Articles of Significant Interest in This Issue

Localization of the Herpes Simplex Virus gD Binding Site on gH/gL

Developing a human herpes simplex virus (HSV) vaccine requires an understanding of the virion glycoproteins involved in entry: glycoprotein D (gD) binds to the receptor and activates the regulator gH/gL, triggering gB to drive fusion. Previous work documented the interaction between gD and gH/gL, detailing the gH/gL binding region on gD. Cairns et al. (e00983-20) “flipped the coin” and identified the corresponding gD contact sites on gH/gL. They discovered a novel mechanism whereby certain gH/gL antibodies stabilize the overall complex and inhibit fusion progression. Their model for the gD-gH/gL triplex provides a new framework for studying fusion and identifies targets for vaccine development.

Comparative Analysis of Respiratory Syncytial Virus and Human Metapneumovirus Infections of Human Airway Epithelial Tissues

The pneumoviruses human metapneumovirus (HMPV) and respiratory syncytial virus (RSV) are responsible for significant respiratory infections worldwide, but no FDA-approved antivirals or vaccines are available. Kinder et al. (e01068-20) utilized a human airway epithelial (HAE) model system to compare RSV and HMPV infections in a more physiological context. While both viruses efficiently infect ciliated cells within HAE culture, significant differences were observed in virus release from the apical surface, formation of intracellular extensions, and inhibition of spread by neutralizing antibodies. This work offers novel information and potential avenues for therapeutic development and intervention.

Giving an EF Hand To Release Progeny Virions

Bluetongue virus (BTV) nonstructural protein 2 (NS2) forms membraneless organelles, known as inclusion bodies, where assembly of progeny virions occurs in infected cells. The mechanism for virion escape from these structures is unresolved. Rahman et al. (e01099-20) discovered an EF hand-like Ca\(^2+\) binding motif in NS2 and showed that Ca\(^2+\) sensing through this motif influences NS2 phosphorylation, which regulates assembly and disassembly of inclusion bodies and the release of progeny virions. Cryo-electron microscopy revealed NS2 as a cage-like oligomer with central Ca\(^2+\) binding regions. This is the first report to demonstrate viral use of calcium to control virion release.

Atomic Architecture and Glycosaminoglycan Binding of Merkel Cell Polyomavirus

Merkel cell polyomavirus (MCPyV) is the causative agent of the majority of Merkel cell carcinomas (MCCs), which are a rare but often fatal form of human skin cancer. In combination with its high seroprevalence, MCPyV represents a serious health care burden, illustrating the urgent need for targeted treatment. Bayer et al. (e01664-19) reported the structure of this human tumor virus and found that the fully assembled capsid is required for the essential interaction with its glycosaminoglycan receptor(s). These data form the basis for future strategies in drug development.
Insect-Infecting Partitiviruses Are Efficiently Transmitted from Both Parents

Until recently, partitiviruses were known to infect only plants, fungi, and protozoans, but partitivirus-like sequences have been associated with a variety of arthropods by metagenomics. Cross et al. (e01070-20) analyzed partitiviruses infecting Drosophila melanogaster and Aedes aegypti, confirmed infection in host tissues, and showed high-efficiency biparental vertical transmission, which likely drives the success of these viruses through host populations. Although there was no evidence of horizontal transmission, phylogenetic placement suggests that cross-species transmission has been common. The establishment of an experimental infection system lays crucial groundwork for further understanding the biological impact and potential utility of insect-infecting partitiviruses.