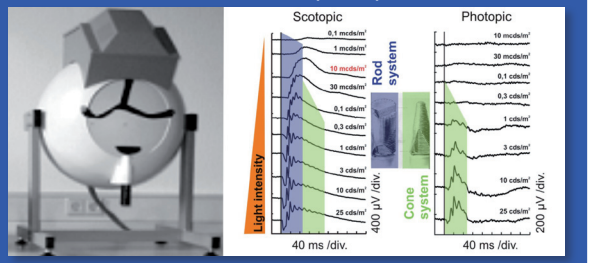
… performing in Excellence

Research Methodology

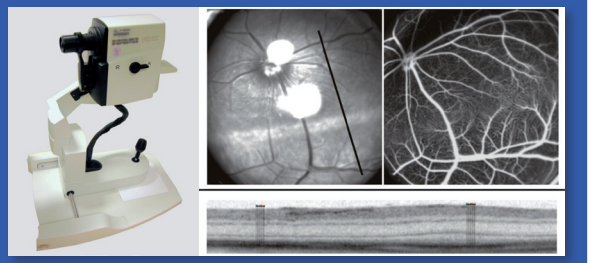
Dr. Seeliger's work bases on in-depth functional and morphological phenotyping of genetic models of blinding human neurodegenerative disorders with electroretinography (ERG), scanning-laser ophthalmoscopy (SLO), and optical coherence tomography (OCT), the same non-invasive techniques used in affected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

Key Technologies of the Group:

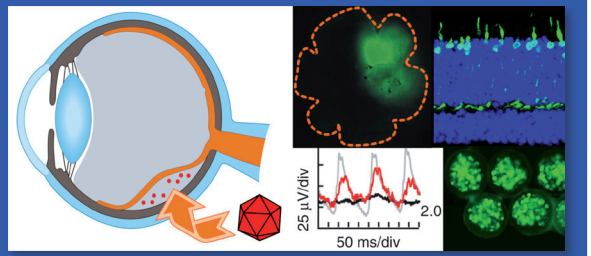
- Functional Assessment (ERG)



- Neuro-Imaging (SLO, OCT)



- Preclinical Therapy Unit



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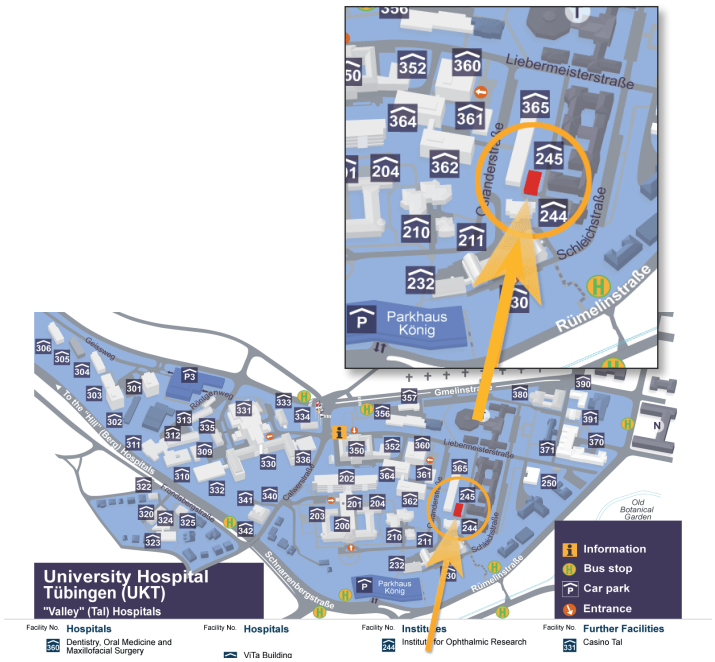

Institute for Ophthalmic Research
Center for Ophthalmology

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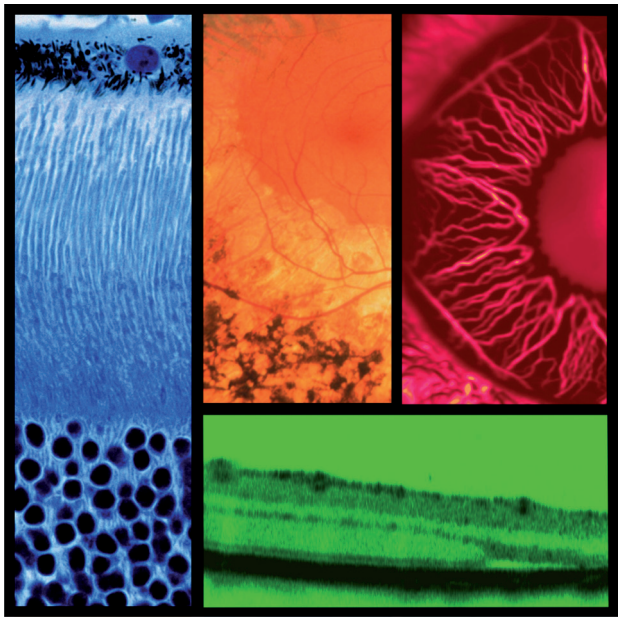
Seeliger Lab

Division of Ocular Neurodegeneration



Division of Ocular Neurodegeneration

UNIVERSITÄTS KLINIKUM TÜBINGEN

EBERHARD KARLS UNIVERSITÄT TÜBINGEN

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.

Mathias Seeliger

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

Key Publications

Seeliger MW, Grimm C, Ståhlberg F, Friedburg C, Jaissle G, Zrenner E, Guo H, Remé ChE, Humphries P, Hofmann F, Biel M, Fariss RN, Redmond TM, Wenzel A (2001). New views on RPE65 deficiency: the rod system is the source of vision in a mouse model of Leber congenital amaurosis. Nat Genet 29: 70-74.

Grimm C, Wenzel A, Groszer M, Mayser H, Seeliger MW, Bauer C, Gassmann M, Reme CE (2002). HIF-1–induced erythropoietin in the hypoxic retina protects against light–induced retinal degeneration. Nat Med 8: 718-24.

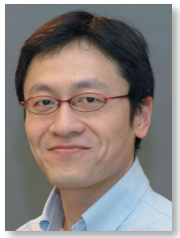
Busskamp V, Duebel J, Balya D, Fradot M, Viney TJ, Siegert S, Groner AC, Cabuy E, Forster V, Seeliger MW, Biel M, Humphries P, Paques M, Mohand-Said S, Trono D, Deisseroth K, Sahel SA, Picaud S, Roska B (2010). Genetic reactivation of cone photoreceptors restores complex visual responses in Retinitis pigmentosa. Science 329: 413-17.

Michalakis S, Mühlfriedel R, Tanimoto N, Krishnamoorthy V, Koch S, Fischer MD, Becirovic E, Bai L, Huber G, Beck SC, Fahl E, Büning H, Paquet-Durand F, Zong X, Gollisch T, Biel M, Seeliger MW (2010) Gene therapy restores missing cone-mediated vision in the CNGA3-/- mouse model of achromatopsia. Mol Ther 18: 2057-2063.

Seeliger MW, Brombas A, Weiler R, Humphries P, Knop GC, Tanimoto N, Müller F. (2011) Modulation of rod photoreceptor output by HCN1 channels is essential for regular mesopic cone vision. Nat Commun 2: 532; 1-10.

Tanimoto N, Sothilingam V, Euler T, Ruth P, Seeliger MW, Schubert T (2012). BK channels mediate pathway-specific modulation of visual signals in the in vivo mouse retina. J Neurosci 32: 4861-4866.

Weinl C, Riehle H, Park D, Stritt C, Beck S, Huber G, Wolburg H, Olson EN, Seeliger MW, Adams RH, Nordheim A (2013). Endothelial SRF/MRTF ablation causes vascular disease phenotypes in murine retinae. J Clin Invest 123: 2193-2206.



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- Head of Molecular Therapy Research

Susanne Beck

- Dr. rer. nat.
- Head of Retinal Imaging Diagnostics & Research

Research to See

The Institute for Ophthalmic Research

The Institute for Ophthalmic Research is headed by Prof. Marius Ueffing and cooperates closely with the University Eye Hospital (Prof. Karl-Ulrich Bartz-Schmidt) under the common roof of the Centre for Ophthalmology in order to perform translational research.

The Institute aims at uncovering the causes for degenerative, inflammatory and vascular diseases of the eye and the visual pathways at molecular, cellular and systemic levels .

The Institute houses several teams of scientists who work together to develop and evaluate concepts for therapy and treatment and optimise clinical and research diagnostics.

Thus, the Institute provides an efficient infrastructure which supports research and education and mediates contacts to other research institutions and to industry.

The Institute enjoys not only a variety of national and international scientific activities, like intense partnerships and cooperations, but also offers courses and seminar opportunities to students and young researchers.

The list of publications and sponsors are the evidence for the success of its activities.