

NEAR INFRARED SPECTROSCOPY TO ASSESS NEURO-VASCULAR COUPLING
CORRELATED WITH SHARP-RIPPLE WAVES IN HIPPOCAMPUS OF SMALL
LABORATORY ANIMALS

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Within the scope of this work, the frequency-resolved method of near-infrared spectroscopy (FD-NIRS) will be applied in hippocampus of mice at a low source-detector separation. FD-NIRS is a non-invasive optical method, based on measurements of changes intensity of modulated light, emitted to the tissue and phase-shift between emitted and detected wave being a measure of the average optical path. The research will include theoretical considerations on modeling the trajectory of photons in the geometry of the infinite medium at low distance between the source point and the detection point using the diffusion equation and the Monte-Carlo method.

The aim of the work is to develop a measurement method that allows the assessment of hemodynamic changes in the hippocampus. The research will be carried out in an invasive manner using optical fibers implemented into the hippocampus. In addition, the aim of the study is to correlate optical signals with sharp-ripple waves signals measured with an electrode placed in the hippocampus between the optodes.