PD Dr. med. habil. Florian Siegerist & Dr. rer. nat. Tim Lange

Targeted mRNA Delivery via Exosomes for Cell-Specific Therapy in Kidney Disease

© privat

Translational Scientist
nTTP-GCT-Cohort 2026

Neonatology & Pediatric Intensive Care Unit
Department of Pediatrics
UNIVERSITY MEDICINE GREIFSWALD

Fields of Research:

- Translational Kidney Research
- Kidney Disease Animal Models
- Advanced Microscopy and AI-Based Tissue Analysis
- Pediatric Kidney Disease

Contact:

florian.siegerist@uni-greifswald.de

© Hadi Awad

Junior Clinician Scientist
nTTP-GCT-Cohort 2026

Institute of Anatomy and Cell Biology
UNIVERSITY MEDICINE GREIFSWALD

Fields of Research:

- Podocyte Biology
- Kidney Disease Models
- RNA Therapeutics
- Exosome Biology
- Translational Nephrology

Contact:

tim.lange@uni-greifswald.de

Project Description:

The tandem project aims to develop and validate an exosome-based platform for cell type-specific RNA delivery to kidney cells as a novel therapeutic approach for kidney diseases. Exosomes serve as natural nanocarriers into which RNA cargo can be packaged, enabling the overcoming of biological barriers and efficient uptake by target cells.

The central hypothesis is that exosomes derived from defined cell types and loaded with RNA enable efficient and selective mRNA delivery to specific renal cell populations, including podocytes, mesangial cells, and glomerular endothelial cells. The efficiency, specificity, and biodistribution of mRNA delivery will be systematically analyzed.

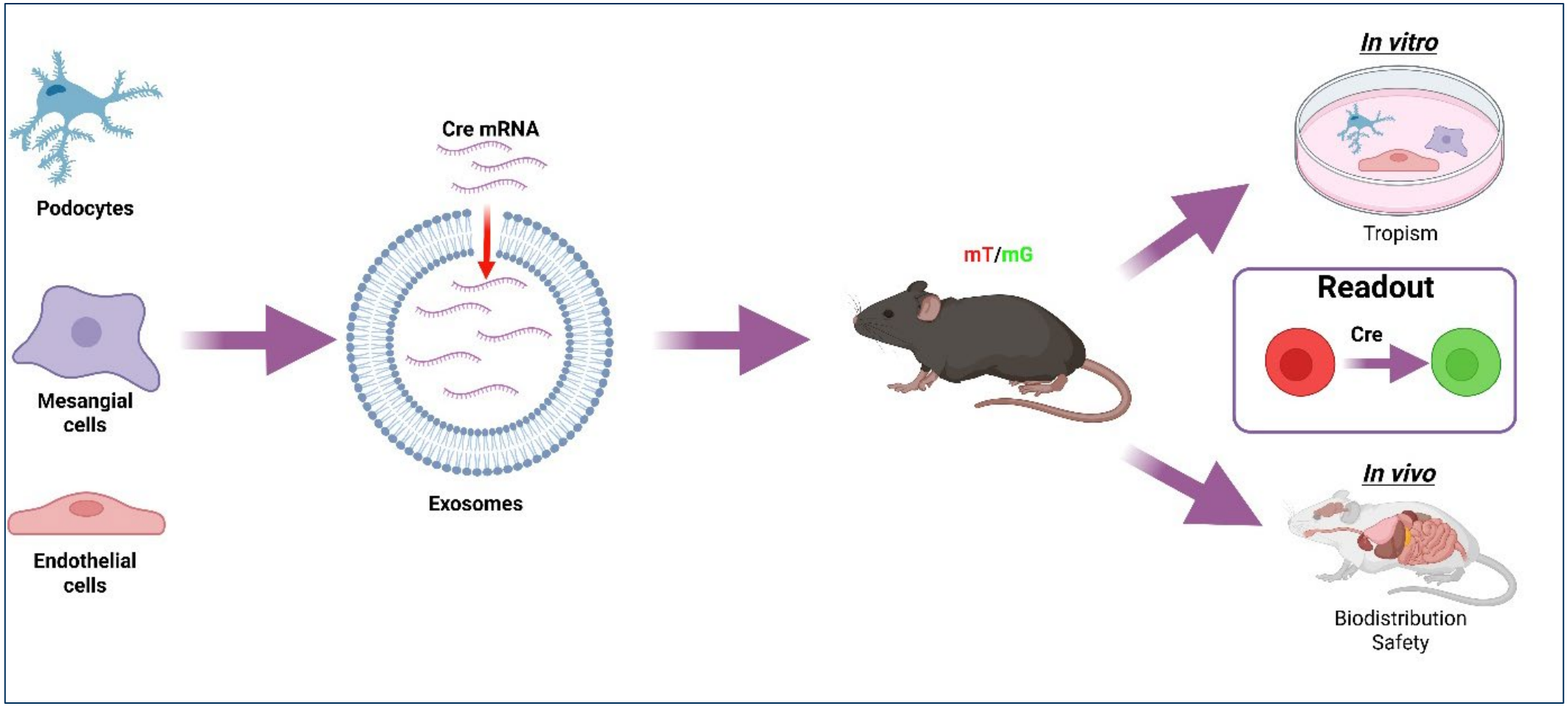
As a functional readout, the mT/mG Cre reporter system will be employed, which enables direct visualization of successful uptake and translation of exosomal Cre mRNA. This system allows precise quantification of exosomal tropism and biodistribution both *in vitro* in isolated kidney cell cultures and *in vivo* in a mouse model. *In vitro*, the functionality and efficiency of the model system will be validated, followed by *in vivo* assessment of organ specificity and immunogenicity.

This combined *in vitro* and *in vivo* approach will generate quantitative data on the functionality, efficiency, and particularly the tropism of the exosome platform. These results will enable precise characterization of cell type–specific mRNA delivery to the kidney and provide a critical foundation for evaluating the therapeutic potential of this strategy.

GCT
National Strategy
Gene- and Cell-Based Therapies
Promotion of Translational Talents

PD Dr. med. habil. Florian Siegerist & Dr. rer. nat. Tim Lange

Targeted mRNA Delivery via Exosomes for Cell-Specific Therapy in Kidney Disease



GCT
National Strategy
Gene- and Cell-Based Therapies
Promotion of Translational Talents