

Host Cell Membrane Lipid Rafts Are Required for Influenza A Virus Adsorption to Host Cell Surface

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Abstract : Influenza still remains one of the most challenging diseases posing significant threat to public health causing seasonal epidemics and pandemics. Previous studies suggest that influenza hemagglutinin is essential for viral attachment to host sialic acid receptors and concentrate in lipid rafts for efficient viral fusion. Studies also reported selective nature of Influenza virus to utilize rafts micro-domain for efficient virus assembly and budding. However, the detailed mechanism of Influenza A Virus (IAV) binding to host cell membrane and entry inside the host remains elusive. In the present study, we investigated if host membrane lipid rafts play any significant role in early life cycle events of influenza A virus. Role of host lipid rafts was studied using raft disruption method by extraction of cholesterol and Methyl- β -Cyclodextrin was used to remove membrane cholesterol. We observed co-localization of Influenza A Virus to lipid rafts by visualization of known lipid raft marker GM1 on host cell membrane. Co-localization suggest direct involvement of these micro-domain in initiation of IAV life cycle. We found significant reduction in influenza A virus adsorption in raft disrupted target host cells indicating poor binding and attachment in absence of coherent membrane rafts. Taken together, the results of present study provide evidence for critical involvement of host lipid rafts and its constituents in adsorption process of Influenza A Virus and suggests crucial involvement in other early events of IAV life cycle. The present study opens a new domain to study influenza virus-host interaction and to combat flu at the very early steps of viral life cycle.

Keywords : lipid raft, adsorption, cholesterol, methyl- β -cyclodextrin, GM1

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