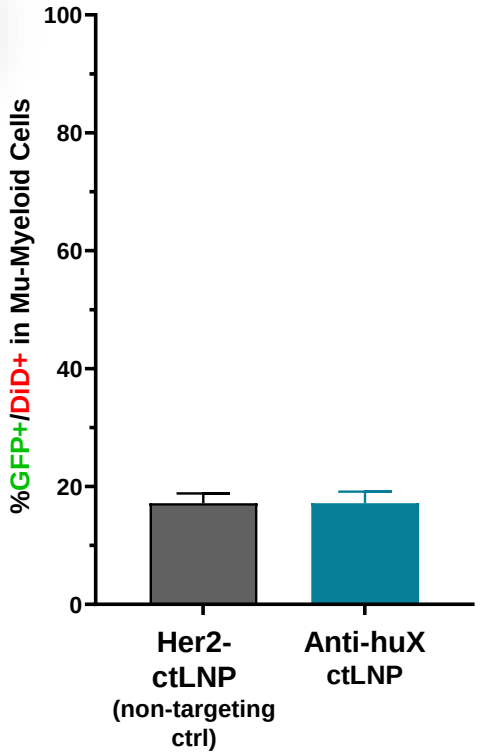


Transduction intensity increases with dose, minimal off-target cell uptake and expression

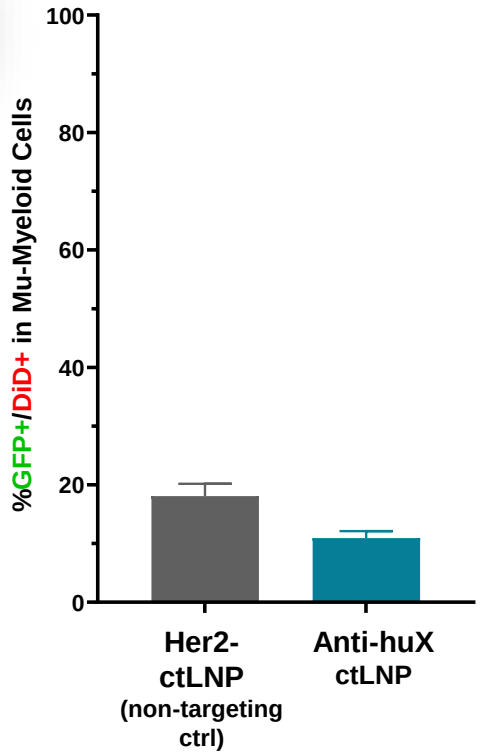


Off-target uptake and expression remains at baseline for T cell ctLNP

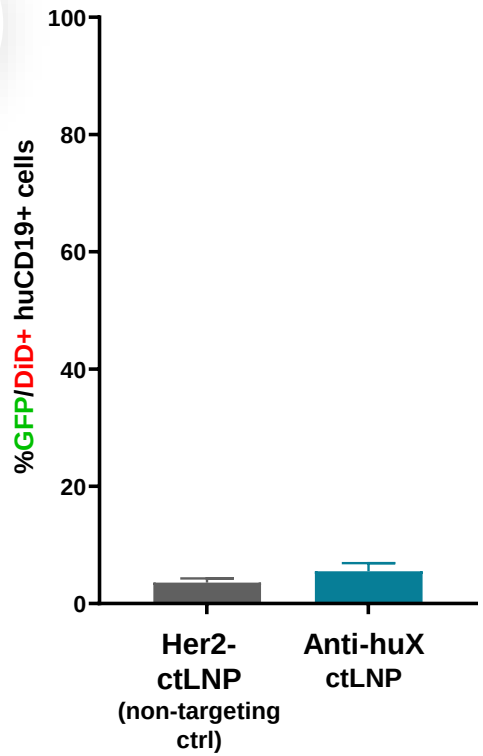
GFP Expression in Circulating Myeloid Cells



GFP Expression in Splenic Myeloid Cells



GFP Expression in Splenic B Cells



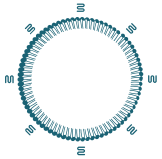
ctLNP platform poised to selectively access multiple cell types and tissues

Foundational proof points

- ✓ Avoid clearance organs and remain available for systemic targeting
- ✓ Targeting ligands drive highly selective, dose-responsive delivery beyond the liver
- ✓ Rapid process for ligand discovery and bioconjugation
- ✓ Compatible with DNA and RNA cargos

Focus on building programs in new cell types and tissues

Two novel platforms – delivery and cargo – drive differentiated therapeutic opportunities



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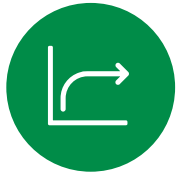
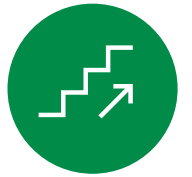


DURABLE



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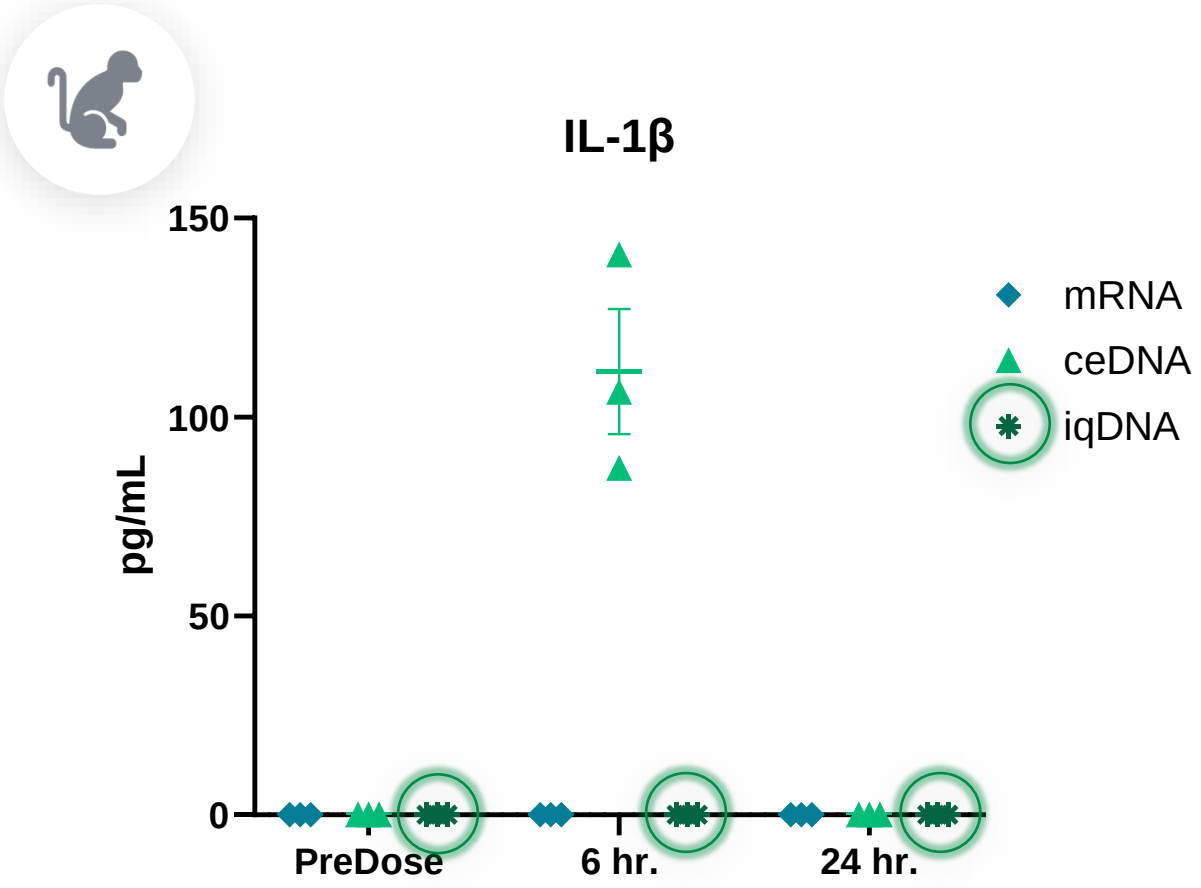
Hepatocytes	iqDNA	Hemophilia A Undisclosed*	
Expansion Areas			

*Moderna has an option to license two iqDNA programs in immune cells, two programs in immune cells, and one addition program in either cell type.

iqDNA solves the central challenge of innate immune stimulation that has held back the non-viral genetic medicine field for decades

iqDNA avoids innate immune stimulation



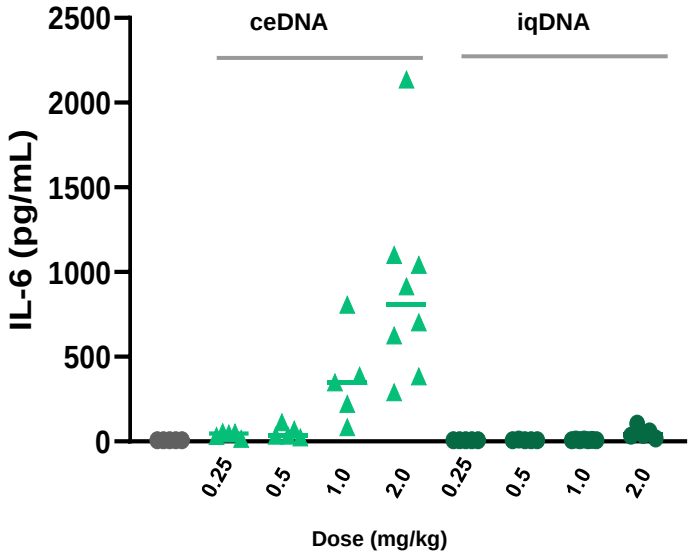
Proprietary rapid enzymatic synthesis enabled the discovery

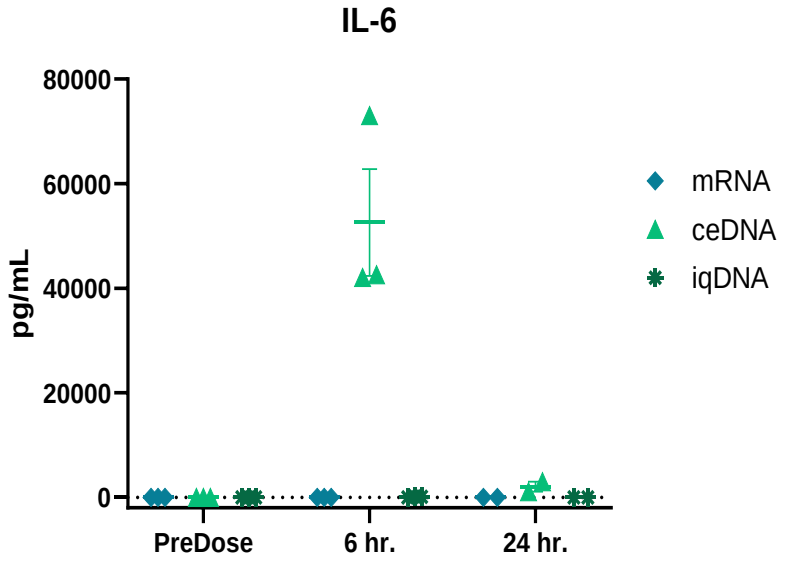
Site specific ligation

Chemical modifications

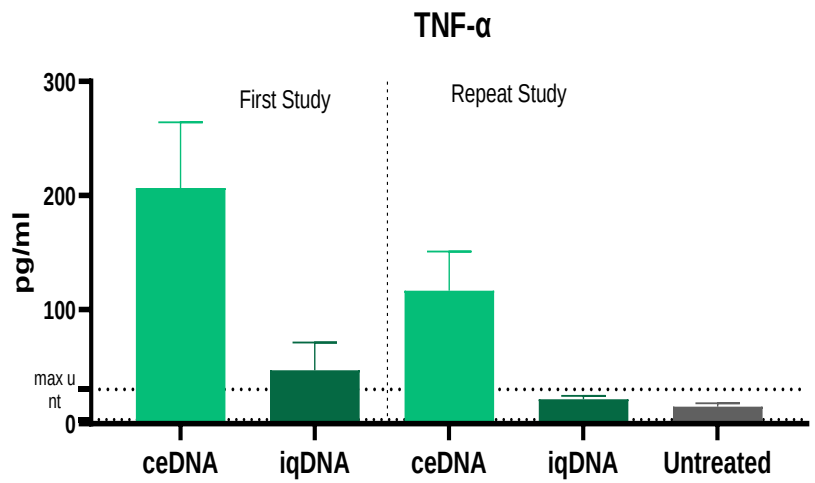
Novel structured elements

iqDNA profile is conserved across species, including in human PBMCs



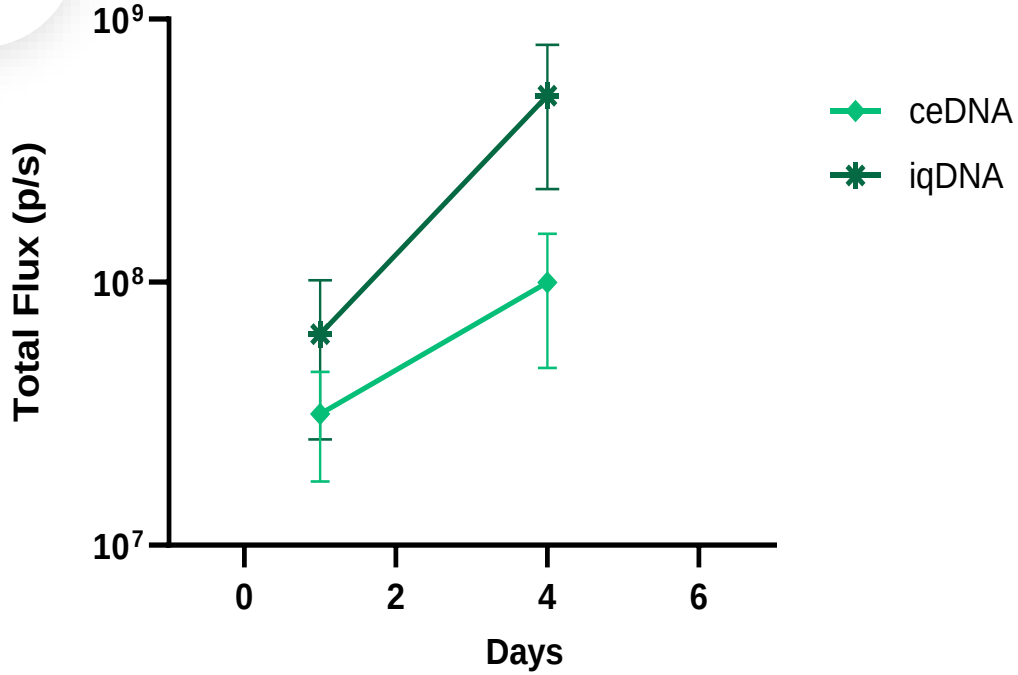


Transduced hPBMCs

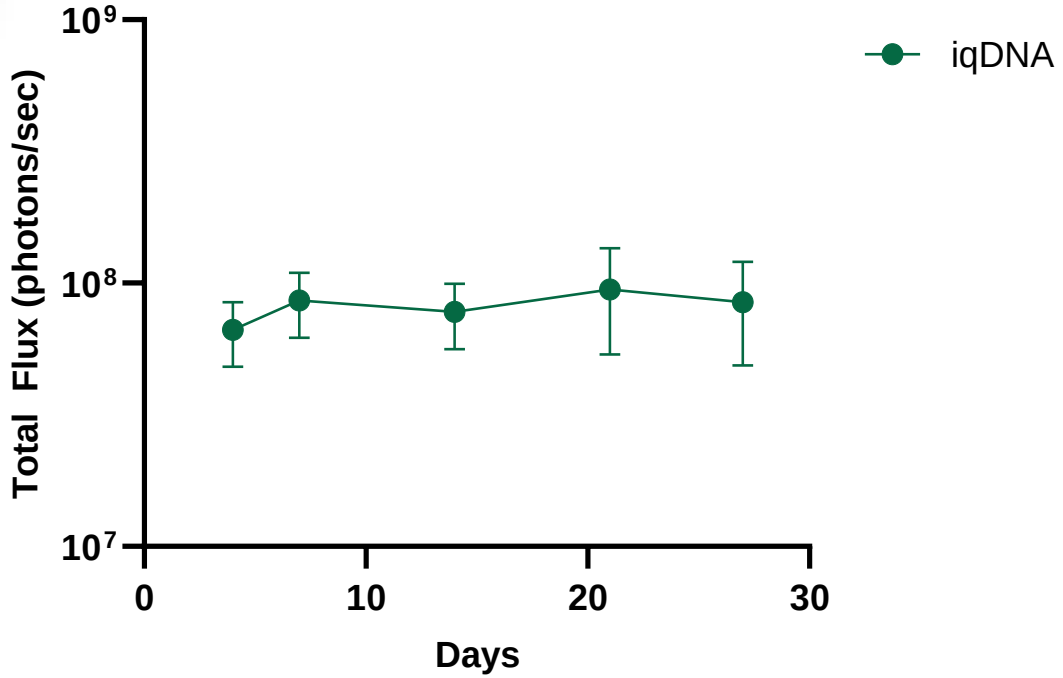


iqDNA demonstrates robust and durable luciferase expression in mice

Luciferase IVIS (6 days)



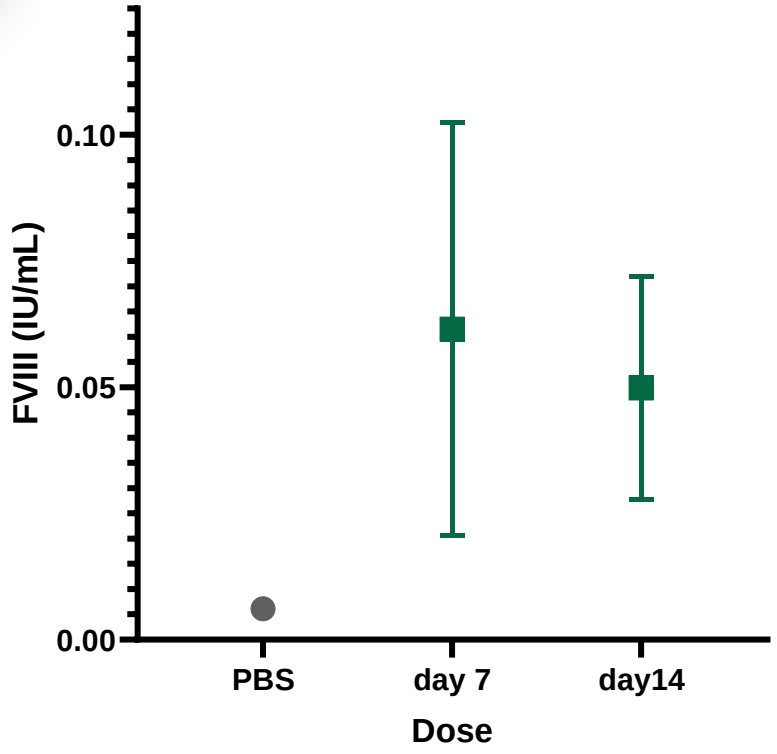
Luciferase IVIS (30 days)



iqDNA Factor VIII expression demonstrated in mice, and quiet immune profile sustained with Factor VIII in NHP across several LNPs

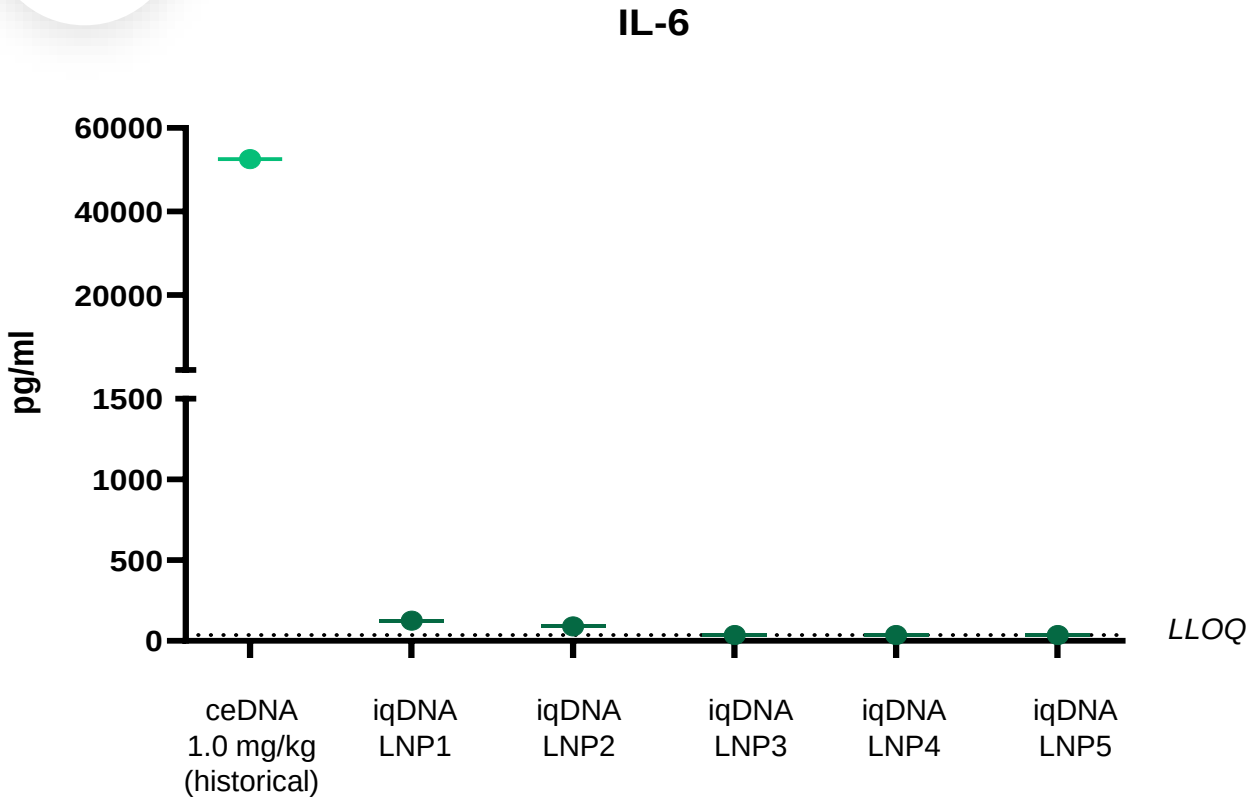
iqDNA Factor VIII expression in mice

(0.5 mg/kg)



iqDNA Factor VIII is immune quiet in NHP

(0.5 mg/kg; 6 hrs)

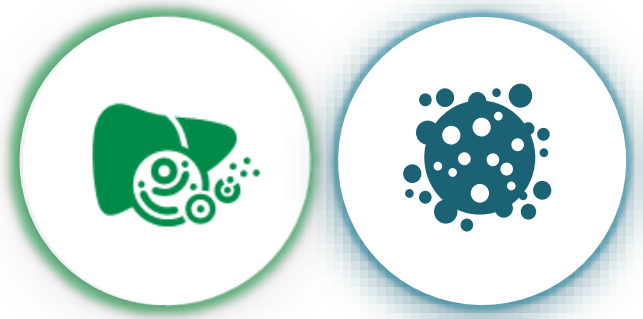


iqDNA platform maturing for applications to multiple tissues

Foundational proof points

- ✓ Avoids innate immune detection across species
- ✓ Avoids innate immune detection across constructs in NHP (luciferase and Factor VIII)
- ✓ Robust and durable expression
- ✓ Compatible with wide range of LNPs
- ✓ Scalable with RES manufacturing

Focus on optimizing for applications in liver and immune cells



2024 milestones focused on program proof points for development

In vivo immune cells

T cell ctLNP *in vivo* RNA expression and efficacy for therapeutic transgenes

In vivo HSC

HSC ctLNP *in vivo* RNA POC in humanized murine model for sickle cell disease

iqDNA

iqDNA optimization for applications in liver and immune cells

Partnering

Continue to expand ctLNP and iqDNA opportunity space through partnering

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iqDNA cargo enables heme A program and expands T cell & HSC opportunities

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Cash runway to 2H 2027 to focus on building clinical programs


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And our goal is no limits
Thank You
Geoff McDonough MD | President & CEO
generation bio™