Membrane Penetration by Nonenveloped Viruses

DMR MRSEC 1420382

2017

To infect cells, viruses must translocate their genome across the cell membrane. For nonenveloped viruses – those lacking the membrane envelope – the process of membrane penetration is poorly understood. The Seed project in the Ivanovic lab seeks to establish a single molecule imaging-based approach to study membrane penetration by reovirus, a model nonenveloped virus.

The main challenge of this experimental strategy is to develop a method for enclosing virions in membrane vesicles. This has been achieved previously for proteins (~1e5Da), but not for a thousand-fold larger virus particles (~1e8Da). One approach being explored is to facilitate virion envelopment by membranes during liposome formation by including membrane components that bind virions. Ivanovic has generated high-purity reovirus preparations and demonstrated direct binding of virions to synthetic liposomes. This sets the stage for virion envelopment experiments.



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