NUS National University of Singapore | Department of Biological Sciences
Faculty of Science

VIRTUAL BIOLOGY COLLOQUIUM

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Hosted by A/P Cynthia He

Cytoskeletal architecture and cell morphogenesis in *Trypanosoma brucei*

By Christopher de Graffenried

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Trypanosoma brucei causes human African trypanosomiasis and the livestock disease known as nagana, which both cause significant health and economic burdens in sub-Saharan Africa. Key to survival within hosts is the shape of the parasite, which allows it to move rapidly through crowded, high-viscosity environments such as blood and tissue. This shape comprises a tapered posterior and a narrow, pointed anterior end, generated and maintained by a helical sheath of microtubules (MTs), which underlies the cell surface and is termed the subpellicular array (SPA). Our goal is to establish the molecular mechanisms that drive SPA assembly and maintenance, which will determine how trypanosomes shape their cells. To do this, we are studying a series of MT-associated proteins including MT-crosslinking proteins and molecular motors using cell biological and biophysical approaches. Our research will contribute to a better understanding of the plasticity of MTs and the structures they create in an early branching eukaryote, which is vital to establishing their fundamental properties and potential functions in a broader range of eukaryotes.

About the Speaker

My diverse training in chemical biology, cell biology, and parasitology has given me a unique skillset to study cytoskeletal biogenesis in trypanosomatids. My graduate work in the laboratory of Carolyn Bertozzi focused on the importance of the localization of Golgi-resident enzymes in their substrate specificity and the production of cell surface glycoconjugates. I pursued my interest in the Golgi in the lab of Graham Warren at Yale and the Max Perutz Lab in Vienna, where I showed that the Trypanosoma brucei Polo-like kinase homolog (TbPLK) is important for Golgi biogenesis. We performed a series of proteomic screens to identify novel TbPLK binding partners and substrates, which uncovered key components of several cytoskeletal structures that had previously only been described morphologically. Since starting at Brown University, the primary goal of my laboratory has been to use these novel protein components to develop a molecular understanding of cytoskeletal biogenesis in T. brucei.

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