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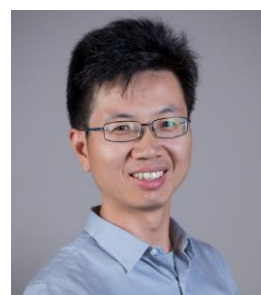
Uncovering the hidden gates of complex ion channels

报 告 人: Professor Jianhan Chen

University of Massachusetts, Amherst

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报告摘要:

Ion channels regulate the flow of ions through membranes in numerous cellular processes and are broadly involved in various human diseases. They generally contains gating structures that open and close to control the flow of ions. Emergence of Cryo-EM technology has led to an explosion of channel structures captured in different conformational states in recent years. However, identification of the gate and particularly gating mechanism can be very challenging. Here I will discuss two examples from collaborative efforts in uncovering the hidden gates of ion channels. The first one concerns the calcium-gated big potassium (BK) channels, where both structures with and without bound calcium show wide open transmembrane pores. The second example focuses on the recently discovered TMEM16 family, which includes both long-sought-after calcium-activated chloride channels (CaCC) and calcium-activated phospholipid scramblases (CaPLSases). Combining homology modeling, atomistic simulation and mutagenesis, we have identified an inner activation gate and discovered a general 'clam shell' mode for gating of TMEM16 family proteins. These successes highlight the exciting current opportunity for leveraging atomistic simulations to bridge structural and functional studies of complex ion channels.

报告人简介:

Jianhan Chen is a professor of Departments of Chemistry and Biochemistry & Molecular Biology at the University of Massachusetts, Amherst. He received a Bachelor's of Chemistry from University of Science & Technology of China and received his PhD in Chemical and Material Physics, University of California at Irvine. His research is focused on Computational biochemistry and biophysics and NMR spectroscopy. He has ~ 70 journal articles published or in press; H-index = 31.

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