Research Methodology

Dr. Seeliger’s work bases on in-depth functional and morphological phenotyping of genetic models of blinding human neurodegenerative disorders with electroretinography (ERG), scanning-laser ophthalmoscopy (SLO), and optical coherence tomography (OCT), the same non-invasive techniques used in affected patients.

Key Technologies of the Group:

- Functional Assessment (ERG)

- Neuro-Imaging (SLO, OCT)

- Preclinical Therapy Unit

Institute for Ophthalmic Research
Division of Ocular Neurodegeneration

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Division of Ocular Neurodegeneration

Our mission is to uncover the pathophysiology of ocular neurodegenerative processes, to develop and test therapeutic strategies, and to understand and model normal retinal function.

In the field of Neurodegeneration Research, we investigate the causes of and the disease mechanisms in retinal degenerations, and relate the findings in human patients to those in animal models with homologous genetic defects. Also, we examine animal models generated by groups worldwide for their relevance in this regard.

In Systems Biology, we assess functional pathways, particularly in the outer retina, by means of mouse lines with specific defects in photoreceptor function and/or connectivity, as many aspects of normal retinal function are still unclear.

Cross-breeding of such lines enables us to investigate isolated pathways, to obtain new insights about their nature, and to model their behaviour.

The advancement of therapeutic research is also an important part of our work that we follow in many national and international collaborations. Molecular Therapy means for us the development of curative and symptomatic strategies in in vivo models and the translation to human studies.

Key Publications


Regine Mühlfriedel
- Dr. rer. nat.
- Research specialty: Molecular Therapy and Imaging

Vithiyanjali Sothilingam
- Dr. rer. nat.
- Research specialty: Electrophysiological Diagnostics and Imaging

Mathias Seeliger
- Professor, Dr. med. Dipl.-Ing.
- Head of the Division for Ocular Neurodegeneration Research

Gudrun Utz
- Certified Technician (MTA)
- Scientific Support
- Transport Logistics

Regard to See

The Institute for Ophthalmic Research

Seeing is an essential part of human life. As a leading centre for vision research we conduct rigorous research in order to break new ground in understanding the principles of vision and the mechanisms of blinding diseases. We are confident that this research will enable us to rationally develop effective treatments that ultimately retain or restore vision.

Within the Center for Ophthalmology at the University of Tübingen Medical Centre, we and our colleagues at the University Eye Hospital jointly strive for scientific excellence, for speed in translating the advancements into patient’s benefit, and for training and mentoring the next generation of leaders in our field.

As leaders and partners in multi-national collaborations, we work for continuous strengthening our ties to fellow international scientists in the public and private sector and to foundations, industry and patient organizations.

As an integral part of Tübingen’s biomedical and neuroscience campus, we offer a scientific environment that favors creativity for generating ground-breaking ideas, their transfer into reality and their translation into diagnostics and therapy to help those that suffer from vision loss.