

Critical Role of Lipid Rafts in Influenza a Virus Binding to Host Cell

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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. Influenza A Virus (IAV) surface protein hemagglutinin is known to play an important role in viral attachment to the host sialic acid receptors and concentrate in lipid rafts for efficient viral fusion. Selective nature of Influenza A virus to utilize rafts micro-domain for efficient virus assembly and budding has been explored in depth. However, the detailed mechanism of IAV binding to host cell membrane and entry into the host remains elusive. In the present study we investigated the role of lipid rafts in early life cycle events of IAV. Role of host lipid rafts was studied using raft disruption method by extraction of cholesterol by Methyl- β -Cyclodextrin. Using GM1, a well-known lipid raft marker, we were able to observe co-localization of IAV on lipid rafts on the host cell membrane. This experiment suggests a direct involvement of lipid rafts in the initiation of the IAV life cycle. Upon disruption of lipid rafts by Methyl-b-cyclodextrin, we observed a significant reduction in IAV binding on the host cell surface indicating a significant decrease in virus attachment to coherent membrane rafts. Our results provide proof that host lipid rafts and their constituents play an important role in the adsorption of IAV. This study opens a new avenues in IAV virus-host interactions to combat infection at a very early steps of the viral lifecycle.

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

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