

Inositol polyphosphate metabolites in metabolic signaling and diseases

Asso. Prof. Feng Rao
School of Life Sciences,
Southern University of Science and Technology

Date : 21 September 2023

Time : 10:30am - 12:00 noon

Venue : G4302, Green zone, 4/F, Yeung Kin Man Academic Building

Abstract

The inositol polyphosphates (InsPs) originate from the membrane lipid PIP₂. Except IP₃, InsPs are relatively understudied metabolites when compared to the phosphoinositides. In the past years, our lab have uncovered physiological roles for the higher inositol phosphates including IP₆ and IP₇. The more abundant IP₆ was identified as an intermolecular glue between the Cullin RING E3 Ligases (CRL) and their inhibitor: CSN, thereby instilling dynamics CRL activation and proteostasis regulation to safeguard glucose-induced insulin secretion and to restrain pro-tumorigenic glycometabolism (PNAS, 2020; Nat Comm. 2021; Mol Cell 2023). IP₇, on the other hand, is an energetic molecule that is dynamically synthesized in response to GPCR activation, thus acting as a GPCR messenger to transmit intercellular communications. In particular, we demonstrate a role for IP₇ in acetylcholine-mediated neural regulation of metabolism, whereby it works together with Ca²⁺ as coincident messenger to trigger synaptotagmin-dependent insulin vesicle exocytosis (Nat Metab 2023). These findings shed light on the biochemical principles and physiological functions of the higher inositol polyphosphate metabolites.

About the Speaker

Dr. Rao is currently tenured associate professor at the School of Life Sciences, Southern University of Science and Technology (SUSTech). He obtained his B.Sc. from National University of Singapore, his Ph.D. from Nanyang Technological University, and conducted his postdoctoral training at Johns Hopkins University School of Medicine, where he worked with Lasker Laureate Prof. Solomon H. Snyder on physiological roles and signaling mechanisms of inositol polyphosphate metabolites. Before joining SUSTech in 2016, he was assistant investigator at the National Institute of Biological Sciences.

Dr. Rao's research group studies the signaling principles of emerging messenger molecules and their metabolic enzymes, with an emphasis on how they are integrated into cellular (patho)physiology under disease micro-environment. His work have attracted attentions in the form of journal Commentaries, Highlights, or F1000 recommendations, and are recognized with awards such as the National Excellent Young Scholar, the Shenzhen Outstanding Young Scholar, and the Young Investigator Award from the Chinese Society of Metabolic Biology.

Enquiries:

Ms Joyce Tan (3442-2924, joyce.tan@cityu.edu.hk)

Ms Irene Wong (3442-4707, irene.wong@cityu.edu.hk)

All are welcome!