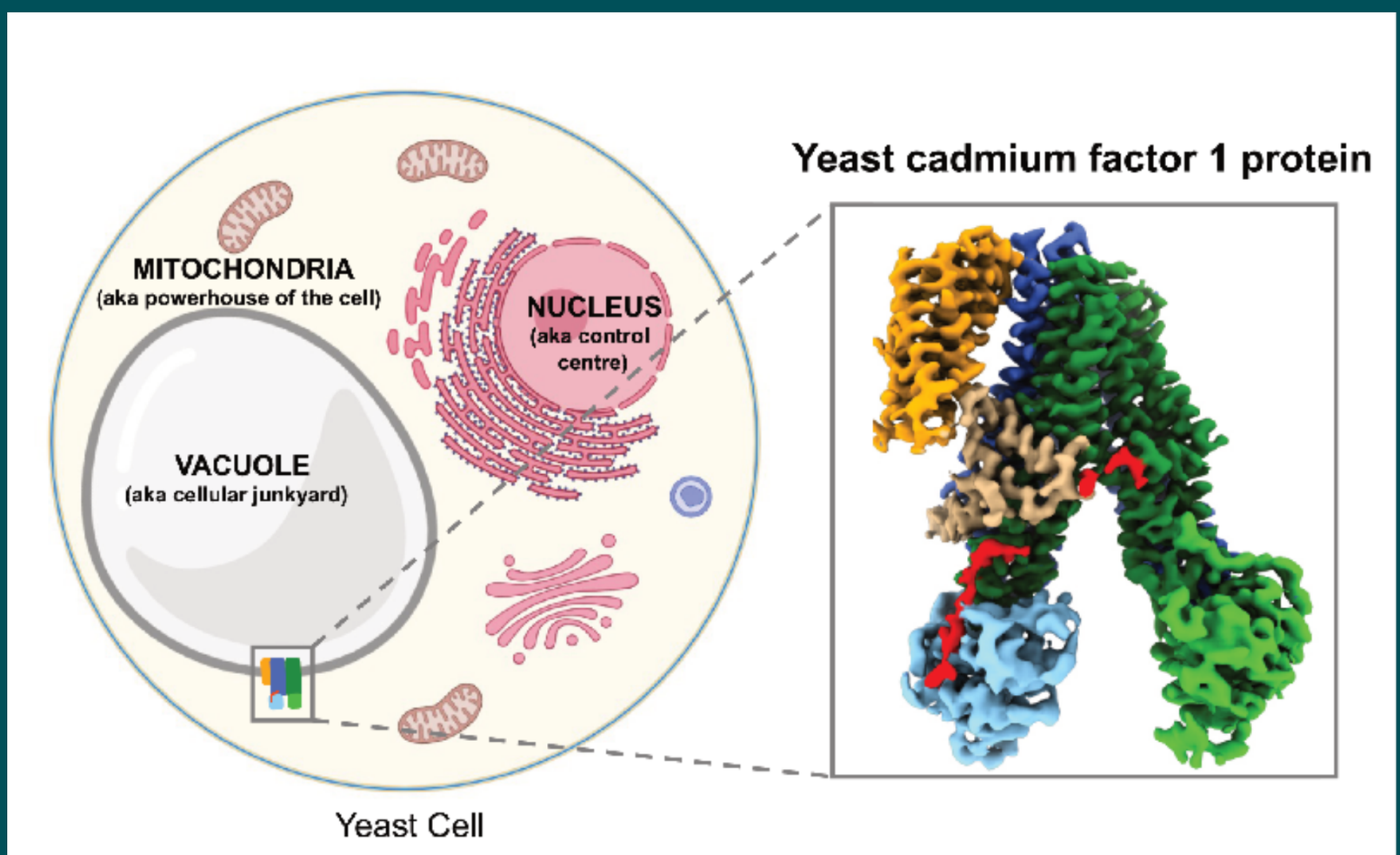
Chemical & Physical Sciences
UNIVERSITY OF TORONTO
MISSISSAUGA

COLLOQUIUM SEMINAR SERIES

A STRUCTURAL INVESTIGATION INTO THE MEMBRANE PROTEIN YCF1P



Membrane transport proteins move molecules, such as nutrients and toxins, across biological barriers and are vital for life. One important class of transport proteins are the ATP binding cassette, or ABC proteins. ABC proteins are found in all organisms, and use the cellular energy molecule, ATP, to move substrates across biological membranes against their concentration gradients. ABC proteins are further sub-classified based on the similarity of their structural features. Of particular interest is the C family of ABC proteins (called ABCC proteins). Genetic changes (or mutations) in ABCC proteins cause numerous diseases, such as cystic fibrosis and diabetes. Additionally, aberrant action of ABCC proteins can render cells resistant to antibiotics, chemotherapeutics, and other drugs.

Although ABCC proteins are well characterized, the structure (or 3D shape) of regions of the proteins that are involved in regulation of ABCC activity has remained elusive. Our high-resolution structure of the yeast ABCC protein Yeast cadmium factor 1 protein (Ycf1p) provided atomic-level information for two previously structurally uncharacterized elements. Our Ycf1p model highlights the structural features of a protein module found in the membrane, which is known as transmembrane domain 0 (TMD0) and is unique to the ABCC family. Additionally, our Ycf1p model provides molecular-level information about a disordered protein segment, which is known as the regulatory region and is chemically modified in cells. Because yeast Ycf1p is similar to human ABCC proteins, our Ycf1p structure demonstrates how mutations in TMD0 and the regulatory region lead to several disease-causing mutations.

CPS AWARDS COLLOQUIUM

Wednesday, February 2, 2022

Join us on Zoom at 3:10pm

https://utoronto.zoom.us/j/88646928603

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