Coronavirus WebQuest (powered by 3DMD), Part II ***Name:_____***

Videos

Go to

https://www.3dmoleculardesigns.com/The-Science-of-Coronaviruses/How-Do-Coronaviruses-Infect-Us.htm

Video #1: Binding to the ACE2 Receptor

1. Describe the three main parts in a coronavirus (yellow, magenta, and the squiggle).

2. What is the protein that the magenta part binds to on a host cell (in green)?

3. What system are these cells in (HINT: what system is affected by COVID-19)?

Video #2: Receptor-Mediated Endocytosis

4. What is the purple structure? What is the white line? What are the purple structures Dr. Herman is pointing at?

5. What is the process by which the virus RNA enters the cell? It's in the title.

6. The receptor's contact with the virus's spike protein triggers activity in what 3-legged protein in the host cell?

7. What is the impediment to the virus RNA entering the cytoplasm, once the virus has docked with the cell and is in an endosome?

Video #3: pH-Induced Conformational Change

8. What does the docking of the virus cause the host cell proteins to release? This does what to the pH of the endosome?

9. How does the spike protein change at a lower, more acidic pH?

10. Instead of the ACE2 receptors, what does the spike proteins bind to?

11. What is the effect of th;e final conformational change in the spike protein, as shown in the image above?

Video #4: A Closer Look at the Spike Protein

12. What are the two main proteins discussed in this video (red and green)?

13. How many subunits are in the spike protein?

14. How many receptor binding domains are there? How many are “up”?

15. What kind of bonds do the two proteins make? What is the “bridge” between the acidic and basic amino acids called?

Modeling-

Go to https://www.3dmoleculardesigns.com/3DMD-Files/Science-of-Coronaviruses/HostCellMembrane-Color.pdf and print the paper model. Use the video on the first link to help you assemble. OR, go to http://www.markhoelzer.com/corona/jmol2.html# and obtain a screenshot of each of the models of the spike protein.