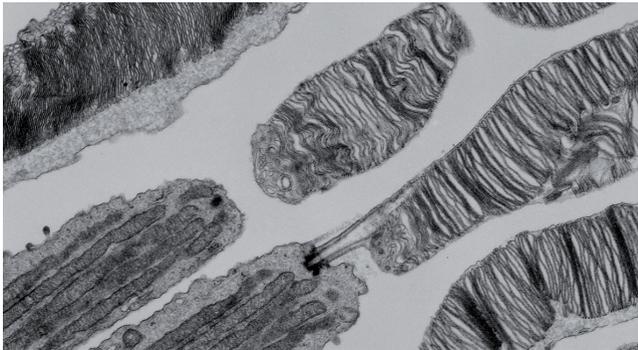


### Exemplary research topics

#### Pathomechanisms causing retinal degeneration

- To elucidate the functions of antioxidative melanin as well as toxic melanolipofuscin and lipofuscin pigments in the RPE
- To investigate the vascular system breakdown in choroid and retina and the mechanisms of pathological neovascularisation
- To investigate the transport of proteins after intravitreal application



#### Development of new treatment strategies

- To eliminate existing lipofuscin and melanolipofuscin from the RPE in order to reduce the progression of dry AMD and M. Stargardt by our own EMA-approved drug

#### Assessment of preclinical drug effects to the eye

- To generate relevant cellular and animal models for preclinical studies (e.g. VEGF over-expression model for CNV)
- To investigate the mode of action of drugs, the drug-pigment interactions in pigmented epithelia and melanocytes and the toxicity in the RPE and photoreceptors

### Institute for Ophthalmic Research Section for Experimental Vitreoretinal Surgery

Head: Prof. Dr. Ulrich Schraermeyer

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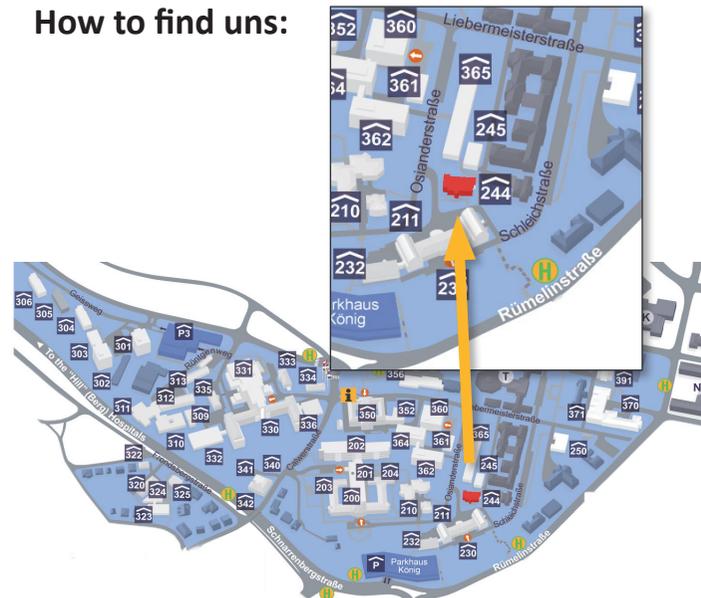
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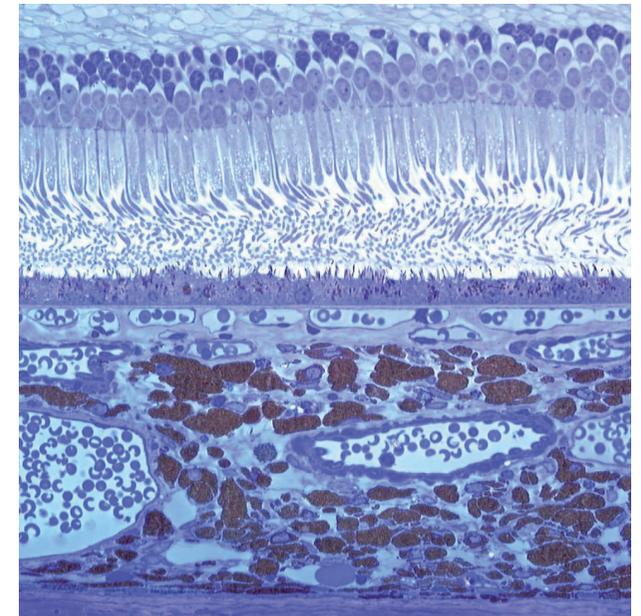
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#### How to find uns:



### Schraermeyer Lab Section for Experimental Vitreoretinal Surgery





Many important eye diseases are caused by malfunction of the vascular system or the retinal pigment epithelium (RPE), both key players in retinal maintenance and survival.

Among these diseases are wet and dry AMD, diabetic retinopathy, retinal vein occlusion and retinopathy of prematurity. Also in ocular tumors angiogenesis is a key event. Angiogenesis and maintenance of existing blood vessels are dependent on growth factors that are currently used as targets for therapeutic interventions.

Thus, we investigate how therapeutic interventions, e.g. which target vascular growth factors

like VEGF, modulate the environment of retina and choroid. The aim is to understand and improve current therapies and to develop future therapeutic options.

Recently we discovered a drug that has the potential to slow down the disease progression of M. Stargardt and dry AMD. This drug has recently obtained Orphan Medicinal Product Designation from the European Medicines Agency (EMA).

Our research is performed in close cooperation with the pharmaceutical industry and patient organizations.



## Ulrich Schraermeyer

- Professor, Dr. rer. nat.
- Head of the Section of Experimental Vitreoretinal Surgery



## Sylvie Julien

- Dr. rer. nat.
- Deputy head of the Section of Experimental Vitreoretinal Surgery

## Methodology

A broad range of experimental techniques is performed in our lab on experimental animals (mice, rats, rabbits, monkeys). Methods range from surgery and drug treatment and *in vivo* diagnostics (OCT, SLO, ERG) to histological analysis of the tissues (including donor tissue).

Our key techniques are immunohistochemistry and electron microscopy (EM), incl. autoradiography and immuno-gold. EM offers insights into many still unknown properties, mechanisms, functions and structures of eye tissues. EM is a great tool that helps to understand molecular biological and physiological findings.

In addition, primary cell culture of RPE, choroidal endothelial cells and thrombocytes from different species (e.g. human, rat, rabbit, dog, pig, monkey) as well as human cell lines (e.g. ARPE19, Y-79) are routinely used for the assessment of ocular toxicity, pharmacokinetics and pharmacodynamics.

# Research toSee

## 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.