CeMMP Centre for Cryo-electron Microscopy of Membrane Proteins

SEMINAR SERIES 2022

## A/Prof. Megan Maher

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Megan Maher was awarded a PhD in Inorganic Chemistry from the University of Melbourne in 1998. She carried out postdoctoral research at the University of Sydney from 1998-2005, funded by a series of independent Fellowships from the Australian Synchrotron Research Program, the Australian Research Council and the University of Sydney. Between 2006-2007, she held the position of Team Leader in the Membrane Protein Crystallography Laboratory, headed by Professor So Iwata at Imperial College, London. In 2008 Megan returned to the Centenary Institute in Sydney, on a Career Development Fellowship funded by the Cancer Institute of NSW. Megan relocated to La Trobe University at the beginning of 2012 to take up a position as LIMS Senior Research Fellow. In 2015 she was appointed to the position of Senior Lecturer and Associate Professor in 2018. In 2017 Megan was awarded the Georgina Sweet Award for Women in Quantitative Biomedical Science and an ARC Future Fellowship in 2018. Megan joined the School of Chemistry and Bio21 institute at the University of Melbourne in 2019 as part of the University's Driving Research Momentum (DRM) strategy. Megan's current research focuses on investigating the role of trace metals in biological systems, with a particular focus on the structural biology of metalloproteins and integral membrane protein transporters.

## Structural insights into manganese transport across membranes

Metal ions are essential for all forms of life. In prokaryotes, ATP-binding cassette (ABC) permeases serve as the primary import pathway for many micronutrients including the first-row transition metal manganese. However, the structural features of ionic metal transporting ABC permeases have remained undefined. This presentation will describe the crystal structure of the manganese transporter PsaBC from Streptococcus pneumoniae in an open-inward conformation. The Type II transporter has a tightly closed transmembrane channel due to 'extracellular gating' residues that prevent water permeation or ion reflux. Below these residues, the channel contains a hitherto unreported metal coordination site, which is essential for manganese translocation. These structural features are highly conserved in metal-specific ABC transporters and are represented throughout the kingdoms of life. Collectively, our results define the structure of PsaBC and reveal the features required for divalent cation transport.