



Transforming CAR-T Manufacturing: LVV Turbo™ Breakthroughs Meet Ultra-T Delivery Technology



Presenter

Lorraine Fievet, Ph.D.
Technical Support Scientist
uBriGene



Presenter

Devin Stranford, Ph.D.
Senior Scientist
Syenex



Moderator

Jeff Hung, Ph.D.
VP of Commercial Strategy
uBriGene



Cell Therapy Developer Innovator

David Wald, MD, Ph.D.
Founder and CEO
Kure Cells



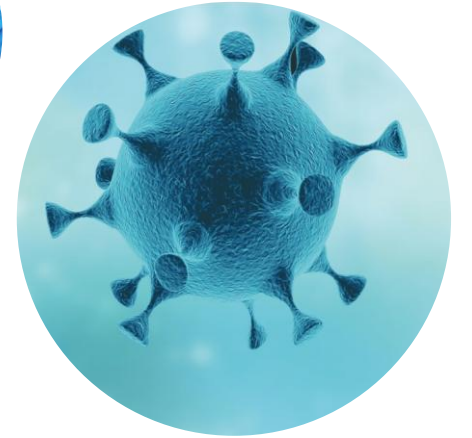
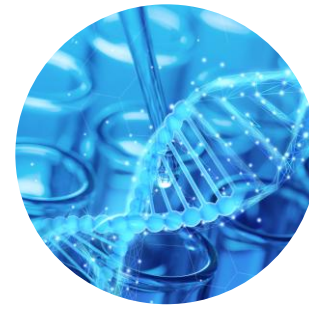
Delivery Technology Innovator

Jay Rosanelli
Co-Founder and CEO
Syenex

Logistics

- You will be put on mute during the webinar
- We welcome you to ask questions using the “Q&A” on the top right corner of the platform
- Your questions will be addressed after the presentation

Agenda



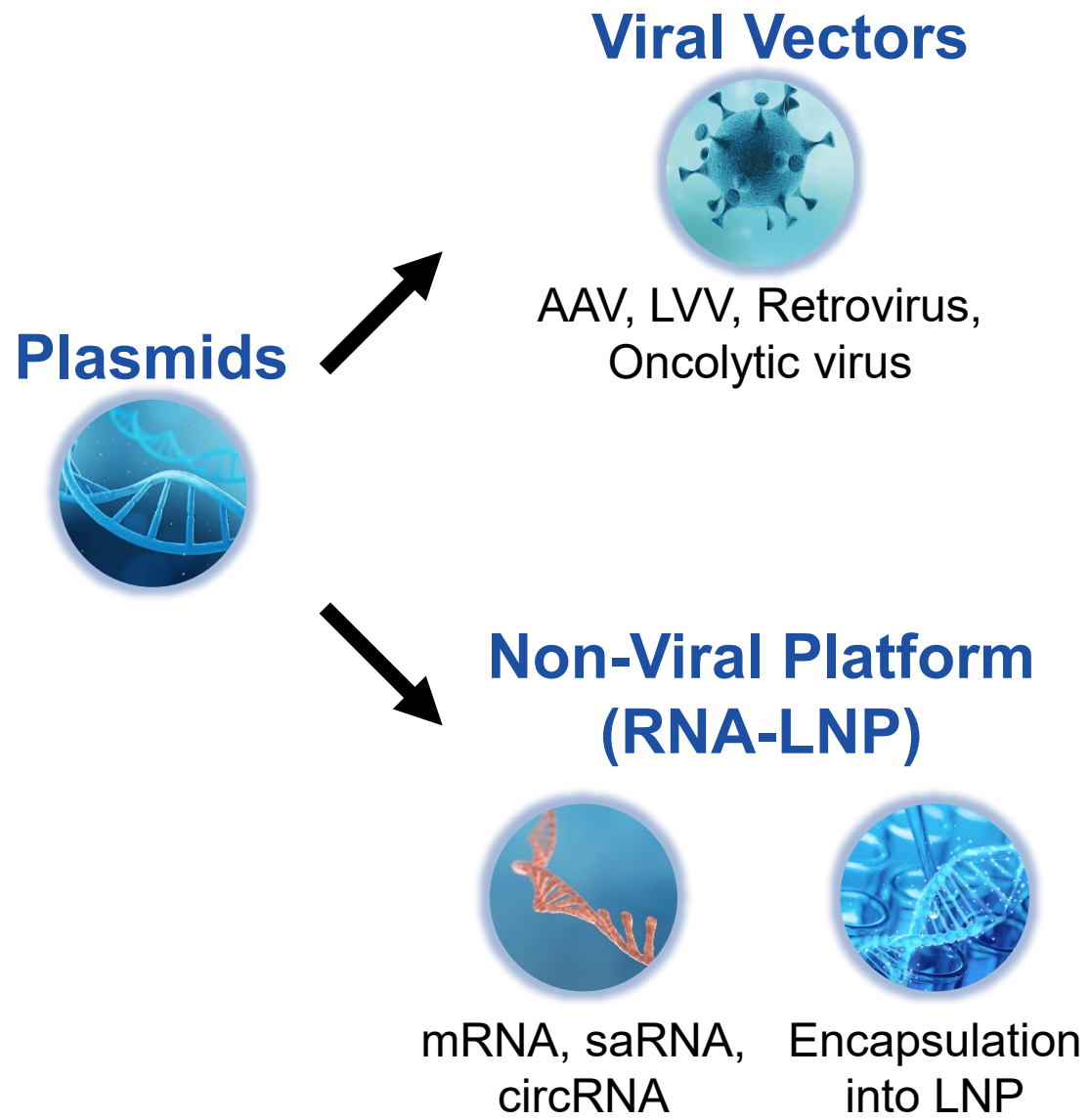
01 uBriGene's overview

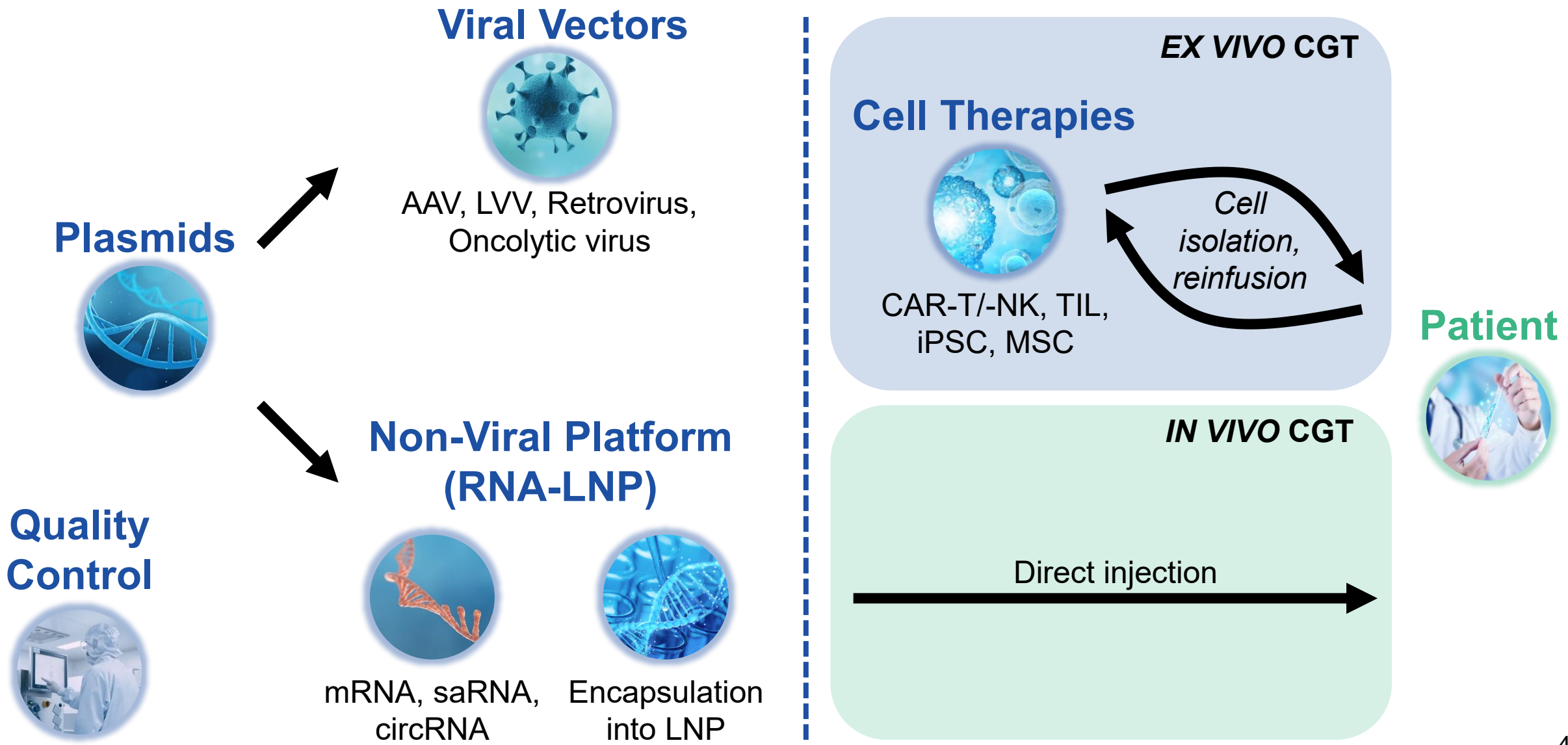
02 uBriGene LVV Turbo™ manufacturing platform

03 Syenex Ultra-T™ innovative technology

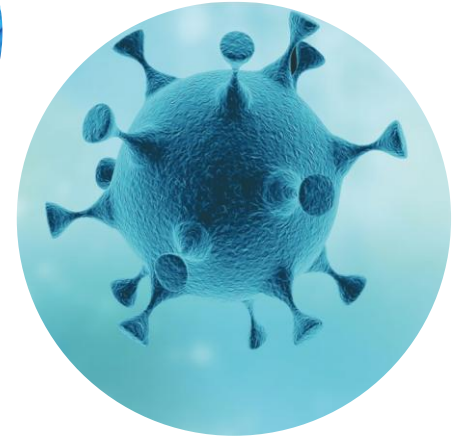
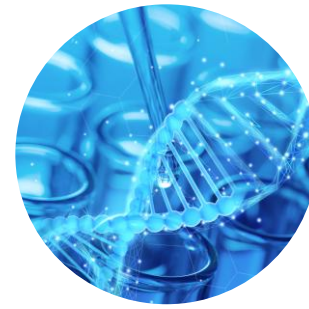
04 Kure Cells success story

05 Q&A





Agenda



01 uBriGene's overview

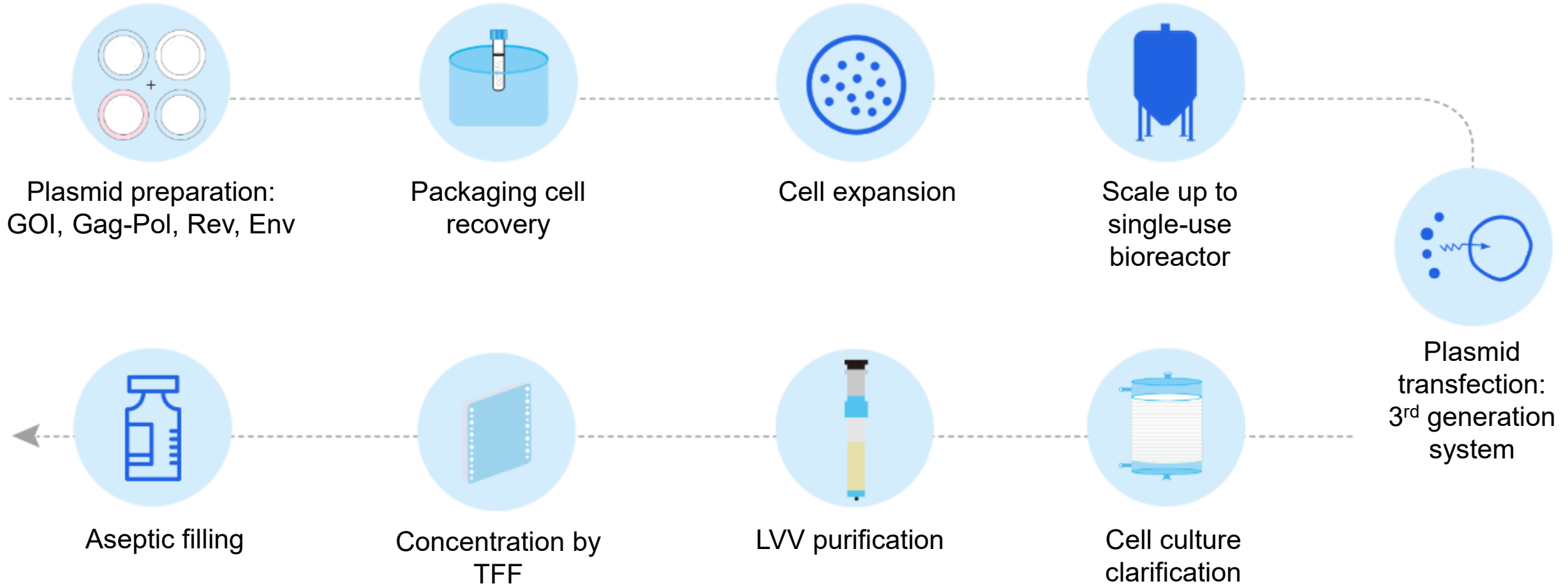
02 uBriGene LVV Turbo™ manufacturing platform

03 Syenex Ultra-T™ innovative technology

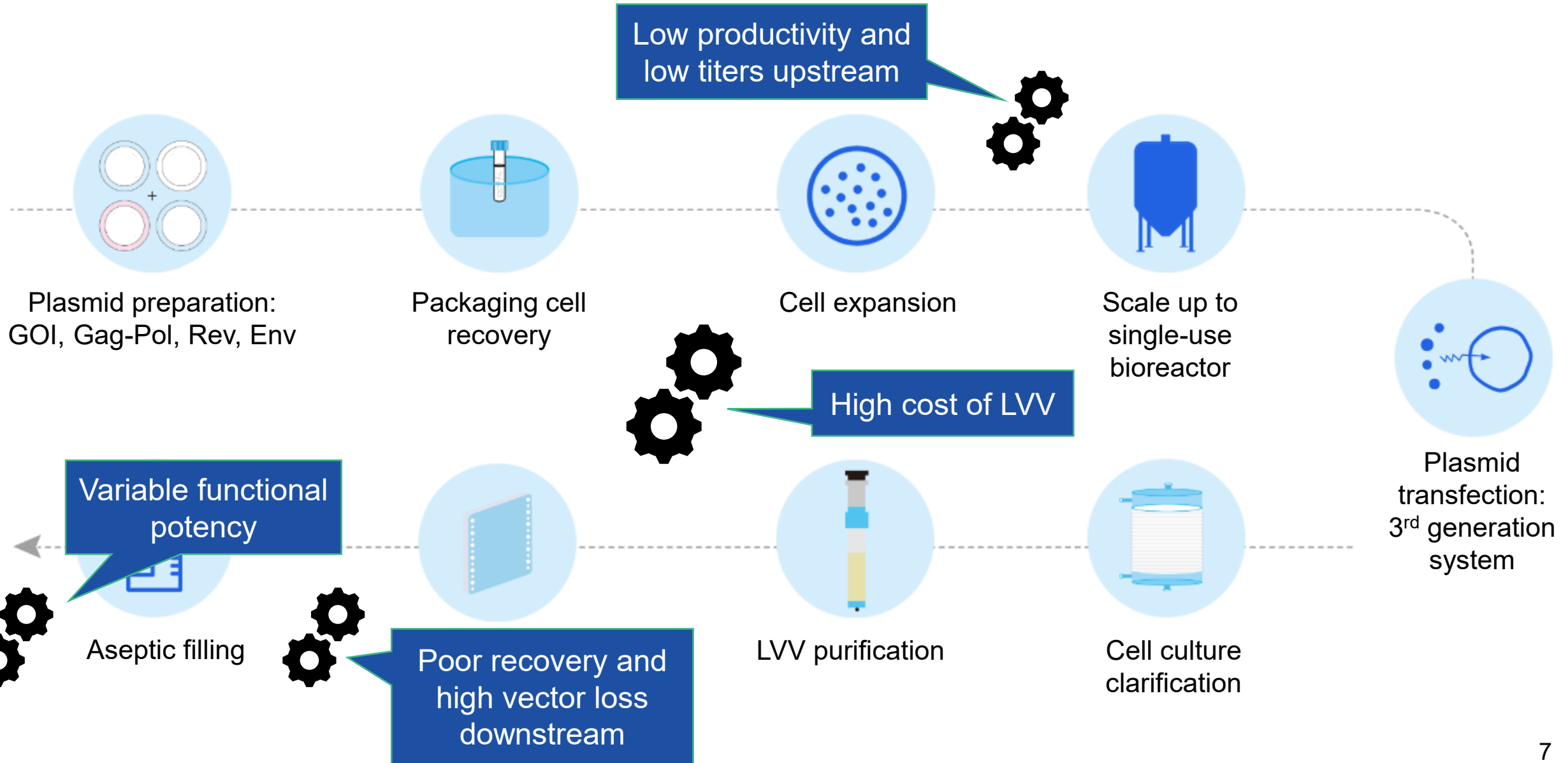
04 Kure Cells success story

05 Q&A

Classic LVV packaging process bottlenecks



Classic LVV packaging process bottlenecks



I

**LVV Turbo™ 293TH
Suspension Cell Line**

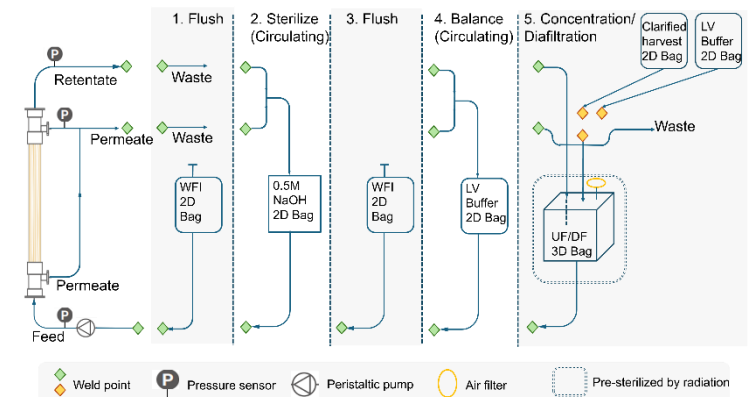
II

**LVV Turbo™ Closed
Process**



III

**LVV Turbo™ + Ultra-T
syenex**



Highly-Productive LVV Suspension Cell Line 293TH



Selected from >500 clones for high LVV packaging



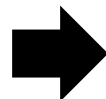
Adapted to suspension and serum-free culture



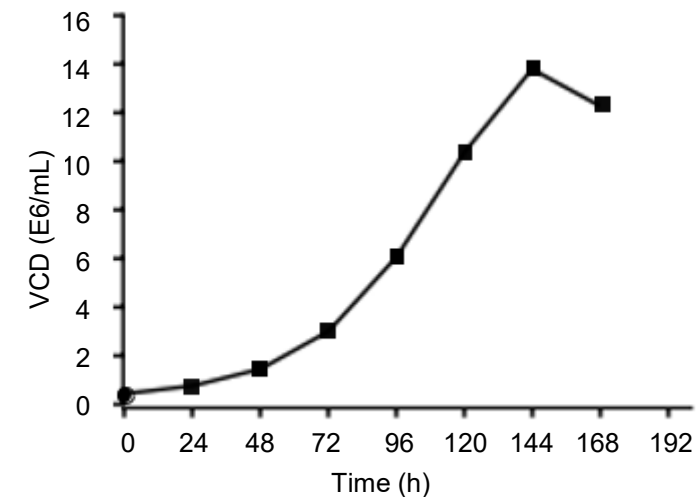
DMF with the FDA



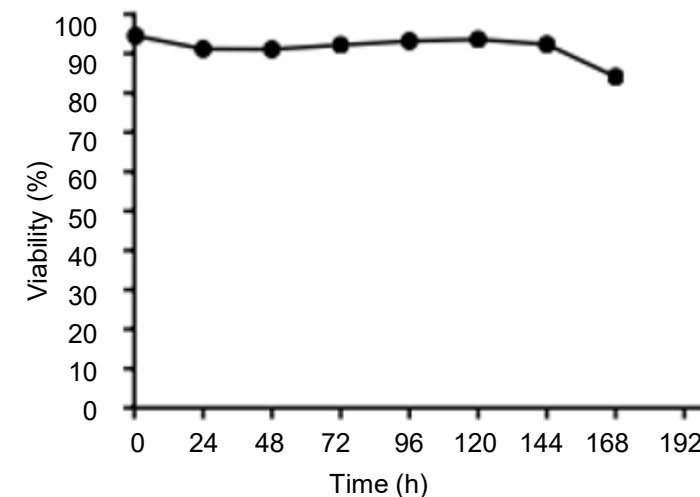
No additional cost for using 293TH in manufacturing with uBriGene

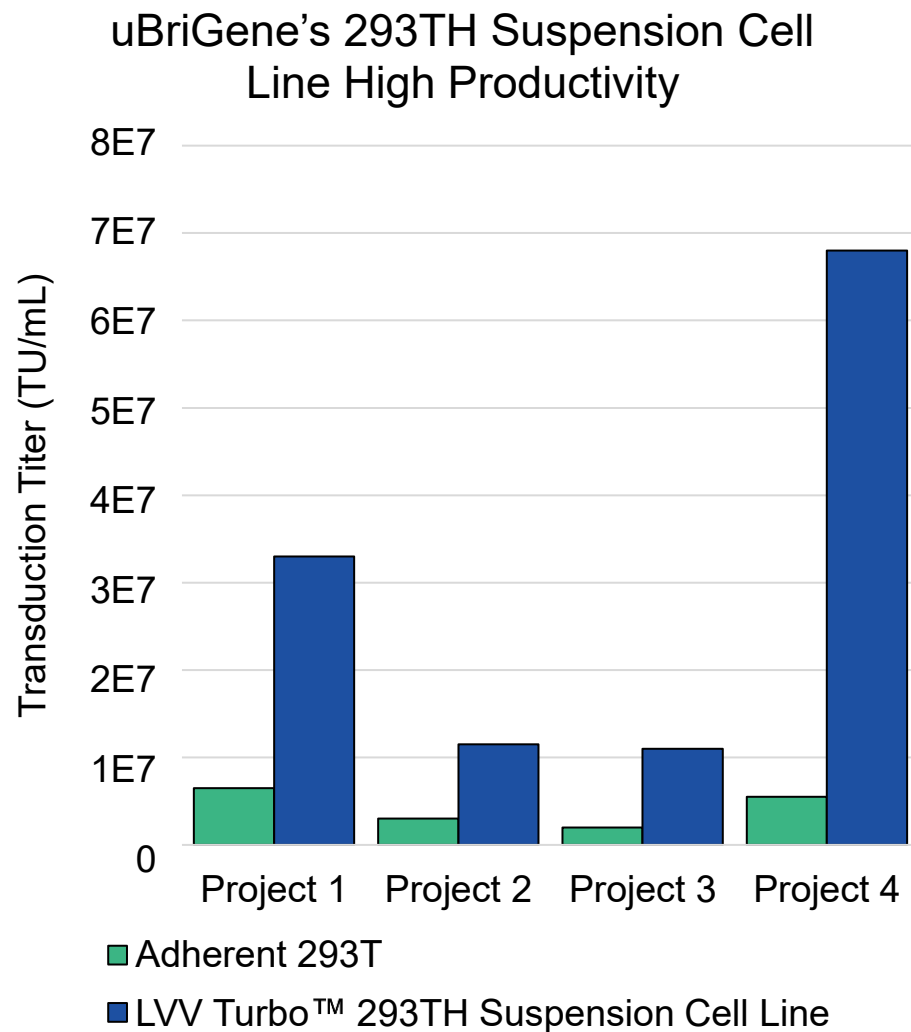


Highest cell density: 1.4E7 cells/mL

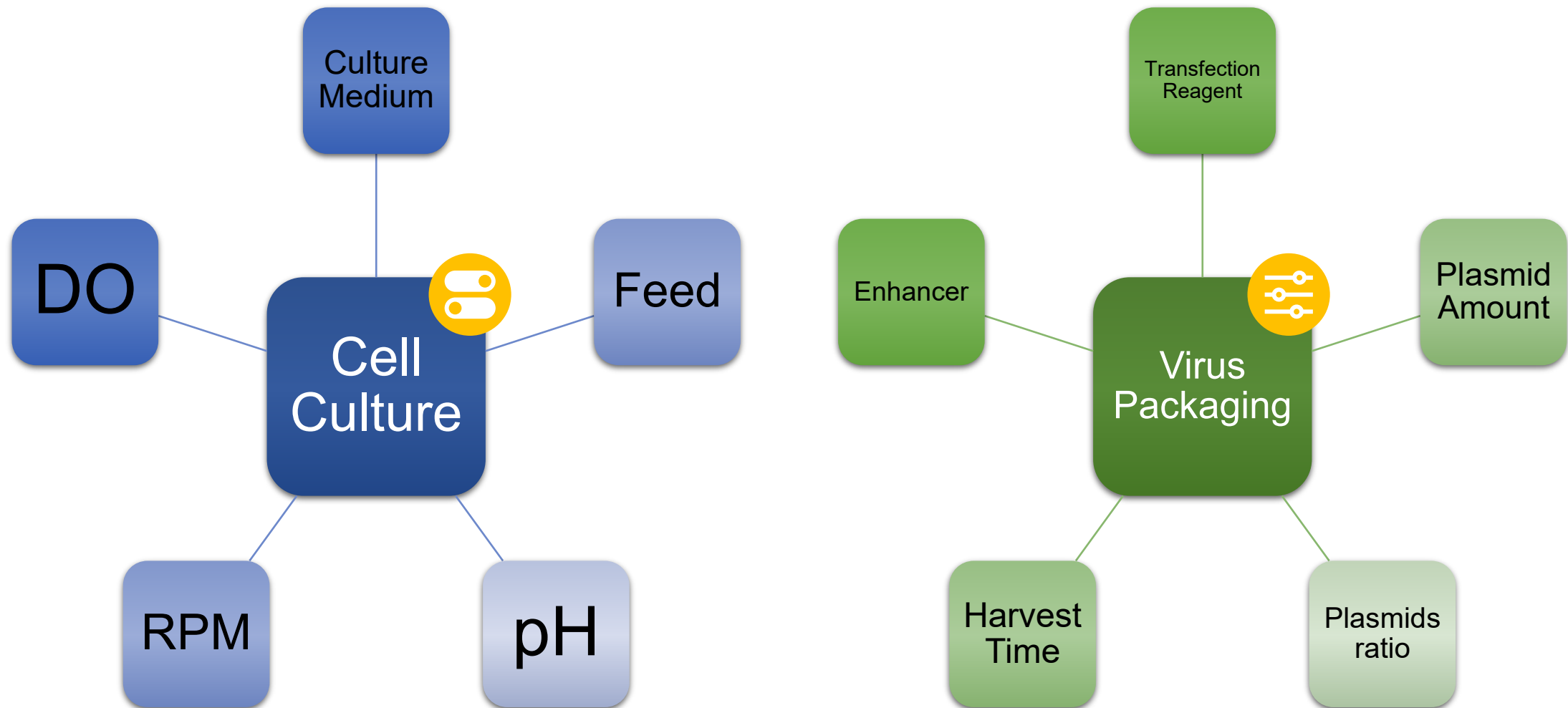


Cell viability >90% until 144h

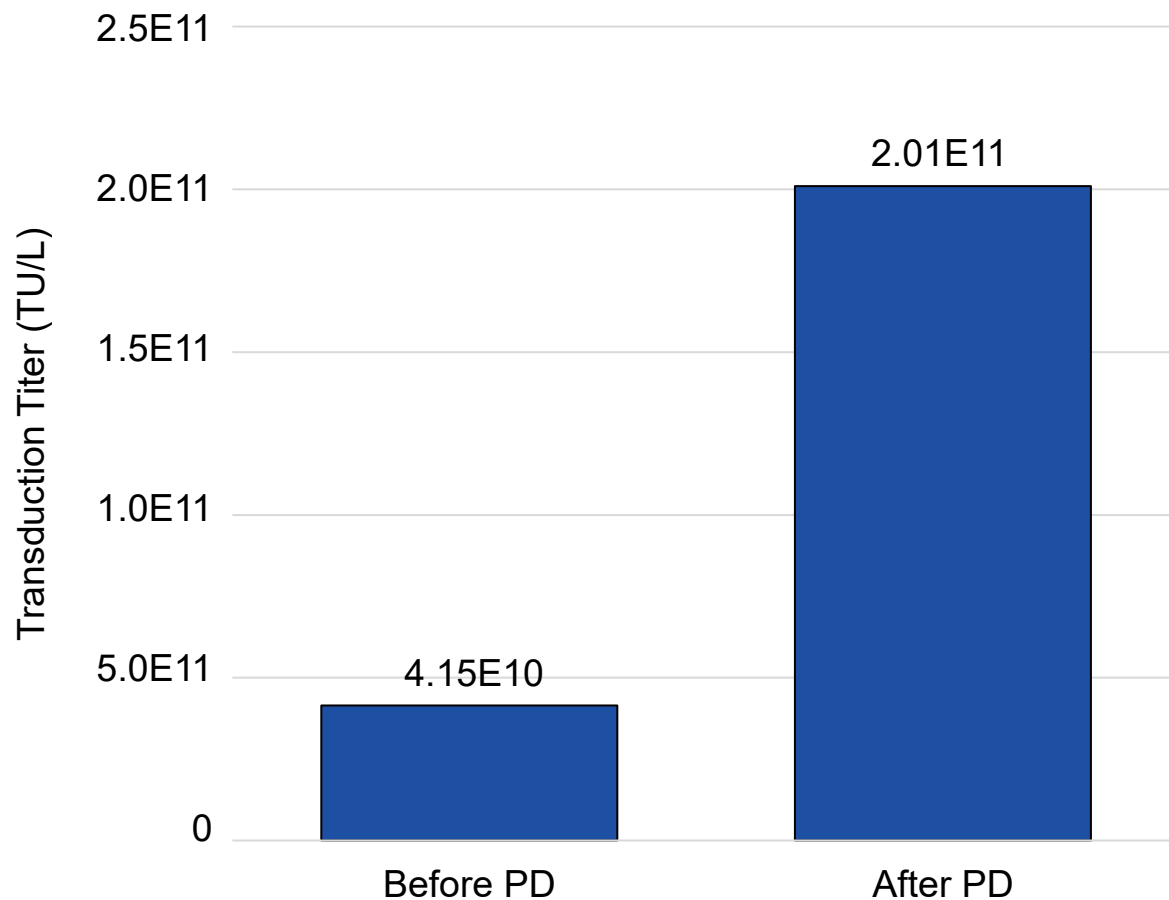




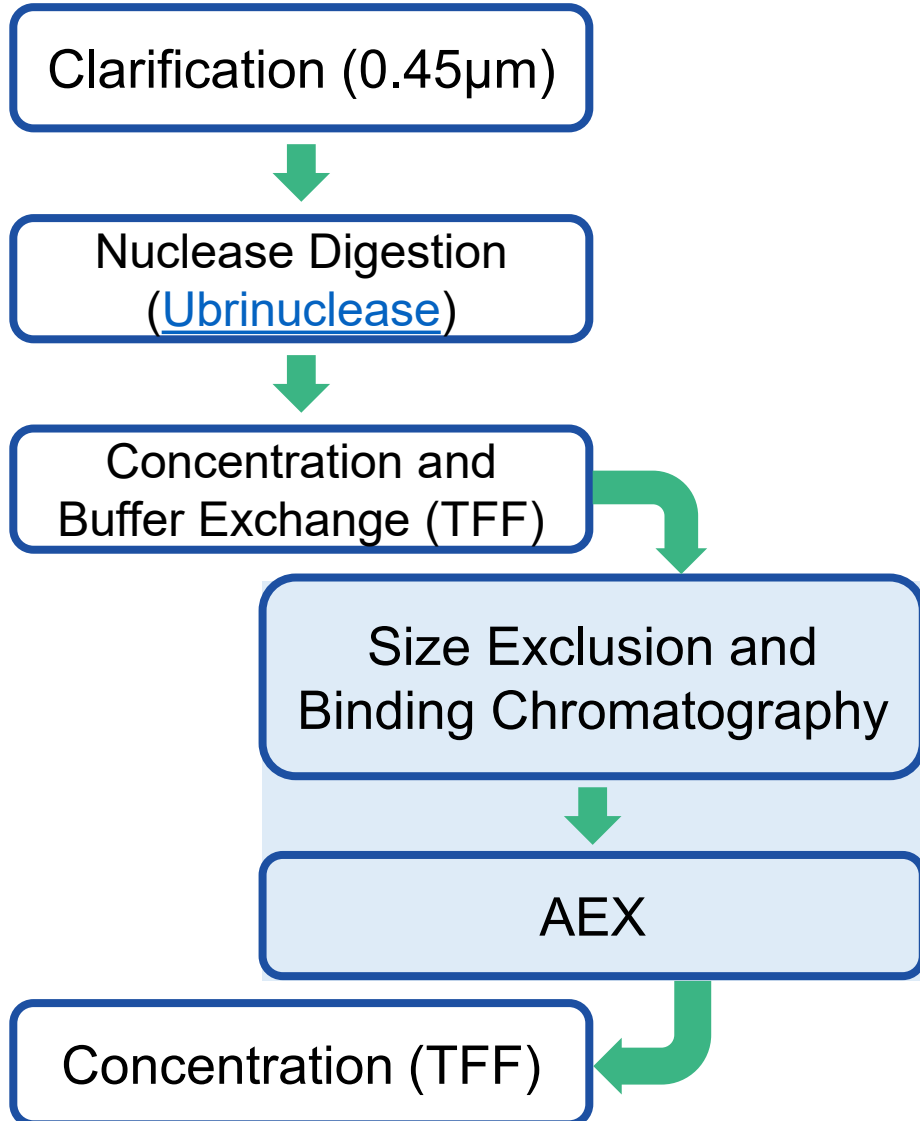
- Transduction titer measured by flow cytometry using Jurkat cells (immortalized human T lymphocyte cell line)
- **4- to 12-fold increase in productivity**



4.8-fold increase in upstream titer after PD optimization



- PD run in 2L bioreactors
- Transduction titer measured by flow cytometry using Jurkat cells
- **Almost 5-fold yield increase** thanks to PD



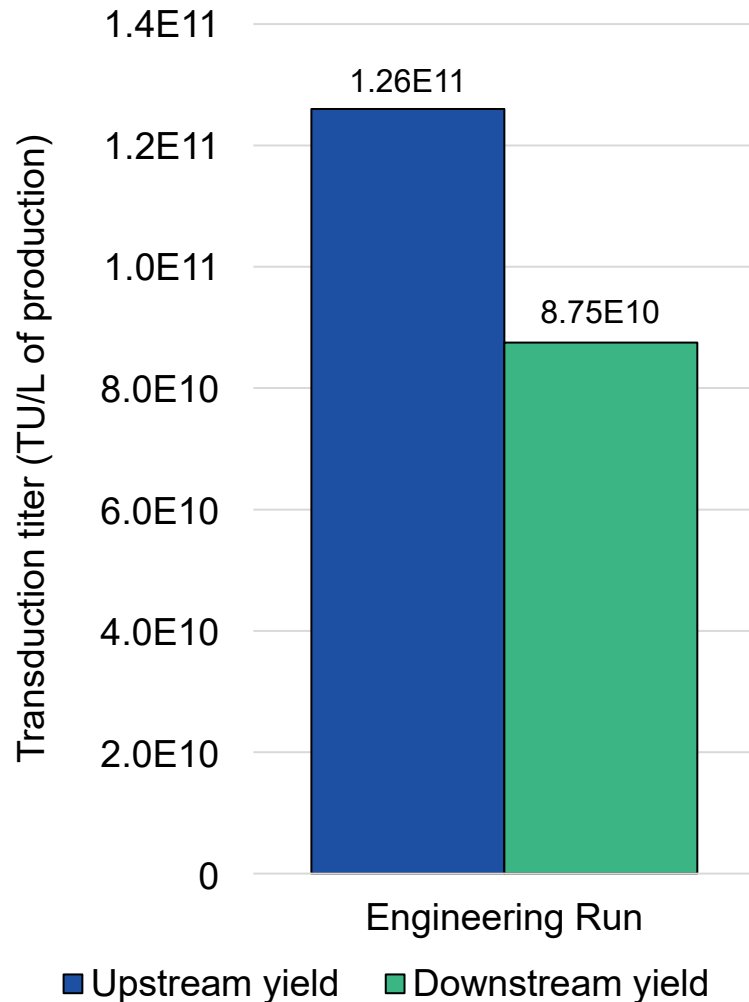
- **2-step chromatography** ensuring high-quality LVV
- **Flexible system** for different pseudotypes:
 - VSV-G (vesicular stomatitis virus)
 - BaEV (baboon endogenous retrovirus)
 - Cocal (vesiculovirus)
- **GMP-qualified aseptic enclosed system achieves up to 70% recovery**
- **No sterile filtration (0.2µm) required**



LVV Turbo™ Closed Downstream Process Benefits



Exceptional Recovery



- Engineering run bioreactor = 20L
- Transduction titer measured by flow cytometry using Jurkat cells
- Exceptional LVV recovery (**69%**)

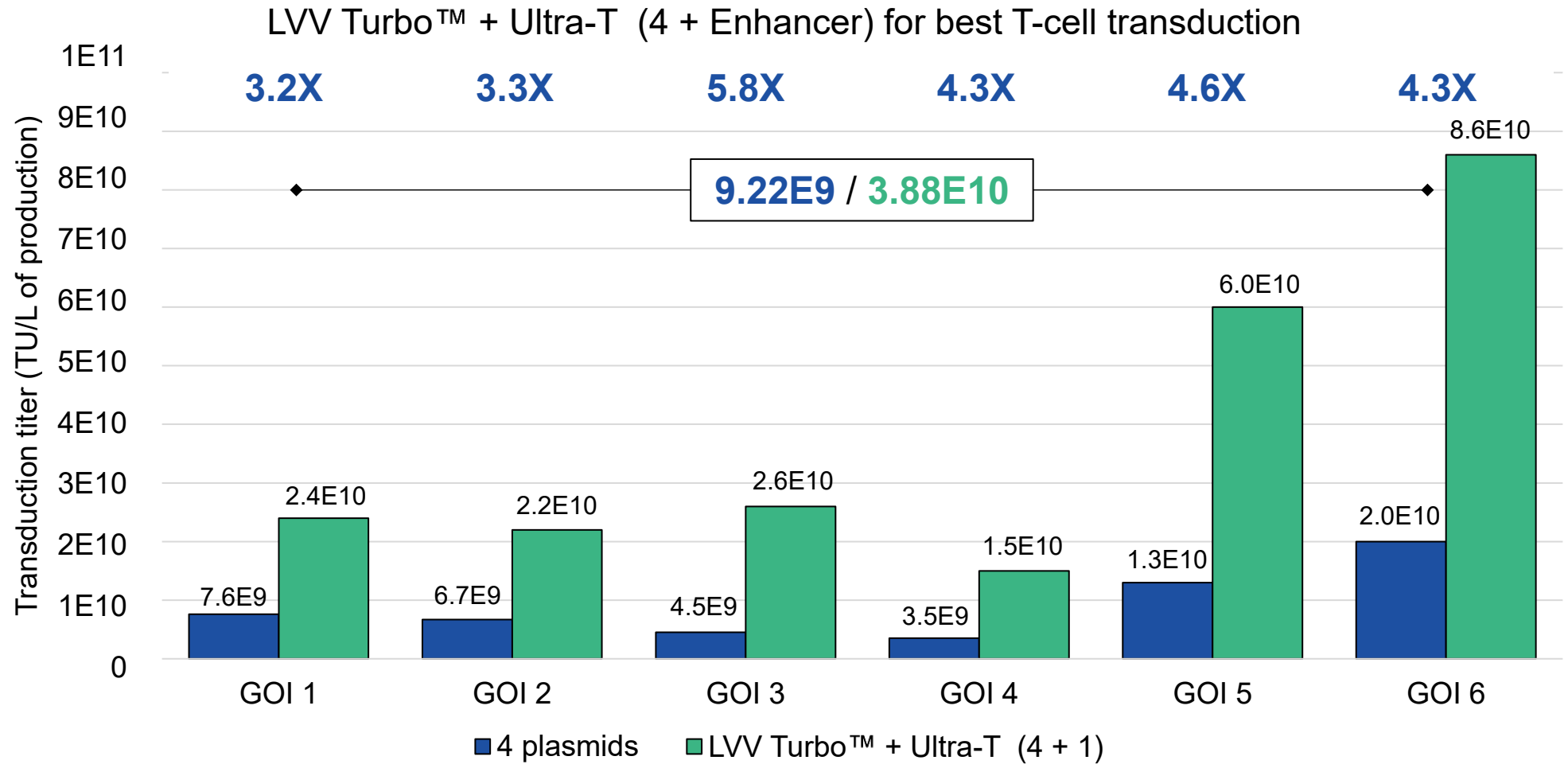
Strategic Partnership with Syenex for High T-Cell Transduction*

4+1 LVV packaging plasmid system

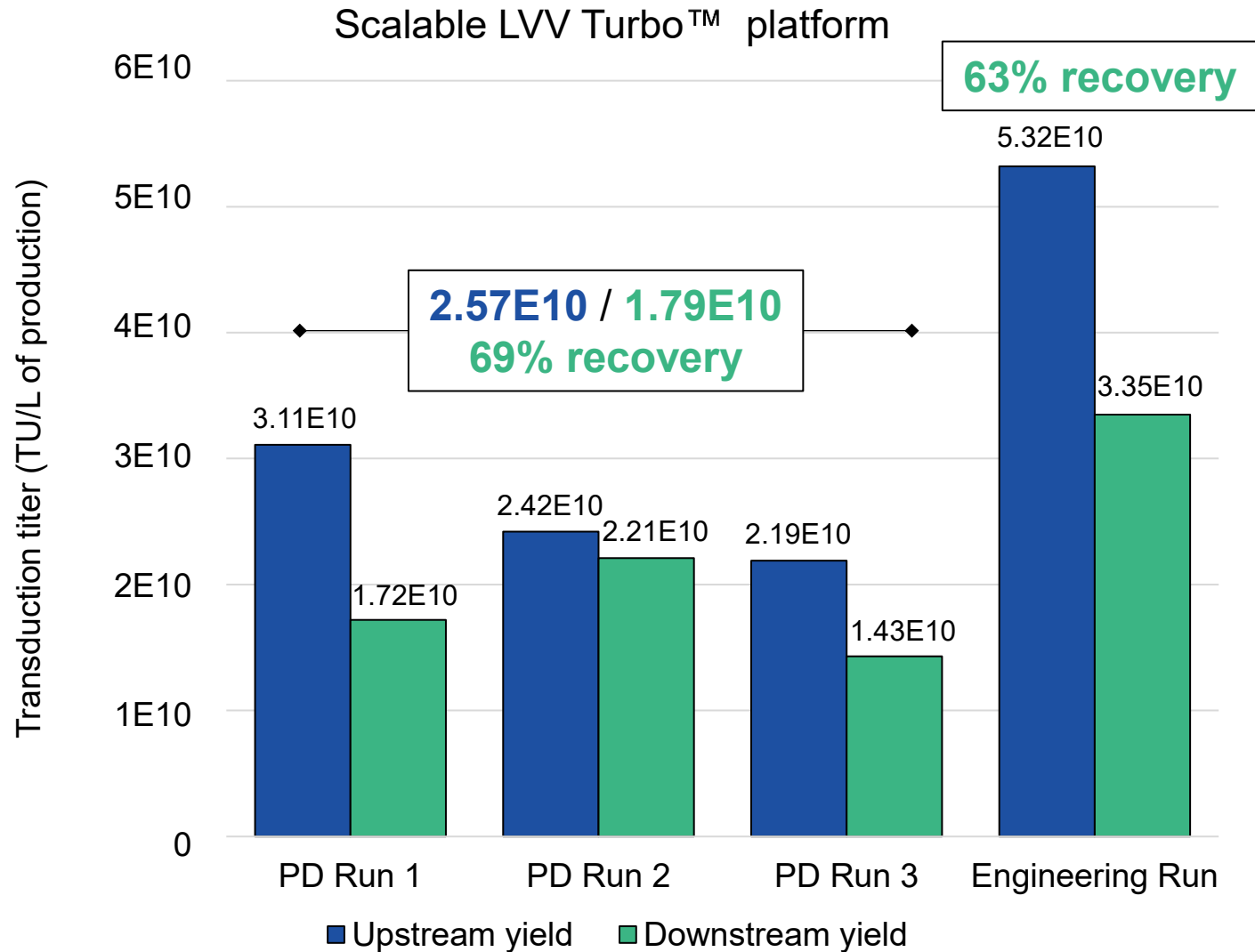
♥ Pan T-cell transduction enhancer

Stay tuned for more technical details from Devin.



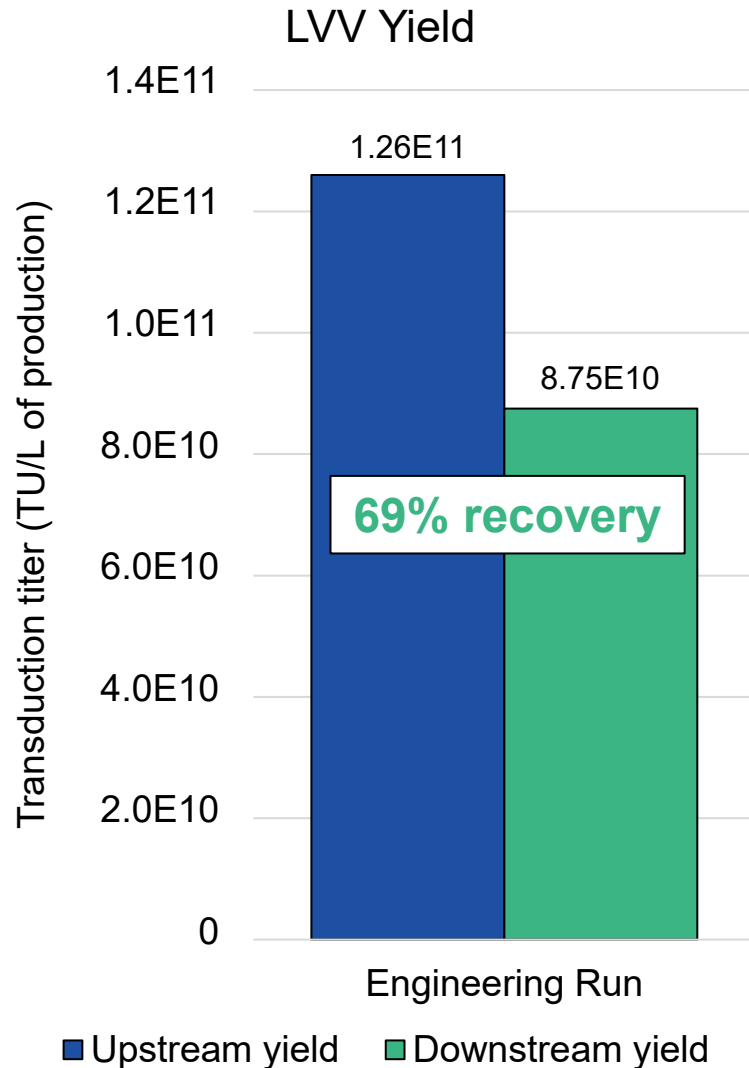


About 4-fold increase in transduction titer (measured by flow cytometry using Jurkat cells)



- GOI: BCMA
- PD run = 1L
Engineering run = 20L
- Transduction titer measured by flow cytometry using Jurkat cells
- **Robust and scalable LVV Turbo™ platform**

How Does the High Titer Translate into CAR-T Doses?

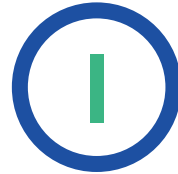


- GOI: CD19
- Engineering run bioreactor = 20L
- Transduction titer measured by flow cytometry using Jurkat cells
- **Total yield: 1.7E12 TU**

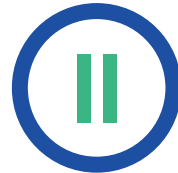
MOI	CAR-T doses
1	~15,000
2	~7,500
5	~3,000

Client's Challenges

Low productivity and low titers upstream, and **scalability challenges**



Poor recovery downstream



Variable functional potency



Inefficient workflows resulting in **high cost of LVV**



uBriGene's LVV Turbo™ Solution

LVV Turbo™ 293TH: High-productivity suspension cell line enabling straightforward scale-up

LVV Turbo™ Closed Downstream Process: GMP-qualified fully closed downstream purification process (up to 70% recovery)

LVV Turbo™ + Ultra-T (via Syenex partnership): Increases transduction titer by 4-fold

LVV Turbo™ platform:

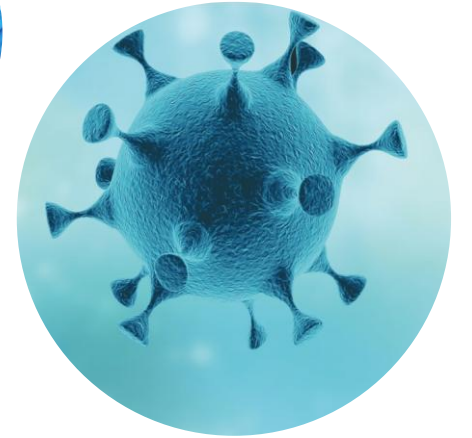
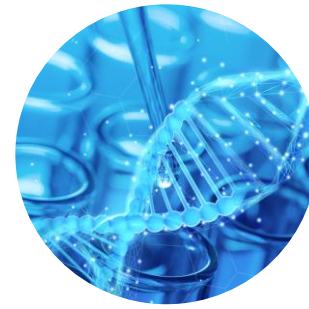
- highly scalable
- maximizes yield
- industry-leading cost per clinical dose



Stay tuned for what's next with our LVV Turbo™ platform as exciting innovations are on the way! Our upcoming webinar will spotlight *in vivo* CAR-T.



Agenda



01 uBriGene's overview

02 uBriGene LVV Turbo™ manufacturing platform

03 Syenex Ultra-T™ innovative technology

04 Kure Cells success story

05 Q&A



Manufacturing CAR-T *ex vivo* at Scale: Ultra-T Next-Gen Delivery Technology

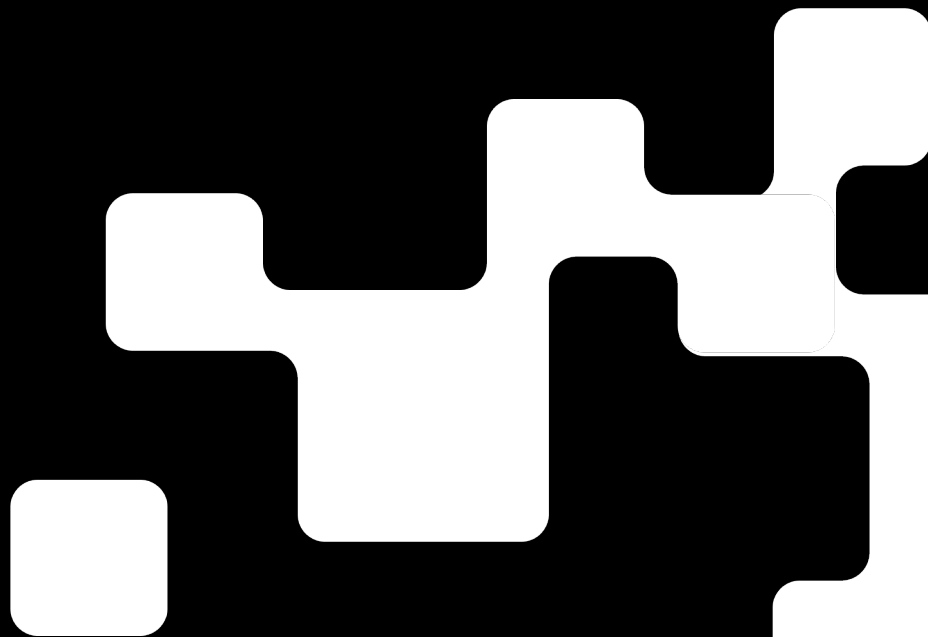
29 January 2026



CURE MORE

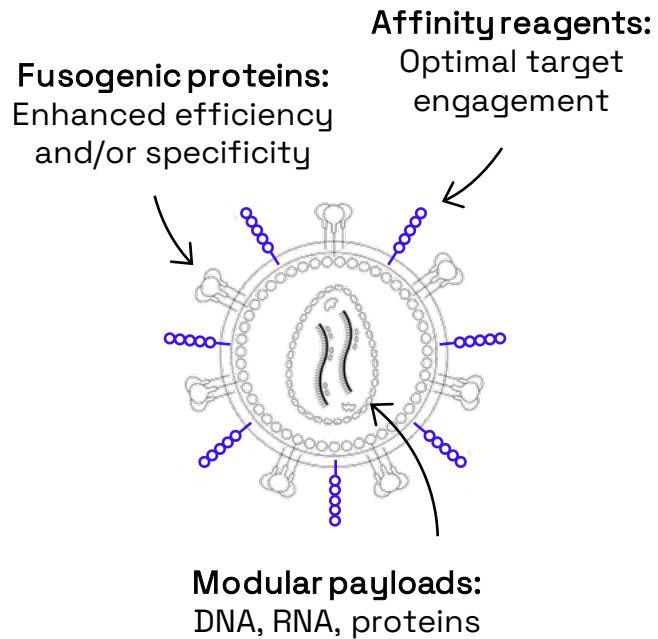
At Syenex, we use synthetic biology to design advanced genetic medicine technologies and make them accessible to all drug developers—under our singular mission to **cure more**

OPEN
SCIENCE

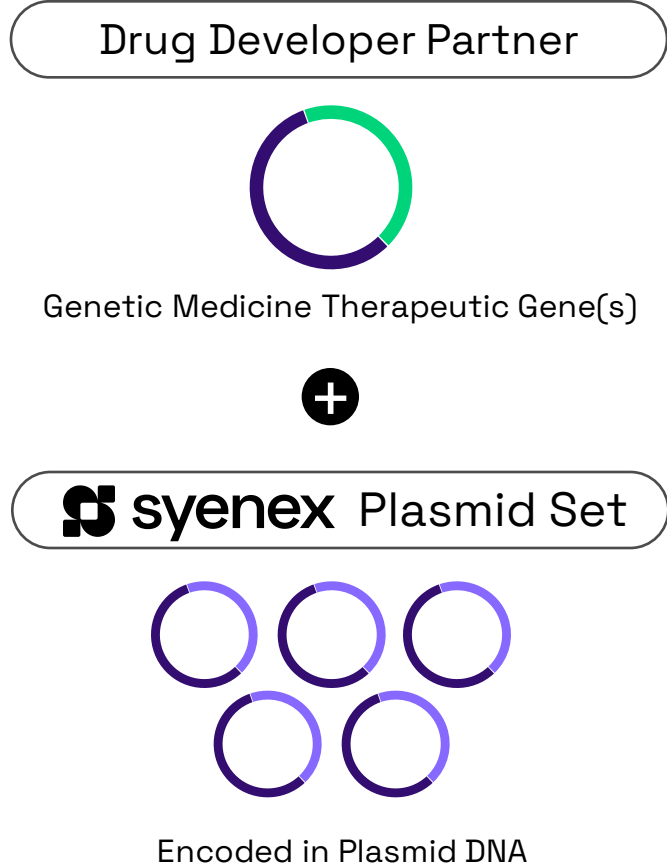


Syenex: Next-Generation Delivery Platforms

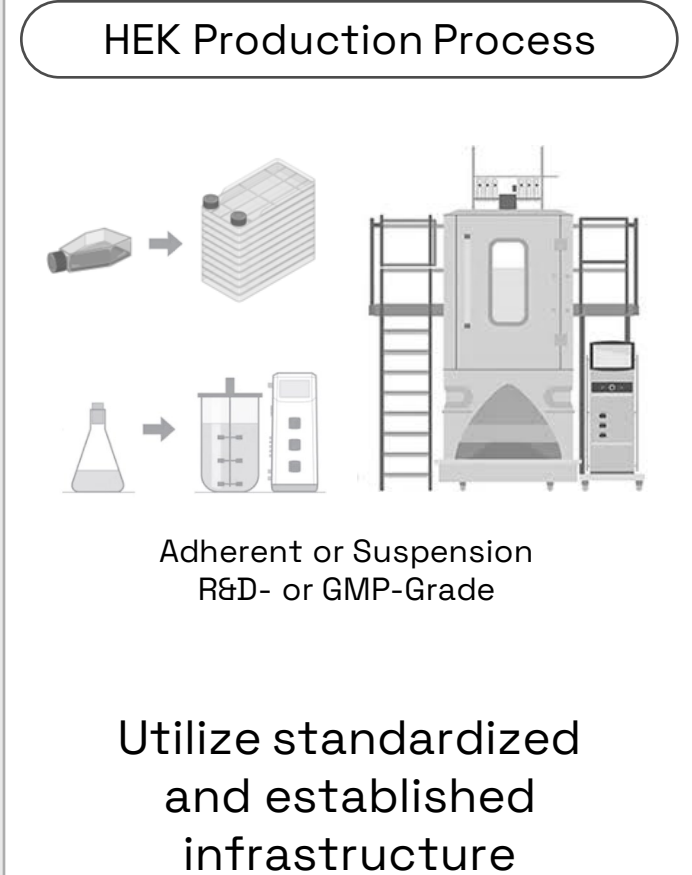
Programmable



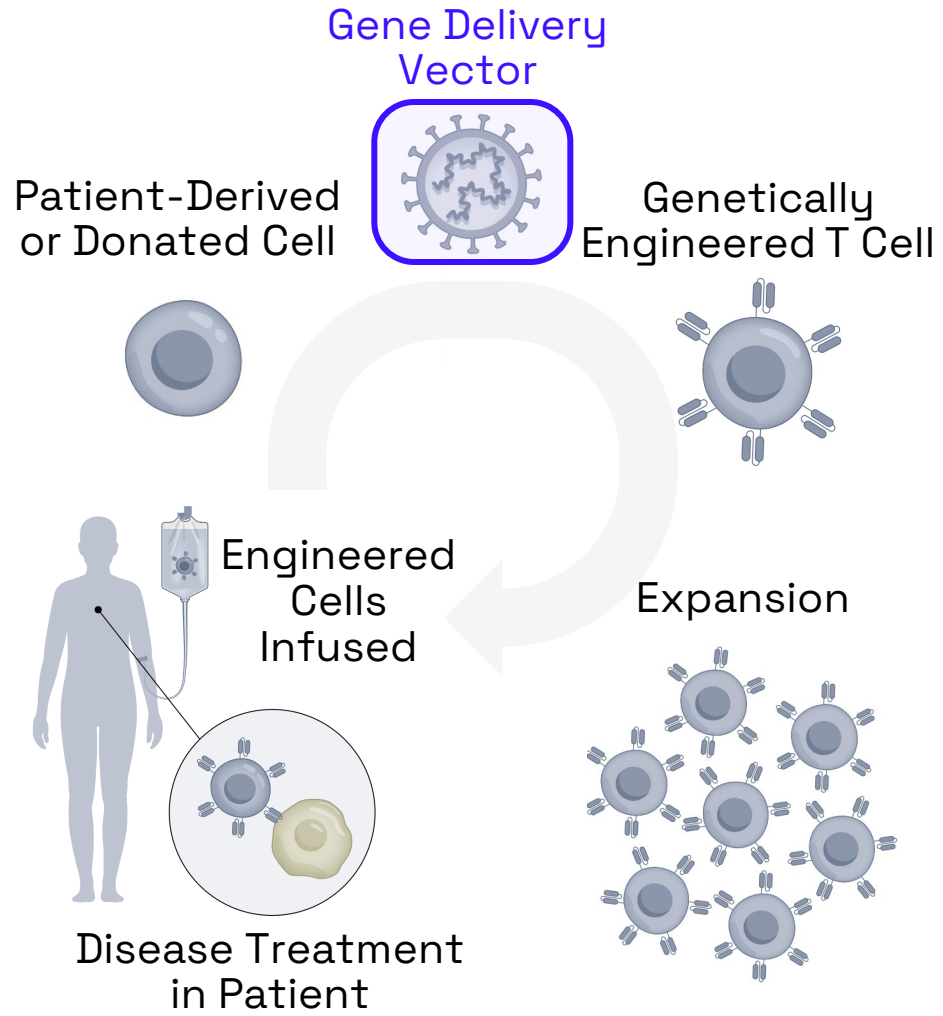
Easy to Implement



Scalable



Best-In-Class Delivery Platforms for T Cell Engineering

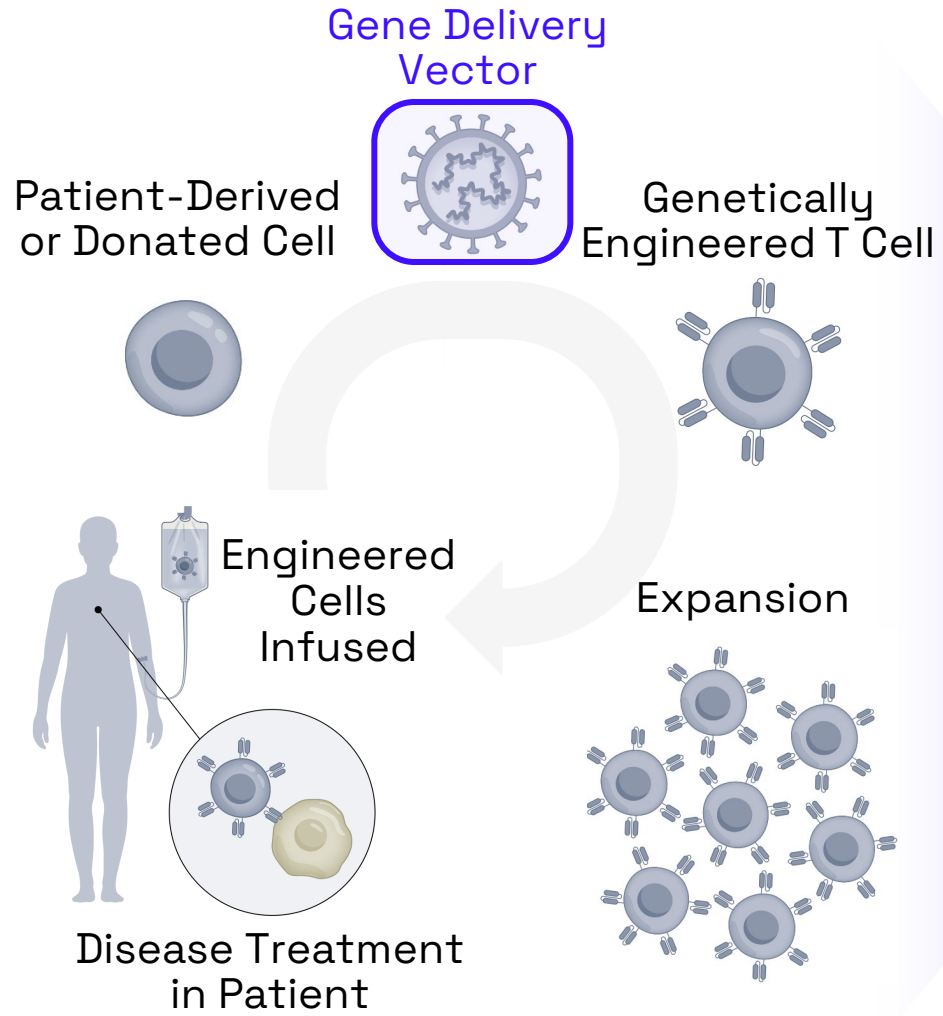


UltraCell™

Optimal Capacity & Potency

- Large (up to 10.9 kb) cargo delivery for cells ex vivo
- High potency reduces doses by 80-90% for cells ex vivo

Best-In-Class Delivery Platforms for T Cell Engineering



UltraCell™

Optimal Capacity & Potency

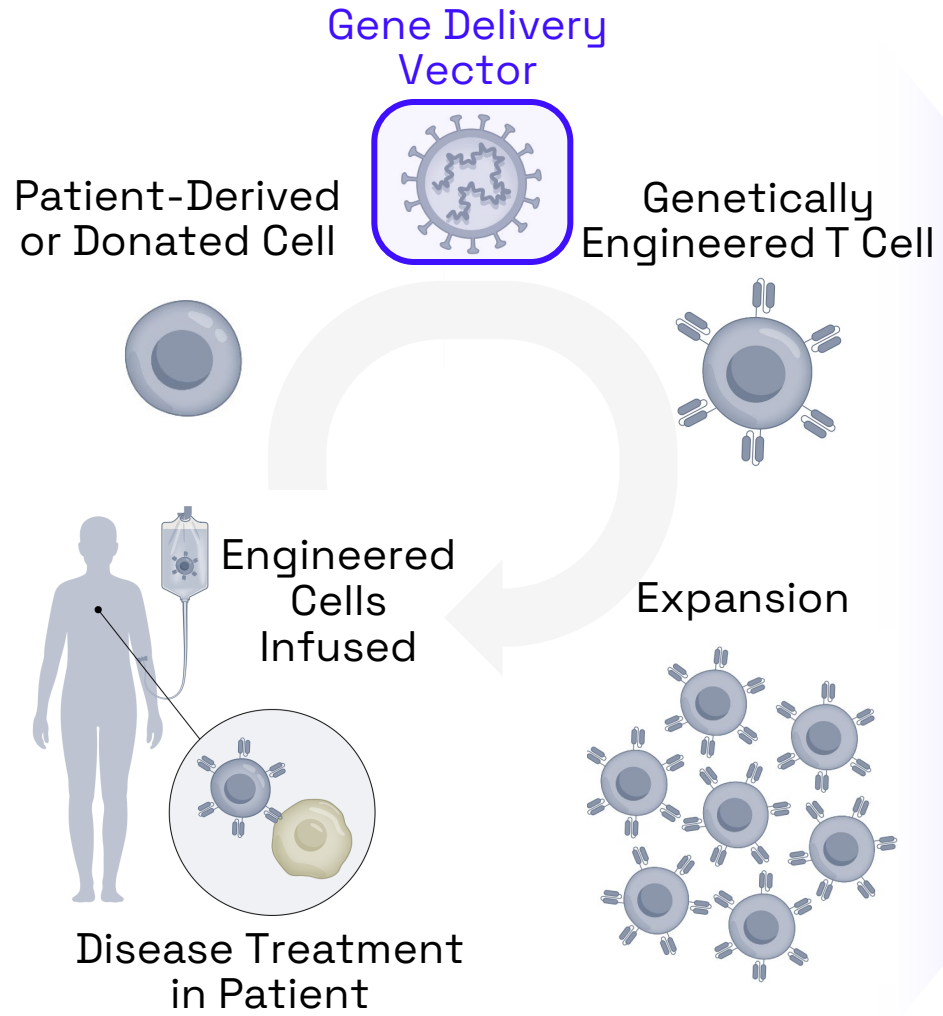
- Large (up to 10.9 kb) cargo delivery for cells ex vivo
- High potency reduces doses by 80-90% for cells ex vivo

RapidCell™

Single-Step Manufacturing

- Dramatically increases manufacturing scalability (>5x)
- Reduces per patient costs by up to \$100K/dose

Best-In-Class Delivery Platforms for T Cell Engineering



UltraCell™

Optimal Capacity & Potency

- Large (up to 10.9 kb) cargo delivery for cells ex vivo
- High potency reduces doses by 80-90% for cells ex vivo

RapidCell™

Single-Step Manufacturing

- Dramatically increases manufacturing scalability (>5x)
- Reduces per patient costs by up to \$100K/dose

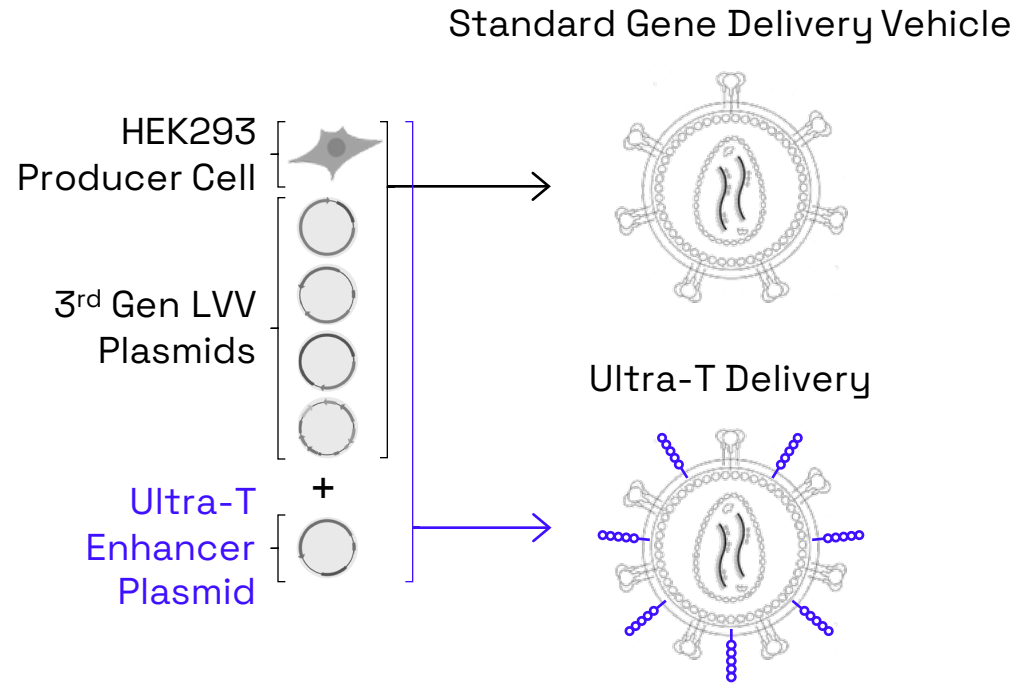
VivoCell™

In Vivo Cell Engineering

- Highly efficient and specific T cell delivery system
- Seamlessly transition T cell therapies from ex vivo to in vivo

Ultra-T Increasing Capacity & Potency

Implementation

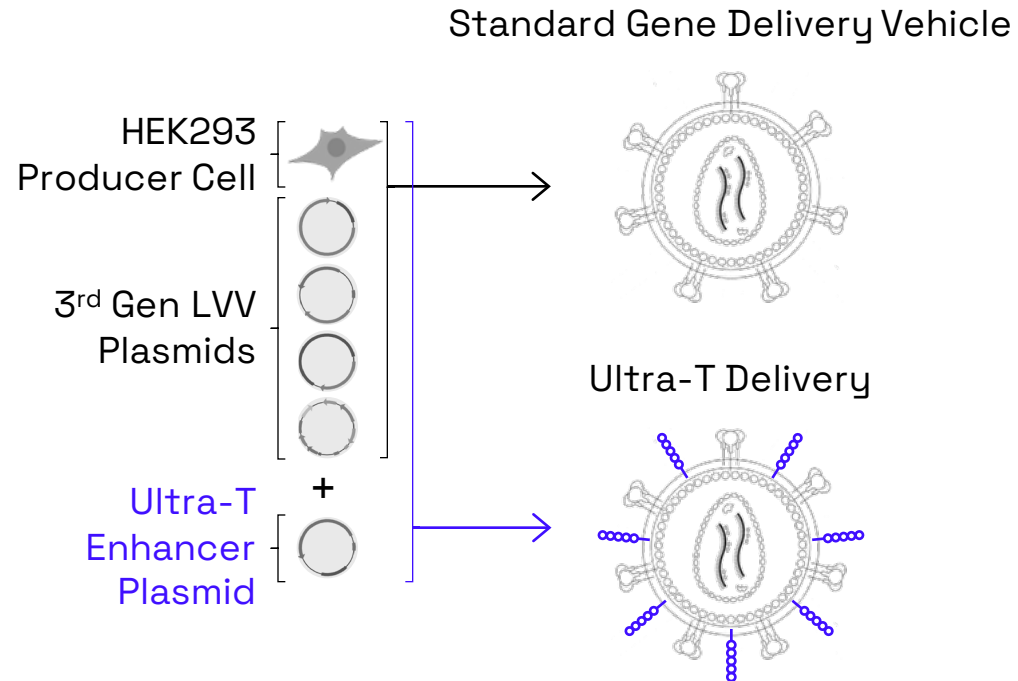


Easy to integrate and
scalable technology:

“+1 Plasmid” Product Design

Ultra-T Increasing Capacity & Potency

Implementation



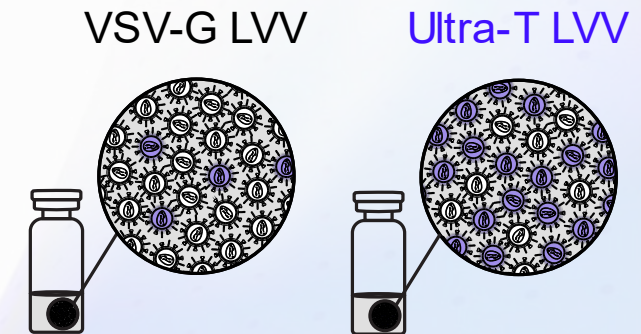
Easy to integrate and scalable technology:

“+1 Plasmid” Product Design

Benefits

80-90% reduction in LVV costs per dose

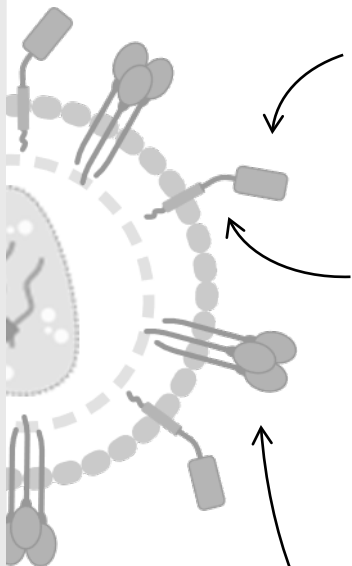
Up to 10.9 kb capacity in LVV packaging



- ☀ T cell-transducing particle
- ⚙ Non-functional particle

Ultra-T Developed by Engineering LVVs

HT envelope engineering to enhance LVV fusion with T cells



Affinity reagent screening

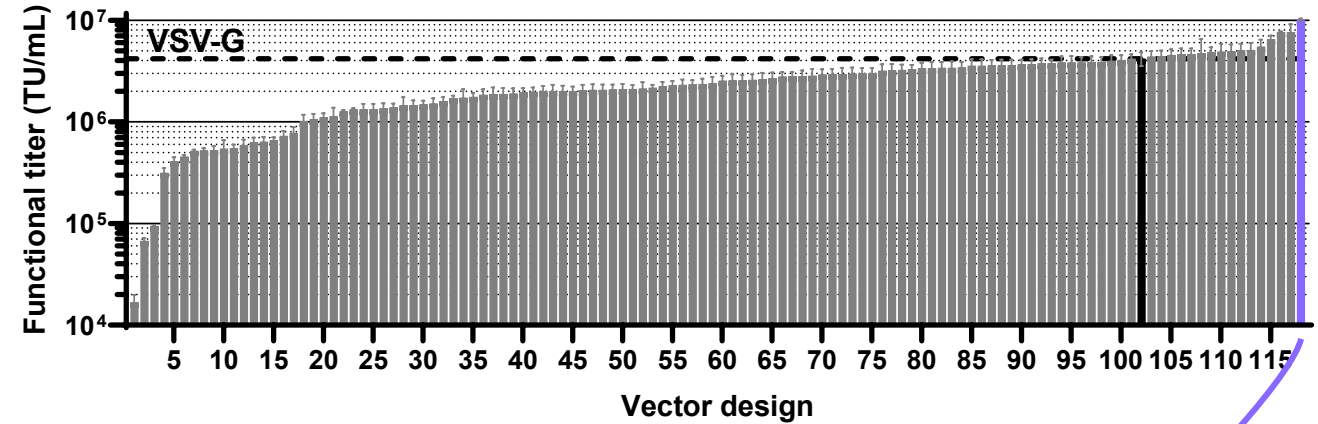
Scaffold optimization:

- Linker
- Transmembrane domain
- Cytoplasmic tail ...

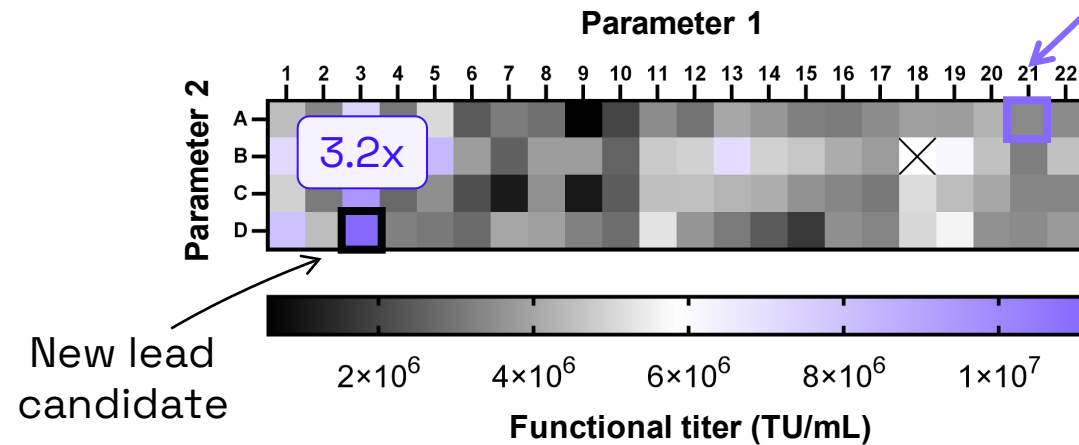
Fusogen screening and engineering

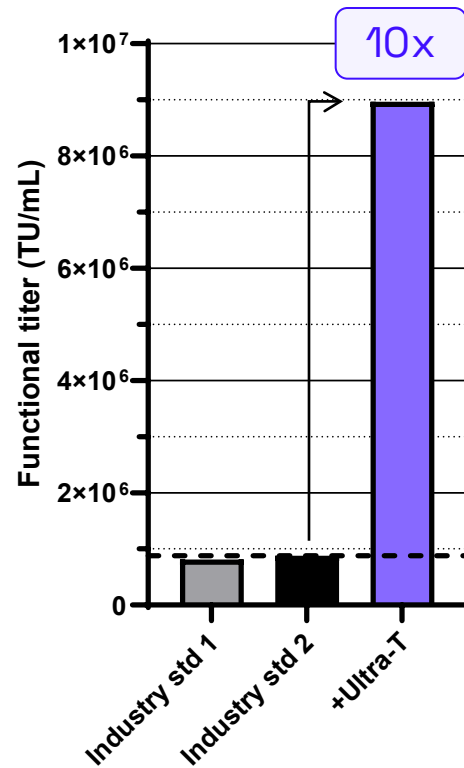
LVV envelope protein screening on activated T cells

2.4x

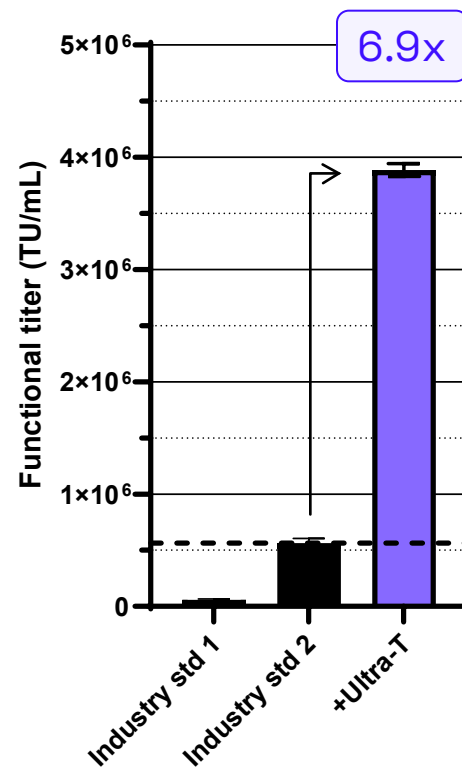


Further optimization of lead LVV design

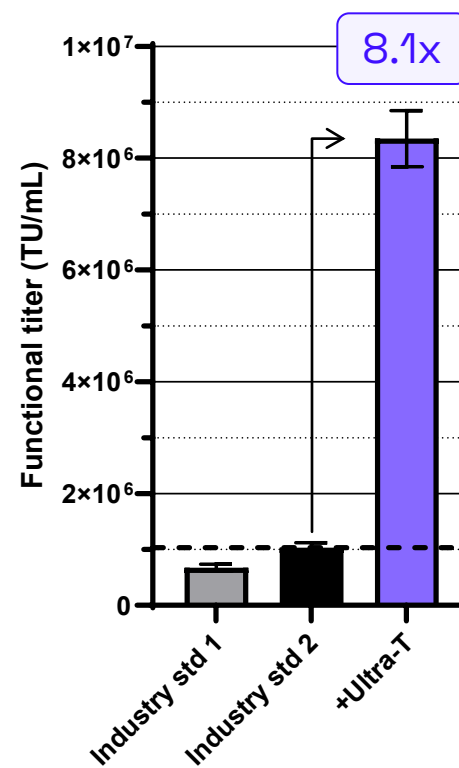




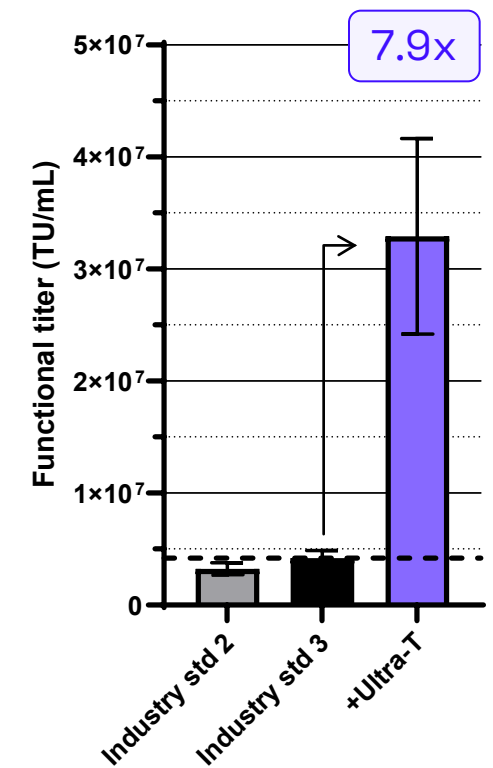
Production: Adherent HEK293T
GOI: Fluorescent protein



Production: Suspension HEK293T
GOI: Fluorescent protein



Production: Suspension HEK293T
GOI: CAR + Fluorescent protein



Production: Suspension HEK293T
GOI: CAR + Fluorescent protein

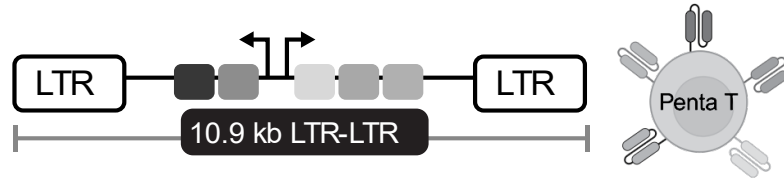
Superior performance compared to industry-standard LVV on activated primary human T cells

Ultra-T

Benefits: Large Payload Capacity

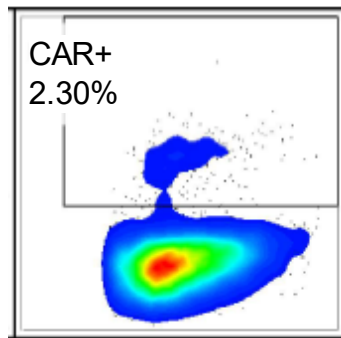
Enables Delivery of Large Transgenes (up to 10.9 kb)

Ultra-T enables 10.9 kb LVV cargo delivery

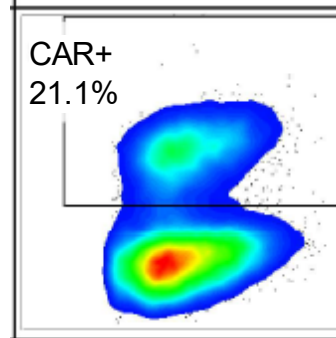


Proprietary XXL T-Cell Production Workflow*

Fusogen alone



+Ultra-T



10x increase in transduction

Target Cell: Activated Primary Human T Cells

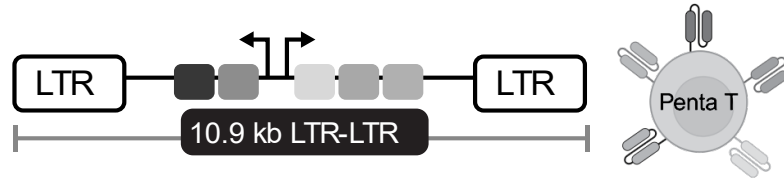
* Partner-generated data: Dr. Philipp Rommel, Carl June Lab, UPenn

Ultra-T

Benefits: Large Payload Capacity

Enables Delivery of Large Transgenes (up to 10.9 kb)

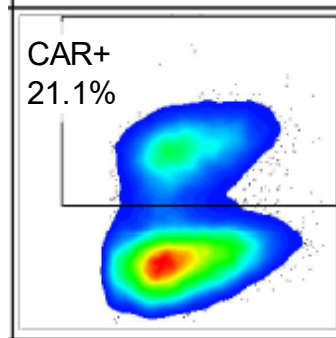
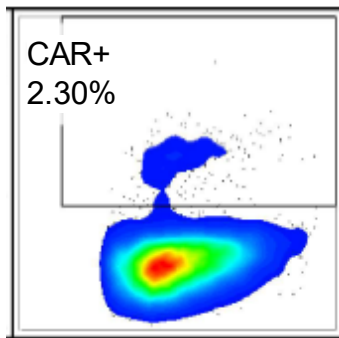
Ultra-T enables 10.9 kb LVV cargo delivery



Proprietary XXL T-Cell Production Workflow*

Fusogen alone

+Ultra-T

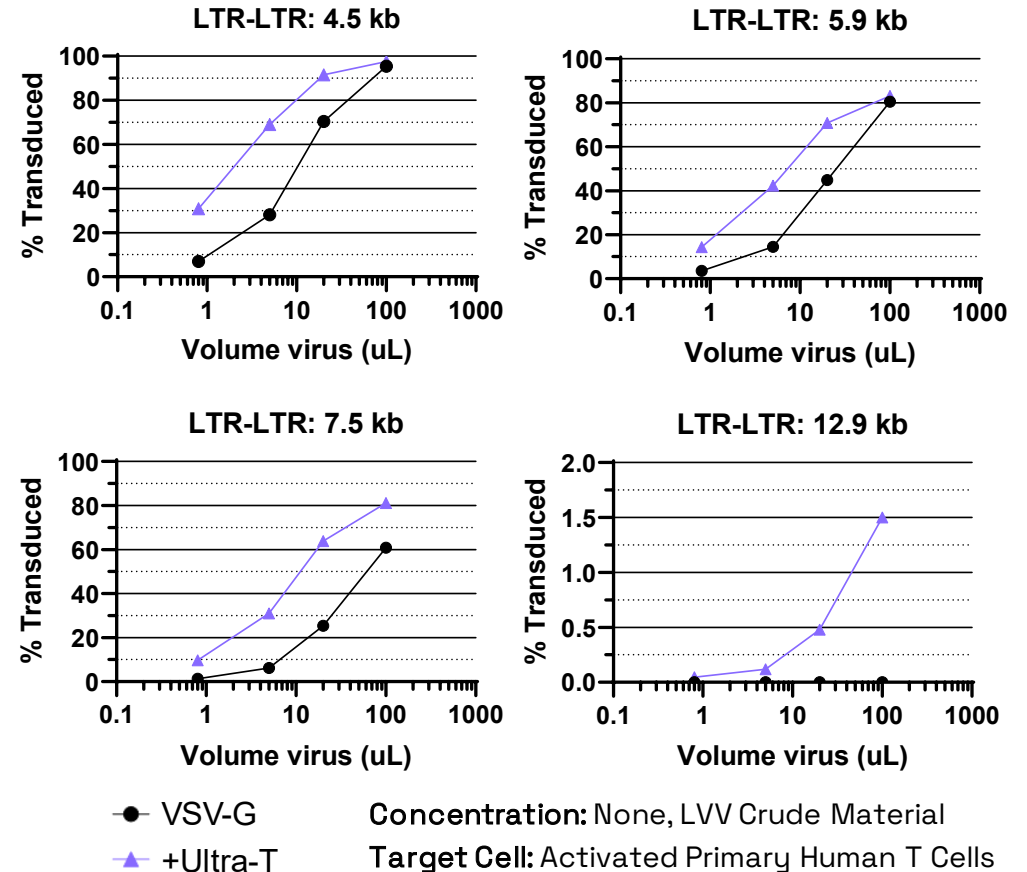


10x increase in transduction

Target Cell: Activated Primary Human T Cells

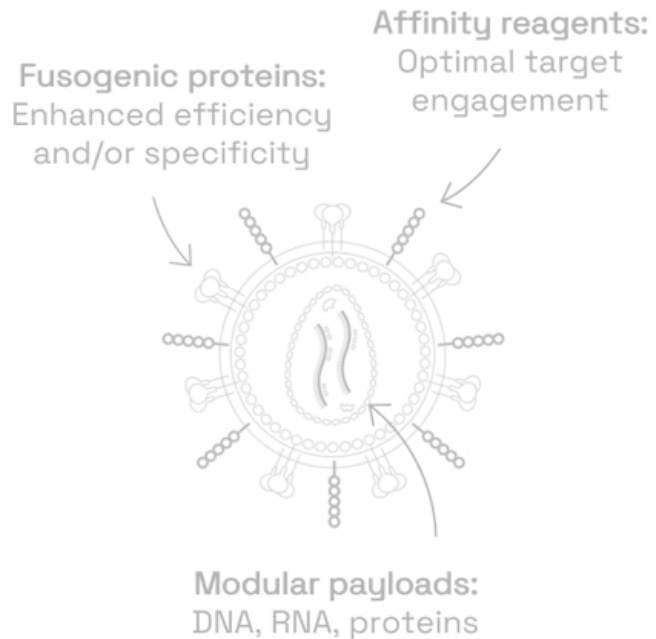
* Partner-generated data: Dr. Philipp Rommel, Carl June Lab, UPenn

Ultra-T LVV transduction enhancement is consistent across a range of transgene sizes



Syenex: Next-Generation Delivery Platforms

Programmable



Easy to Implement

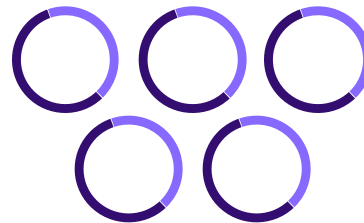
Drug Developer Partner



Genetic Medicine Therapeutic Gene(s)



syenex Plasmid Set



Encoded in Plasmid DNA

Scalable

HEK Production Process

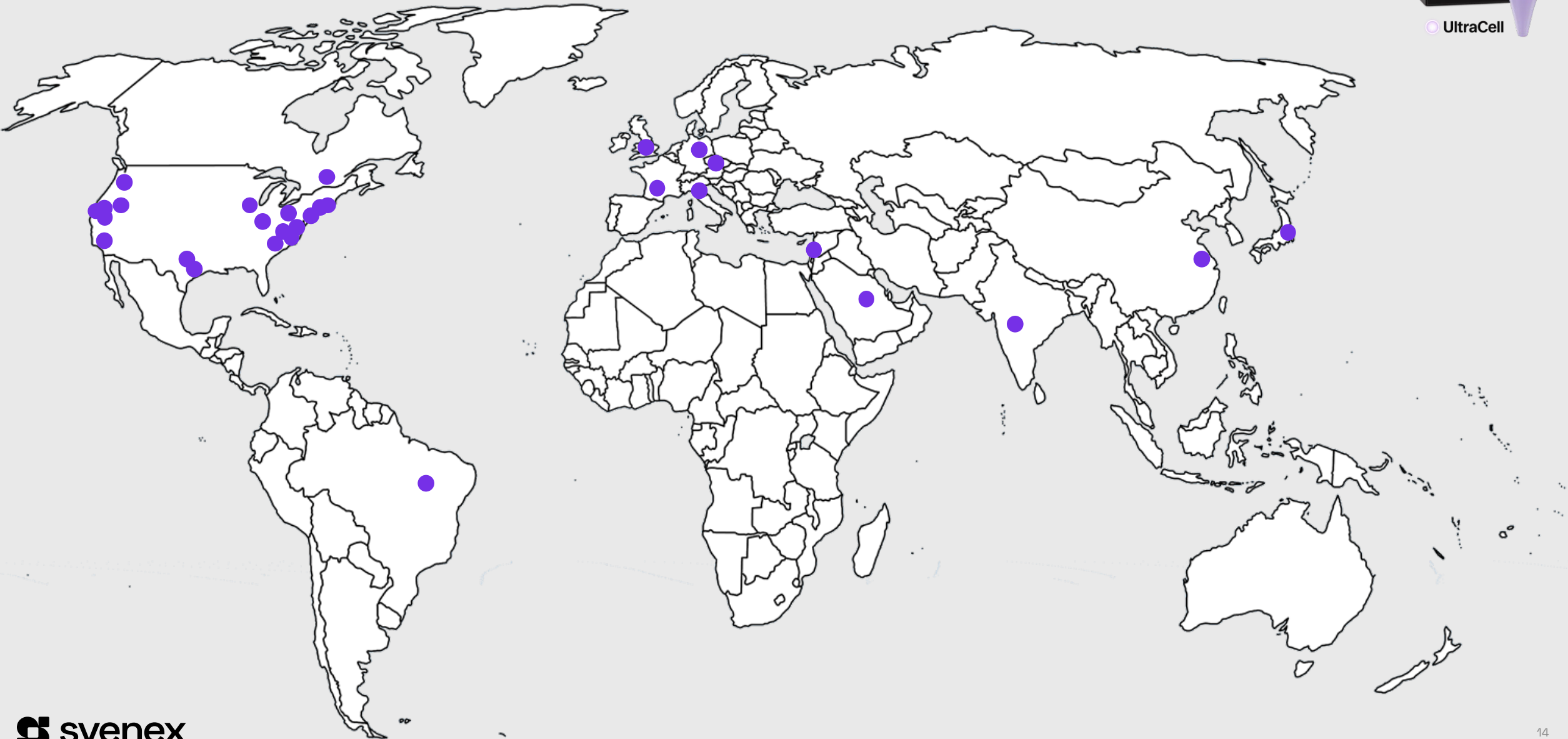


Adherent or Suspension
R&D- or GMP-Grade

Utilize standardized
and established
infrastructure

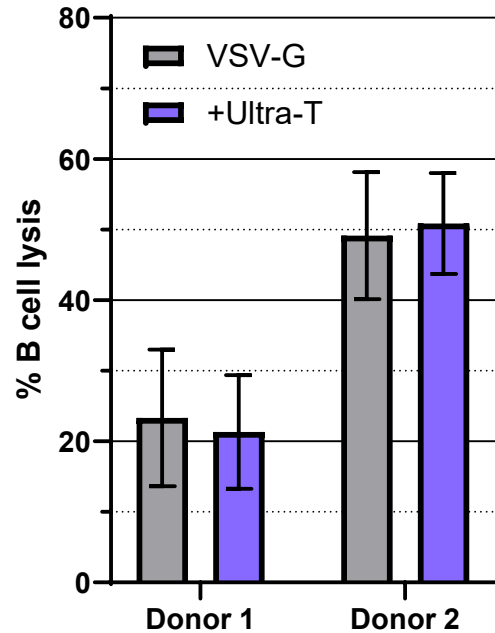
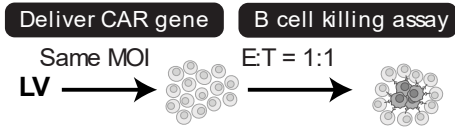
Ultra-T

Adopted by Over 50 Groups Worldwide



Ultra-T Engineered Cells Exhibit Standard Safety & Efficacy

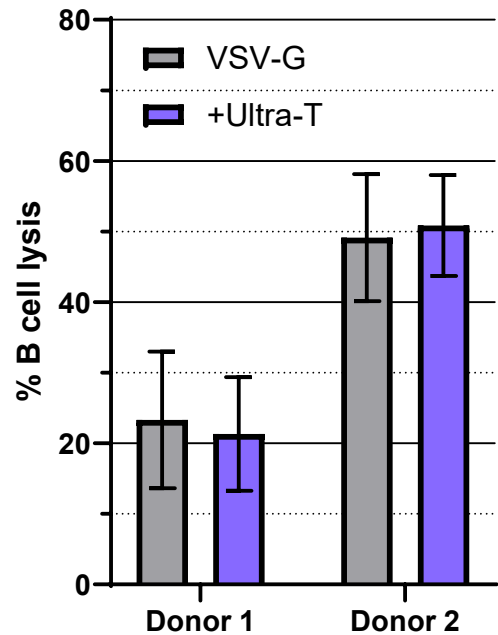
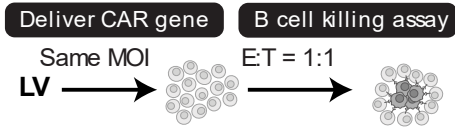
Consistent B cell killing



Partner-generated data

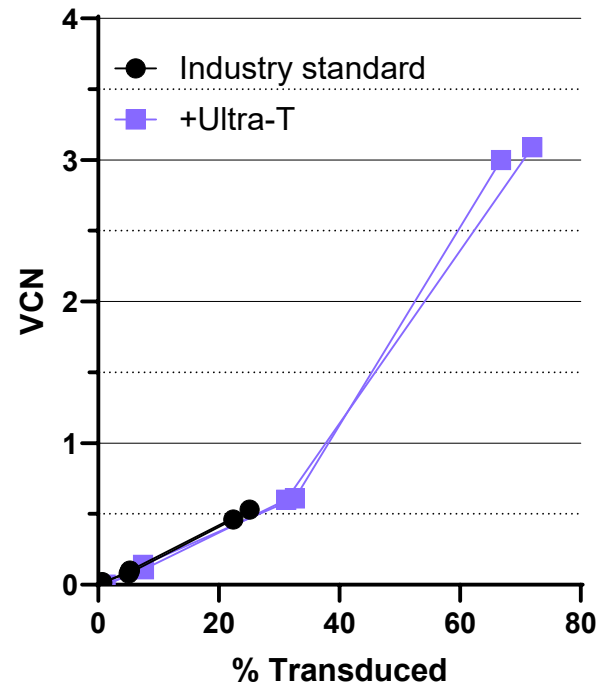
Ultra-T Engineered Cells Exhibit Standard Safety & Efficacy

Consistent B cell killing



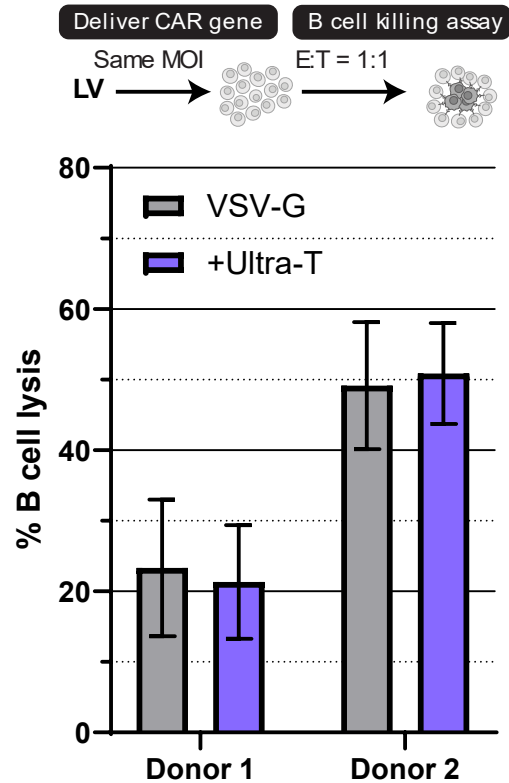
Partner-generated data

Consistent vector copy number



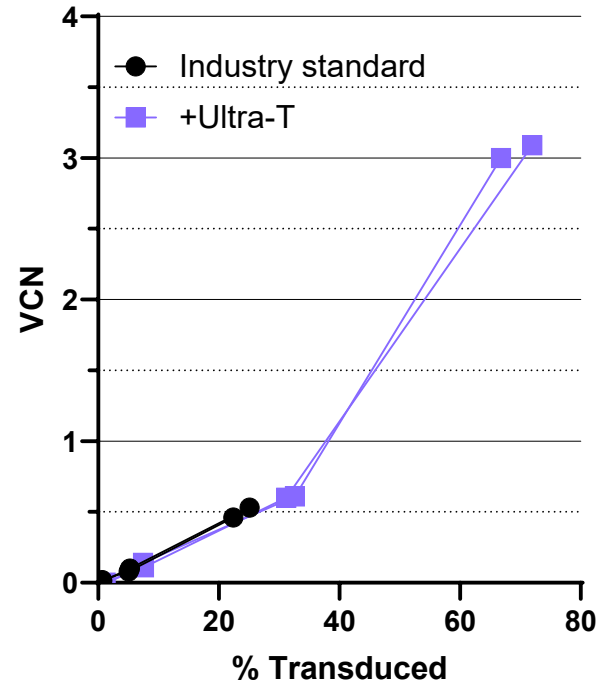
Ultra-T Engineered Cells Exhibit Standard Safety & Efficacy

Consistent B cell killing

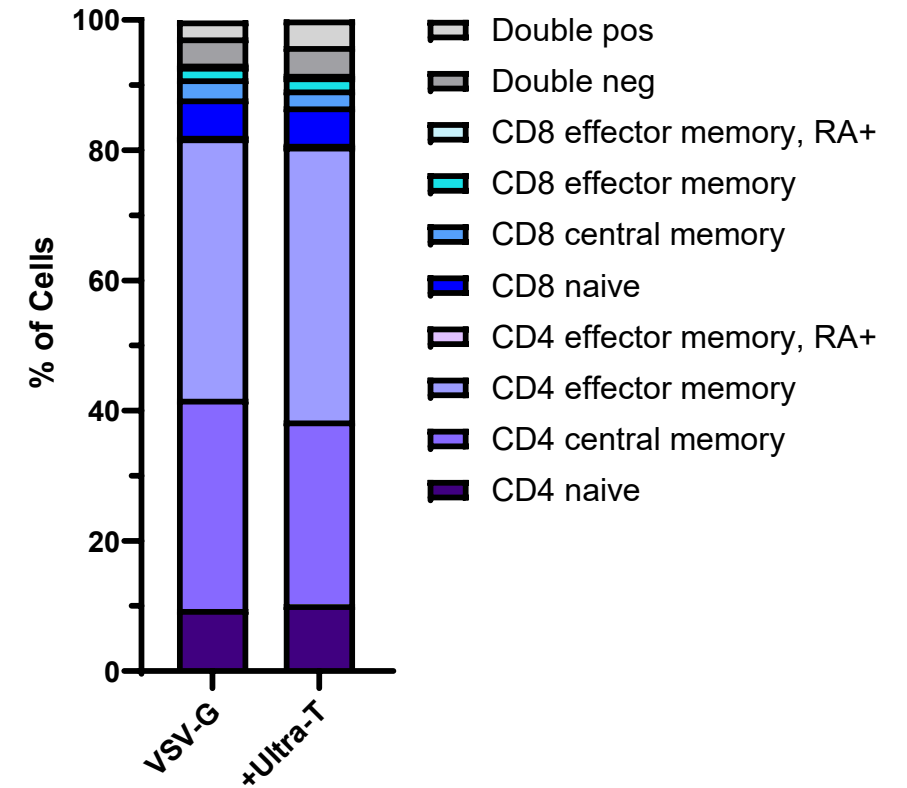


Partner-generated data

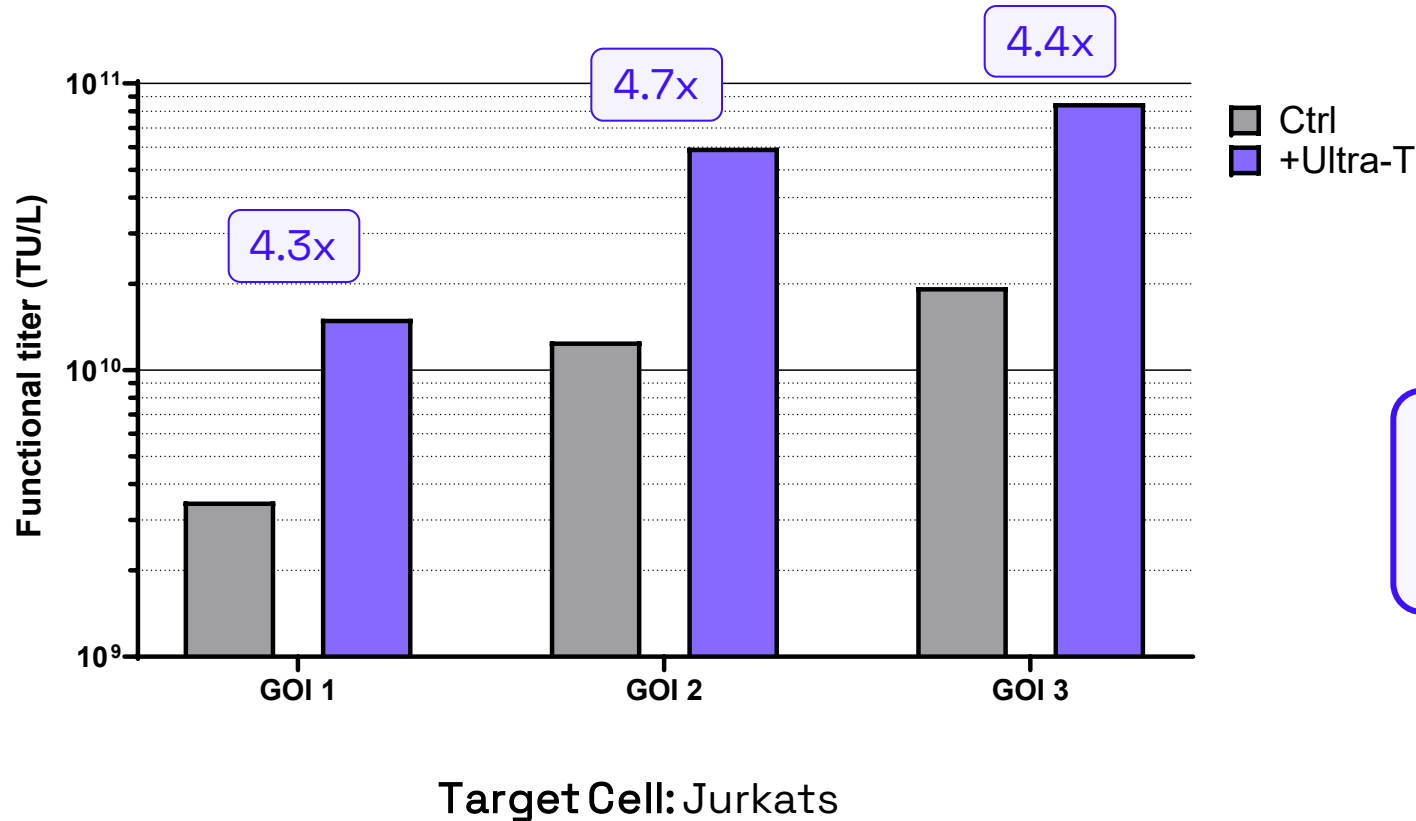
Consistent vector copy number



Consistent transduced cell phenotype



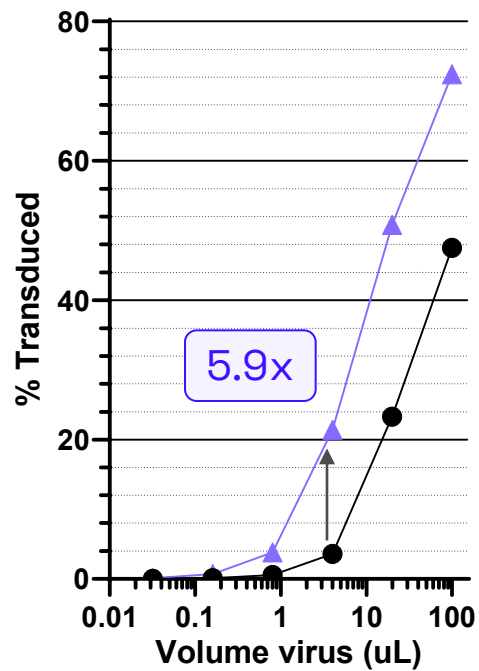
Ultra-T Benefits are Observed in Multiple Third-Party Evaluations



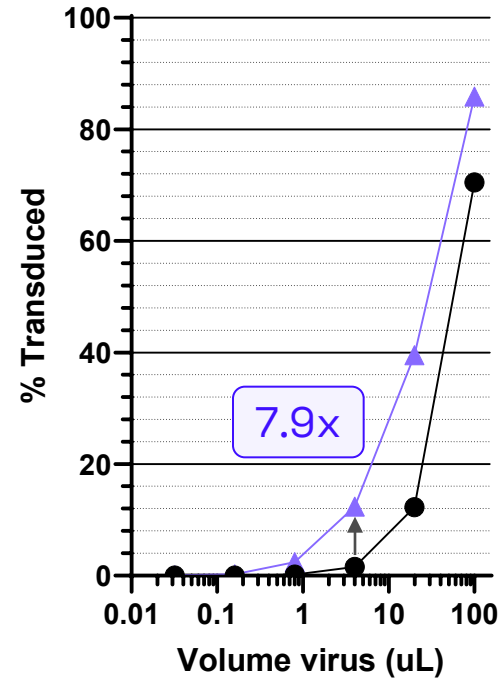
No process
changes required

Ultra-T

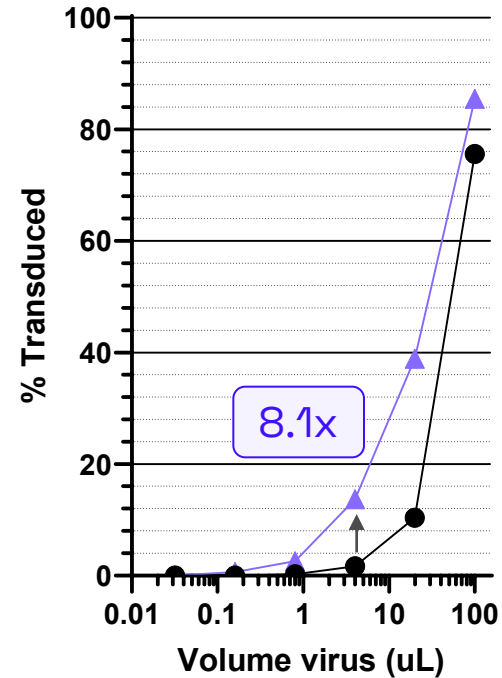
Benefits are Observed in Multiple Third-Party Evaluations Customer 1



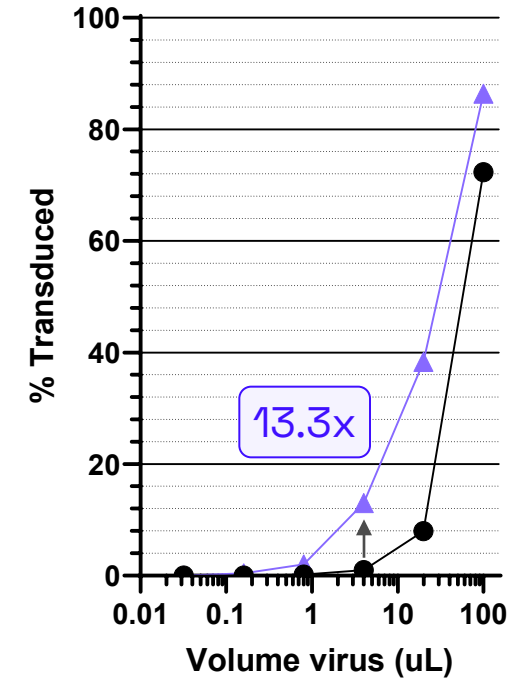
Process Step:
48 h EOCC



Process Step:
72 h EOCC



Process Step:
Post Benzonase



Process Step:
Centrifugation

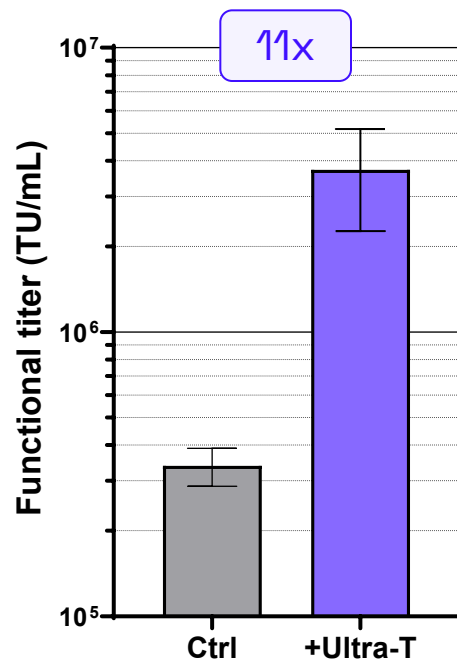
● Ctrl
▲ +Ultra-T

Target Cell: Activated Primary Human T Cells

Ultra-T

Benefits are Observed in Multiple Third-Party Evaluations Customer 2

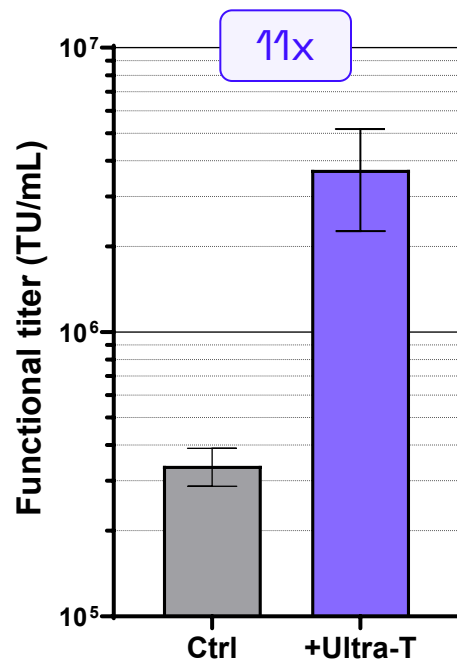
Substantial functional improvement...



Target Cell: Activated Primary Human T Cells

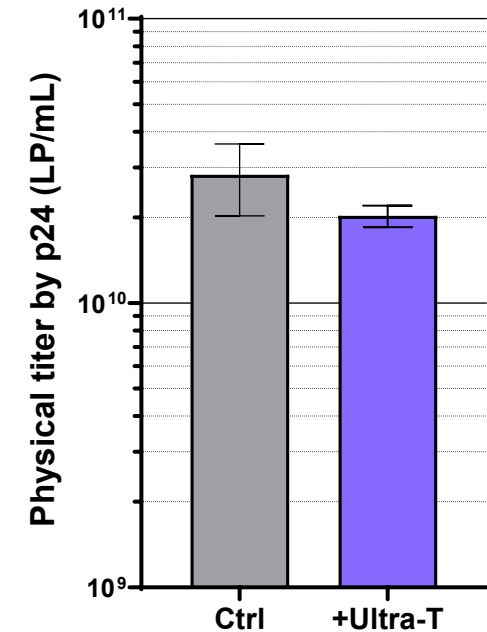
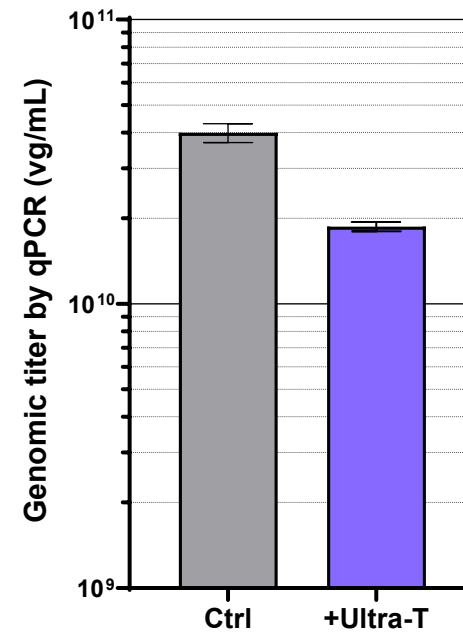
Benefits are Observed in Multiple Third-Party Evaluations Customer 2

Substantial functional improvement...



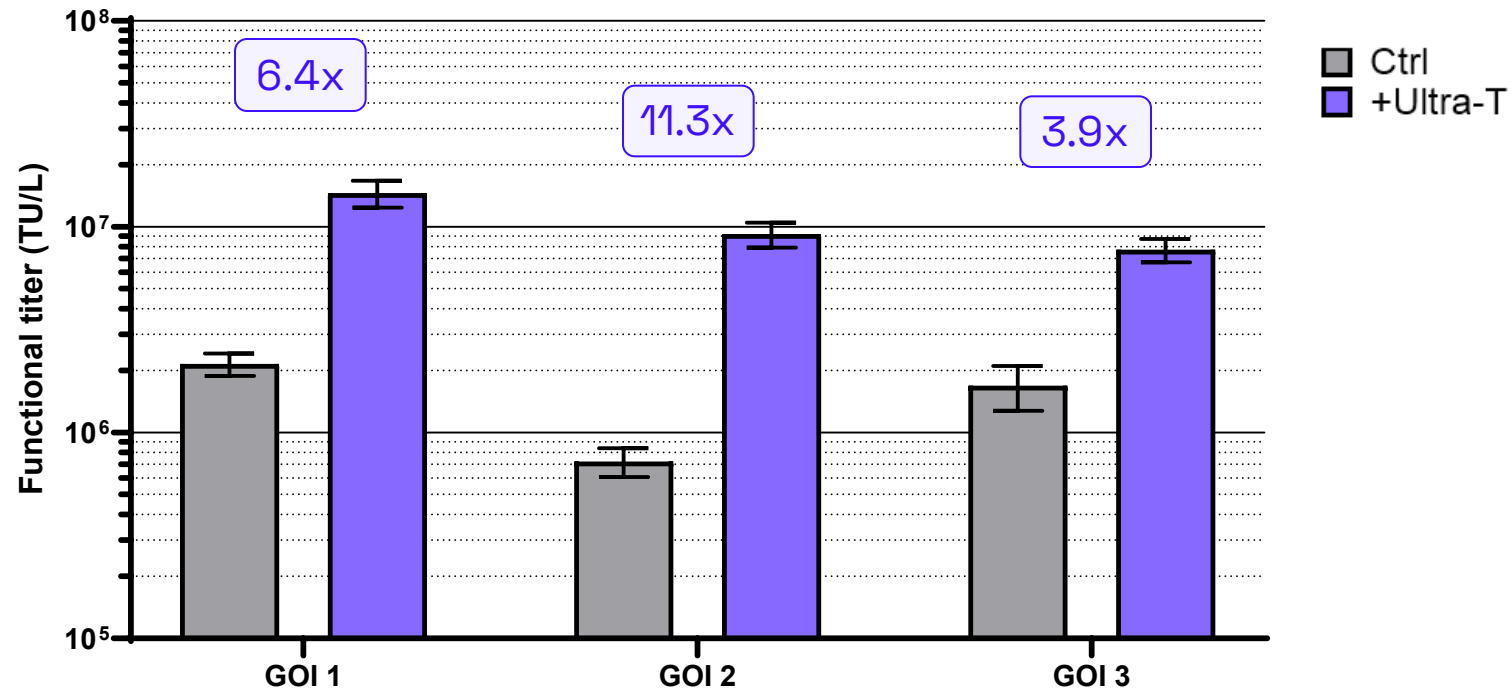
Target Cell: Activated Primary Human T Cells

...achieved with fewer LVV particles



Physical LVV Measurements

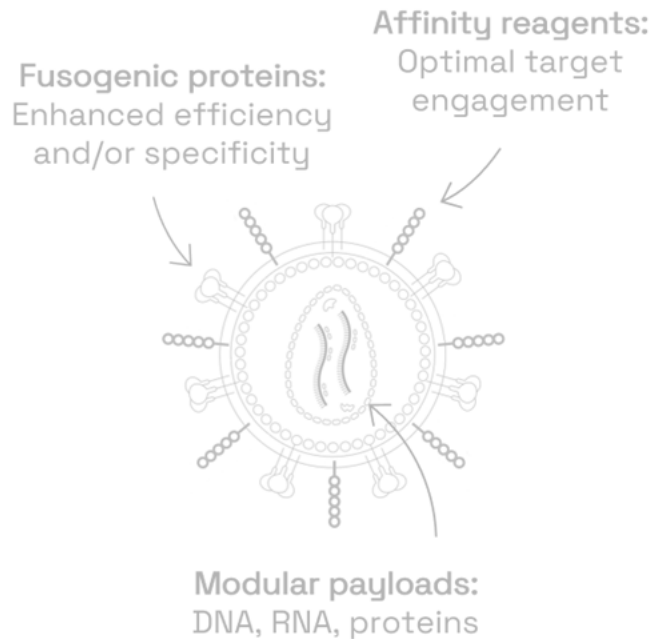
Benefits are Observed in Multiple Third-Party Evaluations Customer 3



Target Cell: Activated Primary Human T Cells

Syenex: Next-Generation Delivery Platforms

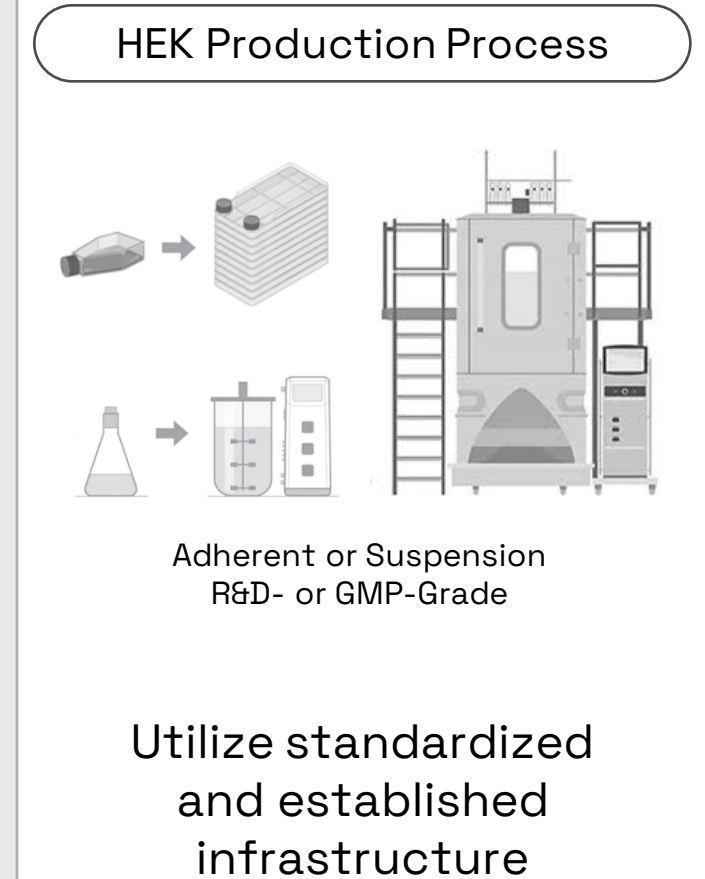
Programmable



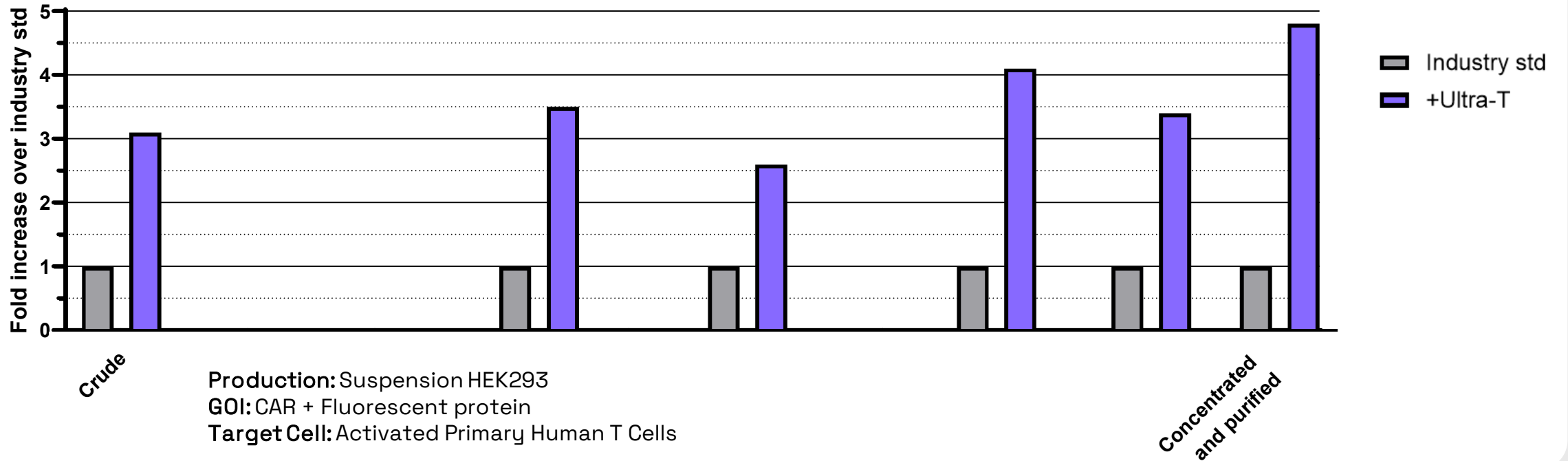
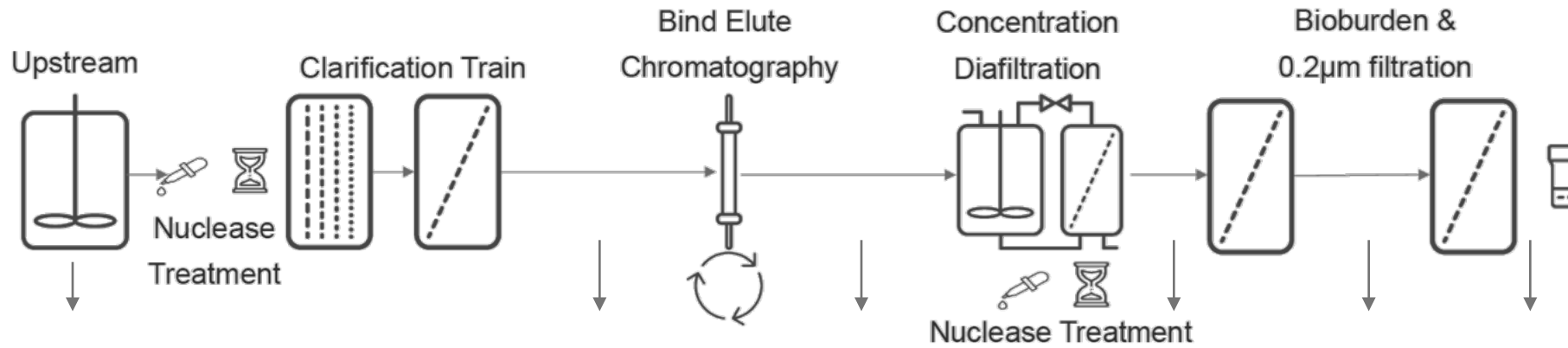
Easy to Implement



Scalable

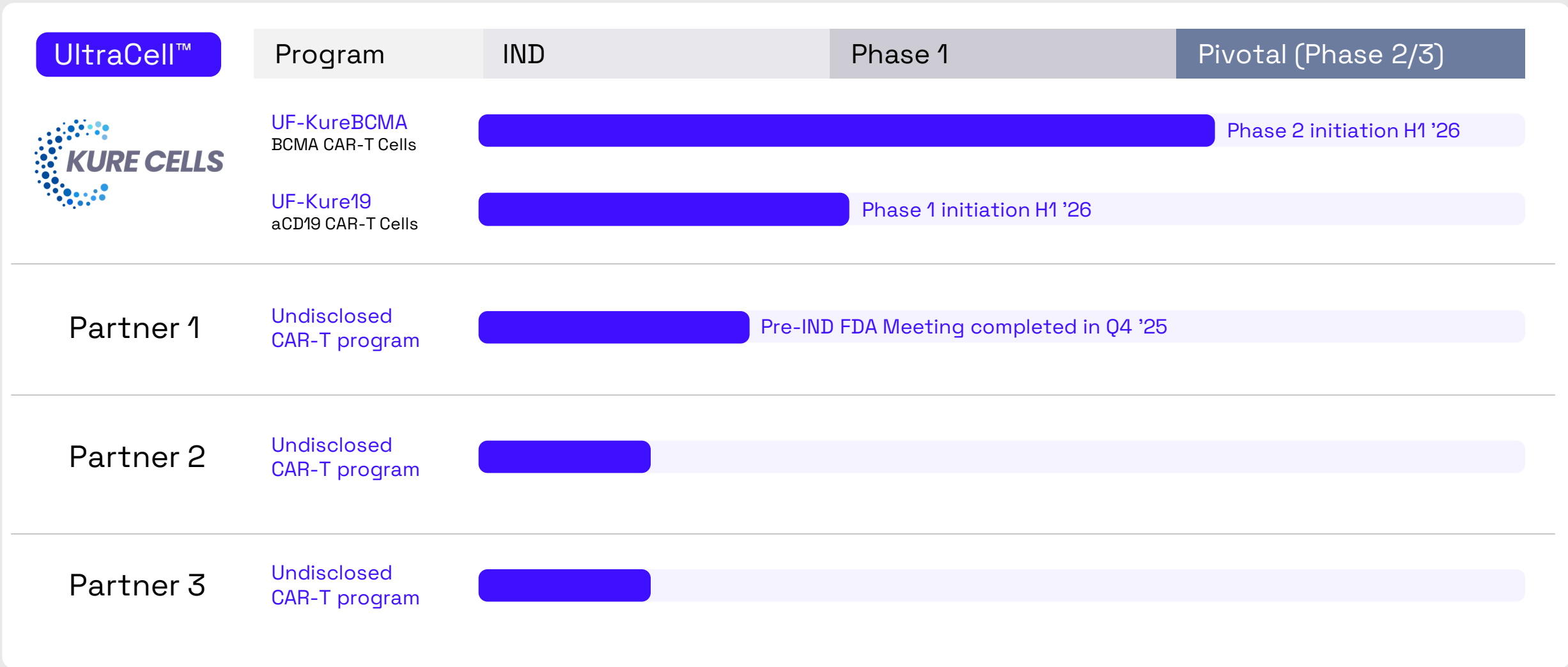


Ultra-T Benefits are Conserved in LVV Scale Up Production



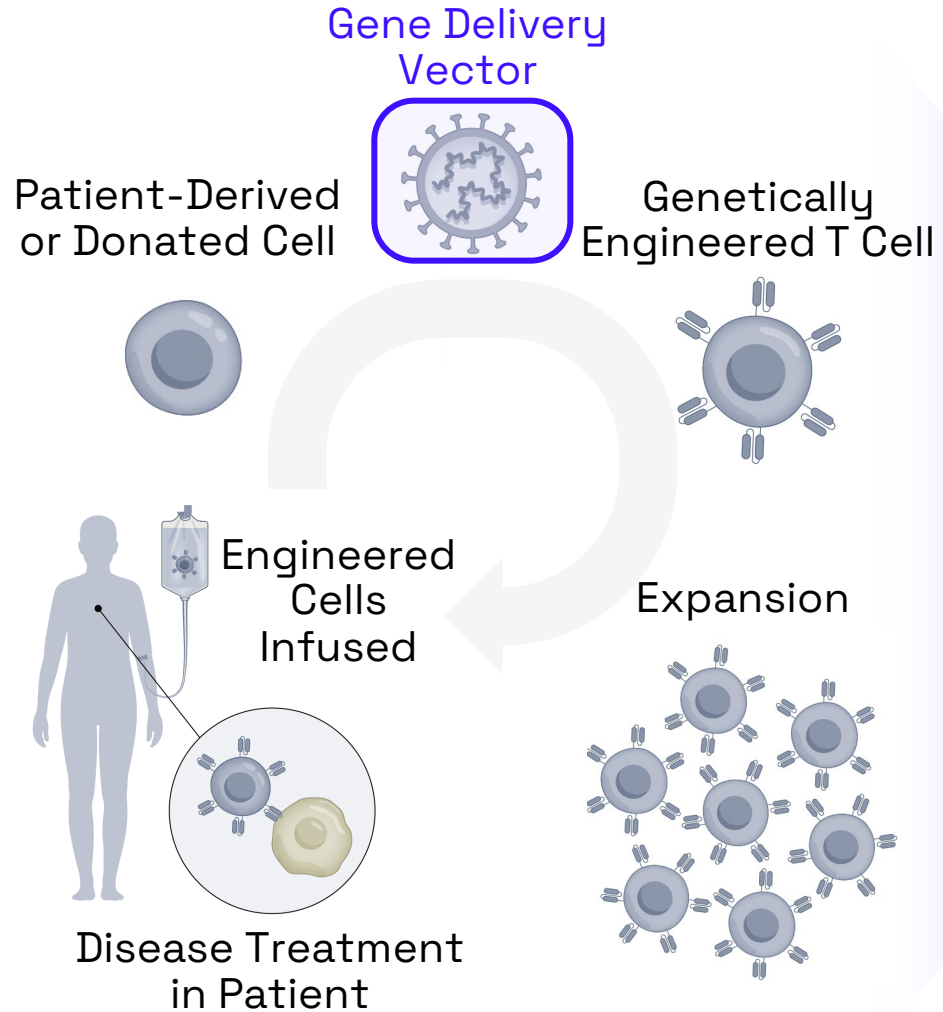
Scales to 50 L GMP Reactors

Ultra-T Incorporated into Multiple Clinical Programs (FIH in H1 '26)



DMF available for cross-reference

Offering Best-In-Class Cell Engineering Vector Systems



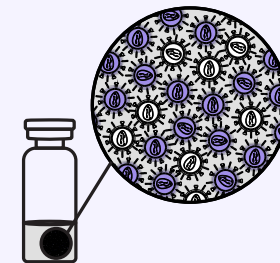
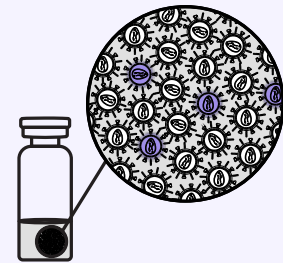
UltraCell™

Optimal Capacity & Potency

- Ultra-T LVV enables 10.9 kb cargo delivery
- Ultra-T LVV reduces dose need by 80-90%

VSV-G LVV

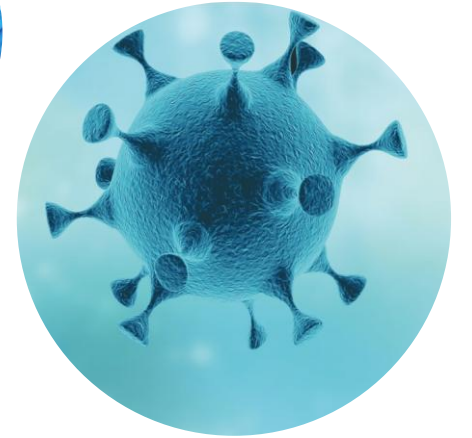
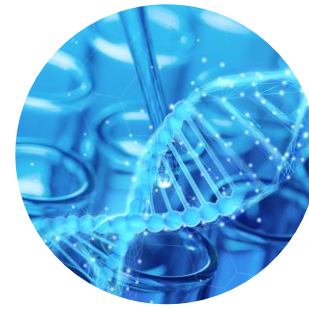
Ultra-T LVV



- T cell-transducing particle
- Non-functional particle



Agenda



01 uBriGene's overview

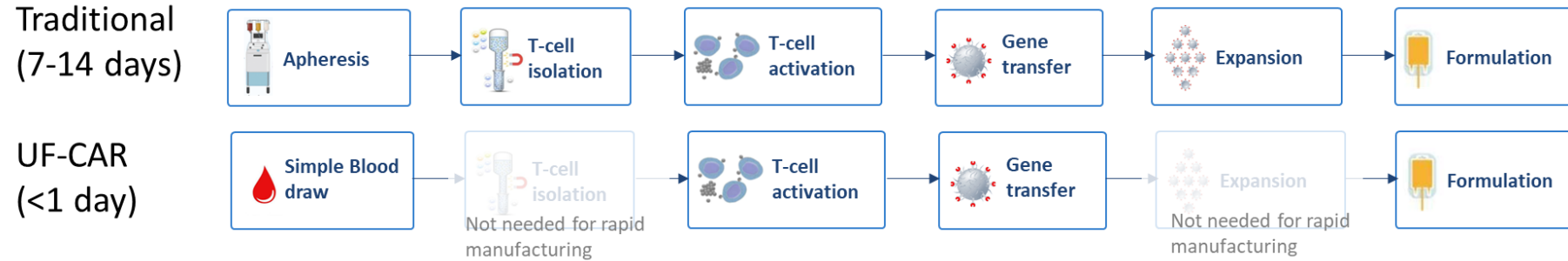
02 uBriGene LVV Turbo™ manufacturing platform

03 Syenex Ultra-T™ innovative technology

04 Kure Cells success story

05 Q&A

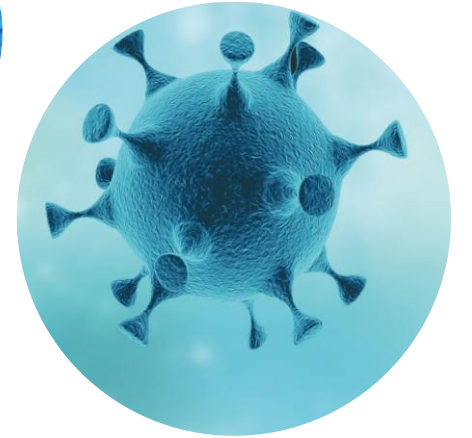
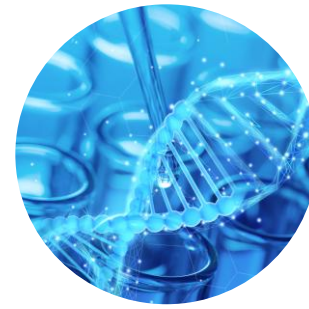
ULTRA-FAST, less than 1 day CAR-T manufacturing



- Simple, highly scalable and low-cost workflow; converted to semi-automated closed system process
- Clinically Validated: UF-KURE19 demonstrated a high rate of durable remission and low CRS/ICANS incidence in completed ph1/1b testing



Agenda




01 uBriGene's overview

02 uBriGene LVV Turbo™ manufacturing platform

03 Syenex Ultra-T™ innovative technology

04 Kure Cells success story


05 Q&A



uBriGene Biosciences
20400 Century Blvd, Suite 125
Germantown, MD 20874
United States



contact@ubrigene.com



Toll Free: 1 800 663 2528
US direct line: 240-551-5140