Ebola Glycoproteins: Structure and Function

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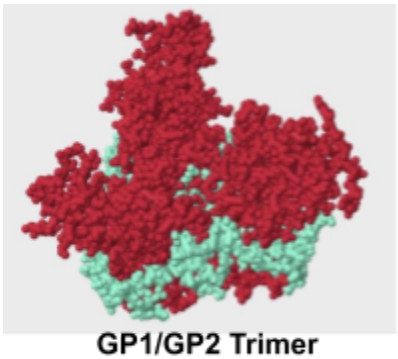
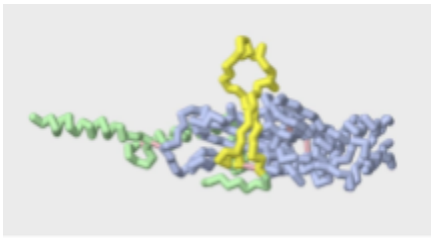


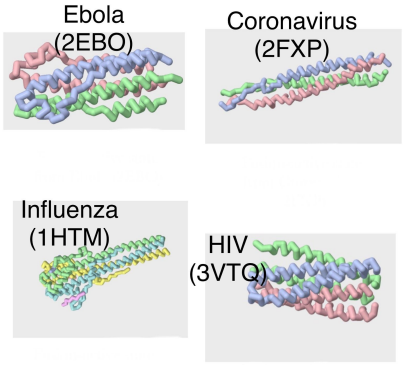
GP1/GP2 Trimer
(GP1 in red, GP2 in cyan)

The structure of Ebola is encapsulated by the disulfide linked glycoproteins, GP1 and GP2 which are formed in a trimer structure. GP's main purpose is to enact virus-host membrane fusion, its means of doing so are still inconclusive. Fusion occurs after virions reach an endosomal compartment where GP is broken into amino acids by the protein degrading enzyme, cathepsin. Once GP breaches the endosome, it changes its shape to allow for the injection of RNA into the cytoplasm. Infection is enacted by interactions between GP1 and its cognate receptors, but little is known about GP1's role in viral entry. GP1 also binds to cell receptors such as the NPC1 protein.



GP1/GP2 Pre-Fusion Complex
Highlighting Yellow Internal Fusion Loop

GP2 mediates the fusion in the internal fusion loop which contains hydrophobic residue which is important for GP2 mediation infection. A bend at low pH reshaped and compacts the hydrophobic patch at the tip of the fusion loop. It is suspected that these changes ease disruption of lipids at the fusion site of virus-host cell membrane contact, therefore allowing fusion. GP2 changes into its fusion-active stage to allow for the virus to meld with the host cell.



The fusion-active stage of GP2 resembles the fusion-active stage of many other viruses such as HIV, Influenza and Coronavirus. The understanding of the functions of one of the fusion-active proteins could greatly assist to the understanding of the other similar proteins. The creation of an antibody or drug that can stop the fusion-active state of a virus such as one listed above, therefore stopping virus fusion and infection all together, would be able to greatly assist in finding a way to prevent infection from any of these dangerous viruses. The research and understanding of one virus is critical to the understanding and prevention of other similar viruses.

Sources:

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PDB Files: 5JQ3, 2EBO, 3CSY, 5T42, 2FXP, 1HTM, 3VTQ