Abstract

Transient receptor potential (TRP) ion channels play important physiological roles in the detection of environmental stimuli that occur primarily at the peripheral terminals of specialized sensory neurons. The recently resolved cryo-electron microscopy structures and molecular biological techniques have provided new tools that enable to study these channels in relation to their function, and thus to understand more deeply their pharmacology and physiology. The aim of this bachelor thesis is to give an overview of the current status of research on the ankyrin TRP channel subtype 1 (TRPA1), a channel activated by diverse irritant chemical stimuli but also by temperature changes. The experimental part is focused on the elucidation of the role of the sensor domain in thermal sensitivity of the TRPA1 channel. Using *whole-cell patch-clamp* electrophysiological technique, the presented results demonstrate that the sensor is an important determinant of voltage-dependent gating. Mutation of the conserved tyrosine in the center of the sensor resulted in channels with clearly different activation kinetics and increased chemical responses upon increasing the temperature from 25 °C to 35 °C.

Key words: TRP ion channel, ankyrin receptor, nociception, structure-function, carvacrol