

Séminaire



CONFÉRENCIER
INVITÉ

Lundi 27 Juin 2022 à 11h

Salle des
séminaires IBS

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Membrane-assisted assembly and selective autophagy of enteroviruses

Enteroviruses are non-enveloped positive-sense RNA viruses that cause diverse diseases in humans. Their rapid multiplication depends on remodeling of cytoplasmic membranes for viral genome replication. It is unknown how virions assemble around these newly synthesized genomes and how they are then loaded into autophagic membranes for release through secretory autophagy. We used cryo-electron tomography of infected cells to show that poliovirus assembles directly on replication membranes. Pharmacological untethering of capsids from membranes abrogates RNA encapsidation. Our data directly visualize a membrane-bound half-capsid as a prominent virion assembly intermediate. Assembly progression past this intermediate depends on the class III phosphatidylinositol 3-kinase VPS34, a key host-cell autophagy factor. Besides, the canonical autophagy initiator ULK1 is shown to restrict virion production since its inhibition leads to increased accumulation of virions in vast intracellular arrays, followed by an increased vesicular release at later time points. Finally, we identify multiple layers of selectivity in virus-induced autophagy, with a strong selection for RNA-loaded virions over empty capsids and the segregation of virions from other types of autophagosome contents. These findings provide an integrated structural framework for multiple stages of the poliovirus life cycle.

Hôte : Winfried Weissenhorn (IBS)