Aalto University

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Electroretinography enables the monitoring of retinal temperature

Title of the dissertation	Ex vivo and corneal electroretinogram in temperature determination and functional characterization of the retina Ex vivo- ja in vivo -elektroretinografia verkkokalvon lämpötilan määrityksessä ja toiminnan tutkimuksessa
Contents of the dissertation	The first steps in vision take place in the retina, where the information about incoming photons is converted into neural signals. Electroretinography (ERG) provides a method for studying the function of the retina. ERG records the electrophysiological responses of the retina induced by light stimuli. In this doctoral thesis, ERG was applied for studying the function of the retina in two different experimental setups: recording directly from isolated retinal tissue, and recording non-invasively from the cornea of an anesthetized mouse. The thesis demonstrates the similarity of the ERG responses recorded in these two setups. The combination of the two experimental setups was thereafter employed to develop a technique for measuring the temperature changes of the retina. The retinal temperature determination is based on the temperature-dependent properties of ERG responses. The monitoring of retinal temperature may provide a valuable tool for improving the efficacy and safety of the heating treatments of retinal diseases. In these treatments, the retinal temperature should stay inside a narrow range in order to reach the therapeutic benefit while avoiding cellular damage due to overheating.
Field of the dissertation	Biomedical Engineering and Biophysics
Doctoral candidate	Marja Pitkänen, M.Sc. (Tech.)
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