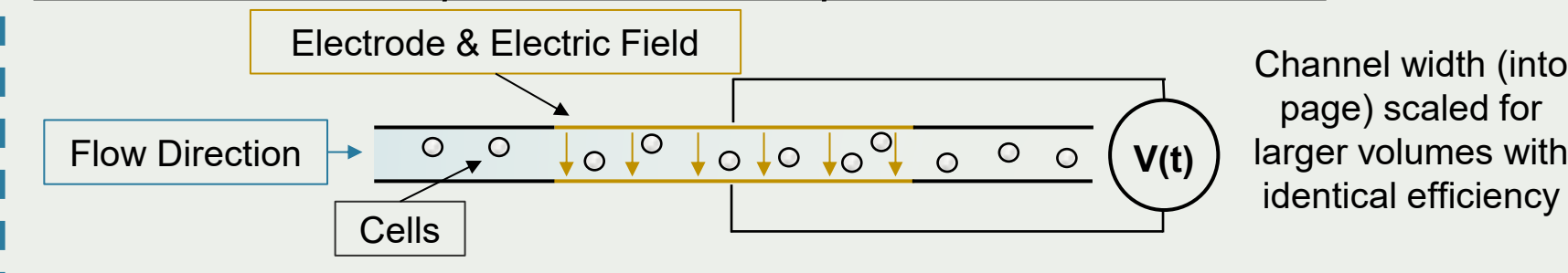


Adaptable continuous flow electroporation system

- CyteQuest's microfluidic electroporation platform: Rapid, reproducible, and scalable transfection from research to clinic. Features customizable waveforms for optimized, consistent efficiency across volumes.
- Electroporation enables non-viral transfection of primary cells. However, standard electroporation methods are incompatible with automation and large-scale cell manufacturing methods.

Microfluidic Electroporation Flow Chip schematic - side view



μL to L
Scalability



Waveform optimization
capability



Current Transfection Capabilities

Cell Types: Primary T, NK, Jurkat, HEK293T
Cargo: Plasmid DNA, mRNA, CRISPR-Cas9 RNPs

References

- VanderBurgh JA, Corso GT, Levy SL, Craighead HG. A multiplexed microfluidic continuous-flow electroporation system for efficient cell transfection. *Biomed Microdevices*. (2024) 26(10).
- VanderBurgh JA, Corso TN, Levy SL, Craighead HG. Scalable continuous-flow electroporation platform enabling T cell transfection for cellular therapy manufacturing. *Sci Rep*. (2023) 13(1):6857

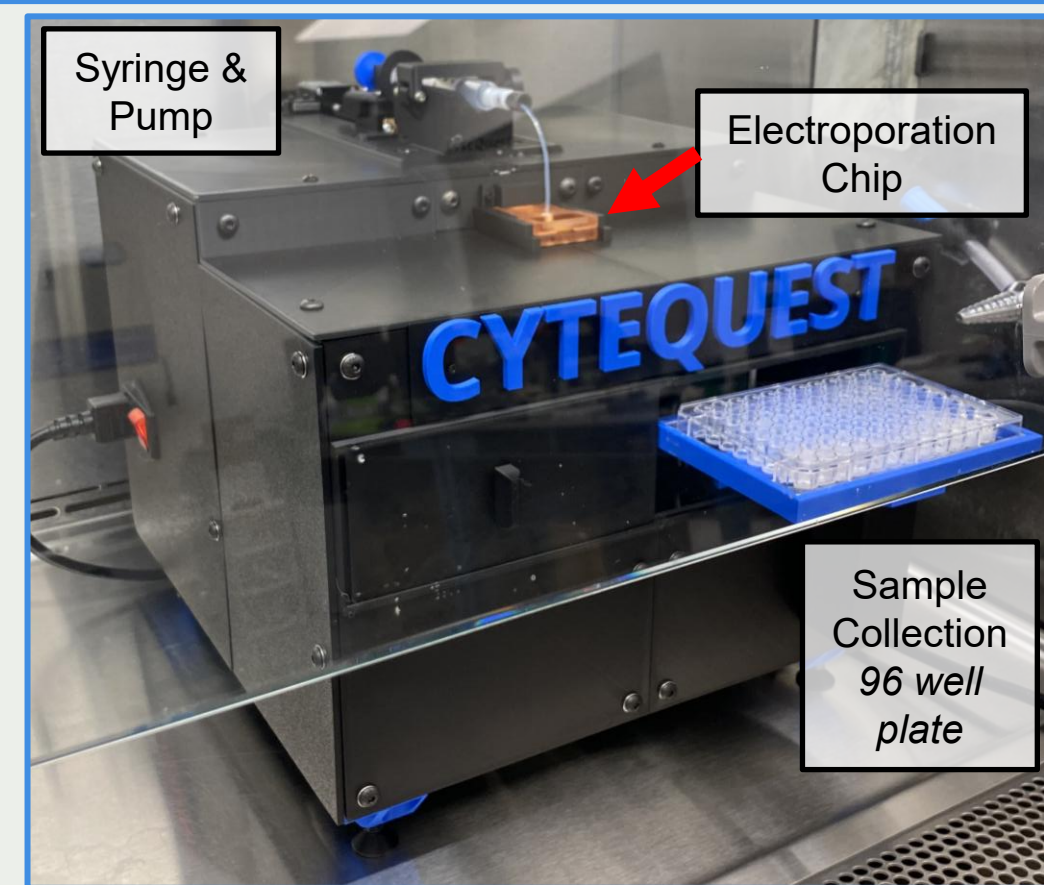
Acknowledgements

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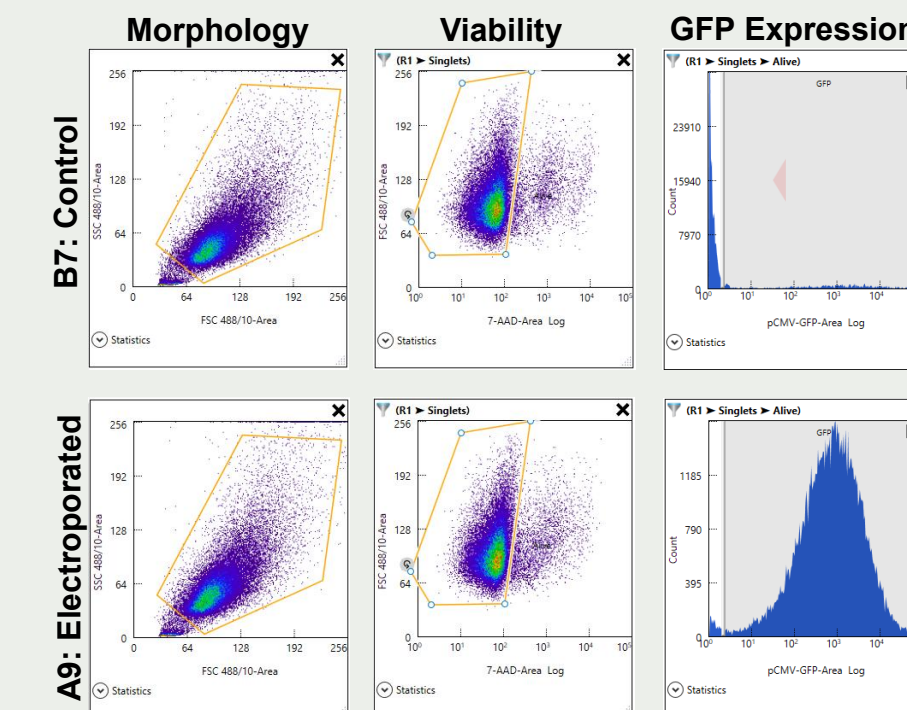
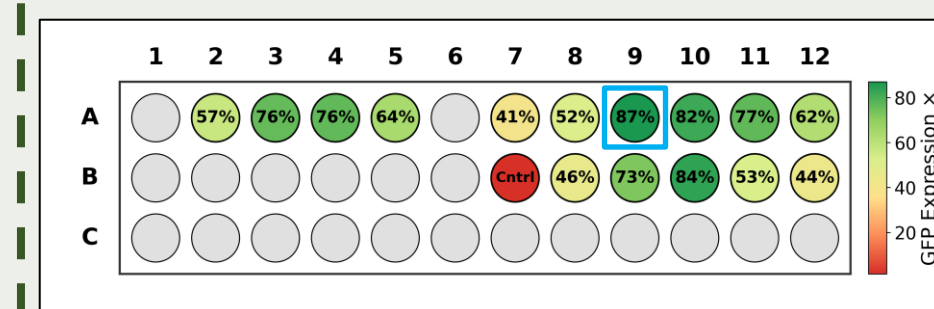
CytoZap Scan

Optimization Instrument (RUO)

- Flexible choice of processing volume: 20 μL to 20 mL
- Multiwell plate sample collection (96, 48, 24, 6 wells)
- Rapid optimization: up to 96 waveforms in minutes
- Robot-controlled liquid handling for automation



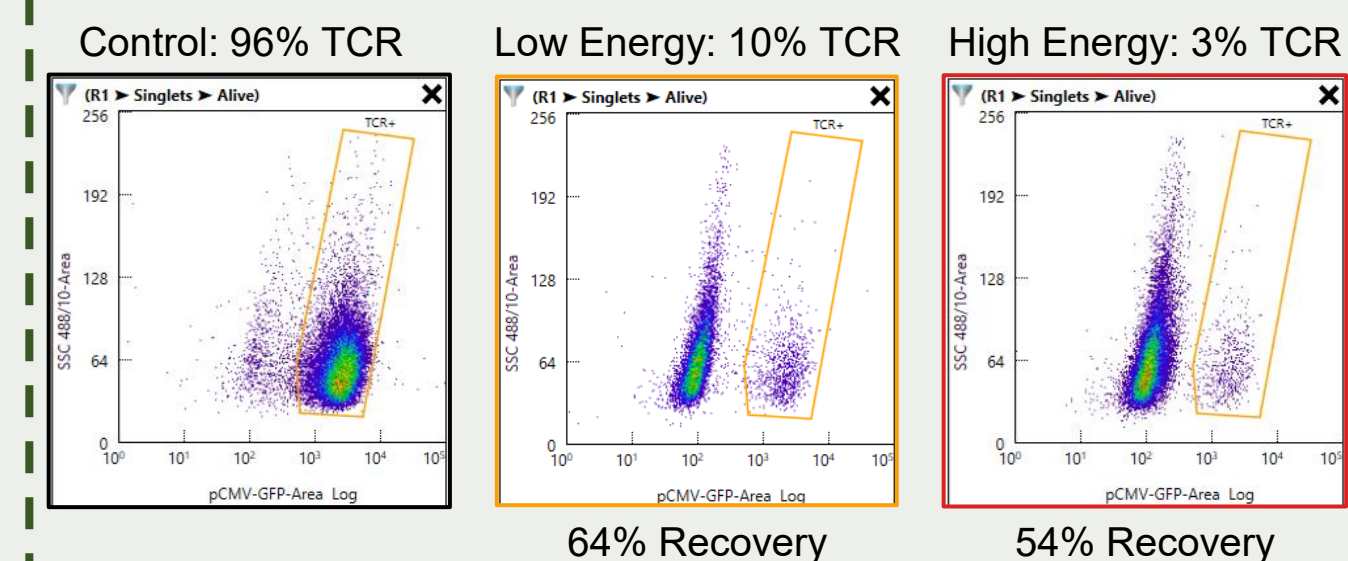
T cell Waveform Optimization plasmid DNA encoding GFP (pCMV-GFP; 3705 bp)



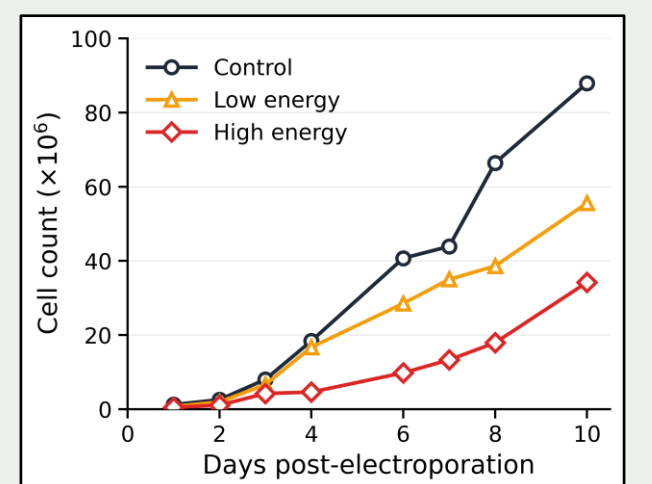
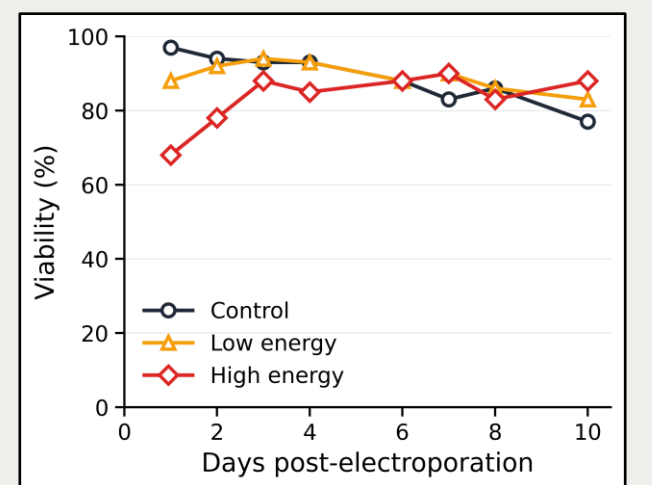
Type	Expression	*Relative Viability
mRNA transfection	97%	98%
CRISPR knock-out	97%	95%
Plasmid transfection	94 ± 2%	97 ± 4%

Error = Standard Deviation *Relative to 0 V control

T cell CRISPR RNP targeting TRAC/TRBC locus



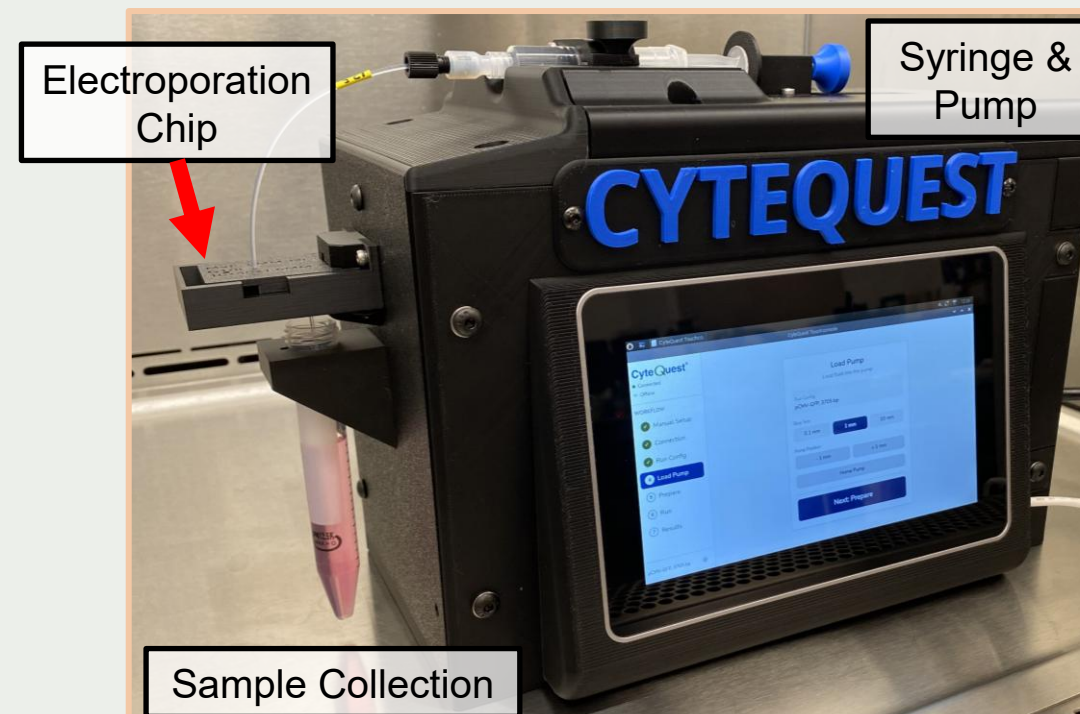
T cell proliferation RNPs targeting TRAC/TRBC locus



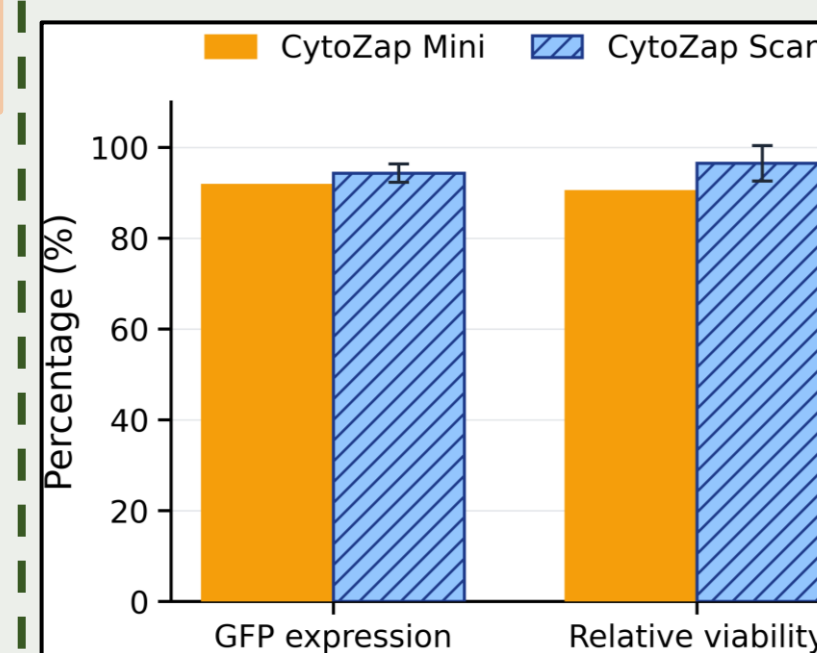
CytoZap Mini

Low to High Volume Scale-Up Instrument (RUO)

- Fluid Volume: 100 μL to 50 mL
- Single tube sample collection
- Volume scale-up with waveform optimized on CytoZap Scan



T cell Waveform Matching with CytoZap Scan plasmid DNA encoding GFP (pCMV-GFP; 3705 bp)



CytoZap Max

High Volume GMP Instrument

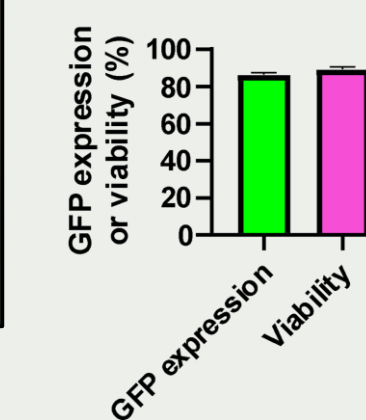
- High volume (20 mL to >1 L)
- High processing throughput (> 500 million cells/min)
- Rapid processing speed: 1 L in 20 minutes
- Bag to bag aseptic processing
- Closed system instrument

Jurkat cells with plasmid DNA-GFP (pCMV-GFP; 3705 bp)

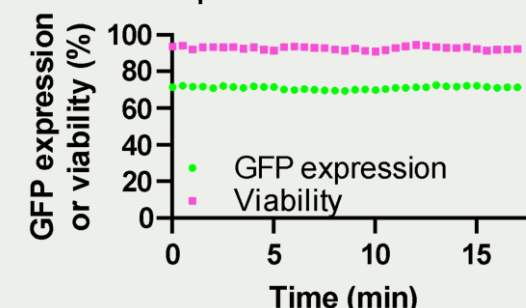


CytoZap Max V1

Processing speed
500 million cells/minute



Processing volume 1 L of
cell suspension in 18 min



GMP Prototype Instrument

