**Blocking Infection?**

Didem Vardar-Ulu1 and Shuchismita Dutta2\*

1Biological Chemistry, Boston University, Boston MA

2Institute of Quantitative Biomedicine, Rutgers University, Piscataway NJ 08854

\*contact: sdutta@rcsb.rutgers.edu)

Given what you have learned about the “Molecular Basis of Infection” by SARS-CoV-2 virus answer the following questions

Q1. If you could engineer any molecule you desired, list 2 ways you would prevent the SARS-CoV-2 infection.

Various approaches for developing a vaccine for SARS-CoV-2 are summarized in <https://media.nature.com/original/magazine-assets/d41586-020-01221-y/d41586-020-01221-y.pdf>. The goal in all these efforts is to enable the human host to mount an immune response so that it produces neutralizing antibodies against the Spike protein to interfere with the Spike:ACE2 interaction and prevent infection.

A recent structure of an antibodies bound to the RBD of SARS-CoV-2 Spike protein was reported – “Crystal structure of SARS-CoV-2 receptor binding domain in complex with human antibody ***CR3022***”

* Examine the Structure Summary page of this structure (PDB IDs 6w41) and visualize it in iCn3D.
* Select the RBD protein chain and examine if it forms any salt bridges with the antibody. Identify the residues involved in these interactions to map out where on the structure. Save suitable images to share.
* Based on your knowledge of the SARS-CoV-2 Spike protein binding to ACE2 (PDB ID, 6m0j), show a figure where the antibody and ACE2 bind.

Q2. Will the antibodies that you visualized be able to neutralize the SARS-CoV-2 by preventing Spike:ACE2 binding? Explain your answer with suitable images of the antibody complex and explanations.