



The Chinese University of Hong Kong

Department of Biomedical Engineering



Time: 10:00 – 11:30 am, 28 May 2019 (Tuesday)

Venue: Room 215, William M.W. Mong Engineering Building

Neuromodulation to restore functions after spinal cord injury



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Abstract

Spinal Cord Injury (SCI) is a devastating neural dysfunction affecting large population worldwide. SCI results in paralysis, pain, paresthesia and autonomic dysfunctions. Current medical and rehabilitative treatments only ameliorate the symptoms and complications that arise from the injury. While modern regenerative therapies have shown promising results in rodent models, they do not translate to human. In contrast, our neuromodulation studies that utilize electrical and pharmacological stimulations to the spinal cord have shown successful restoration of functions after severe paralysis. In this seminar, I shall present a number of studies on spinal cord neuromodulation including epidural electrical stimulation and serotonin (5HT) receptor agonist for functional improvements of SCI animals; and discuss on the exciting translation of these research into clinics for the treatment of SCI. Some engineering works relating to brain-machine interfacing (BMI) and wireless stimulation devices to provide volitional neuromodulation will also be presented in the seminar. Finally, a fresh up-to-date status on restorative neuromodulation for SCI rehabilitation will be presented to challenge to change the old dogma associated with the basic understanding of a spinal lesion and so-called “irreversible paralysis”.

Biography

Dr. Alam is a researcher with mixed background in neuroscience, rehabilitation, and engineering. He received his Masters in Bioengineering from the Miguel Hernandez University of Elche in 2010. In 2013, he received his Ph.D. from the Department of Rehabilitation Sciences, The Hong Kong Polytechnic University. He also received postdoctoral training from Edgerton Neuromuscular Research Laboratory, Department of Integrative Biology and Physiology, University of California Los Angeles (UCLA). Both his PhD and postdoctoral research had been focused on spinal cord injury repair and rehabilitation. Before joining to the Department of Biomedical Engineering, The Hong Kong Polytechnic University, he was a Research Fellow at Singapore Institute for Neurotechnology, National University of Singapore (NUS). Dr. Alam's research is grounded in fundamentals in the field of system neuroscience with applications to prosthetics and rehabilitation following injuries in the central and/or peripheral nervous system. His major research interest is on sensory and motor control of movements. Dr. Alam's key research aim is to understand the neural mechanisms underlying the function and recovery after injuries of the sensorimotor system. Electrophysiology, pharmacology and neurostimulation are the common techniques applied in his research. He also applies modern engineering techniques to utilize this neural system for prosthetic applications.

***** ALL ARE WELCOME *****

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