

We are currently seeking a highly motivated life science student (f/m/d) for a project on

“Influence of colony size and biochemical substrate heterogeneity on epithelial homeostasis”

Epithelial cells are tightly attached to an extracellular matrix (ECM), which provides mechanical stability and important biochemical signalling cues. In diseases like cancer, but also in age-related macular degeneration, localized changes of the composition of the ECM occur. This provides cells with locally different biochemical cues and may have implications for the homeostasis of the whole epithelial monolayer.

Project aim:

This project aims to use micropatterned hydrogels to understand the influence of colony size and of biochemical heterogeneity on epithelial organisation, mechanics and functions. First, MDCK cells will be cultured on micropatterned substrates with patterns of different sizes and on different ECM proteins. The mechanical properties, traction forces, cell organization, cell polarity, nuclear mechanics and cell number homeostasis will be examined. At a later stage, double-coated hydrogels (with patterned protein and surrounding protein) will be used as culture substrates and characterised as described above. Different pattern sizes and densities, as well as different protein combinations will be examined.

This work aims to tackle a basic biology question on epithelial homeostasis in relationship to the ECM and will broaden our understanding of pathologies like cancer and retinal degenerations.

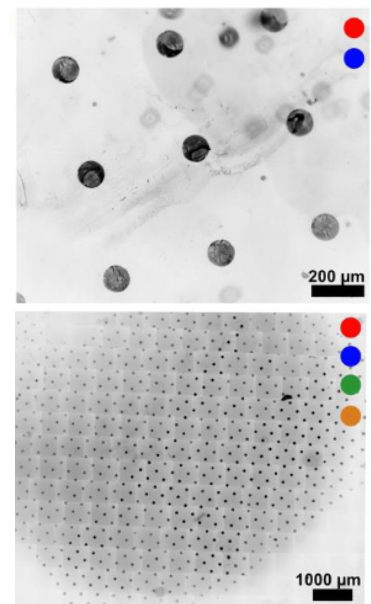


Figure 1: Micropatterned hydrogels.

We offer:

- ☐ Interdisciplinary and active research environment
- ☐ Close practical and theoretical supervision
- ☐ Possibility for ending up in a publication.

Your tasks:

- ☐ Preparation of micropatterned hydrogels and epithelial cell culture
- ☐ Nanoindentation, traction force and monolayer stress microscopy
- ☐ Immunolabeling, widefield and confocal microscopy, image analysis.

Your profile:

- ☐ Background in life sciences
- ☐ Motivated, proactive, and team-oriented attitude.

If you are interested, please send a short motivational letter, CV and transcripts at jdirusso@ukaachen.de or tpiskova@ukaachen.de.

