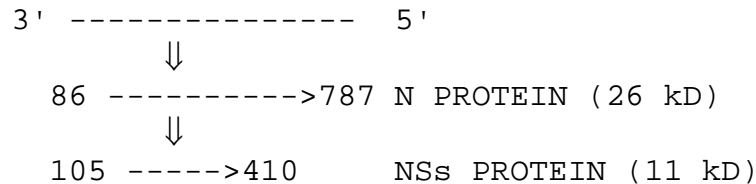




S SEGMENT: 961 N



3. CAPSID

- a. SYMMETRY: HELICAL
- b. SIZE: 3 X >100 nm, CIRCULAR
- c. CAPSOMERS: N PROTEIN, >2000 COPIES
- d. COMPOSITION:

PROTEIN	MW (kD)	COPY NO.	FUNCTION
N	26	>2000	NUCLEOPROTEIN
L	250	~25	REPLICASE

III. CLASSIFICATION AND CHARACTERISTIC MEMBERS

<u>GENERA</u>	<u>PROPERTIES</u>	<u>MEMBERS</u>
BUNYAVIRUS	MOSQUITO-BORNE	SINDBIS, CE
HANTAVIRUS	RODENT VIRUSES	HANTAAN
PHLEBOVIRUS	FLIES, MOSQUITOES	SANDBLY FEVER
NAIROVIRUS	TICK-BORNE	CRIMEAN-CONGO HF
TOSPOVIRUS	PLANT	TOMATO SPOTTED WILT

IV. VIRAL MULTIPLICATION

- A. **ABSORPTION & PENETRATION:** G1 protein binds the virus to cell receptor. Endocytosis brings the virus into the cytoplasm and also strips the envelope.
- B. **UNCOATING:** Uncoating of the N/RNA is not complete and N protein seems to be required for both "transcription" and RNA replication that are catalyzed by protein L.
- C. **GENE EXPRESSION:** The virus cleaves off and uses host mRNA-5' ends. The first ~10 nucleotides plus the cap are "cannibalized" to provide primers for "transcription" of the genome into three mRNAs: L MRNA, M MRNA and S MRNA. L mRNA is translated into one very large protein, the L-protein or the replicase. M mRNA is translated into a large polyprotein (M polyprotein) which is self-cleaved (?) to G1, NSm and G2. The S mRNA is translated into two proteins from two out-of-frame AUGs at positions 86 and 105 from 5'-end. The two proteins are N and NSs, respectively.

D. **GENOME REPLICATION:** The genome is replicated from full-length plus-strands that are replicated separately from the mRNA pools. Full-length minus-strands are made from the plus-strand templates. Both reactions are catalyzed by L (The roles of the two NS proteins are probably involved with replication and transcription).

E. **ASSEMBLY:** N coats the new viral genomes and they circularize (panhandles) due to complementary sequences at the 5'- and 3'-ends. The three nucleoprotein genome segments aggregate and probably interact with the cytosol domains of GP1 or GP2 or both.

F. **BUDDING AND/OR RELEASE:** The three nucleoproteins L, M and S somehow aggregate and bud through Golgi vesicles, which move them to the outside of the cell by reverse endocytosis.

V. CLINICAL CORRELATIONS

A. California Encephalitis viruses (CE & LaCrosse viruses) cause about 100 cases per year of encephalitis in children and adults who work in forested areas. Only about 1 in 1000 infected individuals develops symptoms.

B. Hantaan viruses cause a variety of diseases. The first to be characterized was Korean Hemorrhagic fever or "hemorrhagic fever with renal syndrome." Recently (Sp, '93) the "Four Corners" outbreak of HPS, Hantavirus Pulmonary Syndrome, infected over 100 and killed 40%. The virus is officially called the Sin Nombre virus. The vector or reservoir is the deer mouse, *Peromyscus maniculatus*. Rodents are the carriers or reservoirs for all Hanta viruses. Since this outbreak in '93, which were the first known cases of a hanta virus disease in the USA, hanta viruses and their rodent hosts have been isolated in all of the 48 contiguous states.

C. Rift Valley Fever is primarily a disease of ruminants in Africa. It occurs in large epizootic outbreaks killing thousands of livestock and infecting humans with a dengue fever-like illness. In 1978 200,000 Egyptians were infected and 600 died. The rift valley fever virus is a phlebovirus transmitted by mosquito.

D. Many other rash-fevers and hemorrhagic fevers are caused by members of this family.