Assessing Plate Consistency of LumiPore®-Based Intracellular Delivery in Drug Screening

trince
PRECISION TRANSFECTIONS

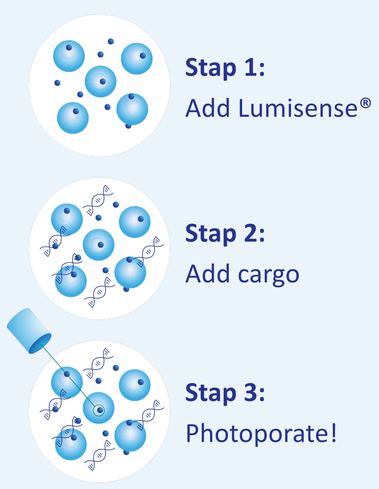
Photoporation: a versatile transfection method

Challenge: **efficient delivery** of larger cargo in **hard-to-transfect cells.**

Trince's LumiPore® intracellular delivery platform:

- **Laser** exposure combined with **photothermal nanoparticles**.
- **Transient permeabilization** of cellular plasma membrane.
- **High-throughput** rate, **high viability**, **proliferative capacity** and **functionality** of photoporated cells maintained.

The 3-step process

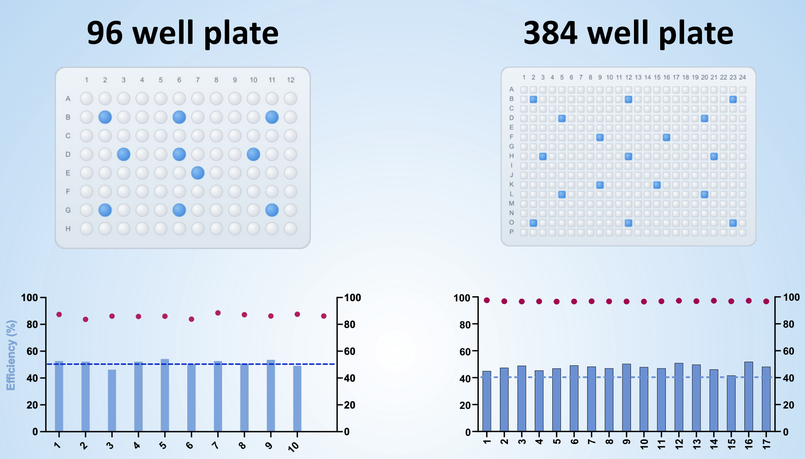


LumiPore® as the optimal intracellular delivery platform for drug discovery

High-throughput screening (HTS) is a key tool in **drug discovery**, enables the rapid evaluation of large numbers of conditions, compounds, or perturbations. However, many HTS technologies face challenges in **scalability**, **assay robustness**, and **reproducibility**, often requiring re-optimization when transitioning between formats.

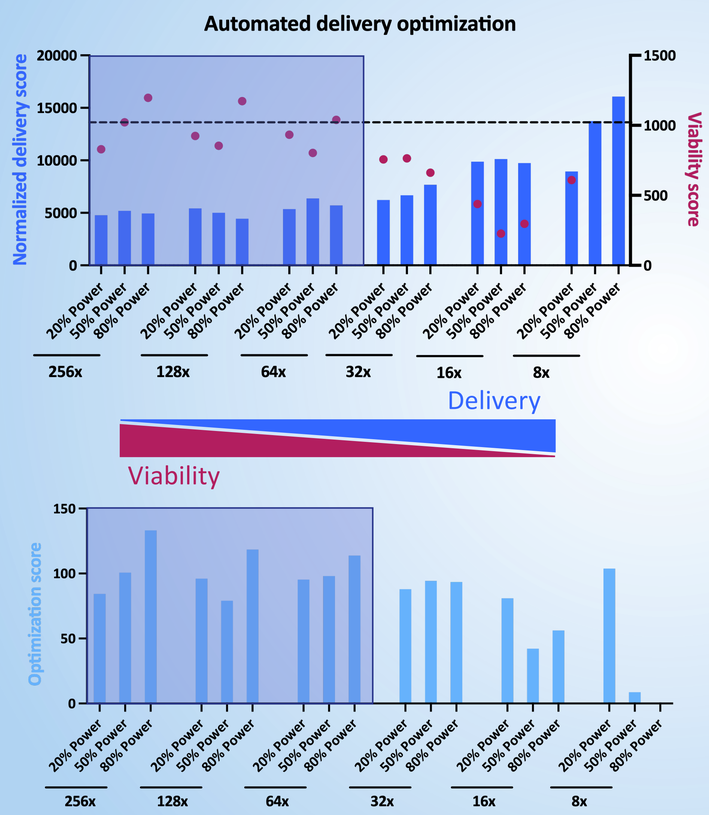
Photoporation enables intracellular delivery of nucleic acids, proteins, and small molecules through **gentle**, **light-induced** transient membrane permeabilization. Its **flexible** workflow supports a broad range of cell-cargo combinations and is seamlessly **scalable** from low-throughput to 1536-well high-density well plates, maintaining **consistent delivery** performance and **reproducibility** across formats. The platform is compatible with automated and semi-automated workflows, facilitating straightforward integration into existing screening and drug discovery pipelines.

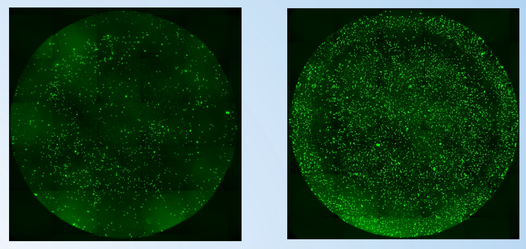
Delivery Efficiency Consistency Within and Between Plates



- eGFP mRNA delivery in Jurkat cells across randomized wells and different plate formats
- >90% cell viability maintained across all treated wells and plate formats
- Consistent delivery efficiency within and between plates
- Demonstrates the scalability and reproducibility of LumiPore®

Automated optimization workflow combining CyBio FeliX® liquid handling and LumiPore® intracellular delivery





- Automated workflow for cell seeding, Lumisense nanoparticles (LS) incubation, and optimization solution addition.
- 6 LS concentrations × 3 laser settings (triplicates) screened in a single 96-well plate.
- Optimal delivery conditions identified in less than 2 hours based on delivery efficiency and viability.

Conclusion

High-throughput workflows are often limited by format-dependent re-optimization, which increases variability and hinders scalability. LumiPore® mediated photoporation overcomes these challenges by enabling **efficient** and **reproducible intracellular** delivery across experimental scales. **Consistent delivery efficiency and cell viability were maintained from high-density multiwell plates to larger culture formats**, allowing direct translation of optimized conditions without re-optimization. These results highlight the **scalability** of the LumiPore® platform and its ability to support both **high-throughput screening** and **downstream applications** within a unified workflow

LumiPore® R&D device

- **Benchtop intracellular delivery system**
- **Optimization per cell line possible**
- **Compatible with well-plates (6-1536), flasks and slides**
- **Full well plate in <10 min**
- **Ideal for high throughput and screening applications**
- **Spatial selectivity photoporation**



CONTACT: info@trincebio.com | trincebio.com | linkedin.com/company/trince

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