

Dissolvable microfluidics to enhance viral transduction efficiencies

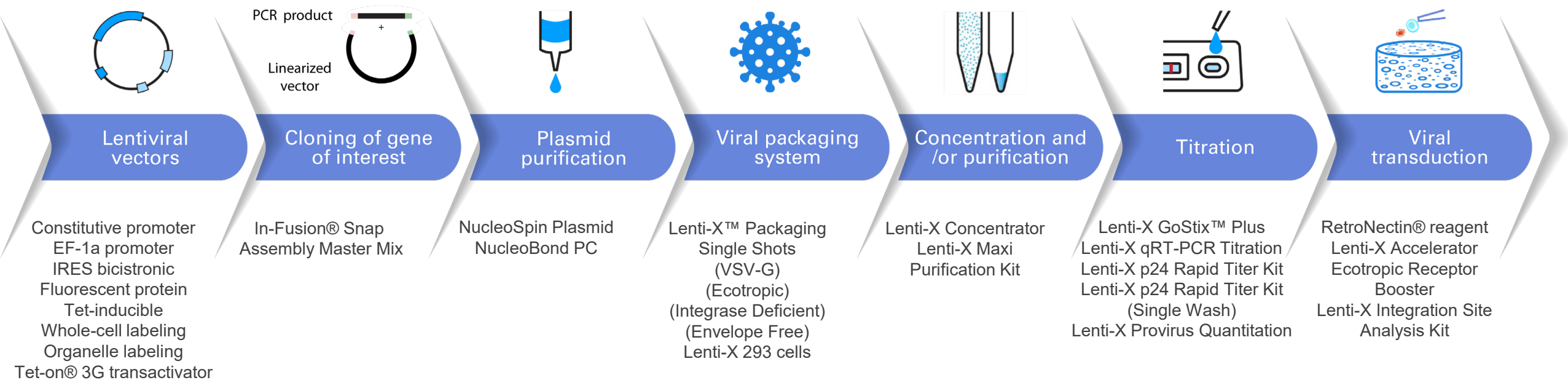
Tom Quinn

R&D Group Leader

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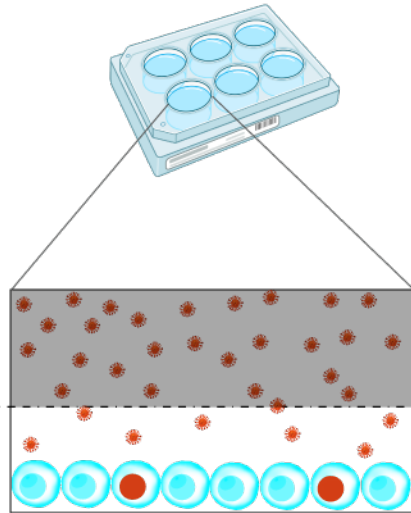
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Takara Bio's comprehensive product line meets lentiviral transduction needs



Viral transduction enhancer approaches

Small molecule/chemical approaches



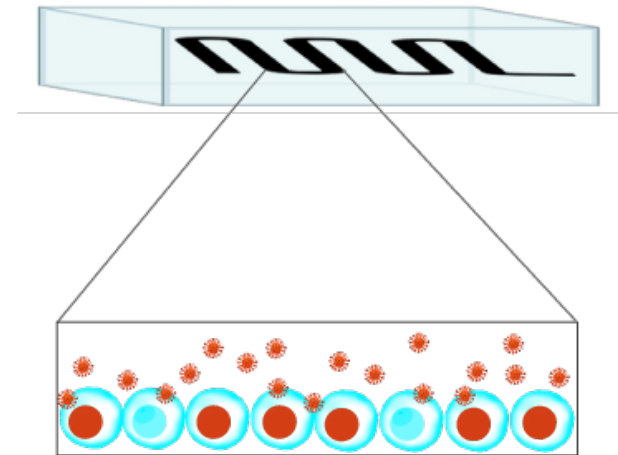
Pros

- ✓ Widely accepted

Cons

- ✗ Specific to cell type
- ✗ Limited transduction efficiency gains
- ✗ Unknown downstream impact on cells
- ✗ Optimization is essential
- ✗ Cumbersome process requiring spinoculation

Microfluidic approaches



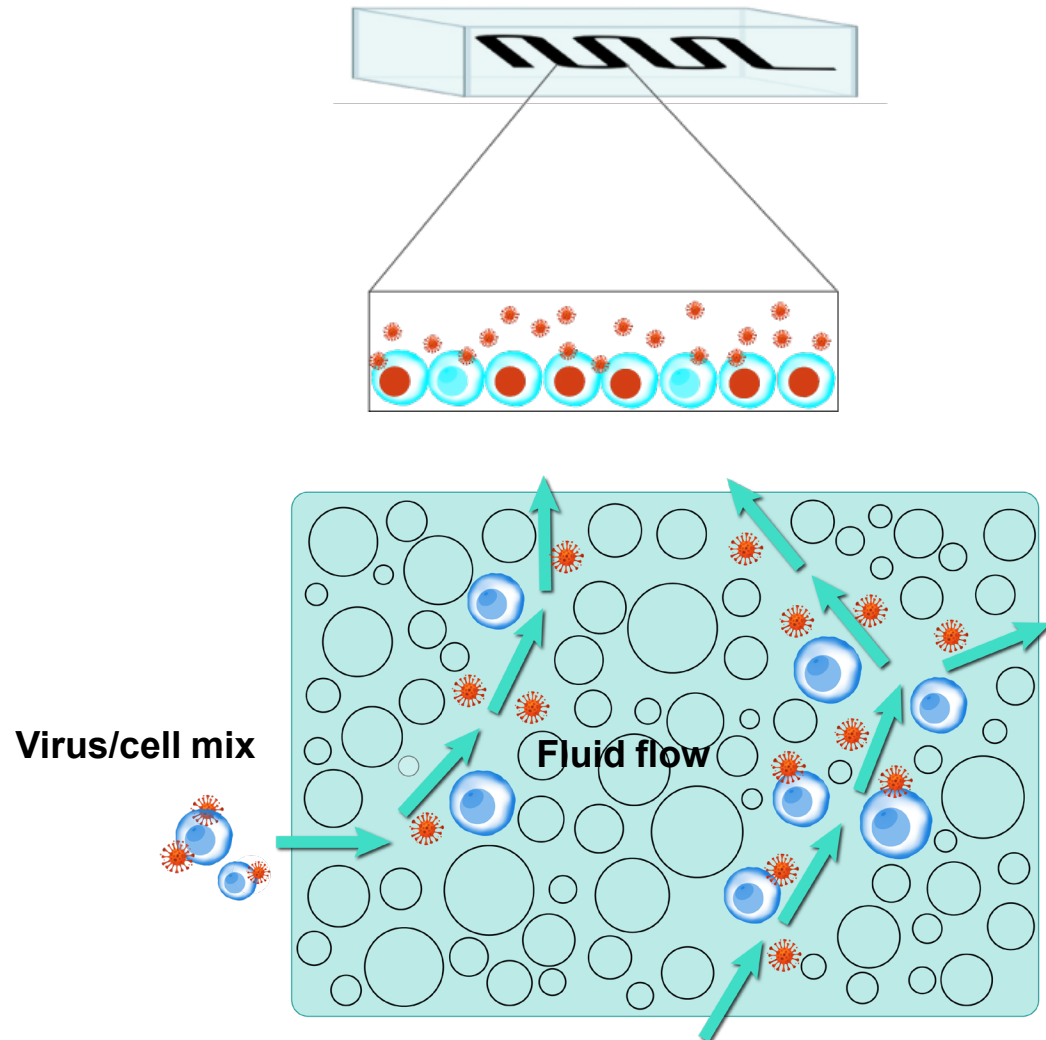
Pros

- ✓ Large increase in transduction efficiency
- ✓ Flexible, cell-type agnostic

Cons

- ✗ Requires expensive instruments
- ✗ Expertise needed to operate

Viral transduction using the Lenti-X™ Transduction Sponge



Lenti-X Transduction Sponge

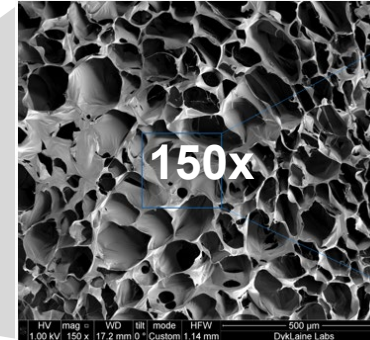
No-spin method for enhanced lentiviral transduction

- High transduction efficiency
- Flexible, cell-type agnostic
- Saves capital cost while ensuring a microfluidic approach
- Gentle handling resulting in high cell viability

Lenti-X Transduction Sponge product format



Blister pack containing 24 sponges



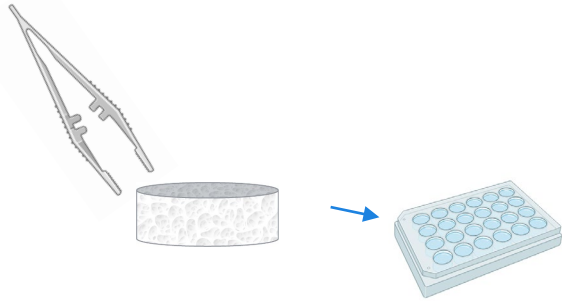
Optimized formulation:
Dried to produce a consistent pore size of 20–300 µm



Release Buffer

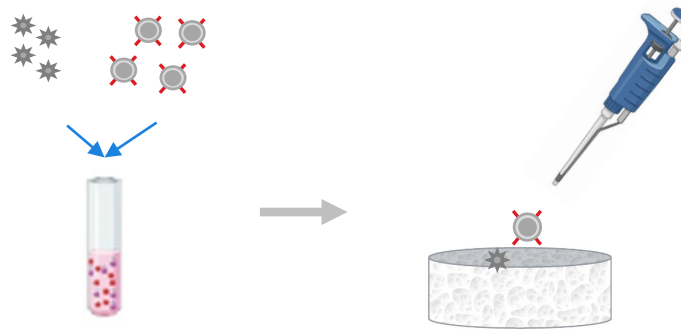
Lenti-X Transduction Sponge workflow: simple, spinoculation-free protocol for high transduction

1



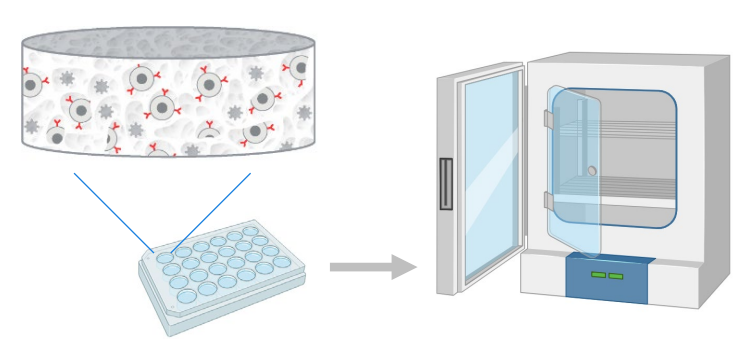
Transfer the Lenti-X Transduction Sponge to a cell culture plate

2



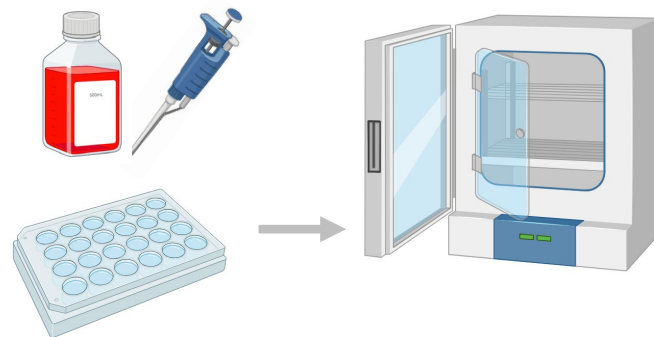
Mix cells and virus together and add the mixture dropwise to the sponge

3



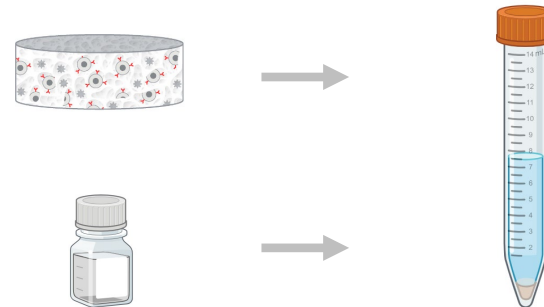
Incubate the Lenti-X Transduction Sponge for 1 hr

4



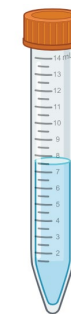
Add media to each well and incubate for 16–24 hr

5



Transfer sponge to a 15 ml conical tube, add Release Buffer, and centrifuge for 10 min to dissolve the sponge

6



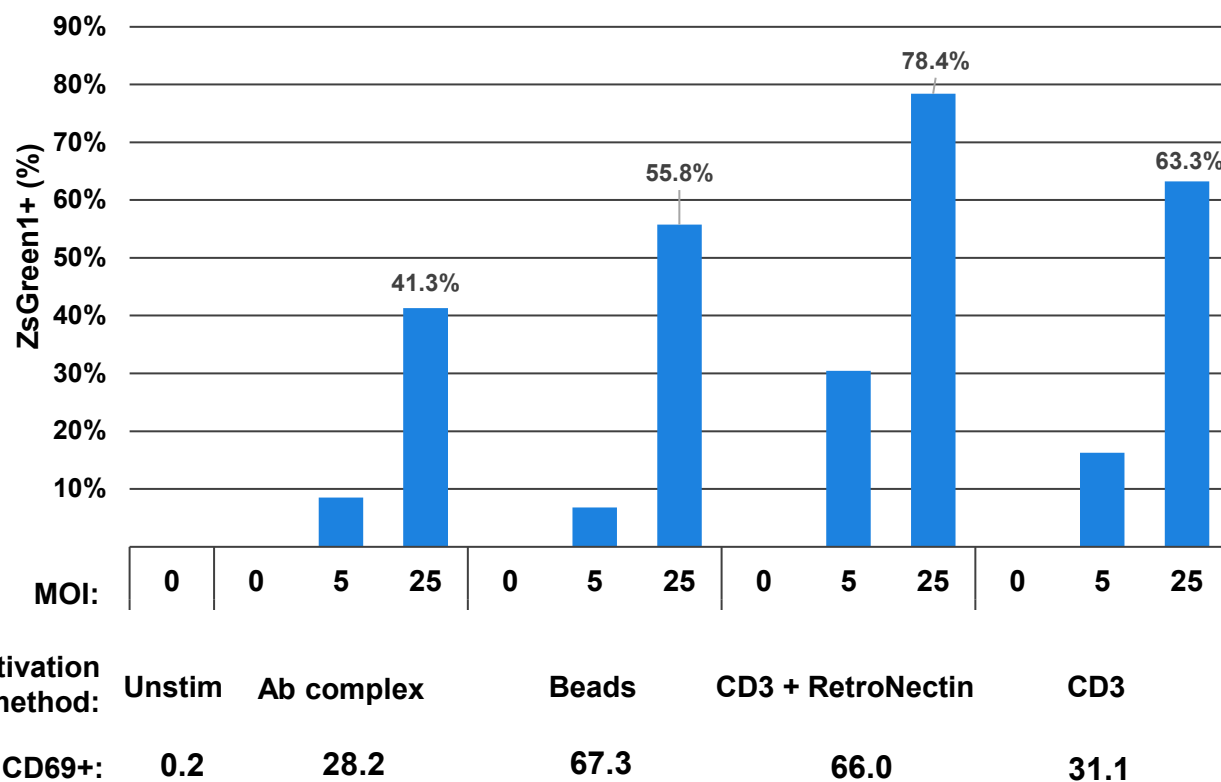
Analysis

Expansion

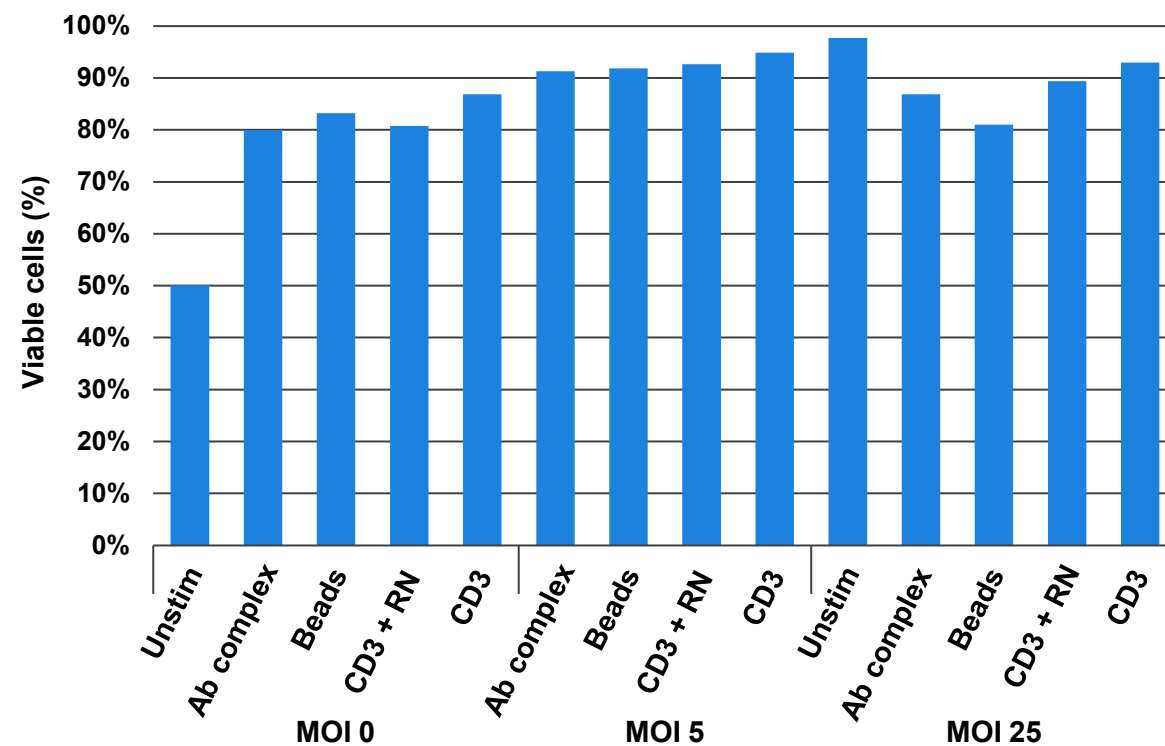
After a final wash with phosphate buffered saline, transduced cells are ready for analysis or further expansion

Transduction of primary T cells with the Lenti-X Transduction Sponge

Efficient transduction of T cells activated by different methods

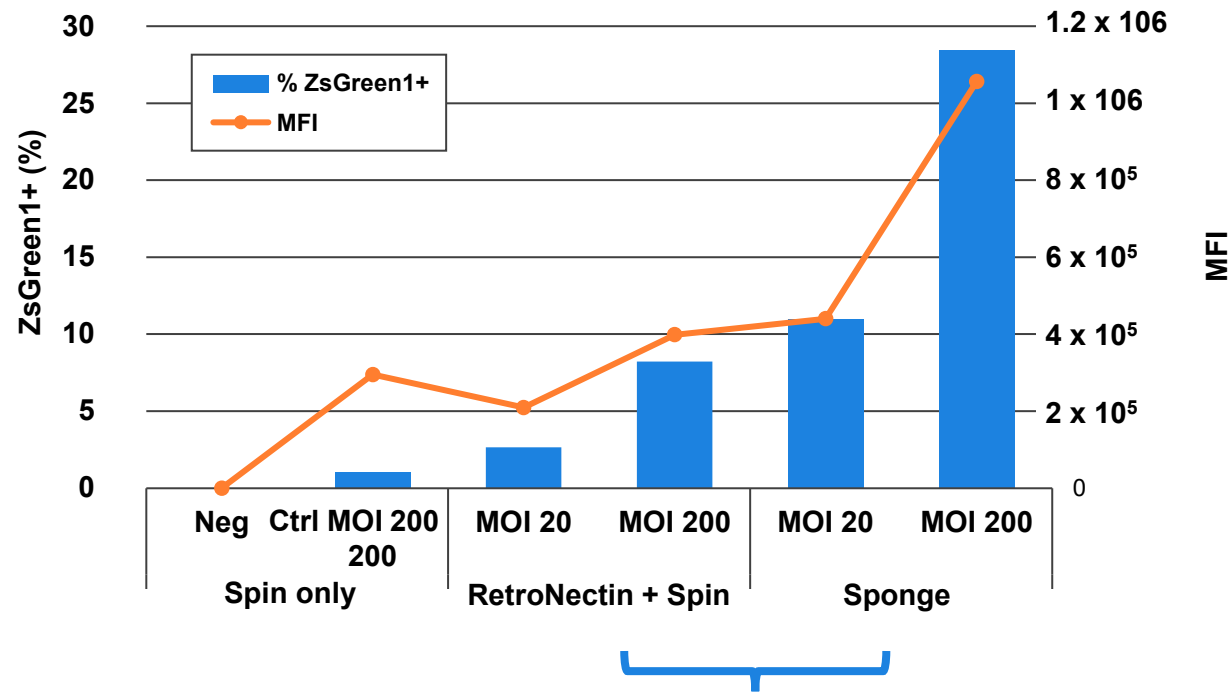


Viability maintained post-transduction



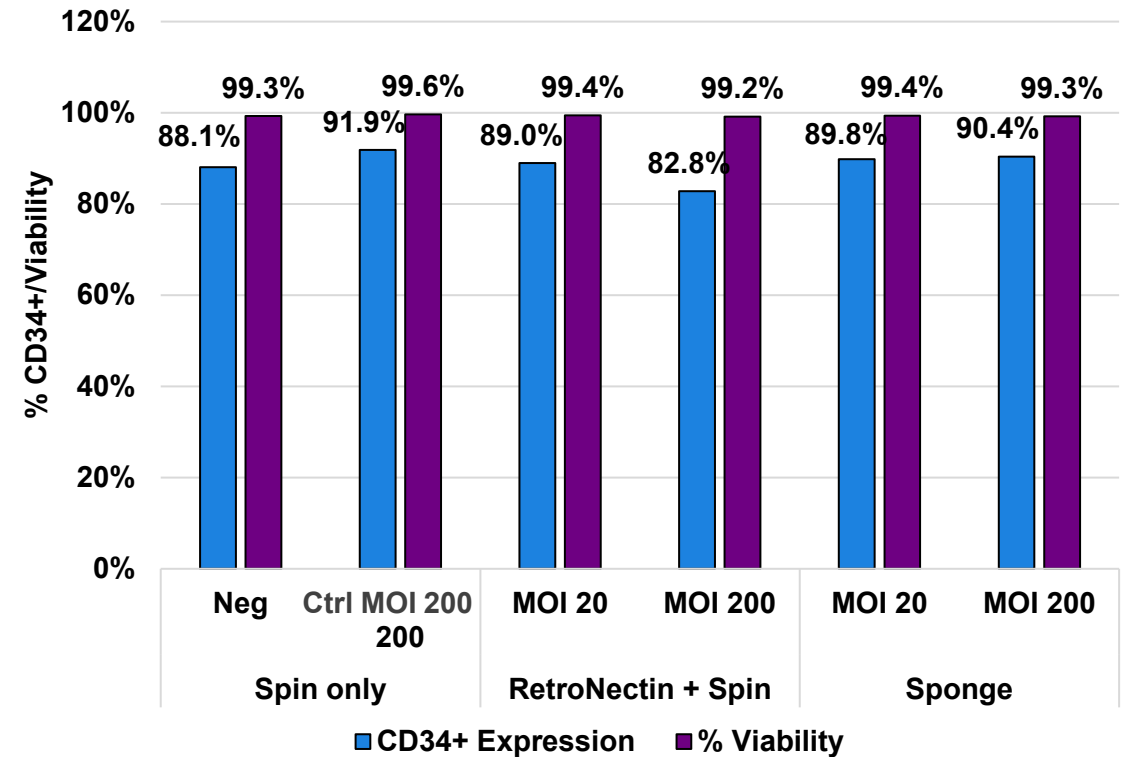
Primary human CD34+ HSCs transduction

Transduction efficiency of human CD34+ HSCs



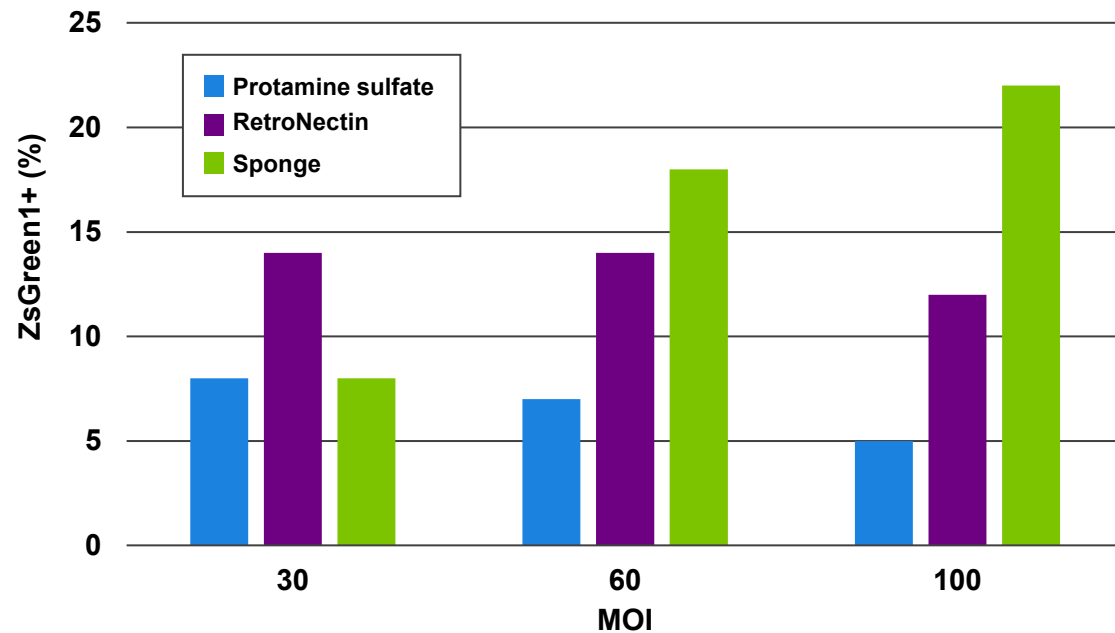
Sponge reduces virus requirement

Viability and phenotype maintained post-transduction

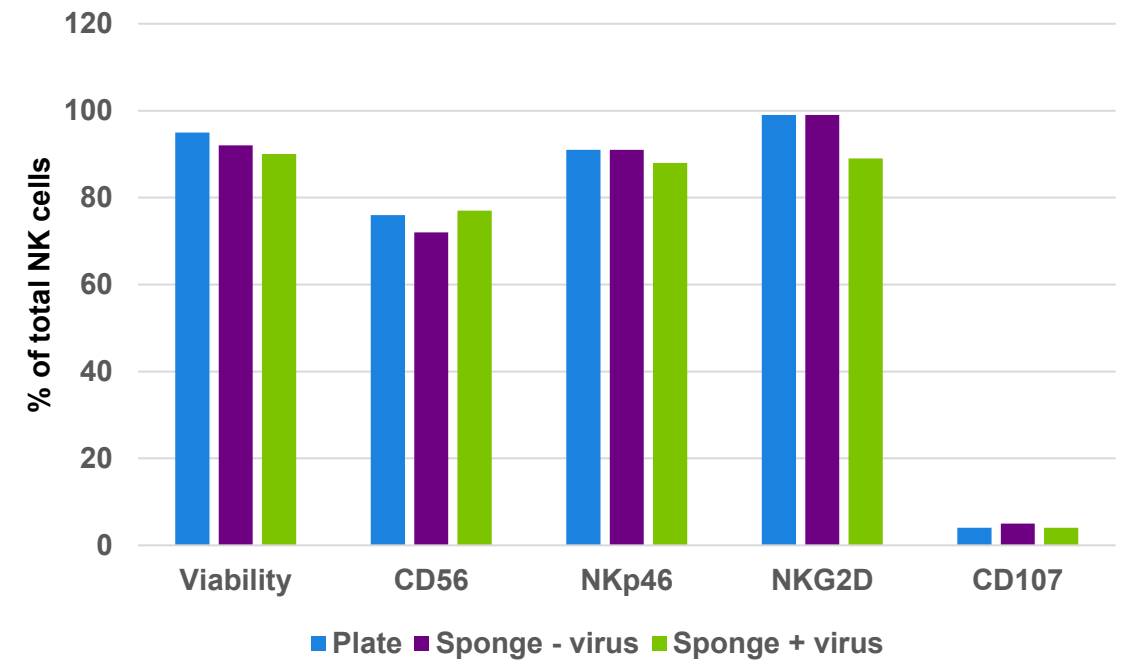


Primary human NK cells transduction

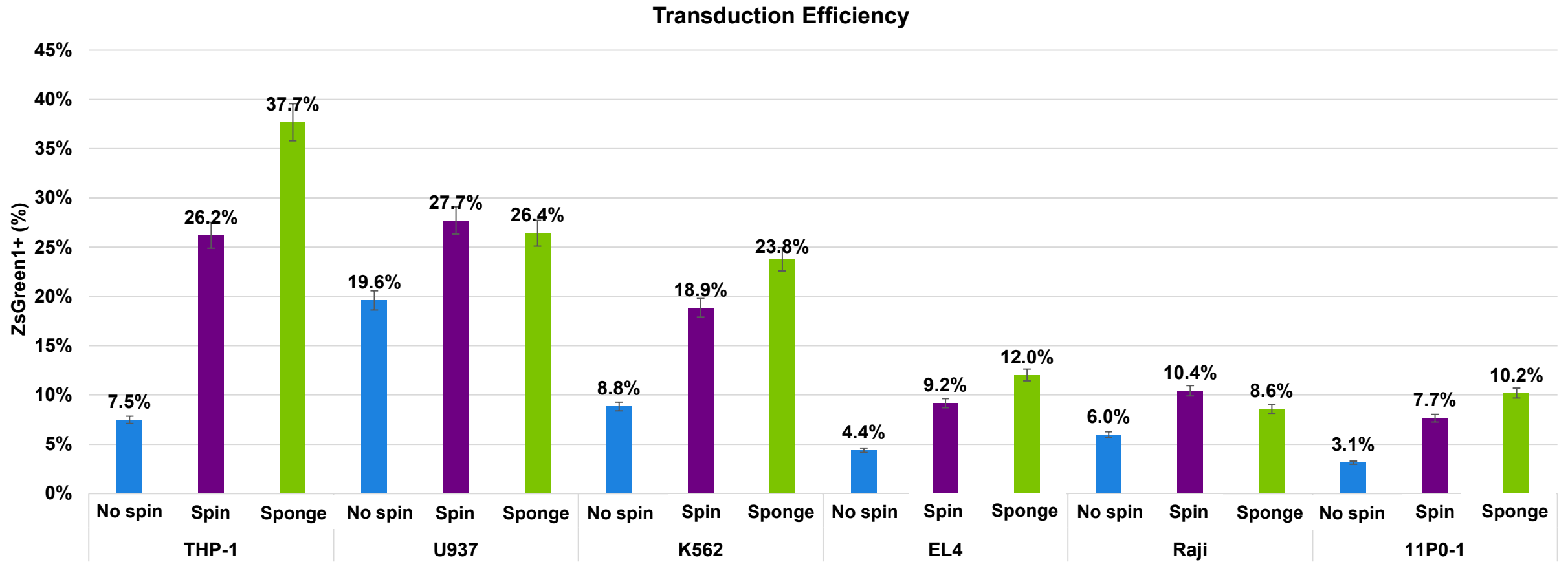
Efficient transduction of primary human NK cells



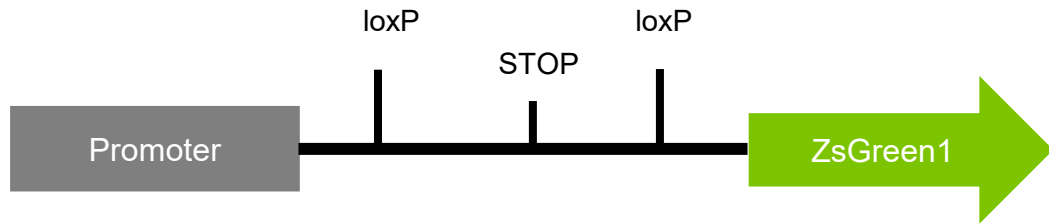
Viability and phenotype maintained post-transduction



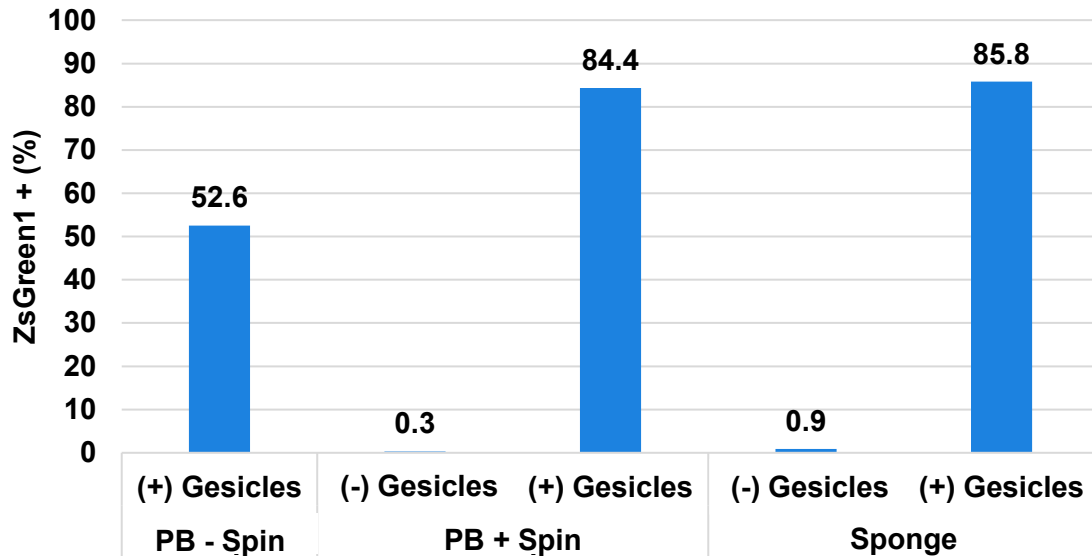
Transduction of other cell types



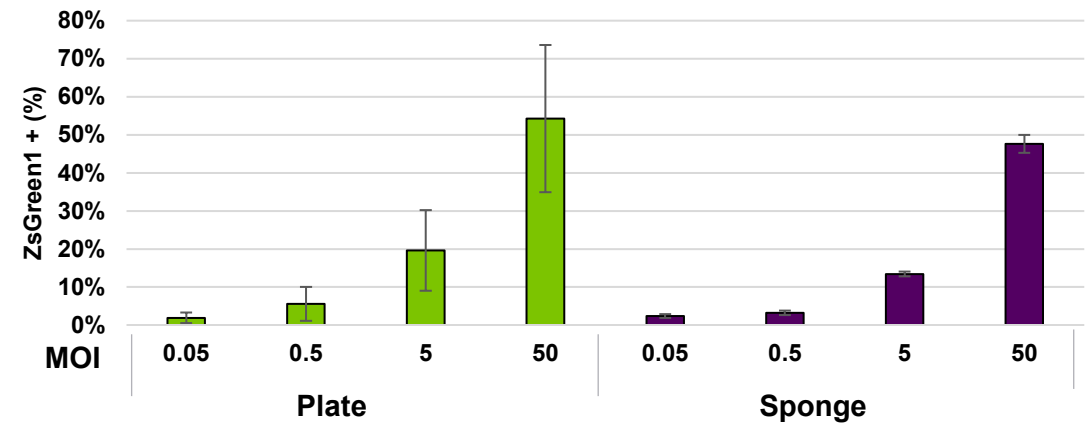
The sponge facilitates the delivery of a wide range of particle types



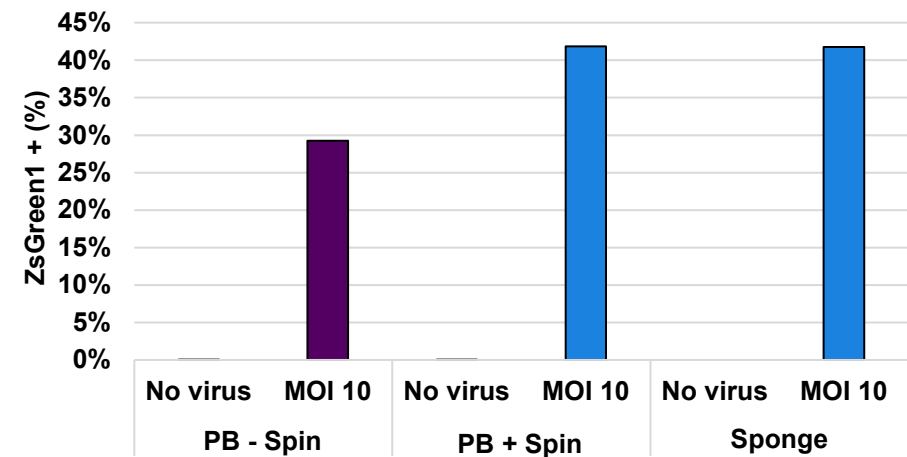
Cre Gesicle transduction efficiency in Jurkat cells



AAV2 ZsGreen1 transduction in HT1080 cells



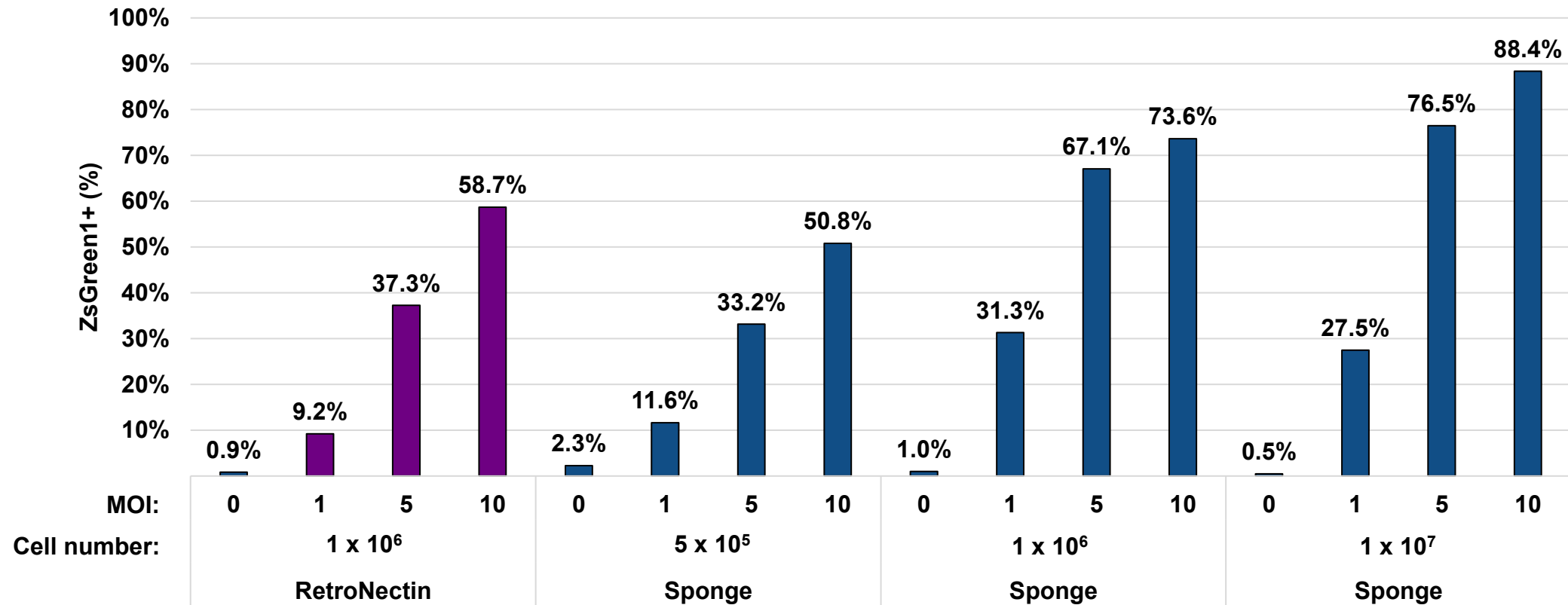
Retrovirus transduction in Jurkat cells



Efficient transduction over a wide range of cell numbers with the Lenti-X Transduction Sponge

Crowding improves transduction efficiency

Cell number (Jurkat) vs. MOI



Lenti-X Transduction Sponge

- Gain microfluidics-driven transduction efficiency without an instrument or expensive consumables
- Achieve transduction efficiencies that are equal to or better than with current methods
- Minimize cell handling and hands-on time with a simplified workflow
- Facilitate transduction of a wide variety of cell types, including CD34+ HSCs, NK cells, and T cells
- Maintain cell viability and yield
- Transduce a wide range of cell numbers (1×10^5 – 1×10^7 per sponge)



Learn more at: [takarabio.com/lenti-x transduction sponge](https://takarabio.com/lenti-x-transduction-sponge)



that's
GOOD
science!®

Transcriptomic analysis demonstrates minimal impact of the Lenti-X Transduction Sponge on primary T cells

