Abstract:

Mutual cell communication in the human body ensures the proper functioning of the essential mechanisms necessary for the life of the individual and preserving the homeostasis of the whole organism. Such communication is established by various types of signal transmission from the recipient cell to the donor cell, depending on the location and type of communicating cells. One such type is signalization through receptor molecules found on the surface or within the cell receiving the signal. These receptors receive the signal molecule in the form of a ligand and bind it to themselves, while activating the receptor and then triggering the intracellular signaling pathways. The most widely represented receptors in the eukaryotic organism include G-protein-coupled receptors, which represent signaling ensured by activation of the intracellular G-protein complex, and one of the main mechanisms occurring in neuronal signaling and signal transmission in the form of a neurotransmitter. Regulation of the amount of receptors on the surface of the cell and transport of the signal molecule into the intracellular spaces of the cell is ensured by the mechanism of endocytosis, whereby internalization of the ligand-bound receptor in the cytoplasm occurs. One of the most researched mechanisms is clatharin-mediated endocytosis where various intracellular molecules are involved in the endocytosis process and interact with each other. Such molecules include so-called adaptor proteins that are useful for correct membrane tubulation or provide specific binding to the ligand-bound receptor. Recently-found protein called "Src Homology 3-Domain Growth Factor Receptor-Bound 2-Like (Endophilin) Interacting Protein 1" (SGIP1) is believed to affect the course of cannabinoid receptor 1 (CB1R) endocytosis, and therefore could be a component of endocannabinoid system in brain cells. After its elevated level in hypothalamic of gerbil suffering from obesity has been proven, this protein has become an interesting candidate for possible therapeutic use in the treatment of this extremely widespread disease. The aim of this thesis is to examine in more detail the influence of SGIP1 protein on endocannabinoid signaling and its potential involvement in the mechanism of endocytosis. Therefore, recombinant constructs SGIP1 with variations of its various motifs will be created to help us more accurately characterize their function in the effect of CB1R internalization.

Key words: Endocannabinoid signaling, internalization, GPCR