

Master Theses

Analysis of pathophysiological mechanisms and development of treatment approaches for neuro-retinal degeneration in ophthalmology

Research

The group of experimental ophthalmology of Prof. Gabriele Thumann has as its primary purpose investigations of the etiology and treatment of retinal degeneration focusing on cell-based gene therapy, cell transplantation, pharmacology, and biomaterial science.

Using non-viral methods we are able to efficiently transfect retinal and iris pigment epithelial cells (RPE and IPE) by stably integrating a recombinant gene into the host cell genome and producing a functional gene product (funded by the SNF and private foundations). Using this technology we are developing new treatment approaches for retinal diseases.

Potential ocular drugs and substances used in ophthalmic surgery are evaluated *in vitro* on their benefit and toxicity in cultures of ocular cells or whole retina cultures. In functional analyses cultured RPE and IPE cells, e.g., are monitored for specific functions using various biochemical methods. Transferring *in vitro* results to *in vivo* conditions, candidate substances are applied or transplanted sub-conjunctivally, -retinally or intra-vitreally to assess biocompatibility in animal models. We are working with healthy mice, rats and rabbits and develop appropriate disease models.

Projects

Several projects are planned and available for a master thesis: Whole organ retinal cultures should be optimized to allow mid-term culture of more than 4 days and to analyze the possible toxicity of perfluorooctan; they should be also used to develop cell-based therapies to treat Age-Related Macular Degeneration or Retinitis Pigmentosa, e.g. Additionally, a fetal serum-free cell culture should be established. Third, we are planning a project to evaluate the characteristics of artificial lenses – why and how some are becoming opaque after implantation?! Finally, the influence of extracellular matrix proteins on RPE biology should be characterized. All studies are supervised by Prof. Thumann but offer the possibility for independent research projects.

Methods

Quantitative Real-Time PCR, phagocytosis assay, viability assays, immunohistology, fluorescence microscopy, cell culture, biochemical and cellular assays like western blot and more.

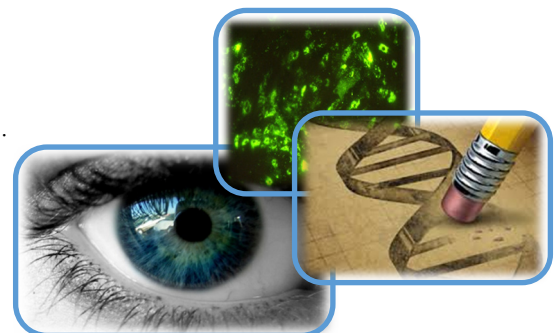
When

Starting in the semesters 2021-2022.

Please send your CV and a motivation letter to Martina.kropp@unige.ch.

Contact

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