universität ulm

Physikalisches Kolloquium — Physics Colloquium

Einladung — **Invitation**

Monday, 16 November 2026

Lecture Hall O25/H2, at 16:15
Coffee and cookies will be served in front of the lecture hall from 16:00

Mechanosensing and Collective Cell Dynamics Drive Intestinal Fate Specification and Tissue Organization

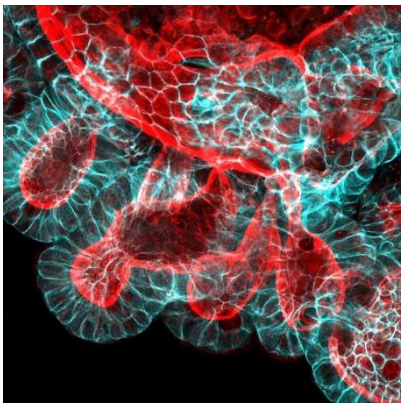


Dr. Andrew Clark

Institute of Cell Biology and Immunology,
University Stuttgart, Germany

https://www.izi.uni-stuttgart.de/institut/team/Clark/

The mammalian intestine is a complex and highly dynamic tissue that relies on a precise balance of stem cell proliferation and differentiation, collective migration and cell death. The underlying mechanisms that coordinate these processes during intestinal homeostasis and disease remain poorly understood. To address this, we leverage organoid culture techniques combined with tissue engineering to generate novel in vitro systems to investigate how these essential processes are coupled and regulated. In addition to using these systems to study aspects of intestinal homeostasis, we also investigate how these processes become dysregulated in intestinal pathologies. Inflammatory Bowel Diseases (IBDs), for example, are characterized by a cycle of recurrent localized inflammation and poor barrier function. A dangerous complication of IBDs and other chronic inflammatory disease is fibrosis, a mechanical stiffening of the local connective tissue. It is not well understood how such changes in tissue mechanics during fibrosis modulate the inflammatory response. Using a combination of high-resolution microscopy, quantitative image analysis and biophysical measurements, we have recently uncovered novel molecular synergies between mechanosensing pathways and inflammatory cytokine signaling that modulate intestinal differentiation patterns and epithelial barrier function. Epithelial barrier function is largely mediated by cell-cell junction complexes, which we also find interact with morphogen signaling pathways that are crucial for regulating intestinal homeostasis and also implicated in intestinal tumorigenesis. Through these diverse interdisciplinary projects, we aim to uncover how mechano-chemical signaling networks regulate the pathophysiology of complex tissues like the intestine.



Host: Prof. Dr. Friedhelm Serwane, Institute of Biophysics

Organisation: Prof. Dr. Johannes Hecker Denschlag, Institute of Quantum Matter,
johannes.denschlag@uni-ulm.de, +49-731-50-26100