



Department of Biomedical Engineering

香港城市大學
City University of Hong Kong

Hosted by Prof. Qinrong ZHANG

Curiosity-driven research; Deconstructing RNA granules

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Time: 10:00 am - 11:00 am

Venue: YEUNG-Y4302

Yeung Kin Man Academic Building

Abstract

Biomolecular condensates (BCs) are specialized subcellular structures composed of proteins and nucleotides that assemble through a unique process known as liquid-liquid phase separation (LLPS). These condensates play critical roles in cellular organization and are increasingly linked to human diseases. However, the precise physiological functions of LLPS—particularly its role in maintaining cellular homeostasis—remain poorly understood. One major challenge has been the lack of tools to selectively disrupt LLPS without altering the underlying molecular components. To address this gap, we developed a novel molecular tool that enables the rapid and targeted dispersion of specific biomolecular condensates. Using this approach, we have, for the first time, directly tested the functional importance of LLPS in the formation and behavior of stress granules—membrane-less organelles that emerge in response to cellular stress.

Biography

Inoue is a synthetic cell biologist whose work bridges science and innovation. He creates cutting-edge molecular tools that allow researchers to visualize and control the inner workings of cells with remarkable precision. By developing technologies like light-activated switches and fluorescent sensors, Inoue and his team are uncovering how cells move, divide, communicate, and respond to their environment. Their research sheds light on essential cellular structures—such as the primary cilium—and processes like cell locomotion, the cell cycle, and phagocytosis (how cells “eat” particles). These discoveries are not only advancing our fundamental understanding of biology but also offering new ways to explore the root causes of diseases, with potential applications in medicine and biotechnology.