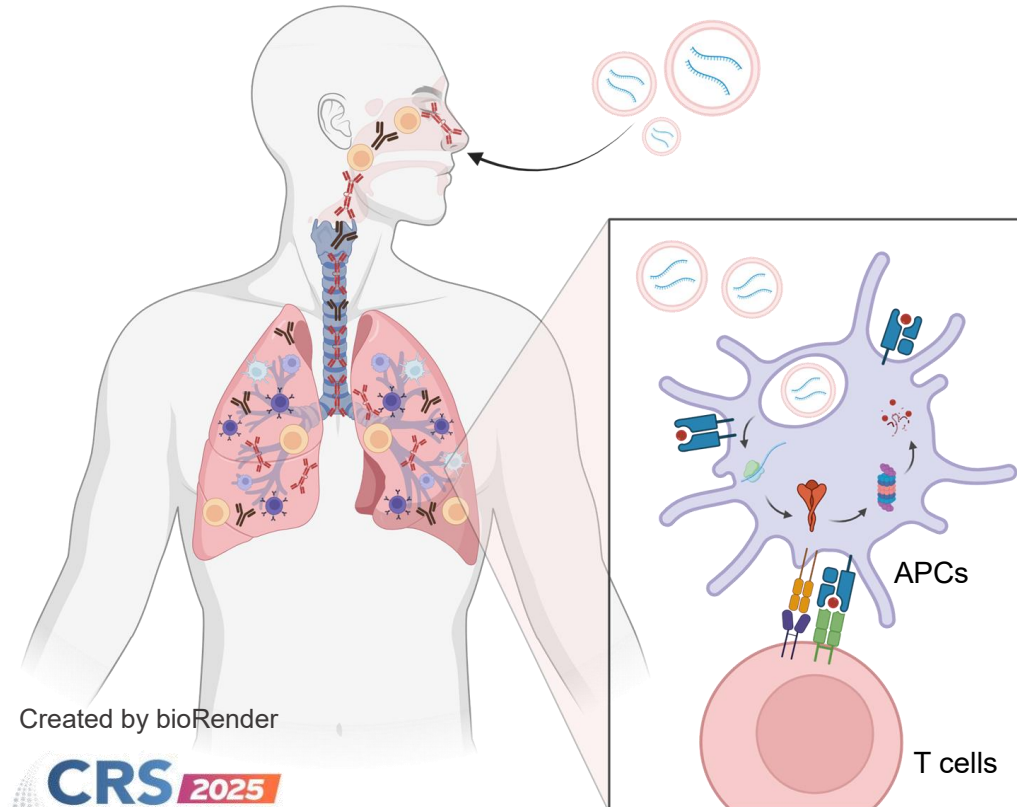


An Optimized Polymeric Delivery Platform for Pulmonary mRNA Vaccines

Presenter: Min Jiang

Supervisor: Prof. Dr. Olivia M. Merkel

Pulmonary mRNA vaccines

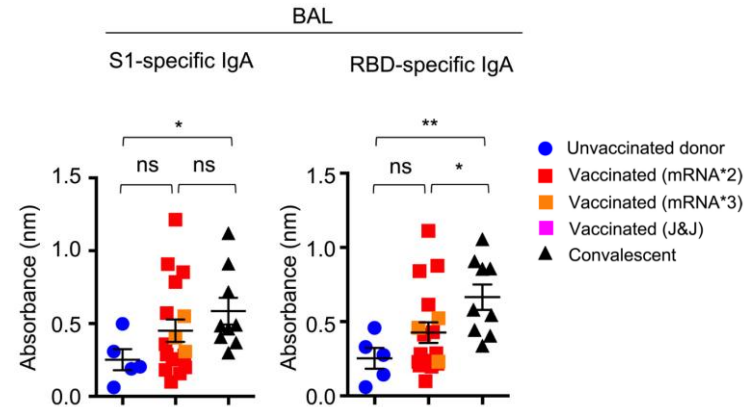


APCs: Antigen presenting cells

→ Respiratory viruses and bacterial

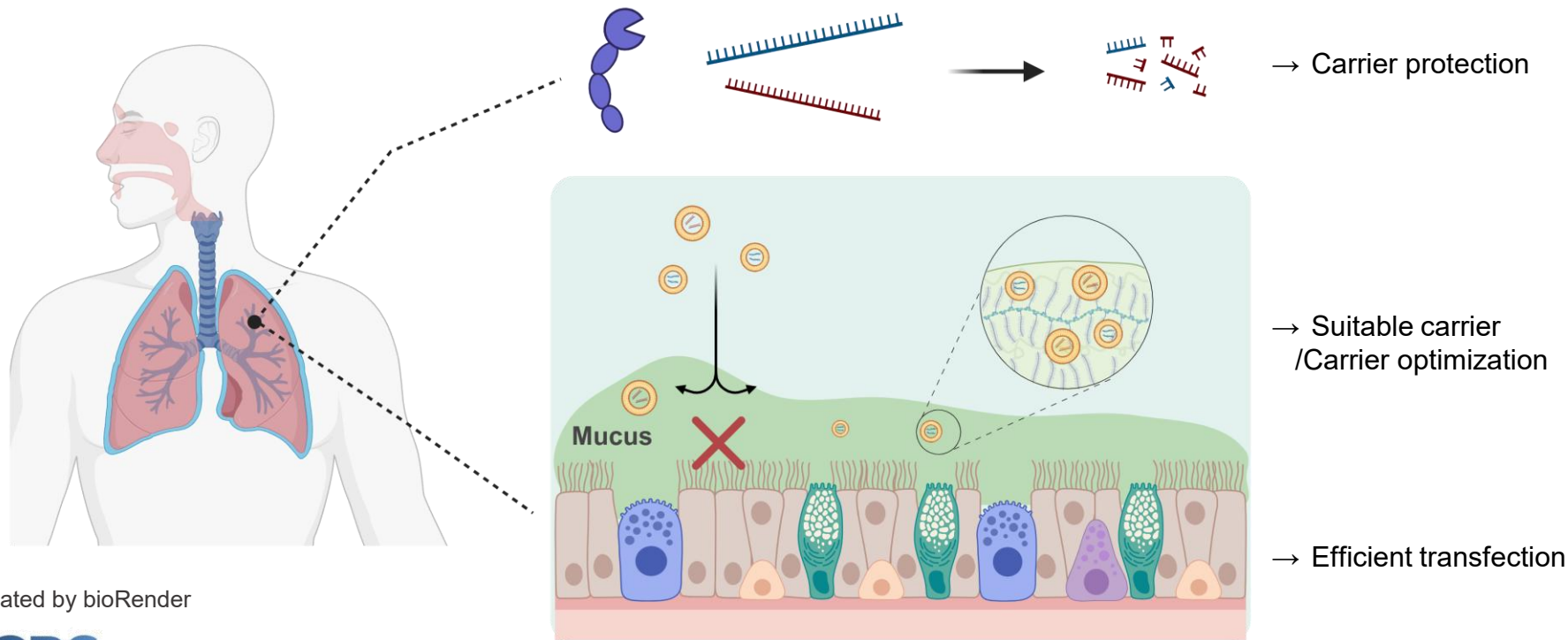
Influenza, Coronavirus, Respiratory syncytial virus (RSV)...

Pseudomonas aeruginosa, *S. aureus*...



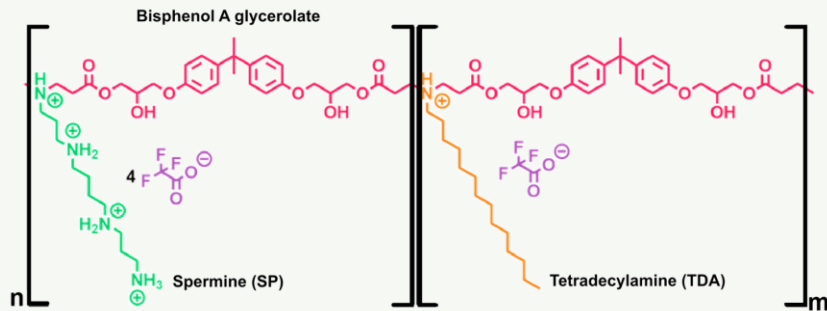
J. TANG, *et al.* Respiratory mucosal immunity against SARS-CoV-2 after mRNA vaccination. *Science Immunology* (2022)

Barriers in pulmonary mRNA delivery

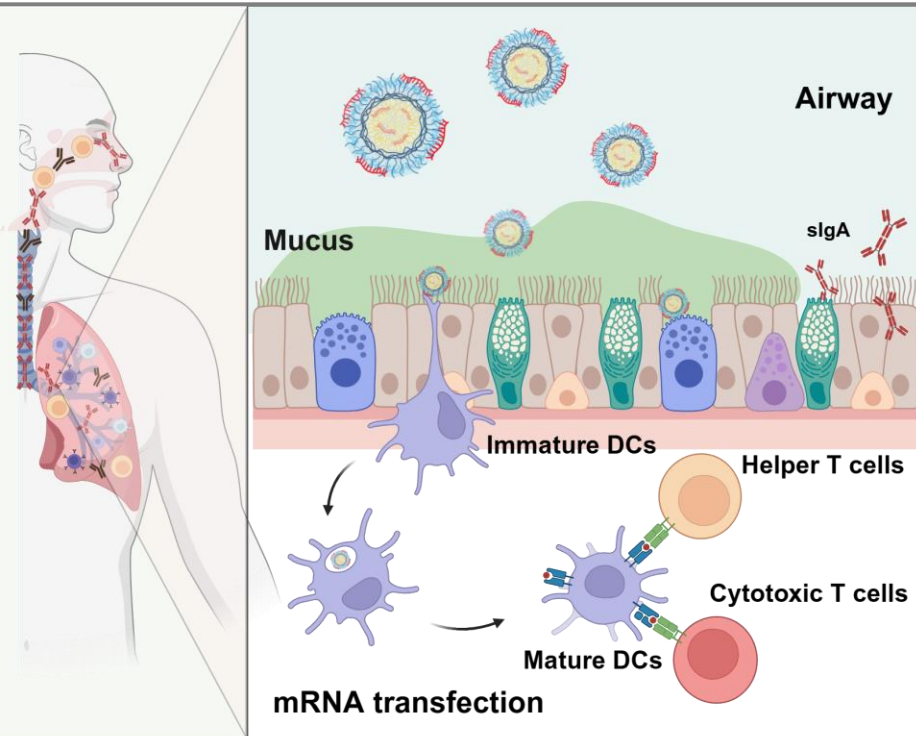
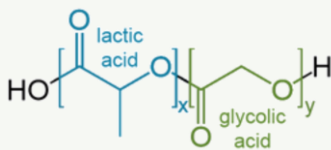


Created by bioRender

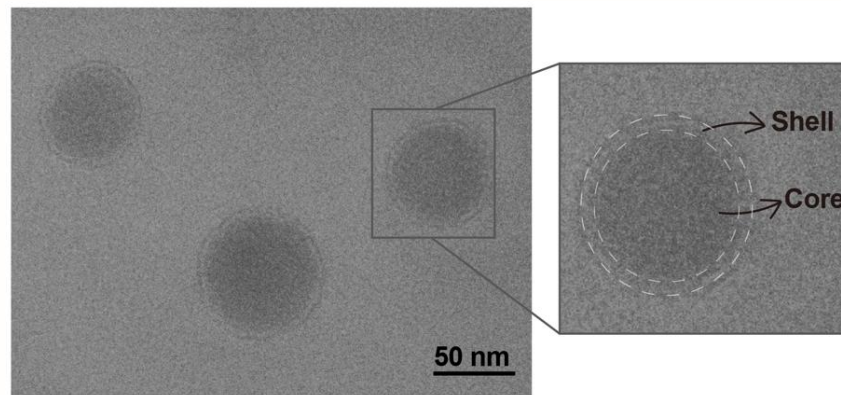
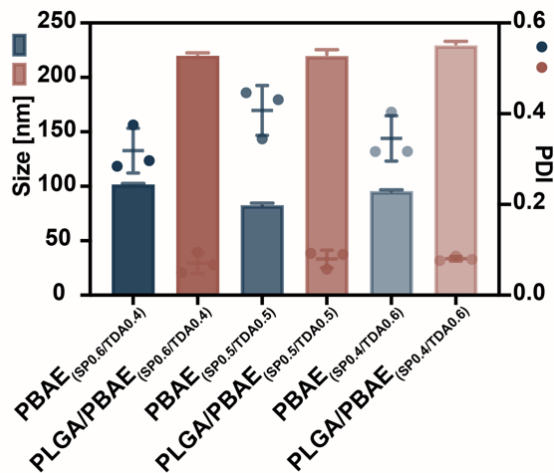
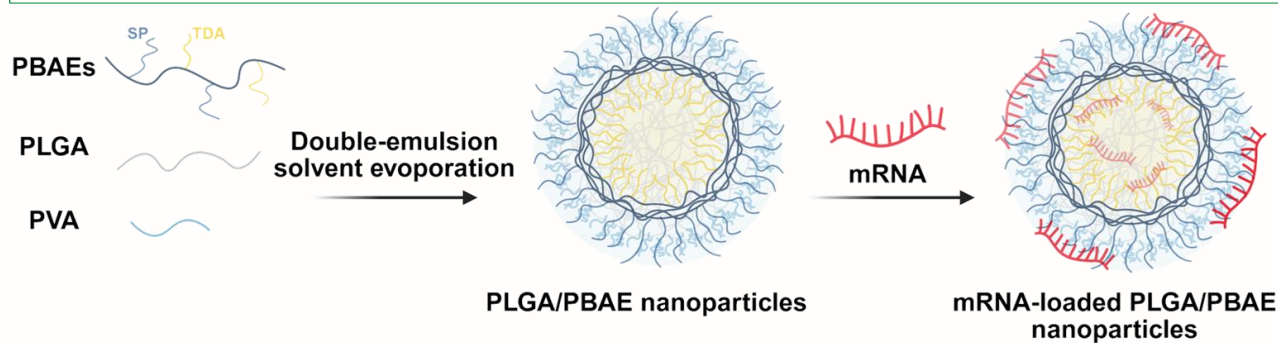
Pulmonary mRNA vaccines using polymeric system



F. Sieber-Schäfer[#], M. Jiang[#], et al. Machine learning-enabled polymer discovery for enhanced pulmonary siRNA delivery. *Advanced Functional Materials* (2025).

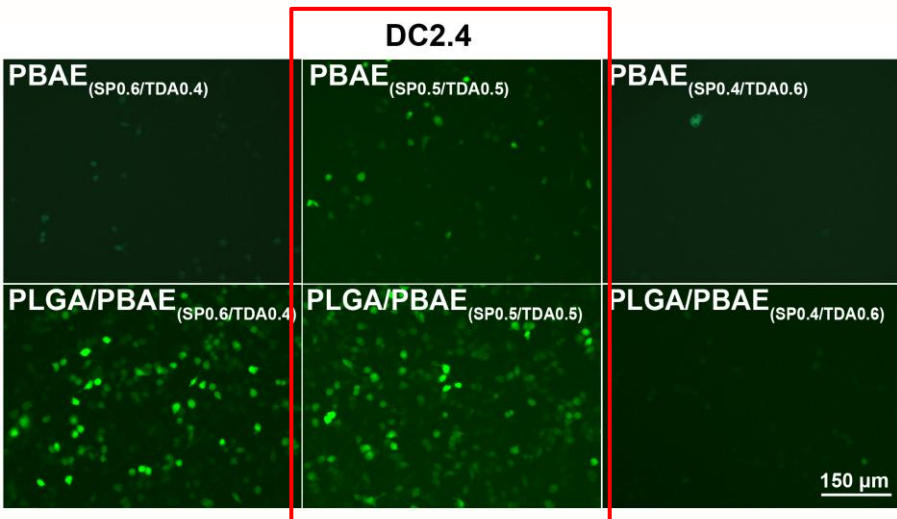


Characterization

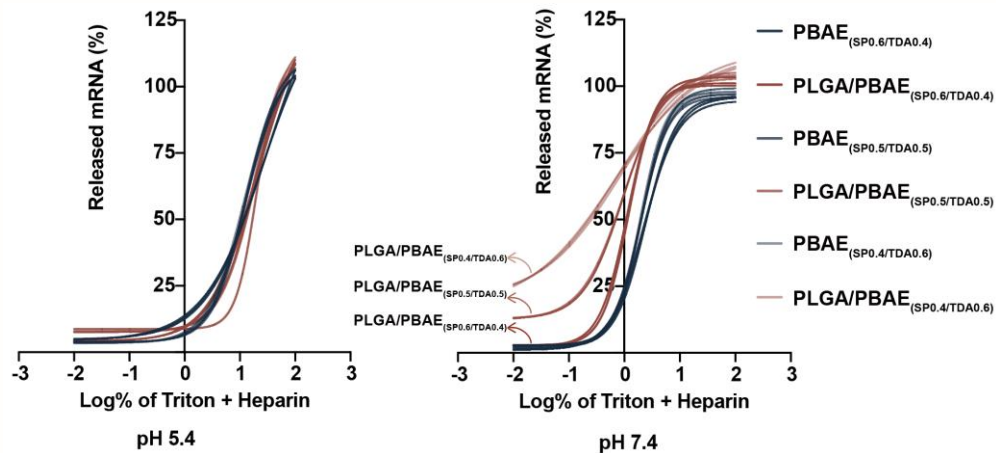


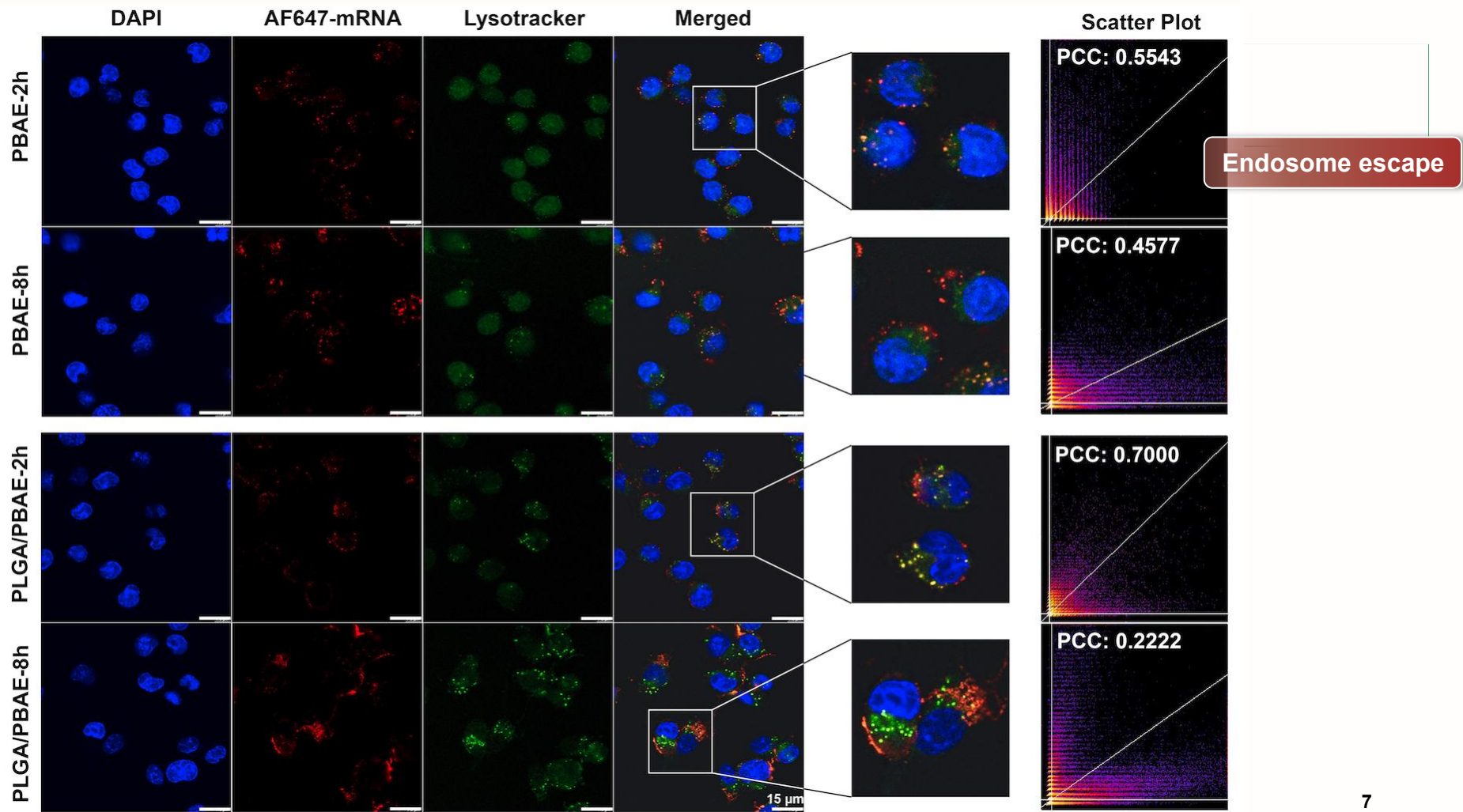
DC2.4 transfection

mRNA transfection



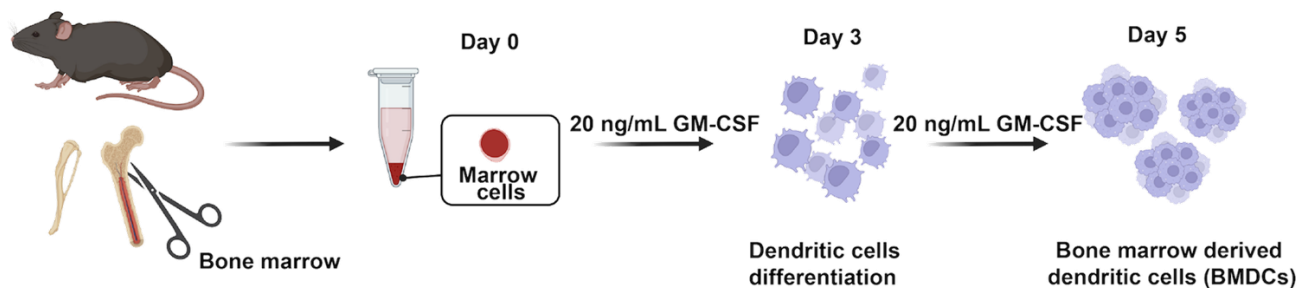
mRNA release



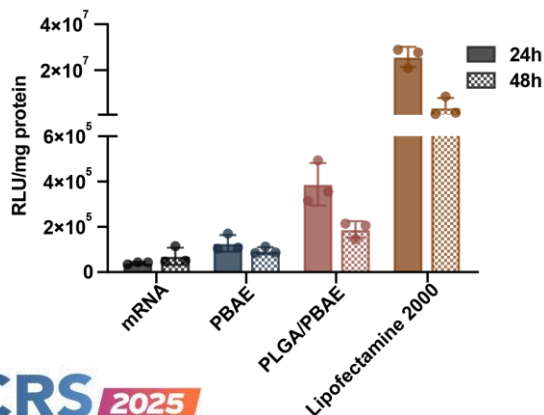


Endosome escape

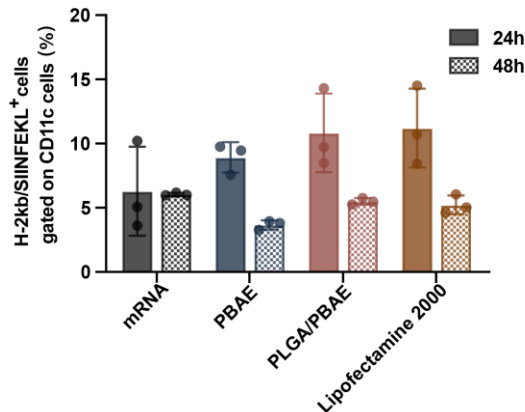
BMDCs transfection and maturation



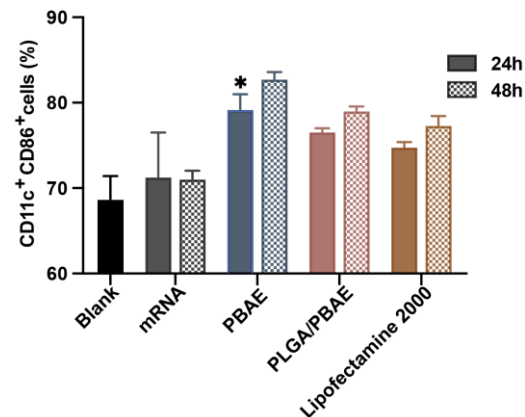
mRNA transfection



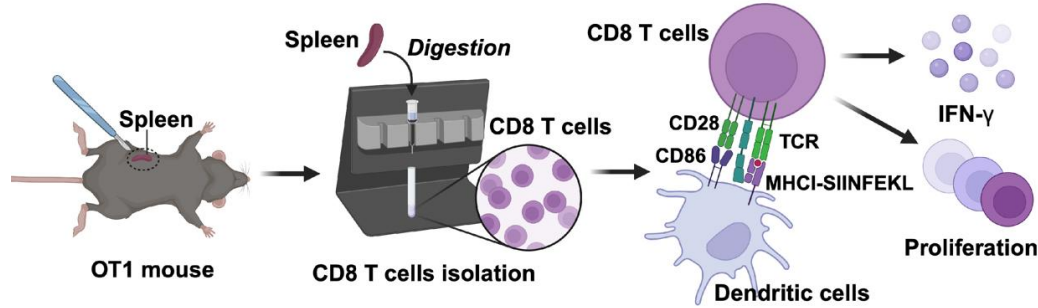
Antigen presentation



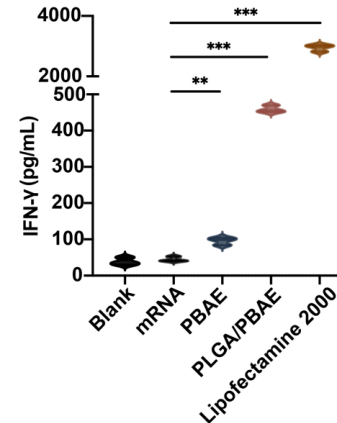
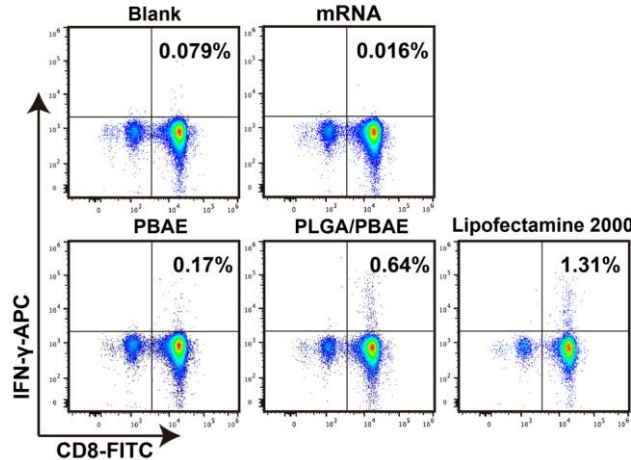
BMDCs maturation



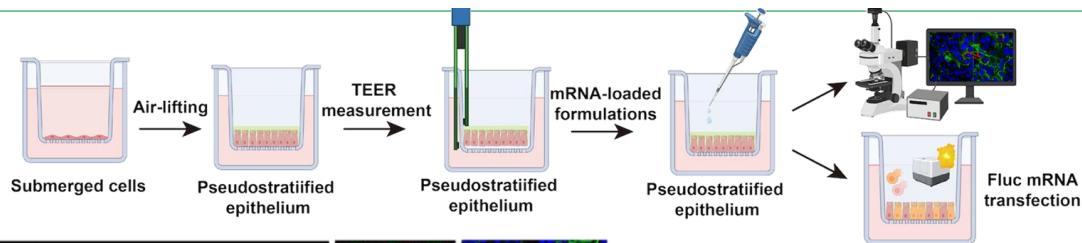
T cells activation



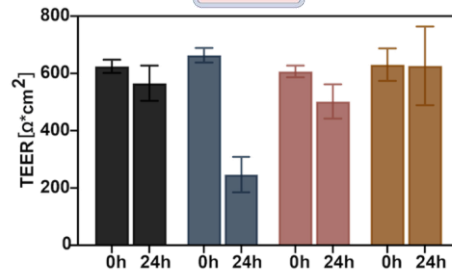
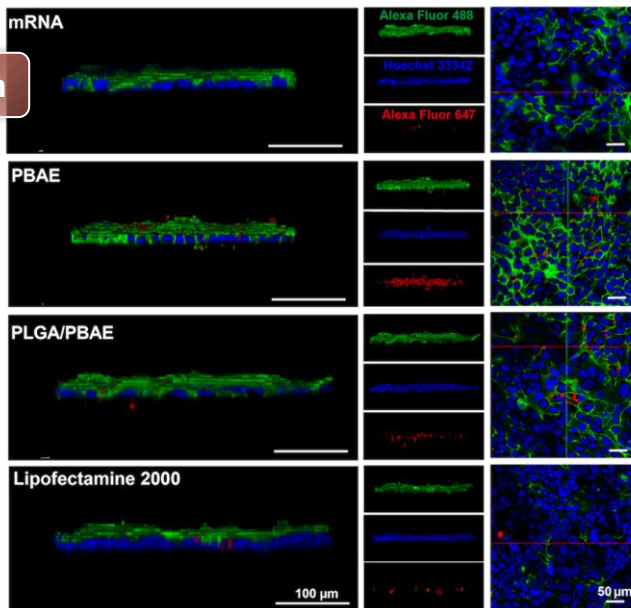
T cells activation



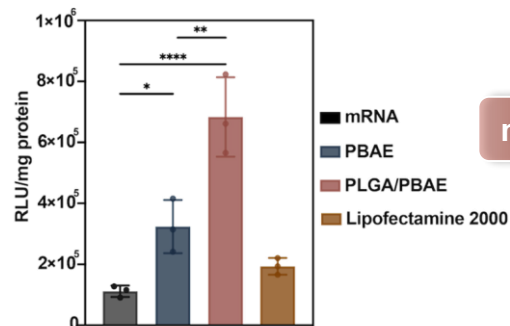
Mucus penetration and transfection in ALI model



Mucus penetration

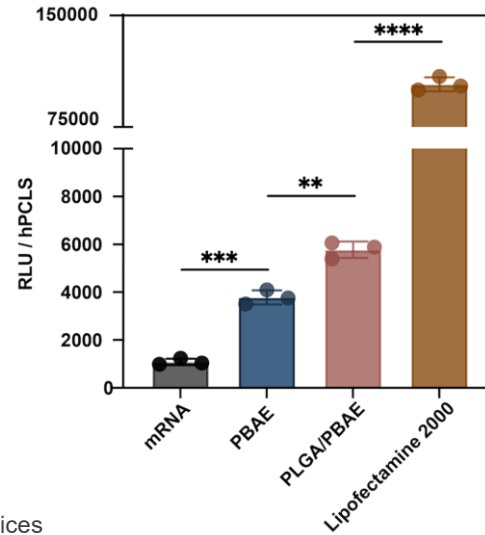
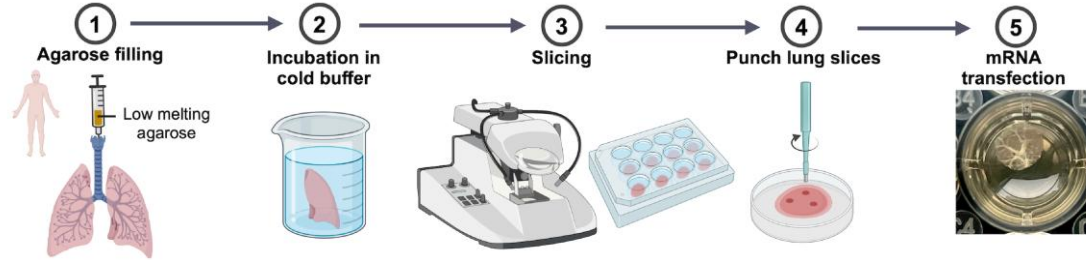


Open tight junction



mRNA transfection

mRNA transfection in hPCLS



Thank you for your attention!

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Universität München



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