



# BiophysTO Lunchtime Seminar Series

## Date

Thursday, Jan 26, 2023  
12:00 – 1:00 pm

## Location

McLennan Physical  
Laboratories, 60 St  
George street.  
Room: MP606

## Dr. Michael J. Norris

Department of Biochemistry  
University of Toronto

# Lipid Binding Drives Measles and Nipah Virus Matrix Protein Polymerization and Virion Assembly

Measles virus, Nipah virus, and multiple other emerging and re-emerging paramyxoviruses cause repeated disease outbreaks in humans and animals worldwide. The paramyxovirus matrix protein mediates virion assembly and budding from host cell membranes. The matrix protein is thus a key target for antivirals, but few high-resolution structures of paramyxovirus matrix proteins are available, and we lack the clear understanding of how viral matrix proteins interact with membrane lipids to mediate viral assembly and egress that is needed to guide antiviral design. Here, we reveal that phosphatidylserine and phosphatidylinositol-4,5-bisphosphate (PI(4,5)P<sub>2</sub>) mediate measles virus and Nipah virus matrix protein interactions with host membranes. We describe the first high-resolution crystal structures for measles virus and Nipah virus matrix proteins and demonstrate that PI(4,5)P<sub>2</sub> binding induces extensive conformational changes in the matrix protein surface with a crystal structure of Nipah virus matrix protein bound to a soluble form of PI(4,5)P<sub>2</sub>. We further show that these lipid-induced structural rearrangements alter the matrix protein shape and electrostatics, to promote membrane curvature and matrix protein lattice polymerization that together form the virion.

Host: Dr. Walid A. Houry



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