… performing in Excellence

Methodology

The laboratory has considerable experience in various techniques of molecular biology which are applied to learn about the signals generated in the retina, RPE and choroid when refractive errors are induced.

We use biochemical assays and quantitative immunohistochemistry.

Myopia is a multi-layered problem since it develops as a complex interaction of genes and (mainly visual) environment. We study myopia at several levels:

- retinal image processing of defocus
- microelectrode recordings of ganglion cells (MEA) under defocus
- gene expression studies of visual function
- pharmacological intervention of myopia, pathway analyses
- interactions of myopia development with bright light and the role of retinal dopamine
- psychophysical studies on spatial adaptation
- behavioral analyses of visual function
- studies on the optical and adaptational limits of vision
- role of fixational eye movements in myopia

The lab has extensive expertise in physiological optics and design, programming and development of new optical technologies for myopia and vision research and has developed instrumentation to measure eyes for major optical companies and for the scientific community.

Contact

Institute for Ophthalmic Research
Neurobiology of the Eye

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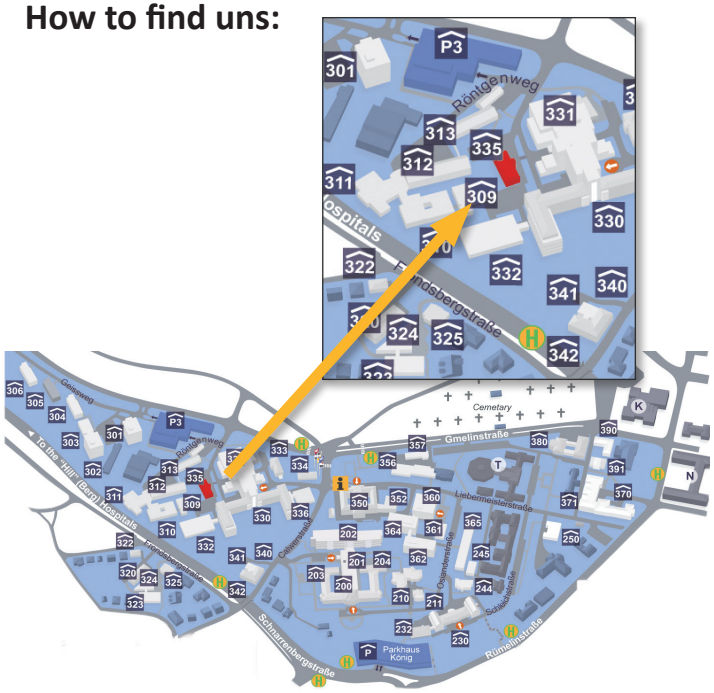
How to find uns:

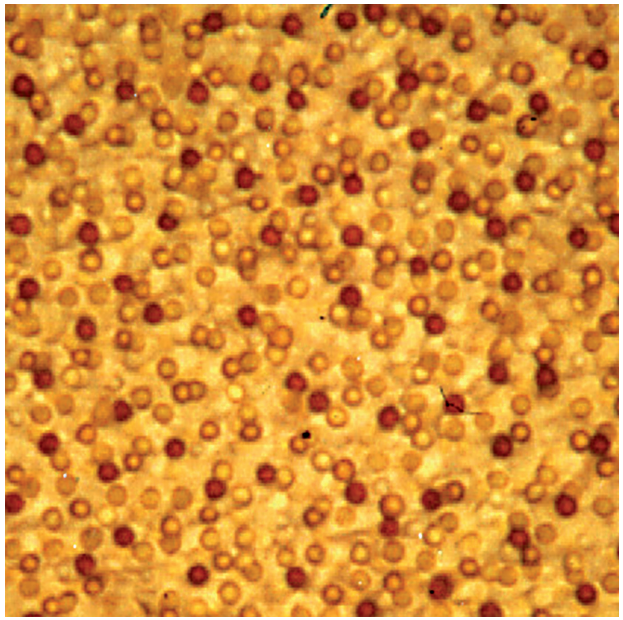


Institute for Ophthalmic Research
Centre for Ophthalmology

UNIVERSITÄTS KLINIKUM TÜBINGEN

Schaeffel Lab

Neurobiology of the Eye



Neurobiology of the Eye

UNIVERSITÄTS KLINIKUM TÜBINGEN

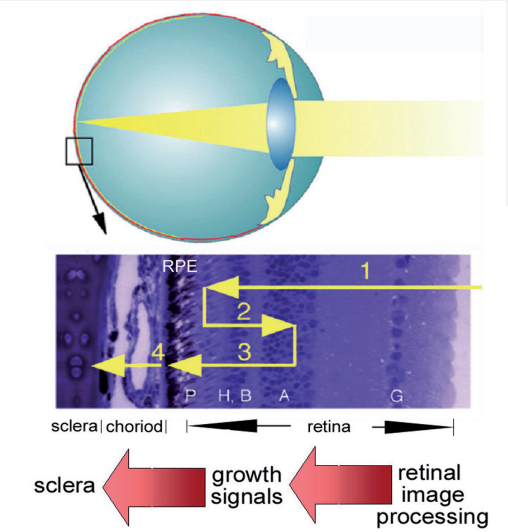
EBERHARD KARLS UNIVERSITÄT TÜBINGEN

Our central research goal is to gain a better understanding of how visual experience and genetic factors affect eye growth and the development of myopia.

We are studying these questions in chicken and mouse models, but also in human subjects. When animal models wear spectacle lenses or diffusers in front of their eyes, they develop myopia or hyperopia. The predictable effect of these visual perturbations on eye growth permits to study the underlying retinal image processing.

One can learn how the output of retinal image processing merges into the release of growth signals from the retina that reach the retinal pigment epithelium where they may be converted into other signals that pass through choroid to the sclera. While these approaches merge into pharmacological interventions of myopia development, there are a number of less invasive strategies.

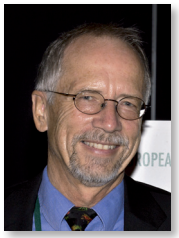
Bright light has an inhibitory effect on myopia development in both animal models and children



Signalling in myopia

but the required intensities and the most effective temporal patterns are not well defined. Also defocus in the periphery of the visual field has an unexpectedly strong effect on the visual control of eye growth, raising the question whether conventional spectacles really represent the optimal solution for the correction of myopia.

However, the most central question “How does the retina know whether the focus of the image is in front or behind?” still remains unresolved.



Frank Schaeffel

- Professor, Biophysicist , Dr. rer. nat.
- Professor and Head of the Section for Neurobiology of the Eye
- Deputy director of the Institute for Ophthalmic Research

Marita Feldkämper

- Dr. rer. nat.
- Head of the molecular biology unit of the Section for Neurobiology of the Eye

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.