

Structure of the Ebola Virion

Structure

The Ebola virion is a rod shaped particle roughly 80nm in diameter, and 600-14000 nm in length. The virions are not particularly rigid, commonly bending into a “U” or “6” conformation, (depending on the temperature), as shown in Figure 1 (Murphy *et al*, 1978) . Each virion particle is comprised of four general constituents, arranged as concentric layers within the rod structure.

The outer most layer consists of the viral envelope. The viral envelope consists of a host cell derived phospholipid bilayer, and may contain other host cell membrane constituents such as glycoprotein. Furthermore the envelope contains many viral glycoproteins (GP/sGP), embedded like spikes into the phospholipid bilayer. (Kawaoka, 2005)

The second layer consists of the viral matrix. The matrix is comprised exclusively of the viral protein VP40. This protein is composed of two domains, attached by a small flexible section. the C domain is large hydrophobic and adheres to the phospholipid membrane, where as the internal domain contains highly basic regions which facilitate clustering of VP40 proteins to form a strong but flexible mesh which adheres the viral envelope to the capsid. (Dessen *et al*, 2000)

The third layer of the virus consists of the Within the matrix a further five viral proteins, NP VP30, VP35 and L, are closely associated with the viral RNA.(Klenk and Freedman, 2004) NP and VP35 are bound directly to the viral RNA, and form the main nucleocapsid which contains and protects the viral genome. VP30, VP24 and VP30 associate with the capsid, but have less important structural purposes, as their main activities relate to viral replication. (Zhanga *et al*, 2014).

The forth and final layer consists of the viral genome itself. The genome consists of a single molecule of single strand, negative sense RNA about 20000bp in length. The strand is coiled into an single helix, maintained in position by binding to NP, each 6 RNA bases are bond to one NP molecule. (Bharat *et al* ,2005) The strand contains the genes related to the 7 viral proteins discussed above (with a short untranslated region on either end) ordered as follows: 3'NP – VP35 – VP40 – GP/sGP – VP30 – VP24 – L-5' (Gen-Bank: KJ660346)

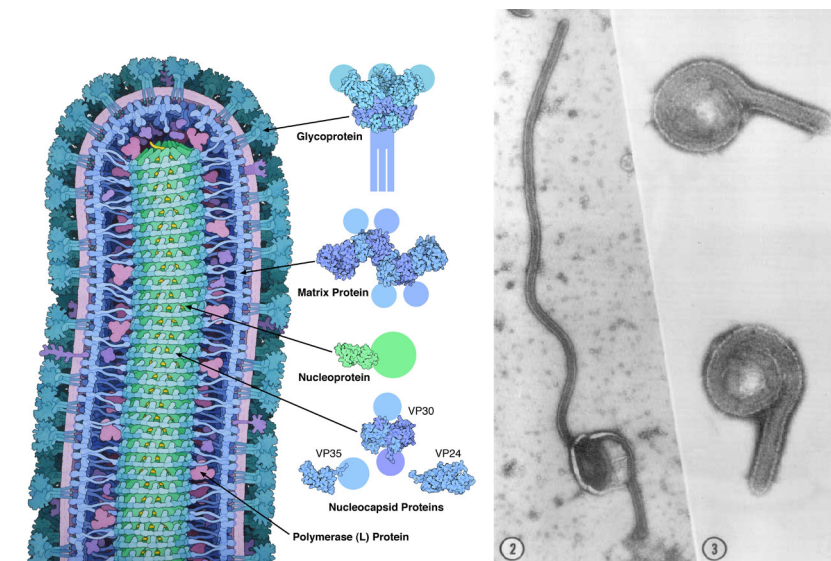


Figure1: 3D projected structure of Ebola Virion (David Goodsell, 2014)

Figure2: Electronmicrograph of unfixed Ebola Virion particles at 90 000X magnification (Murphy *et al*, 1978)

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