

PhD Candidate (m/f/d)

Title: Establishment of an organoid model to study ECM contribution to retinal mechanobiology at the Interdisciplinary Centre for Clinical Research (IZKF) and DWI Leibniz-Institute for Interactive Materials.

Project Description:

Retinal degeneration pathologies, such as age-related macular degeneration (AMD), are the major cause of sight loss worldwide. Besides genetic causes to date little is known about the aetiology of the diseases, being the reason for the lack of efficient treatments. This is due to the limited availability and flexibility of research models which can fully recapitulate the retina system. Particularly understudied is the role of extracellular matrices (ECM) in maintaining a healthy and functional retinal pigment epithelium (RPE) and its interaction with the light-detecting photoreceptors cells. RPE is localized at the base of the neural retina and tightly adheres to the underlying basement membrane (BM), which constitutes the proximal part of the Bruch's membrane. While the BM components carry the biochemical information for RPE adhesion, deeper layers of the BrM, composed of fibrillar collagens and elastin fibres, are proposed to determine RPE physical properties. Furthermore, health, stability, and adhesion of the neural retina to the RPE layer strongly depend on the hyaluronic acid-rich interphotoreceptor matrix.

The PhD project aims to establish an organoid model to study the role of ECM on retinal mechanobiology. The candidate will work in engineering a novel system combining current state-of-the-art human retinal organoids with light and magnetic tunable anisotropic hydrogels.

While animal studies, genome analyses, and patient tissue biopsies have until now only contributed to the understanding of the general function of ECM in retina physiology and pathology, the development of a novel *in vitro* model will provide new insights into the contribution of molecular and structural components of the ECM the biology of RPE and its functional interaction with the neural retina.

We offer:

We offer close supervision with the aim of supporting a highly-skilled, independent scientist in the field of mechanobiology. The candidate will have the possibility to learn state-of-the-art techniques varying from material science to chemistry and biology. The PhD will be carried out in a highly interdisciplinary environment at the RWTH Aachen University and DWI Leibniz-Institute for Interactive Materials. Furthermore, the student will have the possibility to be associated with the mechanobiology graduate school ME3T (me3t.rwth-aachen.de).

The successful candidate will receive a contract with a salary corresponding to 65% of the level 13 TV-L German public system. The position is available starting immediately.

For more information about our research, please visit the group webpage: dirusso.rwth-aachen.de.

Your skills and qualifications:

The candidate should hold a Master of Science in bioengineering, cell and molecular biology, or related disciplines. Sound knowledge of stem cell culture is a plus. Candidates should show a keen interest in working in an interdisciplinary environment that IZKF, RWTH Aachen and DWI offer.

To apply, please send by email a brief description of your research interests, curriculum vitae and the names of two academic referees to Dr. Jacopo Di Russo (Email: jdirusso@ukaachen.de)

Application Deadline: 15.08.2022

