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THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY
Division of Life Science

Seminar Notice

"Single particle cryo EM study of eukaryotic voltage-gated sodium channels"

by

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Abstract

Voltage-gated sodium (Nav) channels play a key role in action potential by mediating the flowing of sodium ions into cells. They are targeted by many toxins and drugs and related with a variety of diseases. We have determined a near atomic resolution structure of a Nav channel at 3.8 Å from American cockroach by single particle cryo electron microscopy (EM) which has emerged and developed over the past few decades and has become a powerful tool for structure determination of biological macromolecules in the last few years. The structure provides insight into the mechanism of voltage sensing and ion permeability and foundation for understanding function and disease mechanism of Nav. We have also solved the structure of EeNav1.4, a Nav channel from electric eel, in complex with β1 subunit at 4.0 Å resolution. The immunoglobulin domain of β1 binds onto the extracellular surface of EeNav1.4 via extensive polar interactions, and the single transmembrane helix interacts with the third voltage-sensing domain (VSD). The VSDs of EeNav1.4 are in "up" conformation, while the intracellular gate of the pore domain is kept open by a digitonin-like molecule. Structural comparison between these two sodium channels shows that there is outward transfer of gating charges in EeNav1.4 coupled to an iris-like pore domain dilation. The fast inactivation motif on the III-IV linker of EeNav1.4 is dramatically repositioned, suggesting a potential allosteric mechanism for fast inactivation.

Date : 12 February 2018 (Monday)

Time : 2:30 p.m.

Venue : Room 2304 (Lifts 17-18)
The Hong Kong University of Science & Technology
Clear Water Bay, Kowloon

(Host faculty: Prof. Mingjie Zhang)

ALL ARE WELCOME!!