

LS14-067 - In vivo optophysiology in humans using a novel laser interferometric approach

Abstract

Optophysiology are tools and methods for investigating the neuronal activity of cells and measuring their structural changes. For the retina, in particular, this means the detection of scattering changes or changes in the position of specific layers, also referred to as intrinsic optical signals, in response to an optical stimulus. These signals could potentially be linked to spatially resolved retinal function and help to gain a deeper understanding of the pathogenesis of retinal diseases. Optical coherence tomography, a non-contact imaging modality that provides axial and lateral resolutions in the μm -range, allows the recording of in situ biopsies and - with its functional extensions - also the assessment of physiological changes in the tissue under study. In the current project proposal, we plan to investigate intrinsic optical signals induced by light stimulation by means of a novel optical approach called cornea referenced dual-beam Fourier-domain optical coherence tomography. The system provides a methodological inherent compensation for axial eye motion and thus allows assessment of position changes within retinal layers in the order of hundredths of micrometers. Due to its high spatial selectivity, the method has the potential to contribute to functional diagnosis of retinal diseases.

Scientific disciplines:

Ophthalmology (40%) | Medical physics (40%) | Neurophysiology (20%)

Keywords:

Neural activity, laser interferometry, optical coherence tomography, retinal physiology

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Further links to the persons involved and to the project can be found under <https://www.wwtf.at/jpeto2.brunner.at/funding/programmes/ls/LS14-067/>