

Abstract

This bachelor thesis deals with the largest gene family of mammals which encode olfactory receptors. Olfactory receptors fall in rhodopsin-like GPCRs subfamily, approximately 600 - 800 millions of years old. At least from this time, olfactory receptors play, as a part of one of the oldest senses (smell), fundamental role in detection of chemical cues from water or air. This work summarizes large repertoire of olfactory receptors and its changes during the evolution of important animal taxons with emphasis on number and fraction of functional and nonfunctional olfactory receptor genes. Those values are part of criteria used for olfactory ability of animals. Olfactory receptors are typically placed on surface of sensory neuron placed in olfactory epithelium, where they bind various odorants and triggers signal cascade which leads to neuron's membrane depolarization. Therefore, about one half of this work summarizes knowledge of olfactory receptor's molecular biology like their structure, main parts of signal cascade ($G_{\alpha olf}$, ACIII, CNG channel, Ca^{2+} dependent Cl^{-} channel) just as parts needed for steady-state establishment. Expression of olfactory receptors detected in amount of non-olfactory tissues (mussels, sperm, brain etc.), indicate possibly important biomedical roles of this receptors.