Abstract

Purinergic receptors are membrane ion channels that are activated by extracellular ATP. In vertebrates, seven genes encode subunits of P2X receptors. The subunits, designated P2X1-7, are 40 - 50% identical in amino acid sequences. P2X receptors are composed of three subunits and are found as homo- and heterotrimers in tissues of vertebrates. P2X receptors have a wide distribution in the organism, functional receptors are found in neurons, glial cells, muscle cells and also in nonexcitable tissues as epithelial, endothelial, and in hemopoietic tissue. Purinergic signalling plays an important role in pain transmission, at CNS injury and immune processes. P2X receptor subunit consists of two transmembrane domains, extracellular domain and intracellular N-and C-termini. Each transmembrane domain contains two amino acids conserved across all P2X subunits. In the first transmembrane domain receptor P2X2 are that Gly30 and Tyr43.

In previous experiments performed on P2X2 receptor, electrophysiological measurements demonstrated that substitution of conserved Tyr43 in the first transmembrane domain with alanine prolongs the deactivation time of ion channel after agonist wash out. This work is focused on clarifying the role of conserved tyrosine in the process of opening and closing of ion channel of P2X receptors and its influence on the stabilization of the closed state of the ion channel.