Department of Biomedical Engineering

Research Student Seminar Series

(Supervised by Prof. King LAI)

Rushing-Hopping Mode for Nondestructive Intracellular Electrophysiological Recordings

Mr. Shengjie YANG
Ph.D. candidate

Date:	November 29, 2023
Time:	2:45pm-3:15pm
Venue:	B6619 Conference Room, 6/F, Blue Zone, Yeung Kin Man Academic Building

Abstract

Patch clamp is the primary tool for quantitative recordings of ion channel currents in cell membranes. However, the break-in procedure to achieve whole-cell configuration results in cell death. In this paper, we propose a rushing-hopping mode to harvest intracellular electrophysiological recordings without cell membrane damage. The mechanism penetrates the cell membrane by oscillating the micropipette tip. After micropipette withdrawal, the cell membrane repairs the contact wound and heals. High-resistance micropipettes and precise micromanipulation are required to implement the measurement procedures. The parameters

for the proposed mode are experimentally specified. For the performance validation, HEK293 cells are employed for whole-cell voltage clamp recordings by this novel mode and traditional mode. It is investigated that the two electrophysiological results are consistent. Electrically stimulated myotube contractions of C2C12 cells are carried out by the rushing-hopping mode to illustrate electrophysiological activities. The completion time for one test is recorded as 5-10 minutes. The experimental results demonstrate the proposed mode could be applied practically to nondestructive intracellular electrophysiological recordings.

Biography

Shengjie YANG is now pursuing a Ph.D. degree in Dr. King Lai's group with the Department of Biomedical Engineering, City University of Hong Kong. His research interests include patch clamp techniques, bio-nanotechnology, and micro-nano manipulation.

All are Welcome!

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