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EFFICIENT AND GENTLE NON-VIRAL ENGINEERING OF iPSCs BY PHOTOPORATION

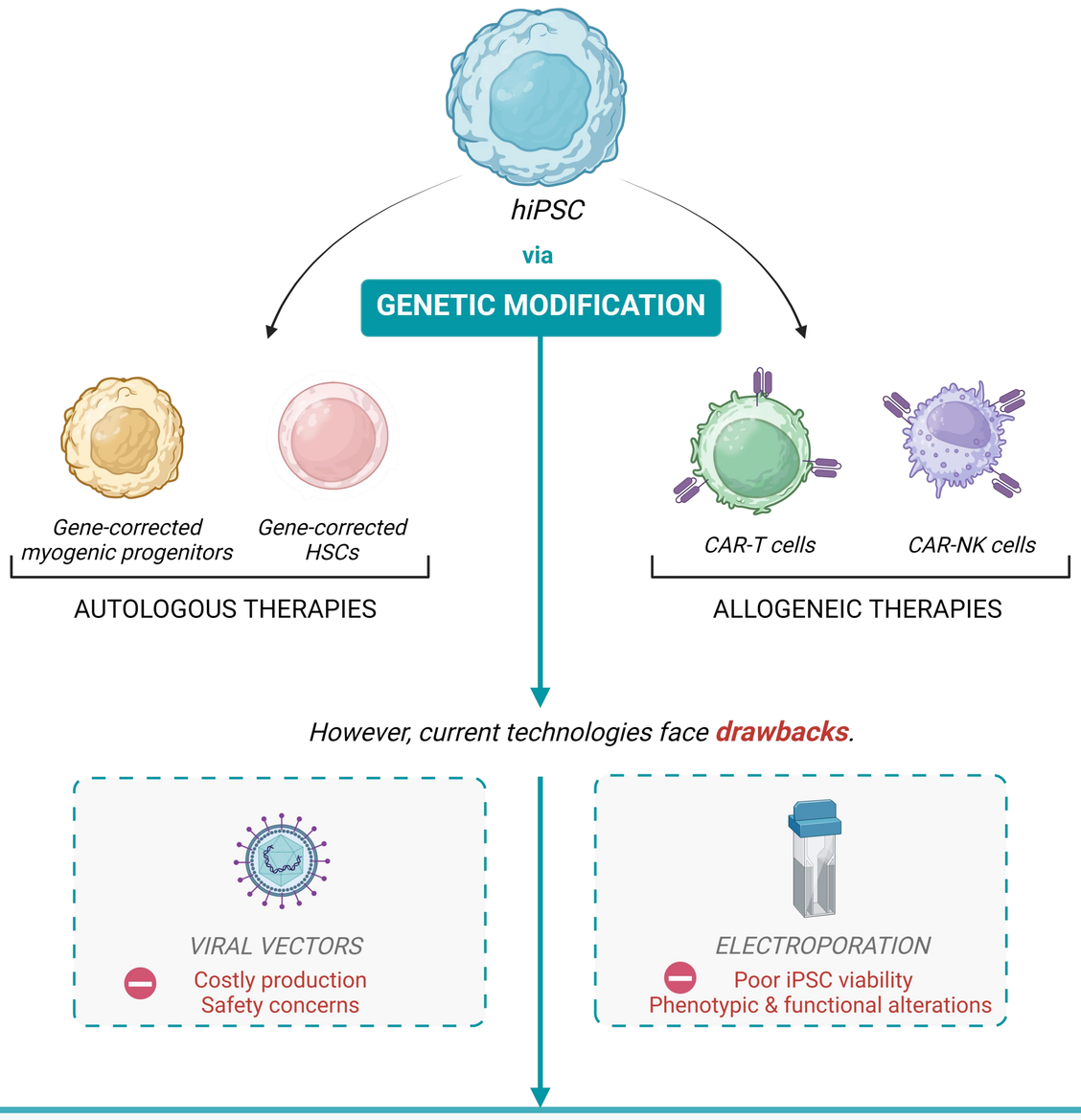
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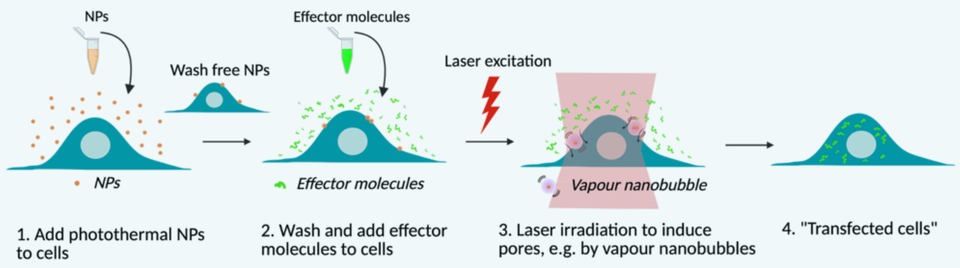
INTRODUCTION



PHOTOPORATION

WHAT Photoporation is a novel and innovative **intracellular delivery** technique.

HOW In its traditional form, photoporation uses a combination of **laserlight** and **photothermal nanoparticles** to generate pores in the cell membrane (1,2).

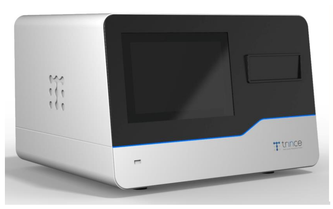


Alternatively, **Photothermal Electrospun Nanofiber (PEN) photoporation** (3, P799) can be used, which has the advantage of **avoiding direct contact of cells with nanoparticles**, reducing toxicity and regulatory concerns when engineered cells are to be used for cell therapeutic applications.

WHY Photoporation offers a **gentler** alternative, thus better preserving the quality of the final engineered cell product. This technology can be used **spatially-selective** and in **high throughput** (4).

Can't wait to photoporate?

Check out the Lumipore ™at booth 41, *trincebio.com* or get into contact via *info@trincebio.com*



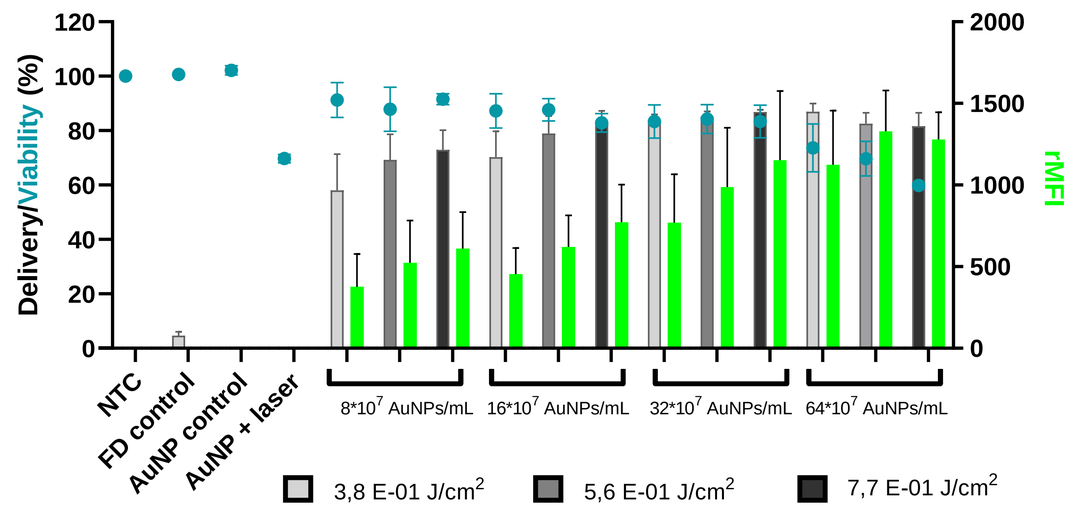
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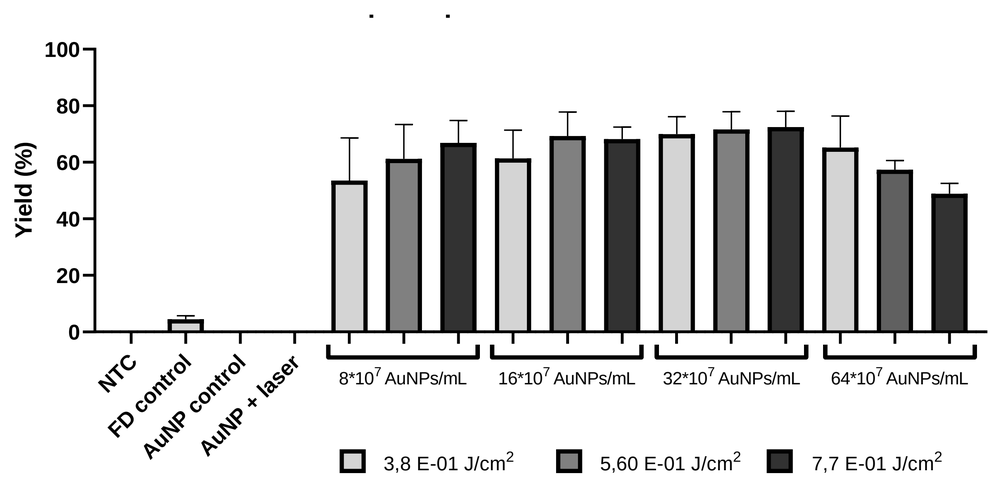
METHODS

- 60 nm cationic gold nanoparticles (PDDAC) were used as photothermal sensitizers.
- FITC-labelled dextran of 10kDa (FD10) was used a model cargo molecule (2 mg/mL).
- Delivery efficiency and relative mean fluorescence intensity were quantified using flow cytometry.
- Viability was measured by means of the metabolic activity assay CellTiter-Glo.

RESULTS



Graph 1. *Intracellular delivery of FD10 in iPSCs for increasing concentrations AuNPs. Delivery efficiency (left y-axis, grey bars) and relative mean fluorescence intensity (right y-axis, green). The corresponding metabolic activity (left y-axis, blue dots) was determined with the CellTiter-Glo assay.*



Graph 2. *Delivery yield of FD10 in iPSCs, defined as the fraction of cells that are both viable and FD10 positive.*

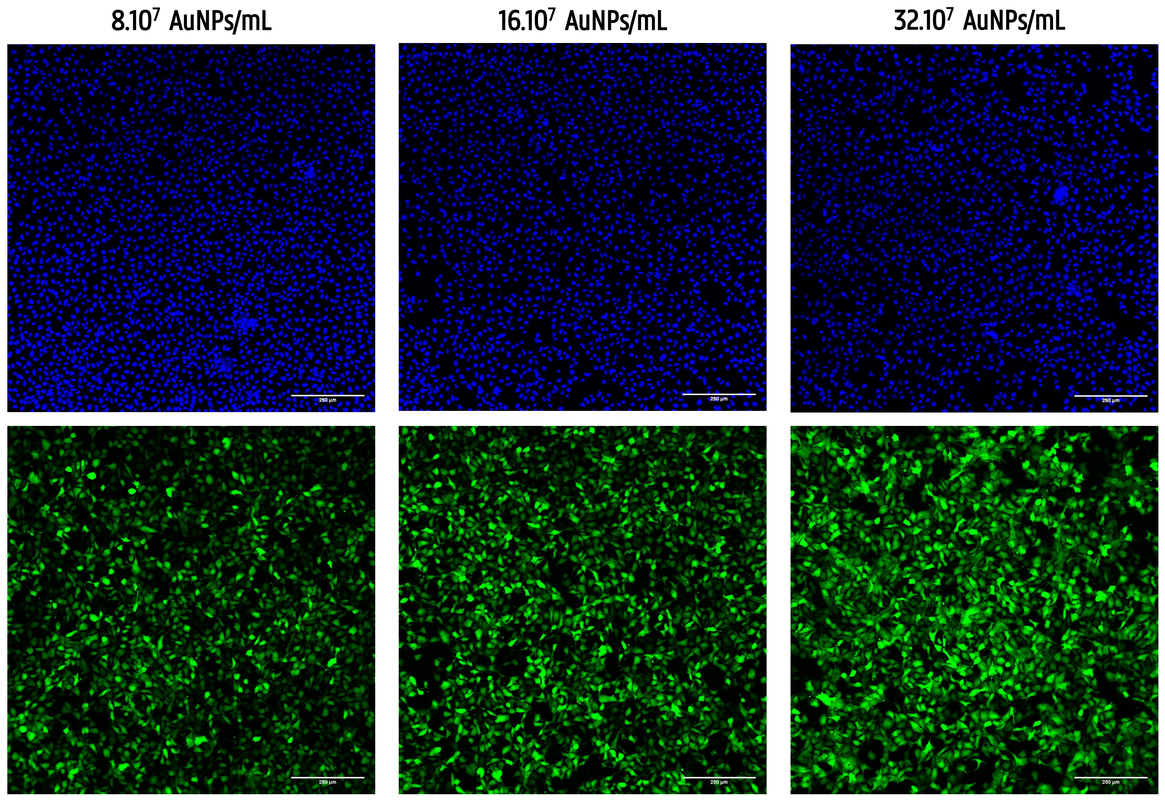


Figure 1. *Confocal microscopy mages of iPSCs after AuNP-photoporation with FD10 (green channel, bottom row). Nuclei were stained with Hoechst 33342 (blue channel, top row). Increasing concentrations of AuNPs (from left to right) were used. Scale bar: 250 µm.*

CONCLUSION and FUTURE PERSPECTIVES

AuNP-Photoporation can reach **high delivery percentages while maintaining high viability in iPSCs**. Other cargo molecules and photosensitizers will be tested to further discover this promising technology for the transfection of iPSCs.

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References.

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2. Xiong R., Sauvage F., Fraire J.C., Huang C., De Smedt S.C., Braeckmans K. Photothermal nanomaterial mediated photoporation. Accounts Chem. Res. 56, 631-643 (2023).
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Other posters on photoporation: P515 (C. Hinnekens), P799 (C. De Clercq), P760 (A. Harizaj)