

## Investigation of the temperature-sensitive gating of TRPV2 channel by molecular dynamics simulation

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**Abstract:** The transient receptor potential V2 (TRPV2) protein is a member of the TRP superfamily of nonselective cation channels. This channel is activated at high temperature ( $> 52\text{ }^{\circ}\text{C}$ ). TRPV2 is expressed in large sensory neurons but also at lower levels in other tissues. TRPV channels mediate  $\text{Ca}^{2+}$  entry and change the concentration of  $\text{Ca}^{2+}$  have important role in intracellular processes such as cell cycle apoptosis, differentiation and etc. Extracellular domains of this channel play an important role in ligand binding. Function of TRPV2 and other TRPV channels remain unknown. Structure of the full-length TRPV2 channel has been characterized structurally at high resolution by cryo-EM. The pore of apo-TRPV2 consists of two constrictions or gates. In this work, all the MD simulations were performed by the GROMACS-5.0.1 package. At first, the membrane model was equilibrated for 50 ns, then the TRPV2 channel was embedded into the membrane. System composition of lipid bilayer is POPC, POPE and CHOL. MD simulations allow us to obtain key insights into the mechanism of ion channel selectivity, ion penetration and pore-lining residues in TRPV2 channel. Analysis of TRPV2 dynamic behavior with focus on pore changes shows that the high temperature causes structural changes in the channel pore.

**Keywords:** Calcium ion; Molecular dynamics; TRPV2; Temperature-sensitive

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