

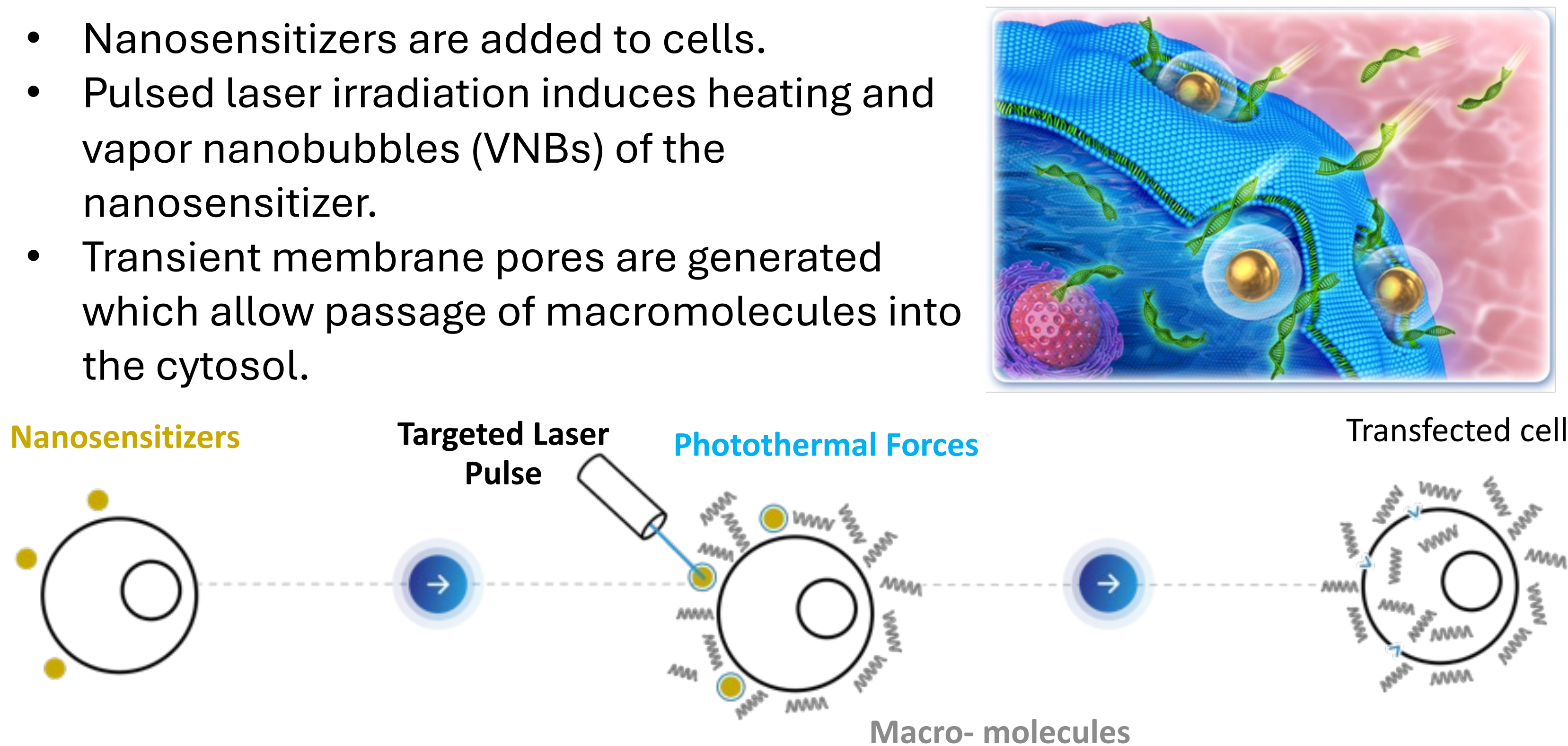
The LumiPore™, a Non-Viral Transfection Platform

Gentle stem cell engineering with Trince's LumiPore™ platform.

Introduction

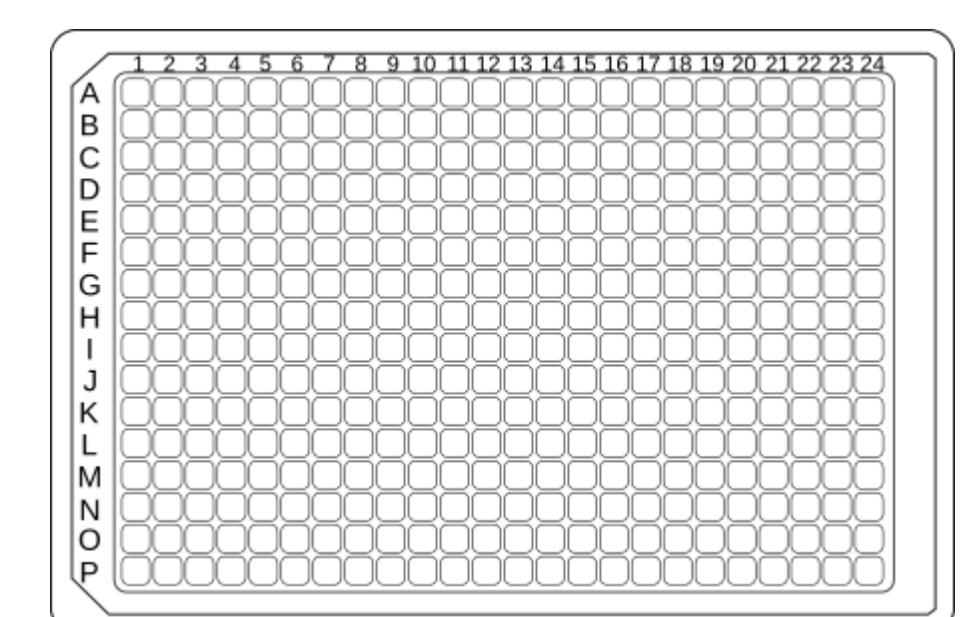
- Transfection is frequently performed in stem cells and cancer cell lines to explore pluripotency, unravel mechanisms of early embryonic development, and facilitate *in vivo* tracking of specific stem cells and their progeny. Additionally, it serves as a powerful tool for reprogramming somatic cells and engineering stem cells, whether through genome editing techniques like CRISPR/Cas9 or by modulating gene expression at the RNA level using RNA interference (RNAi).
- An attractive solution is Trince's LumiPore™ transfection platform, which combines efficiency with gentleness. It combines laser exposure with photothermal nanoparticles to **transiently permeabilize** the cellular plasma membrane, allowing external cargo molecules to penetrate the cells.
- This approach enables the delivery of a wide variety of effector molecules into hard-to-transfect cells, including adherent and suspension stem cells such as embryonic stem cells or iPSCs.
- The platform has a **high-throughput rate** and results in **high viability**, **proliferative capacity** and **functionality** of photoporated cells. It also offers the unique possibility to perform spatially controlled transfections, enabling the transfection of subpopulations.

Photoporation Method

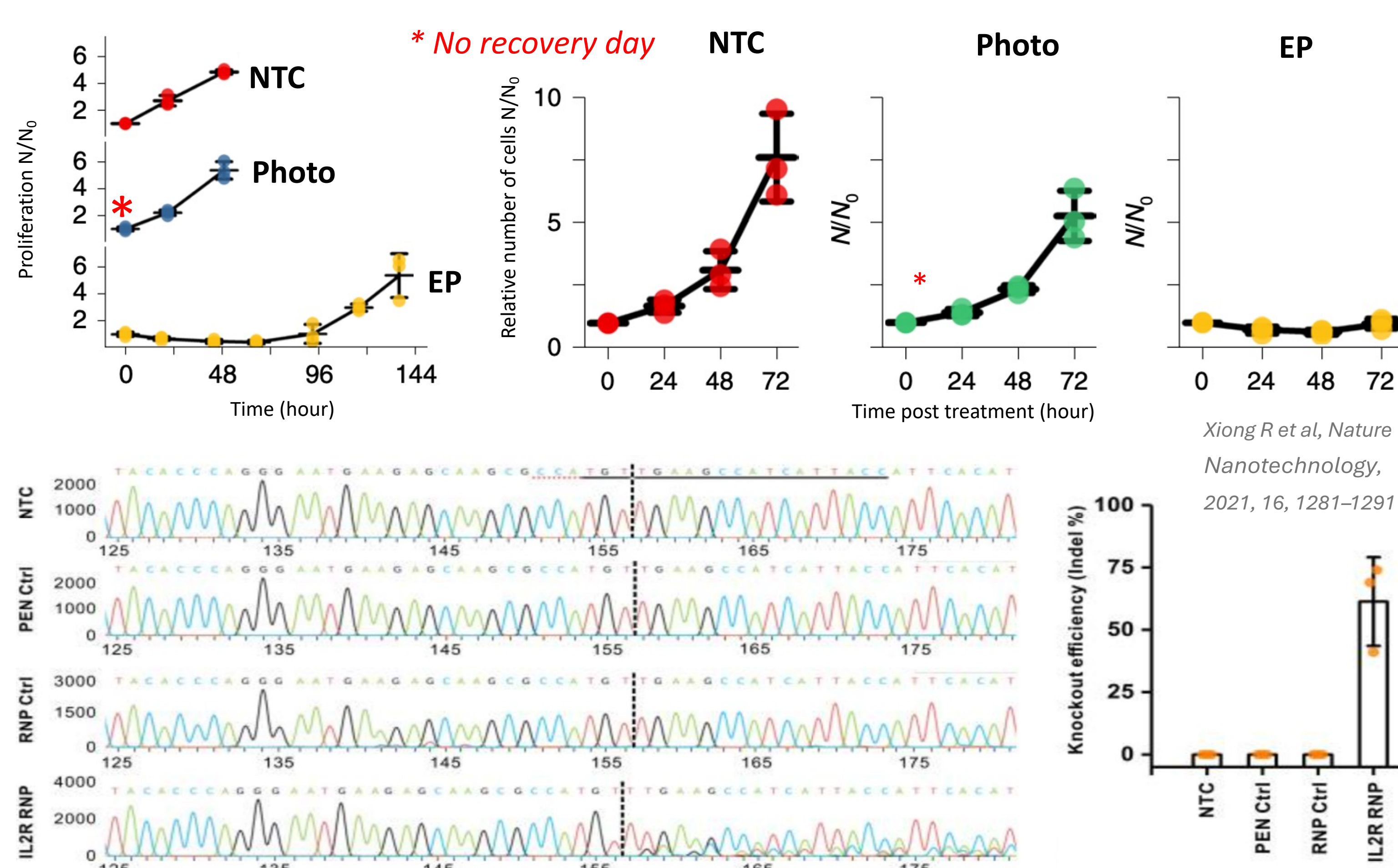


Ramon et al. Current Opinion in Colloid & Interface Science (2021)

- 384 different conditions in less than 10 min.
- Suitable for 6-384 well plates.
- Different cargo types & concentrations.
- Different nanoparticle types & concentrations.
- Easy Design Of Experiments.

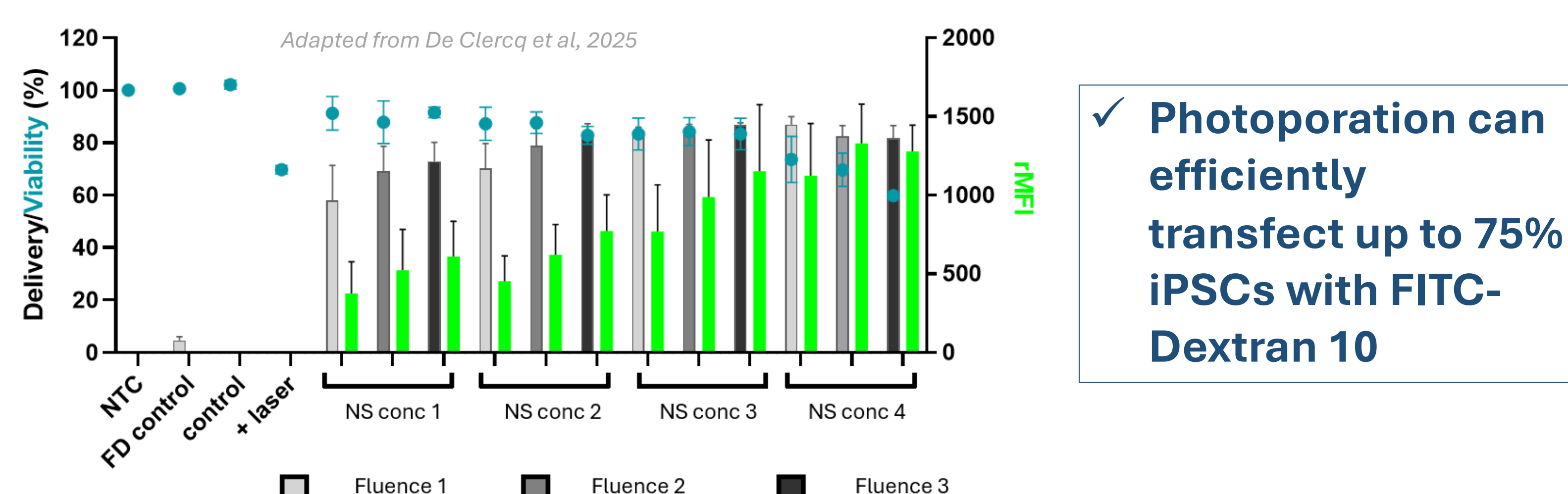


CRISPR-Cas9 RNP transfections in human ESCs



✓ Photoporation can efficiently induce up to 60% IL2-R KO in hESCs

Intracellular delivery of FITC-Dextran (10 kDa) in iPSCs



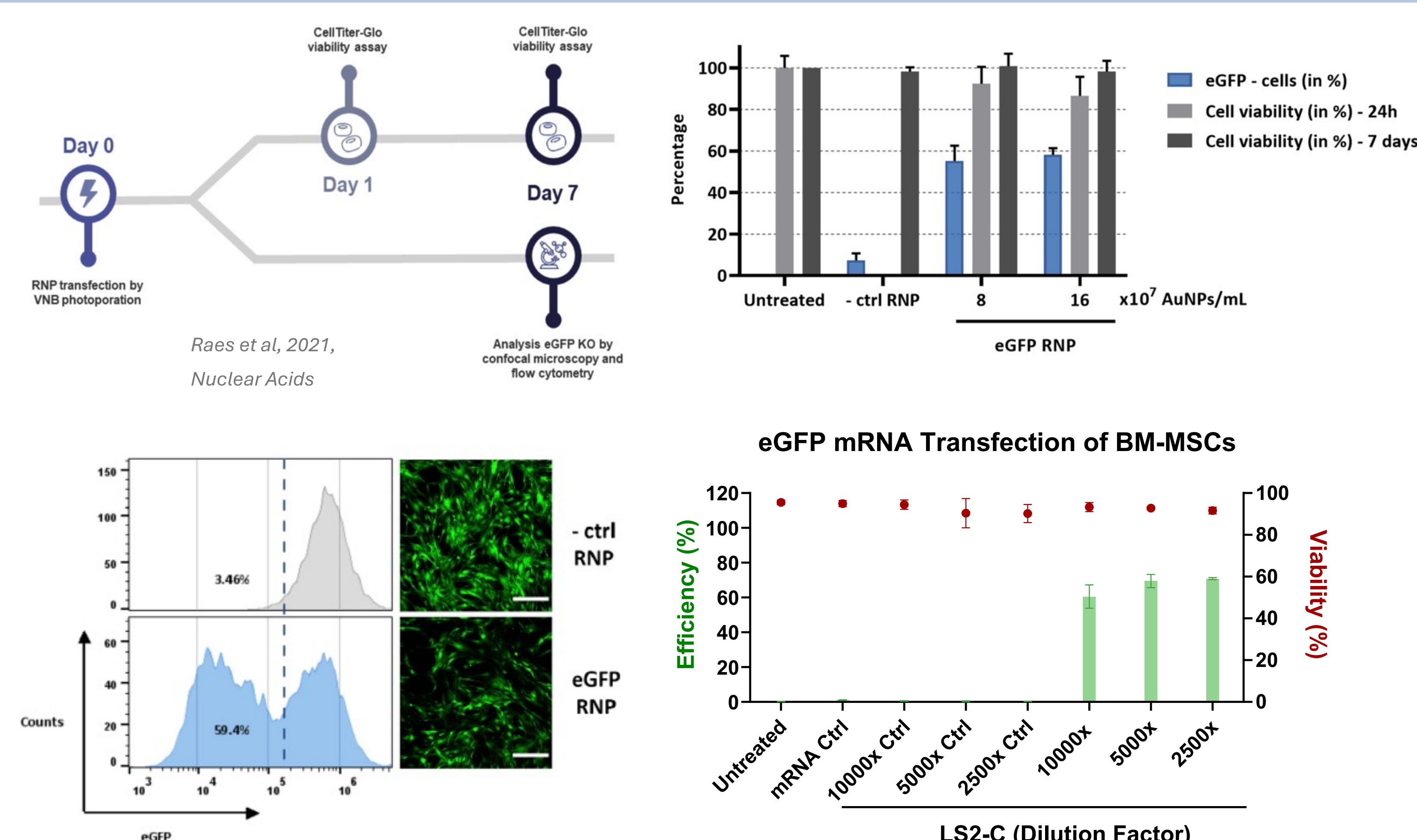
✓ Photoporation can efficiently transfect up to 75% iPSCs with FITC-Dextran 10

LumiPore™ photoporation device



- Benchtop transfection system.
- Delivery of a variety of cargoes.
- Excellent recovery of cells.
- Compatible with well-plates (6-384), flasks and slides.
- Full 96-well plate in < 10 min.
- Special selectivity photoporation.
- No cell detachment needed

CRISPR-Cas9 RNP & eGFP mRNA transfections in MSCs



✓ Photoporation can induce up to 60% knockout of eGFP in eGFP-expressing MSCs.

✓ eGFP-mRNA can be transfected into BM-derived MSCs with an efficiency of up to 70%.

✓ Spatial selective delivery is possible.



Xiong et al. J. Control. Release (2017)

Conclusion

In conclusion, the LumiPore™ platform allows researchers to efficiently and gently transfect stem cells with a variety of cargo molecules for cutting-edge stem cell engineering applications.

- Photoporation is gentle to cells:
 - cells have no delay in proliferation after photoporation.
 - cells maintain a high viability.
- Suspension and adherent cells can be photoporated.
- Photoporation does not require any cell detachment.