Bunyavirus (Hantavirus) - Virion Assembly and Release

Hantavirus proteins G1 and G2 are made from a polyprotein precursor that is cleaved at a conserved site.

The polyprotein precursor is synthesized by ribosomes attached to the rough endoplasmic reticulum (rER).

G1 and G2 are inserted in the rER membrane.

Sugar groups are added (glycosylation) to the proteins while they are in the ER and G1 and G2 associate to form heterodimers.

G1/G2 heterodimers are then transported to the Golgi where further glycosylation occurs.

The G1/G2 are retained in the Golgi until virion assembly.

The N protein forms homotrimers that then interact with each other to form a chain. The multimerization of N protein allows RNA encapsidation to proceed rapidly once the process has been initiated. The nucleocapsid assembly probably occurs in the perinuclear region.

It is not known why + strand vRNA is excluded from association with N protein.

The nucleocapsids are then transported to the virion assembly site at the Golgi. This transport may be conducted by interaction with actin filaments.

At the virus assembly site the N protein interacts with the cytoplasmic tail of G1 bringing together all of the virion components: glycoproteins G1 and G2, N protein, L protein, and the three vRNAs: S, M, and L.

Virion assembly is immediately followed by budding into the Golgi cisternae. Nascent virions are then transported in secretory vesicles to the plasma membrane and released by exocytosis.

Electron microscopy studies of the Sin Nombre virus suggested that New World hantaviruses assemble and bud at the plasma membrane, in contrast to the Old World hantaviruses that bud into the Golgi.