CeMMP

Australian Government
Australian Research Council

MONASH University

bio21 institute

MOLECULAR HORIZONS

WEHI brighter together

SEMINAR SERIES 2026

8 September, 10:00 AM AEST

Prof. John Rubinstein

Molecular Medicine Program, The Hospital for Sick Children

Departments of Biochemistry and Medical Biophysics, The University of Toronto

John Rubinstein received his PhD from Cambridge University in 2002 for work done at MRC Laboratories with Sir John Walker and Dr. Richard Henderson. He is a Senior Scientist and Tier 1 Canada Research Chair at The Hospital for Sick Children and a Professor in the Departments of Biochemistry and Medical Biophysics at the University of Toronto. John's laboratory uses and develops cryo-EM methods, having contributed numerous tools and approaches now in frequent useworldwide for specimen preparation, imaging, and computational image analysis. His group used these methods to determine the first high-resolution structures of ATP synthases and V-type ATPases. Most recently, his team has been using cryo-EM to understand oxidative phosphorylation in mycobacteria to support the development of new therapies for tuberculosis and related infections. John was awarded an Honorary Doctorate from Stockholm University and elected as a Fellow of the Royal Society and a Fellow of the Royal Society of Canada.

Cryo-EM of endogenous protein complexes from the mycobacterial electron transport chain

Oxidative phosphorylation, the combined activities of the electron transport chain and ATP synthase, has emerged as an important target space for therapeutics to treat tuberculosis and other mycobacterial infections. We have used electron cryomicroscopy and biochemical assays to interrogate the structure and function of endogenous mycobacterial ATP synthase and electron transport chain complexes, including imaging the proteins in their native lipid bilayer. These studies reveal how small molecule inhibitors block the activities of key enzymes in the process. They also demonstrate that several of the molecular machines that carry out oxidative phosphorylation in mycobacteria exhibit striking differences from canonical forms of the enzymes.