

Kinetic analysis of the influenza A virus HA/NA balance reveals contribution of NA to virus-receptor binding and NA-dependent rolling on receptor-containing surfaces

Content

Influenza A virus (IAV)-sialic acid (SIA) receptor interactions determine viral fitness and host tropism. The dynamics of binding, determined by a receptor-binding hemagglutinin (HA), a receptor-destroying neuraminidase (NA) and a complex in vivo receptor repertoire, are crucial but poorly understood. Biolayer interferometric analysis revealed virtually irreversible IAV binding to surfaces coated with synthetic sialosides or engineered sialoglycoproteins in the absence of NA activity, making equilibrium-binding models not applicable. Both HA and NA contributed to the initial binding rate. Extreme avidity resulting from multiple low-affinity HA-SIA interactions gave rise to a dynamic binding mode, in which NA activity was driving rolling of virus particles over the receptor surface until receptor density was sufficiently decreased to allow virus dissociation. Addition of competing receptors or antibodies also induced virus dissociation. Quantitative BLI analysis enabled functional examination of the HA/NA balance which governs this dynamic and motile interaction that is expected to be crucial for penetration of the mucus layer and subsequent infection of cells.

Choose primary session

Virus host cell interaction

Choose secondary Session

Virus host cell interaction

Contribution Type : Oral presentation