ID der Kurzfassung : **146**

Host Membrane Lipid Composition Regulates Influenza A Virus Attachment and Membrane Fusion

Inhalt

Influenza A virus (IAV) initiates infection by binding sialylated glycans on the host cell surface, yet the membrane factors regulating this interaction remain incompletely understood. Here, we investigated how the host membrane lipid composition regulates IAV attachment and fusion using single-virus microscopy in chemically defined membrane systems, complemented by biophysical measurements.

We found that sphingomyelin markedly enhanced IAV attachment to GD1a glycosphingolipid receptors in a cholesterol-dependent manner, identifying a cooperative role for these lipids in promoting high-avidity viral binding. Our data support a model in which sphingomyelin and cholesterol drive nanoscale liquid-liquid phase separation, locally concentrating viral receptors and thereby enhancing multivalent virus-receptor interactions. Interestingly, the same membrane composition delayed viral fusion, suggesting that the lipid environment established during attachment also influences subsequent membrane fusion. Consistent with these findings, cholesterol depletion significantly reduced IAV binding to A549 cells.

Together, our results identify host membrane lipid composition as a key regulator of influenza virus entry and suggest that nanoscale membrane organization enhances viral attachment while modulating downstream fusion. These findings provide new insight into how host membrane architecture contributes to influenza infection and may represent a target for antiviral intervention.

Keywords

viral attachment, membrane fusion, biophysics, single-virus microscopy

Registration ID

INF26- 96

Professional status of the speaker

Postdoc

Junior scientist status

Yes, I am a junior scientist.

Track Klassifizierung: Virus host cell interaction

Typ des Beitrags: Oral presentation