

# Advancing CAR-T Cell Therapy Workflows

with Novel Cell Selection and  
Non-Viral Delivery Methods

**Chris Wegener**

Director, Cell & Gene Therapies R&D  
Fresenius Kabi

# Global Technology Leader Providing Exceptional Regional Support

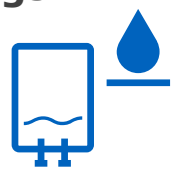
50+ year heritage in developing and commercialization technology, bringing them to the market and offering full-scale service

## Experience

**50**  
 **Years developing & commercializing medical devices at scale**

## Reliable Production Capacity

**18+** **MILLION** plasma sets manufactured per year

**~9** **MILLION** blood bags per year  


2025 US Data on file at Fresenius Kabi USA.

**10+**  
Years serving **C&GT market**

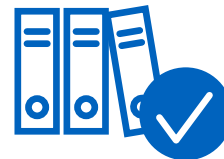


**2**

**Cell processing systems**



## Quality



**ISO 13485 certification, FDA audited facilities**

## Worldwide Distribution



Lovo and Cue available in North America, Europe/UK, Asia and the Middle East

# Established Cell Processing Instrumentation



**Lovo®  
Cell Processing System**



**Cue®  
Cell Processing System**

Laboratory Use Only

The Lovo and Cue Cell Processing Systems are for non-clinical laboratory and research use only. User must obtain appropriate regulatory clearance for clinical use. Refer to the Lovo Cell Processing System User's Guide and Cue Cell Processing System User's Guide for a complete list of warnings and precautions associated with the use of these products.

\*The Cue Cell Selection System is currently in development and is not for commercial sale at this time. All features, specifications, and timelines are subject to change. Fresenius Kabi makes no guarantee that this product will become available for sale.

Announcing  
**Cue Cell Selection System\***  
in collaboration with



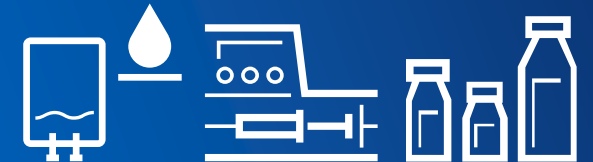
# 4

Approved cell therapies using Lovo in manufacturing



# 75+

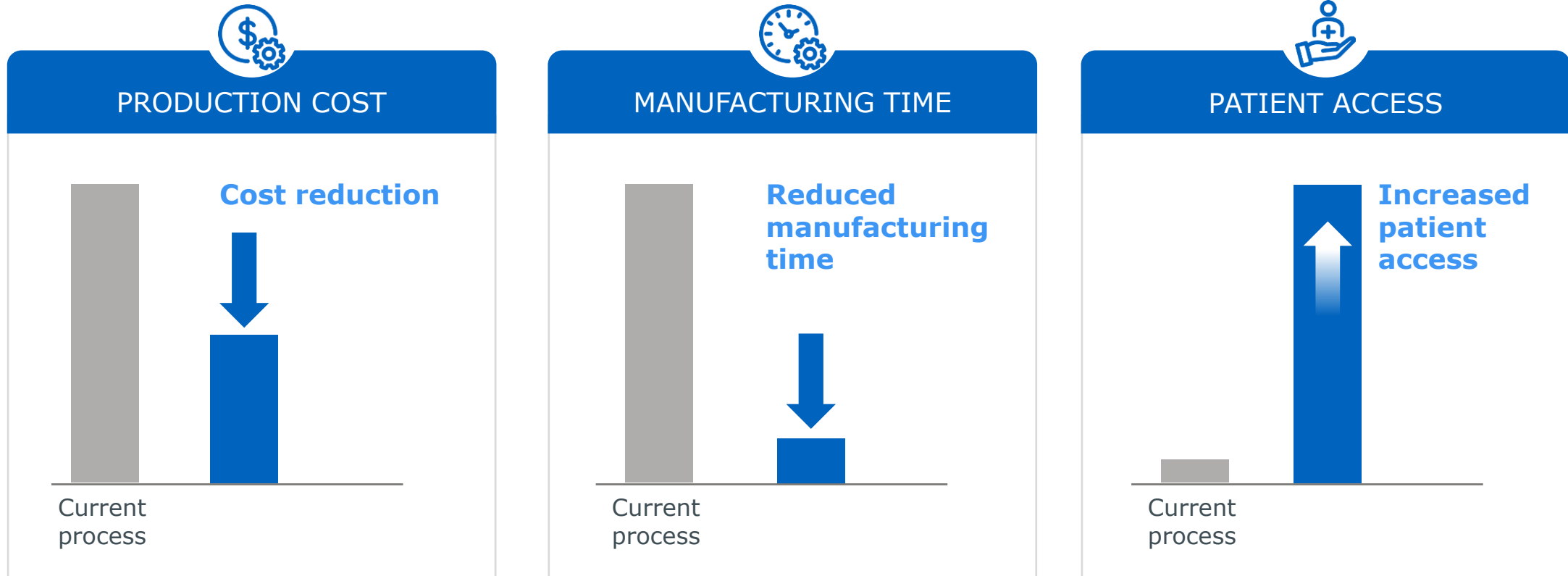
Clinical trials utilizing our instruments



## Regulatory Support

Reference Master File via Letter of Authorization

# Cost-effective Democratization of CAR-T Cell Therapies is Still Needed in the Market



**Solution:**

**To enable rapid, decentralized CAR-T manufacturing**

# Introduction to Collaborators



Automated cell processing technologies, such as Lovo and Cue systems, for **critical cell and gene therapy manufacturing steps** to efficiently wash, concentrate, and formulate cells from development through to commercialization



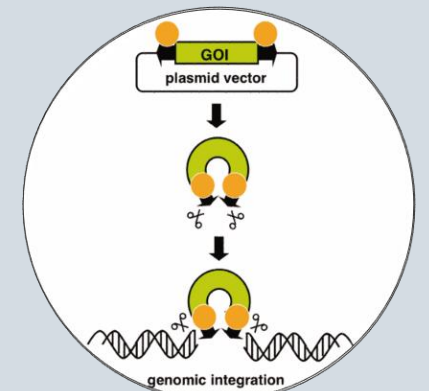
Scalable, non-viral **genome engineering platforms** designed to accelerate the discovery, development, and high-volume manufacturing of gene-modified cell therapies



Affinity- and column-based cell selection technology to rapidly isolate high-purity, "untouched" target cells from blood or apheresis products in under two hours



Next-generation, personalized **CAR-T cell therapies** using a proprietary, non-viral "**Sleeping Beauty**" **transposon** platform designed to make cancer treatments more scalable, cost-effective, and accessible



# Proof-of-Concept for Rapid Non-Viral Manufacturing of CAR-T Cells

## Problem Statement



## 1 Transiently-Expressed T Cell Systems

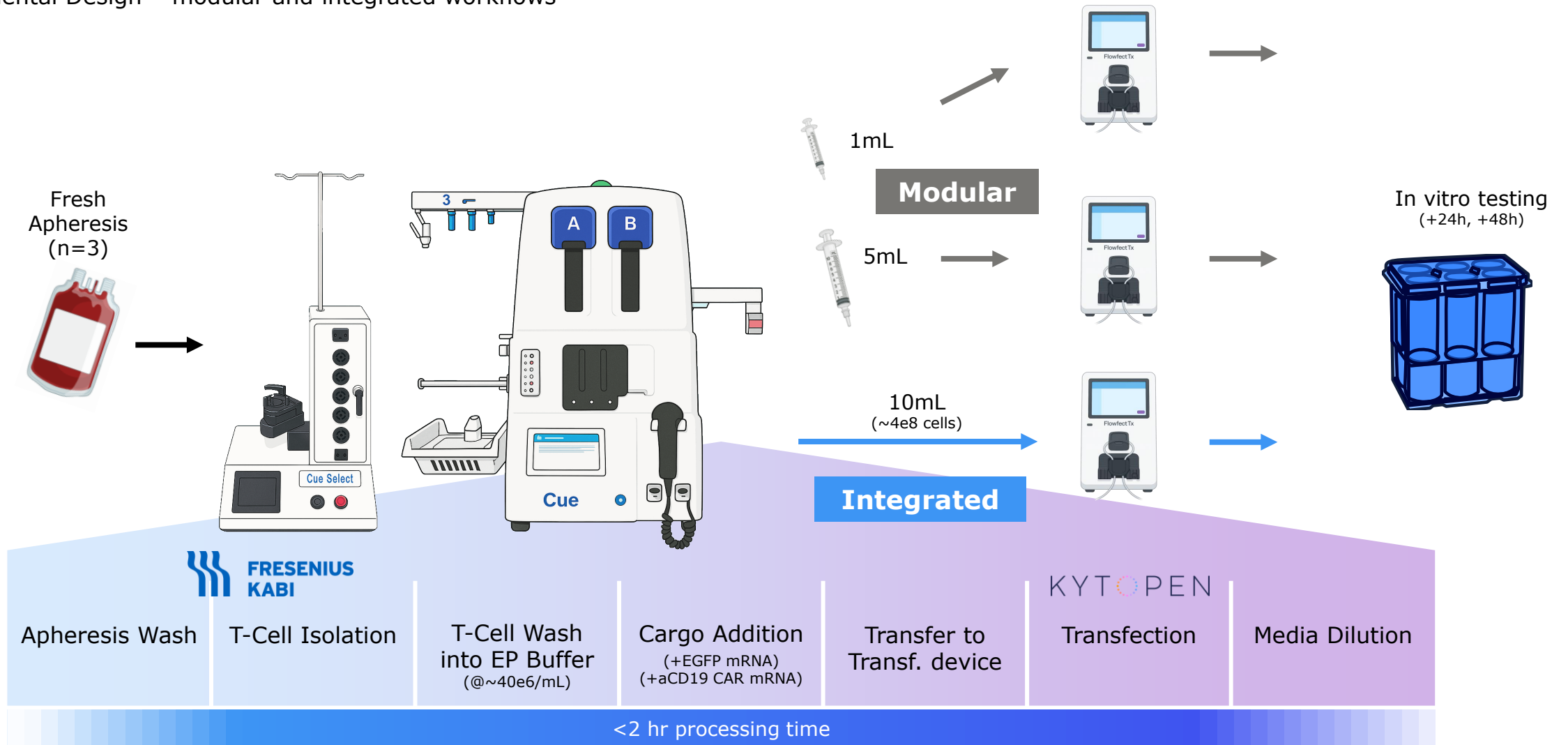
- Isolation of CD3+ T cells from apheresis
- Preparation of non-activated cells for transfection
- Cytosolic delivery of mRNA
- Wash/formulation

## 2 Durably-Expressed T Cells Systems

- Isolation of CD3+ T cells from apheresis
- Wash into growth media
- Activation of cells
- Preparation of activated cells for transfection
- Nuclear delivery of mcDNA transposon via mRNA SleepingBeauty Transposase
- Wash/formulation

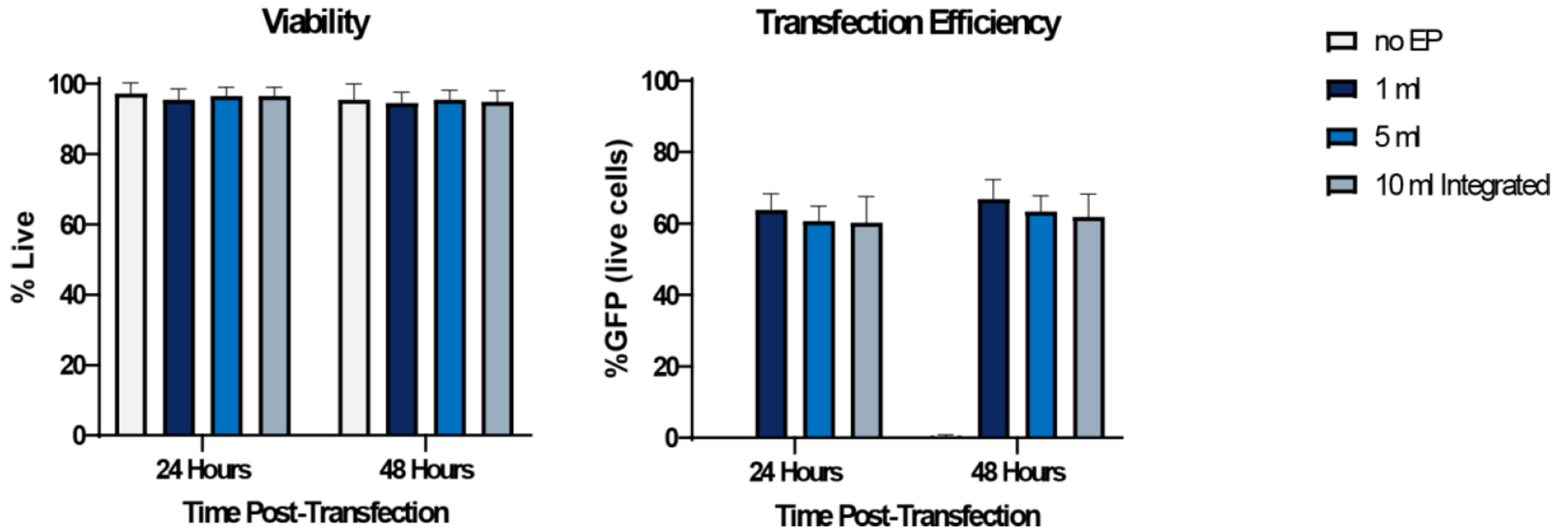
# EGFP and aCD19 CAR mRNAs Transiently-Expressed in Non-Activated T-cells

Experimental Design – modular and integrated workflows



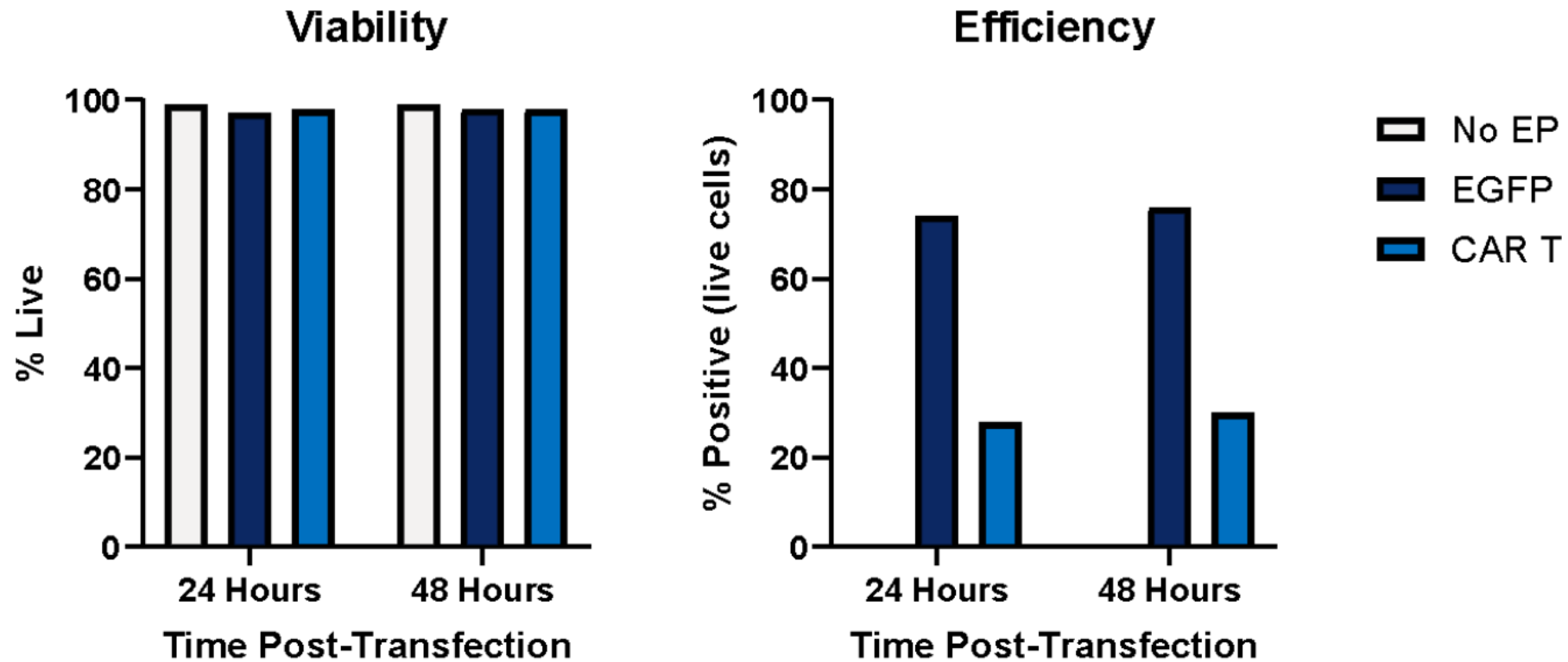
# Delivery of EGFP mRNAs Transiently-Expressed in Non-Activated T-cells

Modular vs. Integrated Workflow Results (EGFP)



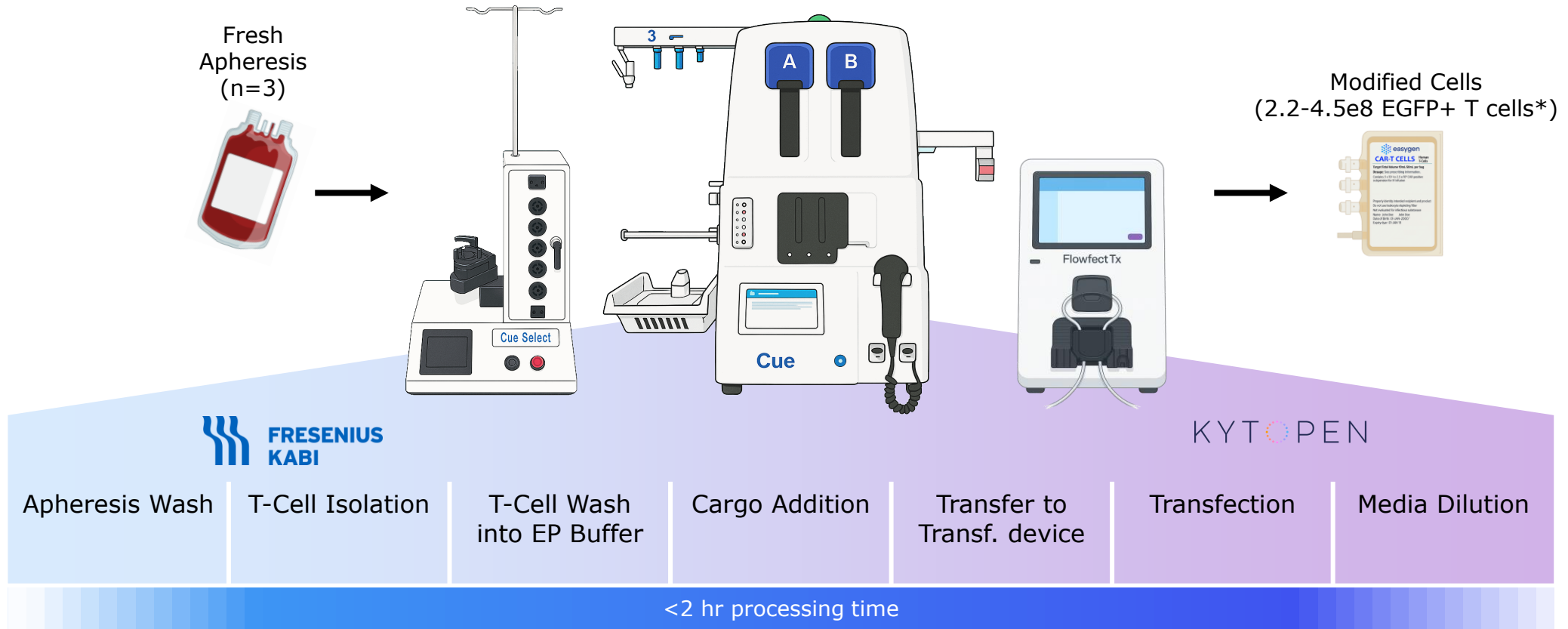
# EGFP and aCD19 CAR mRNAs Transiently-Expressed in Non-Activated T-cells

EGFP vs. CAR Modular Workflow Results (1mL scale)



# Clinical-Scale Yields in Under 2 Hours

EGFP and aCD19 CAR mRNAs transiently-expressed in non-activated T-cells



\*As measured at 24h

# Conclusion: Proof-of-Concept Established

EGFP and aCD19 CAR mRNAs transiently-expressed in non-activated T-cells



## Single unit operation

Demonstrated Cue system when integrated with Fresenius Kabi CD3+ cell selection prototype can prepare cells for transfection in a single unit operation



## Consistent delivery

Kytopen system can perform consistent mRNA delivery of cargoes to T cells across several volume formats

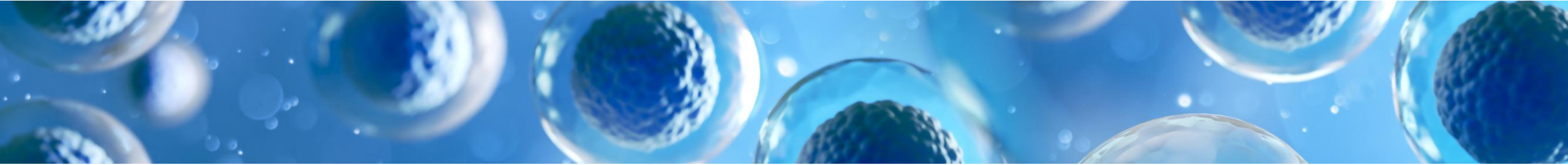


## Under 2 hours

Fresenius Kabi and Kytopen integrated system is capable of automating a functionally-closed, clinical-scale process from apheresis to modified cells in under 2 hours

# Proof-of-Concept for Rapid Non-Viral Manufacturing of CAR-T Cells

## Problem Statement



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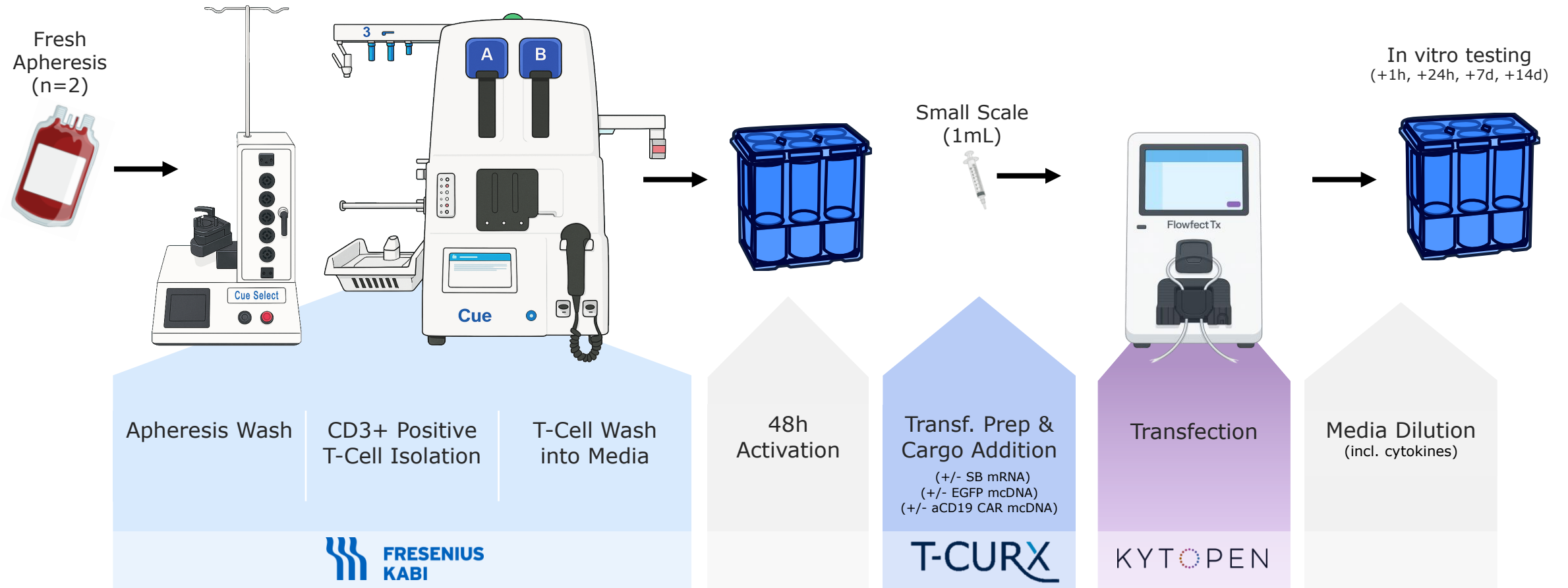
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# EGFP and aCD19 CAR Durably-Expressed in Activated T-cells

Experimental Design – Modular Workflow

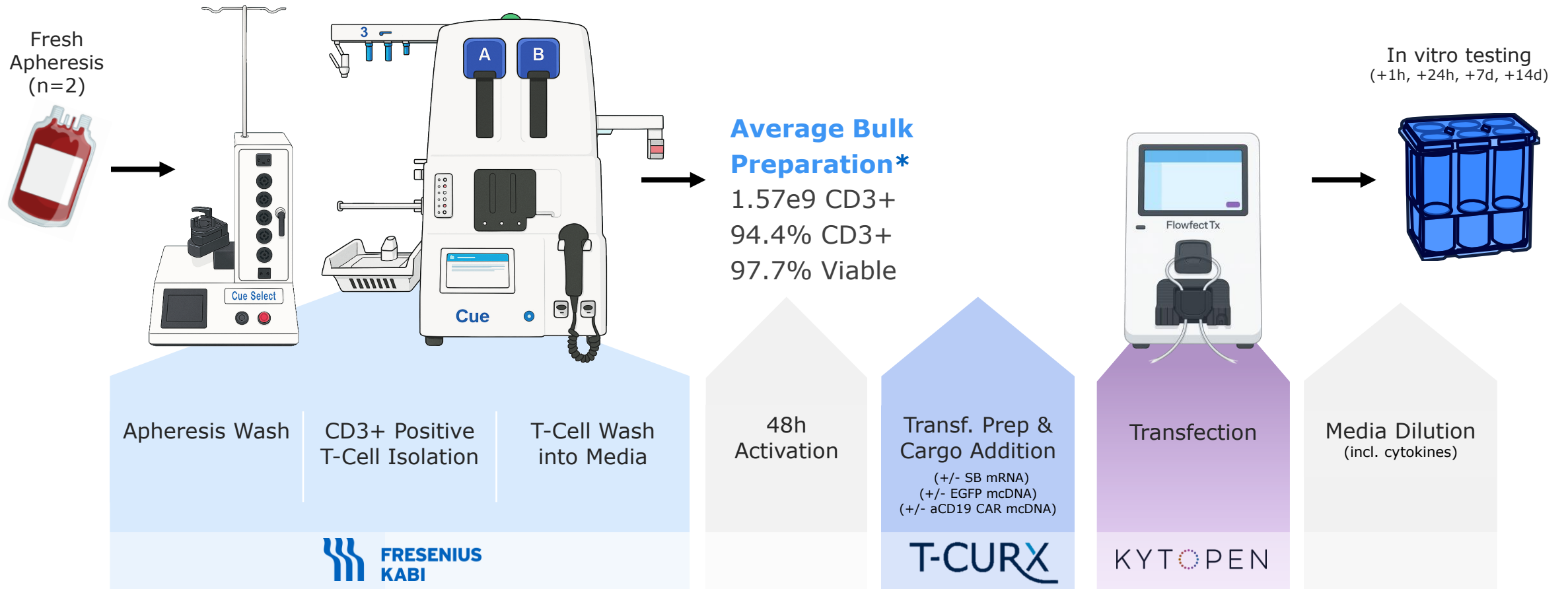


## Upstream Cell Selection Performance using Cue Selection Prototype

Bulk preparation of washed, positively selected CD3+ cells

## Downstream Experimental Design – Modular Workflow

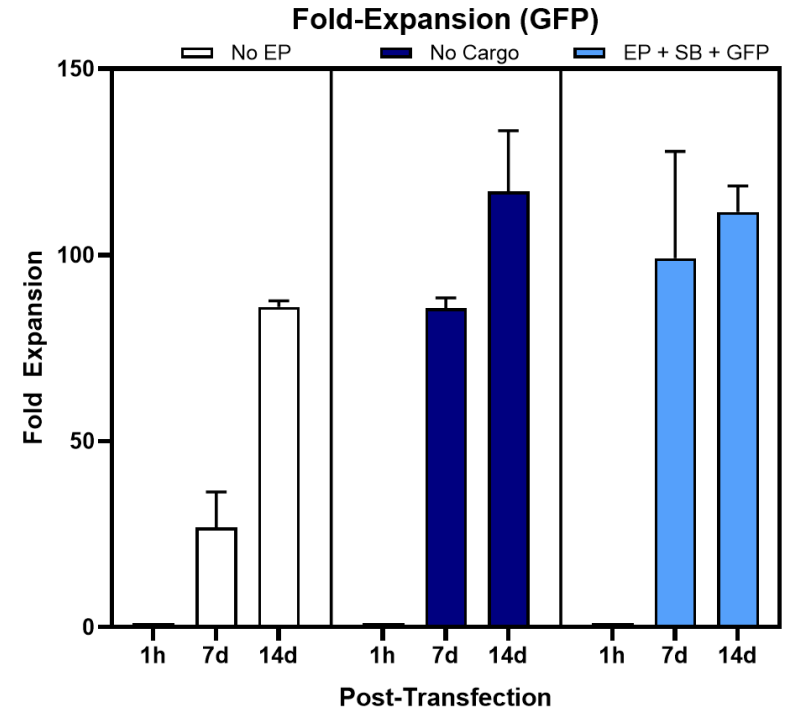
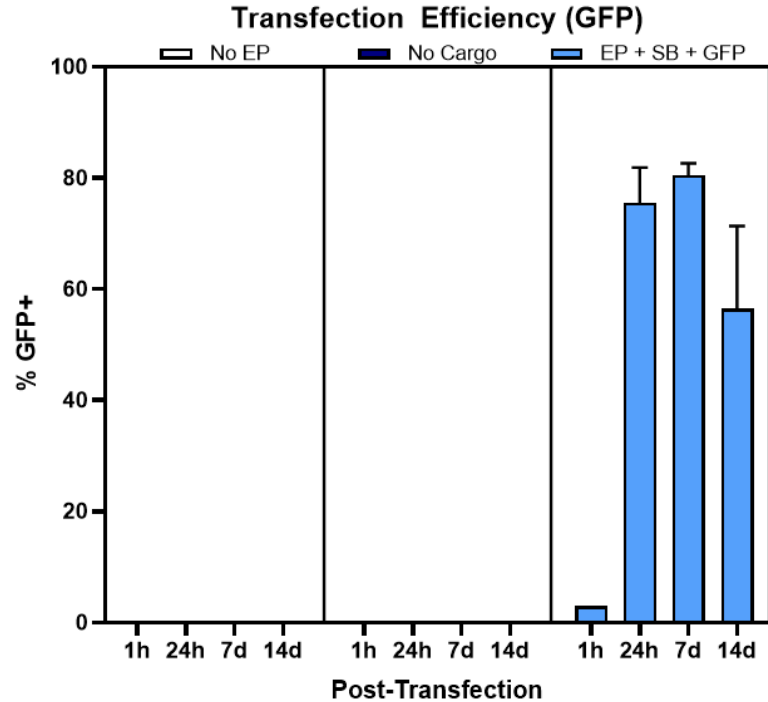
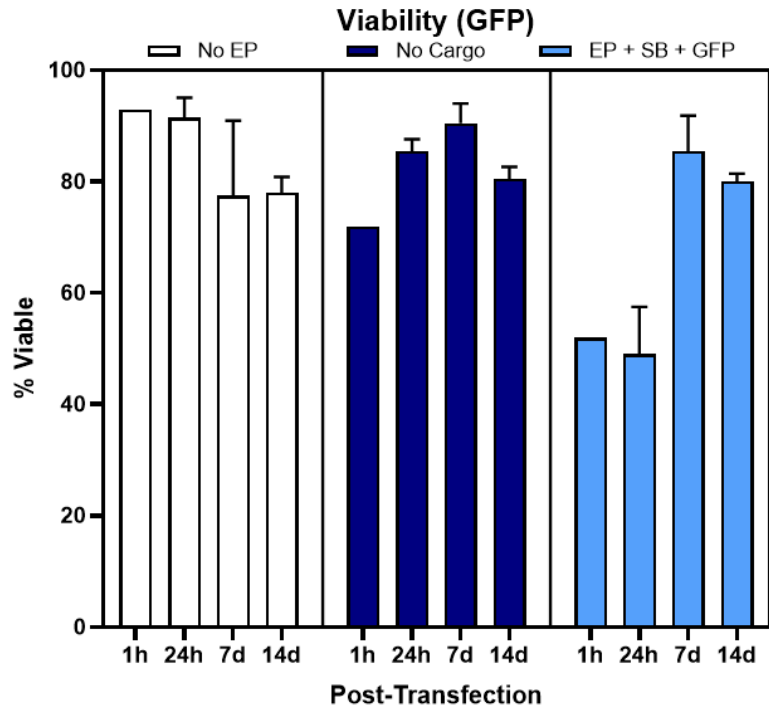
n=2 healthy donors



\*Cue selection system is in development and not commercially available

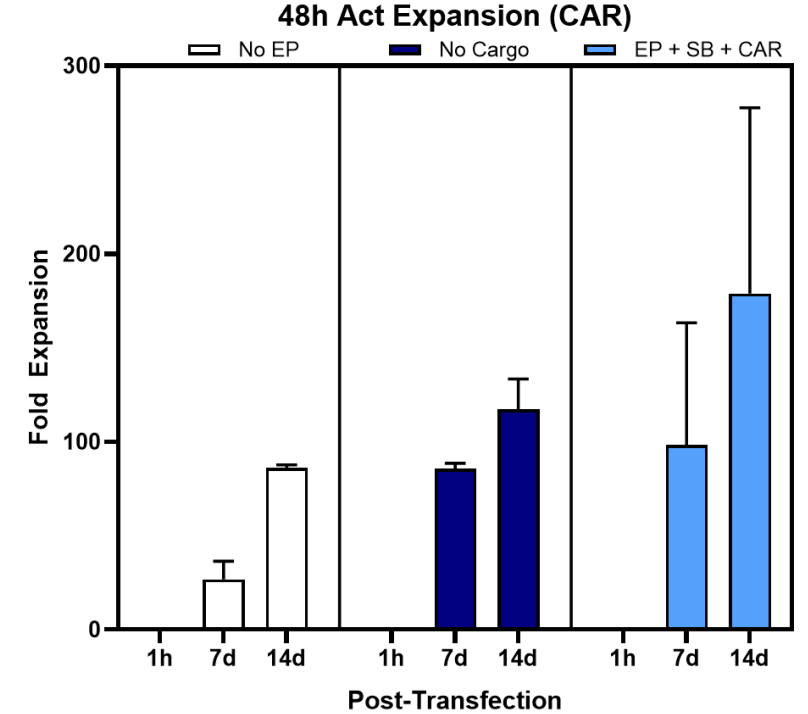
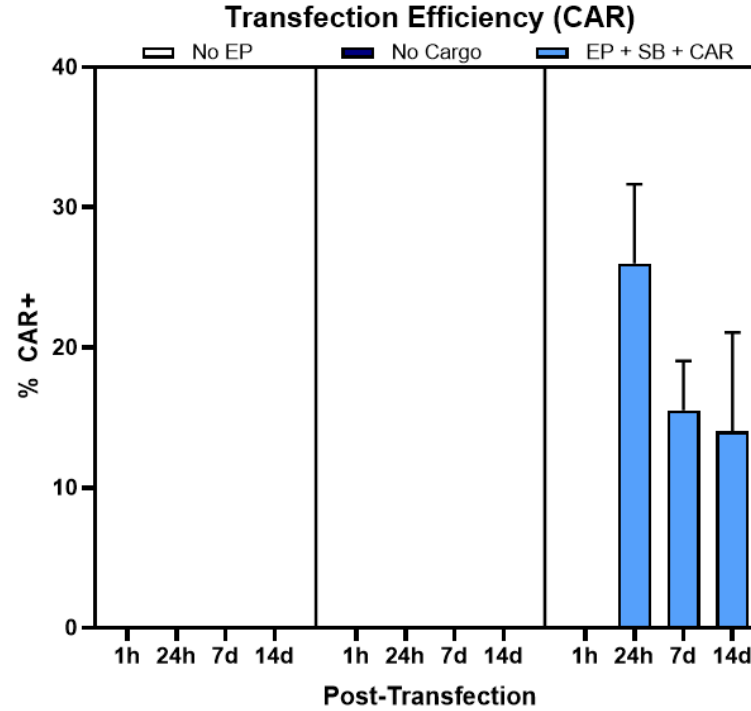
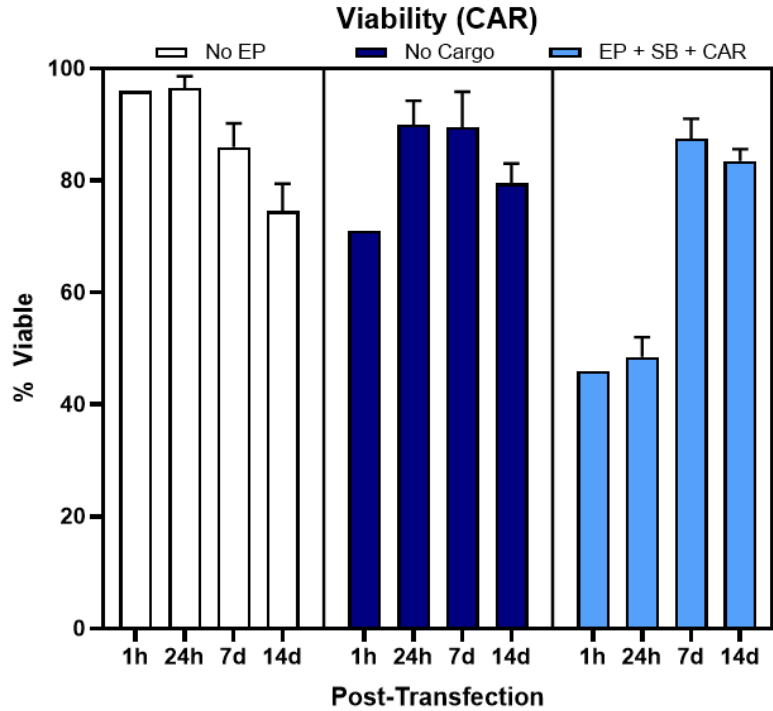
# Pre-Activated EGFP Transfected Cells

n=2 healthy donors



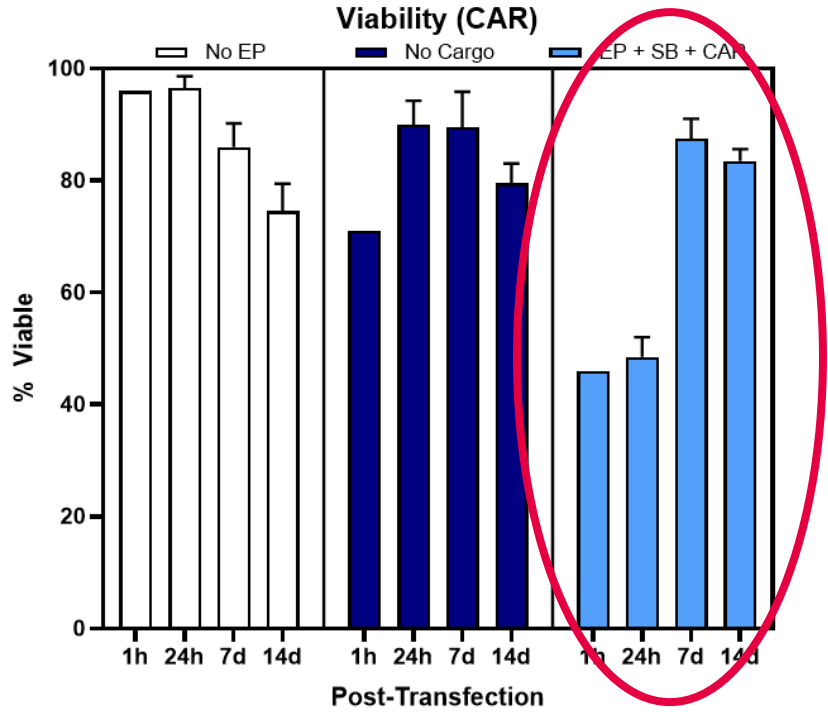
# Pre-Activated aCD19 CAR Transfected Cells

n=2 healthy donors

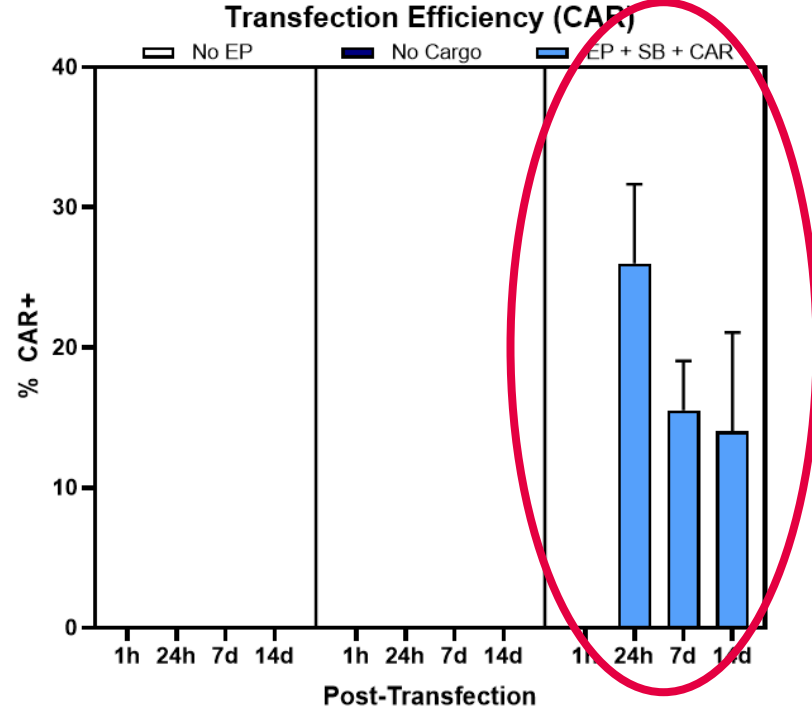


# Plan to Further Optimize Performance

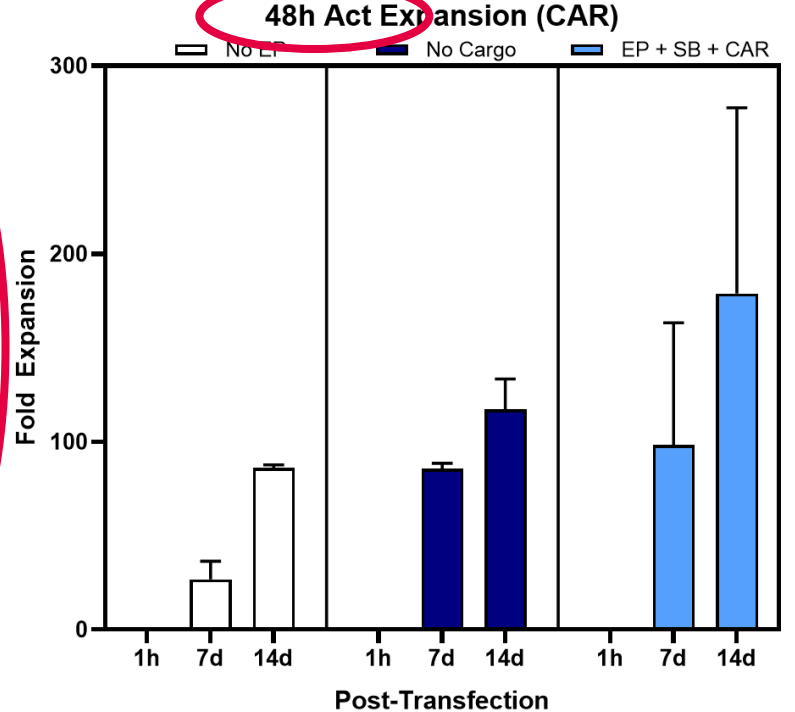
n=2 healthy donors



Kytopen  
transfection profile  
optimization



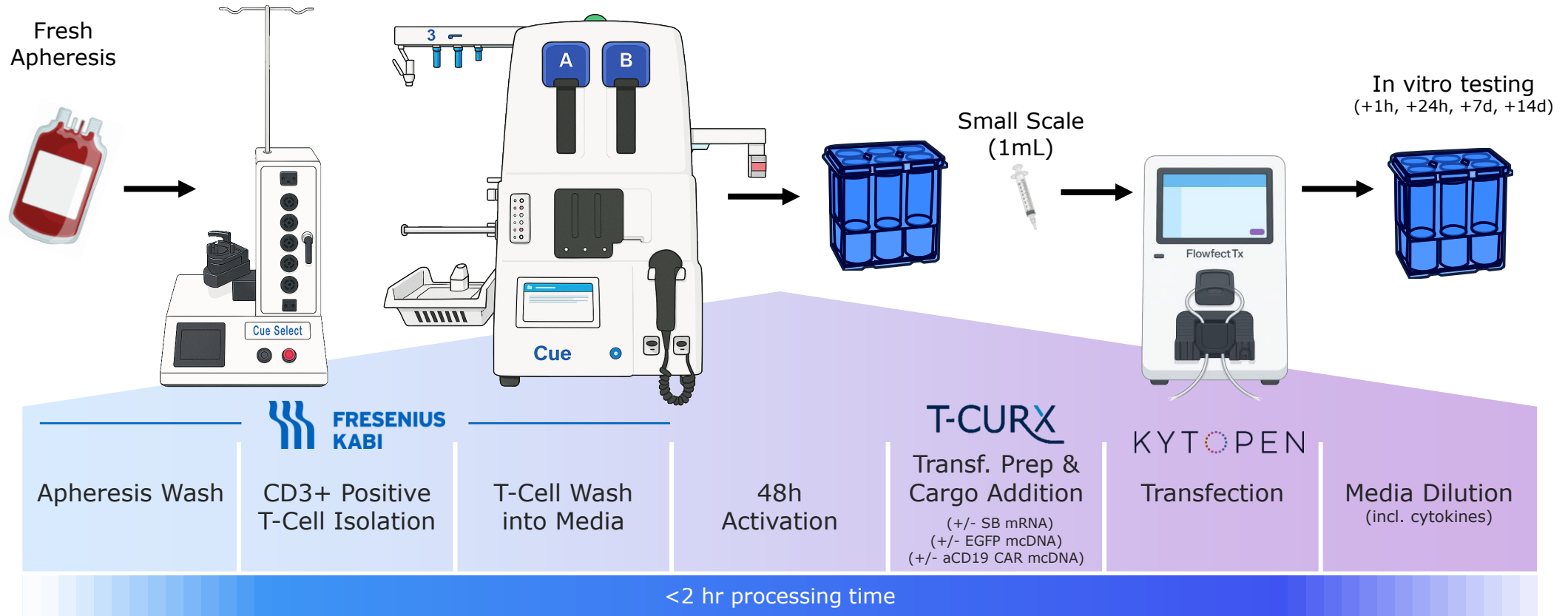
mRNA:mcDNA  
ratio



Activation  
duration and  
method

# Demonstrated Results in Modular Workflow

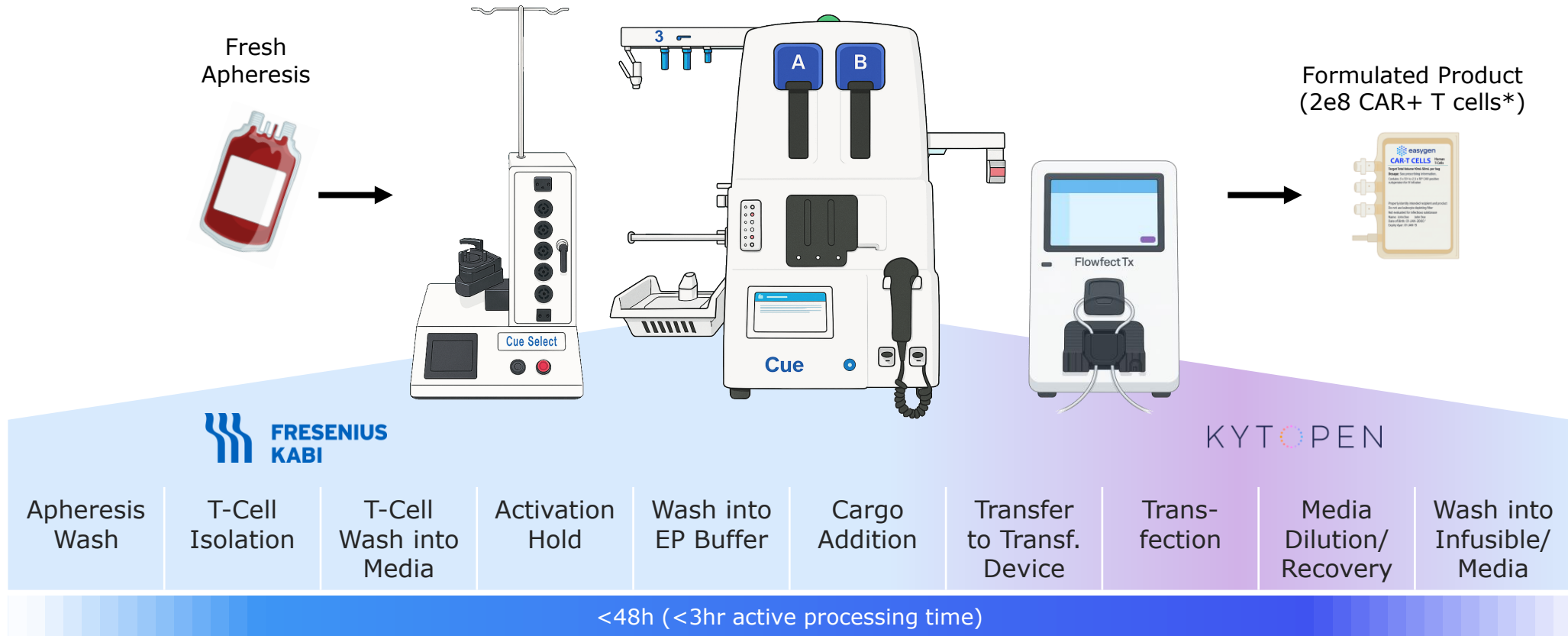
Activated T cell workflows



\*As measured at 24h

# Future Work: Clinical-Scale Demonstration of Production Workflow

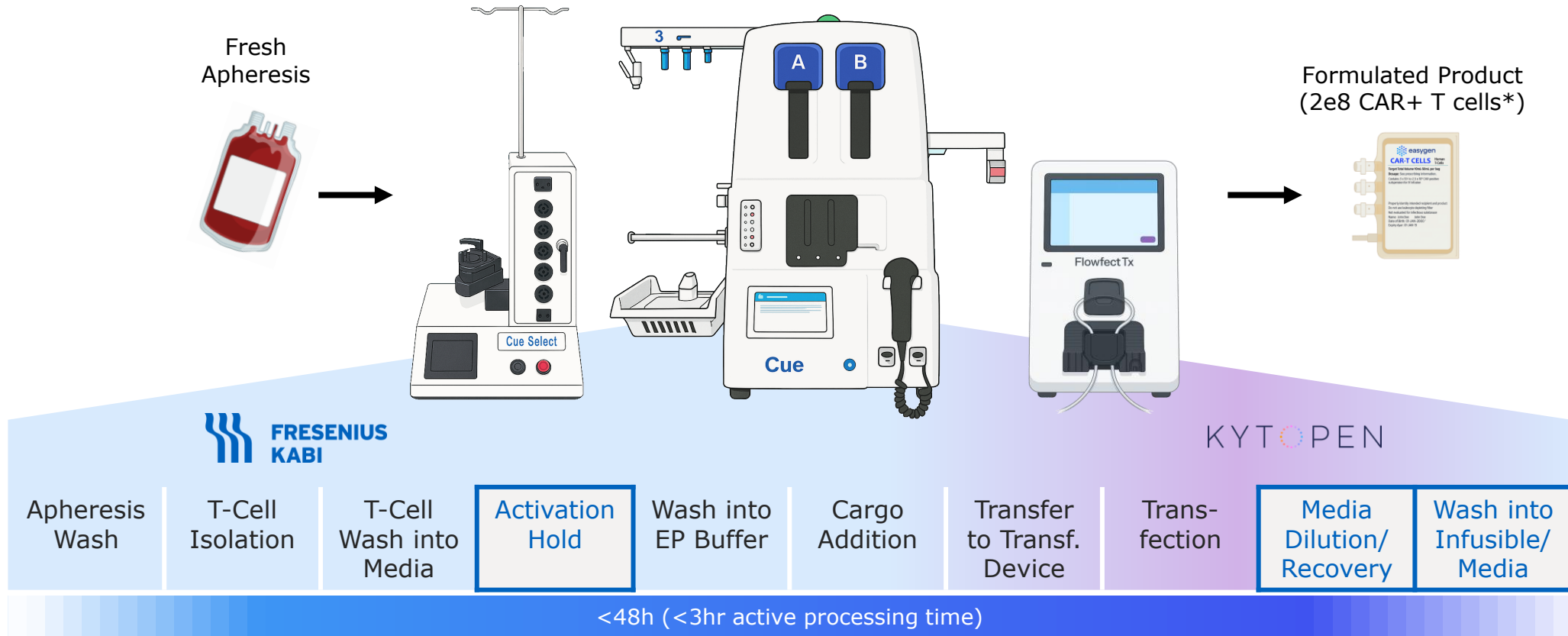
Activated T cell workflows



\*Estimated viable yields at end of processing based on CAR+% at 14d

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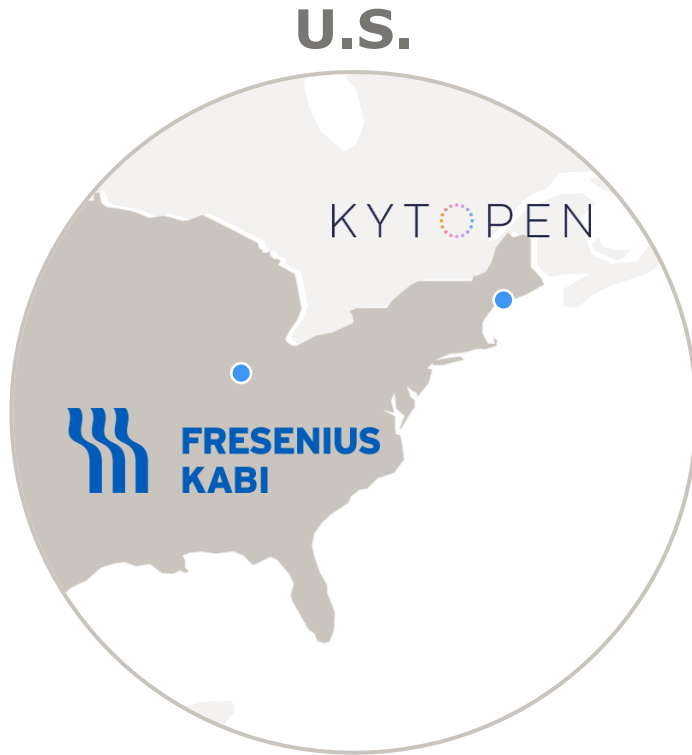
Activated T cell workflows



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# EASYGEN Consortium

Cross-functional Force with the Aim to Tackle the Toughest Challenges in CAR-T



KYTOPEN

T-CURX

## EUROPE





# Visit Us at Booth #623

Thank you for your time.