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香港大學藥理及藥劑學系

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Presents

Seminar series — Drug Delivery and Translational Medicine

Minimalist Design of Biomimetic Materials



by

Prof. Ying CHAU

Professor
Department of Chemical and Biological Engineering,
The Hong Kong University of Science and Technology

Date: 24 February 2023 (Friday)

Time: 10:00 a.m.– 11:00 a.m.

Venue: Lecture Theatre 2, G/F William MW Mong Block,
LKS Faculty of Medicine

Abstract:

Short oligopeptides were designed to capture the functional features of viral capsid protein. In the first generation design, 16 a.a. peptides co-assembled with plasmid DNA into nanostructures with well-defined patterns and conferred high stability of the encapsulated DNA. To improve the transfection efficiency, the peptide design has evolved to optimize nucleic acid-binding, endosomal escape, redox-sensitivity, and nuclear trafficking. In the most recent work, micron-sized peptide/RNA co-assemblies displaying liquid-like properties were found to attain superior transfection efficiency via direct delivery of the nucleic acid to the cytosol. In the second part of the talk, I will describe a biomaterial designed to recapitulate the scaffold protein of membraneless organelles (MLOs), based on the concept of associative polymer theory. The resulting construct was named intrinsically disordered protein-mimicking polymer-oligopeptide hybrid (IPH). IPHs displayed properties characteristic of MLOs, including liquid-liquid phase separation, enrichment biomacromolecules, and localized enhancement of biochemical reactions. Using IPHs with different degree of modification, artificial MLOs containing multiple compartments were constructed to render the segregation of transcription and translation and their directional flow as observed in the nucleus and cytosol.

Bio:

Prof. Ying Chau is a Professor in the Department of Chemical and Biological Engineering at The Hong Kong University of Science and Technology (HKUST). Her current research interests include the design and translation of drug delivery approaches and biomaterials for ocular applications and immunotherapy, as well as self-assembled nanostructures derived from polymers and biomolecules. The technologies developed from her lab are now being commercialized by start-up companies in Hong Kong and Shenzhen. Currently, she is serving on the board of directors of the Nano and Advanced Materials Institute Limited (Hong Kong), and the editorial boards of *Advanced Drug Delivery Reviews* (Elsevier) and Associate Editor of *Drug Delivery* (Taylor & Francis) and *Frontiers in Drug Delivery*. She is also deeply interested in education innovation and a strong advocate for empowering students for impact creation. She is the Founder and Director of Student Innovation for Global Health Technology (SIGHT) at HKUST. She and her team were recognized as finalists in the 2021 UGC Team Teaching Award. She was named the “Leading Woman in STEM” at the 2021 Annual Women of Influence (WOI) Conference & Awards organized by the American Chamber of Commerce in Hong Kong (AmCham).