Department of Biomedical Engineering

The Chinese University of Hong Kong

Graduate Seminar – PhD Oral Defence

Student	***:***	Ms. LAU Sze Ho Gwyneth
Supervisor	***:***	Prof. CHOI Chung Hang Jonathan
Date	***:***	3 August 2026 (Monday)
Time	***:***	2:00 pm
Venue	***:***	Room 1122, William M W Mong Engineering Building, CUHK

Title: Delivery of Gold Nanoparticles for Alleviating Chronic Peripheral Neuropathic Pain

Persistent pain sensation beyond normal healing period of 3 months defines chronic pain. Unrelieved pain not only causes disability, impaired sleep and depression but also incur enormous costs of medical intervention that disrupts patients' quality of life physically, psychologically and financially. The prevalence of chronic pain is 30% globally. Peripheral neuropathic pain (PNP) caused by peripheral nerve injuries or neuropathies is one of the most prevalent types of chronic pain (around 10% globally). Despite that pain drugs dominate over pain devices in the market due to easy accessibility, long-term use of these drugs including cannabinoids, opioids, antidepressants, and anticonvulsants causes adverse side effects, such as nausea, addiction, cognitive issues and kidney problems.

Pain nanomedicines are emerging to use nanoparticles (NPs) as carriers of small-molecule inhibitors or analgesics. They improve drug loading efficiency and prolong blood pharmacokinetics that enhance delivery to specific pain sites to reduce systemic toxicity. Preclinical nanomedicines for PNP are typically loaded with inhibitors of signaling pathways. Yet, they often become too large to package drugs into a single NP entity to cross the blood dorsal root ganglion (DRG) barrier (BDB) or blood nerve barrier (BNB), therefore require invasive intrathecal injection to ensure delivery to key pain transmission sites in the spinal cord or DRG. This thesis presents a less-invasive intravenous delivery of small gold nanoparticles to penetrate BNB and BDB and enter neurons and satellite glial cells in the injured DRG for PNP alleviation without carrying any known chemical or biological drug. This work not only broadens the understanding of BDB and BNB alternations under PNP conditions but also offers mechanistic insights into peripheral neural cell interactions with self-therapeutic gold NPs for PNP treatment. It also highlights the potential of self-therapeutic gold nanomedicine for clinical translation in chronic pain management and improving patient quality of life.

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

For enquiries, please contact Ms. Joyce Chan, Department of Biomedical Engineering at 3943 8278