



Der Vorsitzende des Promotionsausschusses

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## EINLADUNG

Hiermit lade ich ein zum öffentlichen Promotionskolloquium von

**Frau Apothekerin Lena Kliesch**  
HIPS Abteilung Wirkstofftransport  
(Prof. Dr. Claus-Michael Lehr)

am

**Freitag, 28. Juni 2024, 13:30 Uhr s.t.**

per Videokonferenz:

MS Teams: <https://teams.live.com/join/9450228424231?p=SykmgKxtdtNPDx80mC>

Teams Bitly: <https://bit.ly/lenakliesch>

Raum für die Prüfung: HIPS, Gebäude E8.1, Seminarraum 0.27

### **Thema der Dissertation:**

#### **Laser-assisted intradermal application of mRNA-loaded nanocarriers for minimally invasive ("needle free") vaccination via the skin**

Our skin, as a natural protective layer, has a high immune cell density, but a suitable application technique is necessary to expose them to antigens for vaccination purposes. In this work, laser microporation was used for short-term, local removal of the outermost barrier layer. The aim was to investigate whether such a minimally invasive application has the potential to improve mRNA vaccination. For this purpose, lipid-polymer hybrid nanoparticles were produced and optimized in their lipid composition with a focus on transfection efficiency *in vitro*. To investigate the distribution of nanoparticles and their transfection efficiency in tissue, an *ex vivo* human skin model was established. In this model, the most potent particle (lipid layer: 2.5 mol% PEG, 70<sub>DOPE</sub>/30<sub>DOTMA</sub>) led to detectable levels of both, live transfected cells in tissue and stimulated, migrating immune cells.

Saarbrücken, 13. Juni 2024

Prof. Dr. Uli Kazmaier