LITHUANIAN UNIVERSITY OF HEALTH SCIENCES

International Summer School Practice

Differences in Calcium Ion Permeability between Human Connexin-37 Polymorphic Variants

This project investigates the calcium ion permeability of human connexin-37 (hCx37) gap junctions formed by the S319 and P319 polymorphic variants. While the P319 variant is clinically associated with an increased risk of cardiovascular disease and exhibits a 1.5-fold higher unitary conductance than S319, its specific permeability to calcium remains undefined. Resolving this gap is physiologically critical: hCx37 is heavily expressed in vascular endothelial cells and localized at myoendothelial junctions, where Ca^{2+} exchange between the endothelium and vascular smooth muscle cells regulates blood pressure.

Students will work with cell lines transfected with either hCx37-S319 or hCx37-P319. Intracellular calcium dynamics will be monitored using the cell-impermeable Fluo-4 indicator, introduced via a patch pipette, with signals captured via fluorescence microscopy. When required, dual electrophysiological and fluorescence recordings will be conducted to correlate channel conductance with permeability.