CDB SEMINAR

Yoichiro Mori

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Friday, June 26, 2015
16:00~17:00   Seminar Room D2F

Modeling Electrodiffusion and Osmosis in Physiological Systems

Summary

Electrolyte and cell volume regulation is essential in physiological systems. Despite its importance, mathematical modeling in this area is relatively sparse. After a brief introduction to cell volume control and electrophysiology, I will discuss the classical pump-leak model of electrolyte and cell volume control. This classical model will be generalized to a system of partial differential equations (PDE) that incorporates tissue-level electrodiffusive, convective and osmotic phenomena. This model will then be applied to the study of cortical spreading depression, a wave of ionic homeostasis breakdown, that is the basis for migraine aura and other brain pathologies. Time permitting, I will also discuss our recent attempt at formulating a PDE system modeling cell-level electrodiffusive and osmotic phenomena, and its application to the study of the role of osmotic pressure in cell movement.

Host:
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