

Abstract

Ankyrin transient receptor potential channel TRPA1 is an excitatory ion channel that transduces nociceptive information on primary afferent sensory nerves of mammals and other organisms. Structure function studies on TRPA1 are valuable for understanding the mechanisms of channel activation and for specific drug discovery efforts, however, significant interspecies differences hamper direct transfer of findings in animals to human. On the other hand, the interspecies differences may prompt identification of many important functional domains. The aim of this bachelor thesis is to give an overview of recent evidence regarding the functional and structural properties of human TRPA1 ion channels from the point of view of the comparison of the most important interspecies differences among TRPA1 orthologs.

The experimental part is focused on the comparison of activation properties of human TRPA1 channel with a chimera in which the fifth transmembrane region was replaced by that from *Drosophila melanogaster*. The presented results obtained by electrophysiological technique *patch-clamp* demonstrate that outward membrane currents induced by depolarizing voltage are significantly reduced in chimera, which indicates an important role of the fifth transmembrane domain in TRPA1 channel gating (In Czech).

Key words: ankyrin receptor, ion channel, nociception, sensory neuron, structure-function