



University of
Zurich^{UZH}

Zurich Center for Integrative Human Physiology (ZIHP)

ZIHP Special Seminar

Friday, March 24, 2017, 13:00 h

University of Zurich, Irchel

Lecture room Y03 G91

Dr. Jens Dübel

Institute de la Vision, Sorbonne Universités, Paris

Optogenetic approaches to restore vision and to investigate neural circuits in the retina

The insertion of microbial opsins into retinal neurons is a promising optogenetic approach to restore vision in retinal degenerative diseases. However, the light intensity that is needed for optogenetic stimulation is still very high. Moreover, safety and functionality of microbial opsins have to be tested in the primate retina. To address these issues, we develop cell-type specific optogenetic treatment strategies in the mouse and primate retina, using novel microbial opsins with enhanced light sensitivity and altered action spectra. In addition, we combine optogenetic approaches with cell replacement strategies. Therefore, we introduce microbial opsins into photoreceptor precursors prior to transplantation. With this approach, we ensure that transplanted photoreceptors, derived from human induced pluripotent stem cells (hiPSCs), stay sensitive to light, overcoming a major challenge of photoreceptor replacement therapy. Finally, I will briefly highlight how we employ two-photon-based optogenetic stimulation in combination with electrophysiological recording to investigate neural circuits in the retina.

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