



# Antibody-Antigen-Epitope Activity

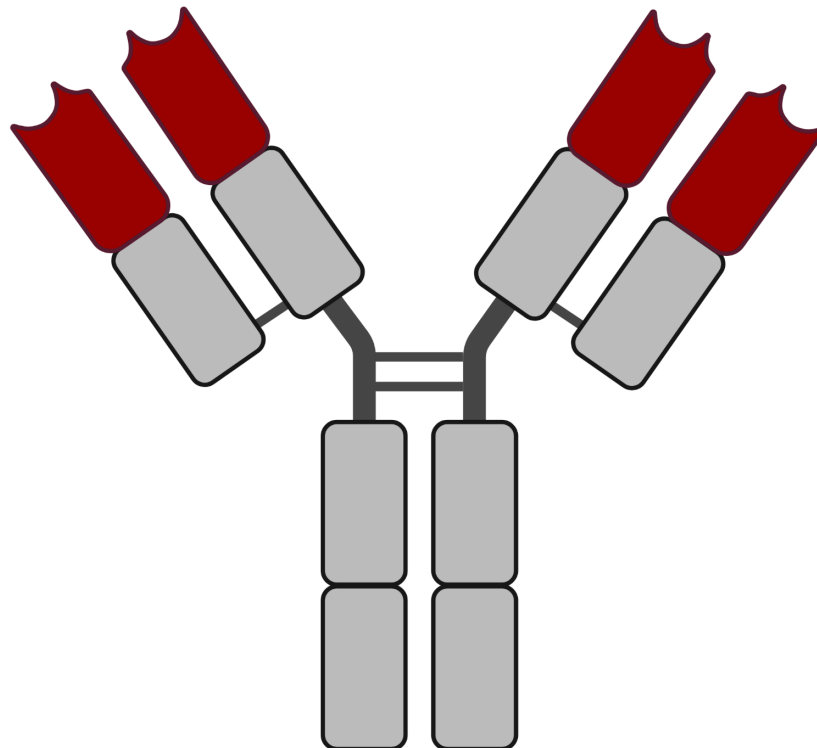
Adapted from [Suchman et al. 2018](#)

## Instructions

Complete **Part Ia and 1b** before our session together. Copy this document or download a version to edit on your own. You can print copies and write on them if you prefer.

### Part Ia. Labeling the “Ys”: Parts of an antibody.

Share your knowledge about antibodies! Based on the video you watched and using the image below.

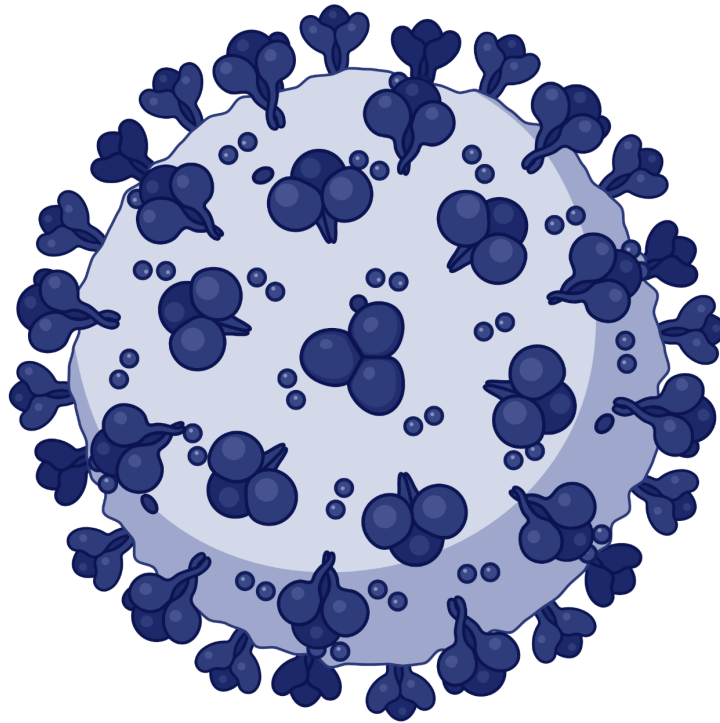


Created with BioRender.com

1. Label the light chain of the antibody with the letter “L”
2. Label the heavy chain of the antibody with the letter “H”
3. Draw rectangles around the variable regions on this antibody.
4. Circle the constant region(s) on this antibody.
5. Draw an arrow to the region that may bind to a specific epitope.



## Part Ib. The Virus and its Antigens: Recognizing Potential Invaders.



Created with BioRender.com

1. Where are the potential epitopes in the diagram above?
2. How many different epitopes are there?
3. What is the relationship between epitopes, antigens, and antibodies?



## Part II. Binding of Antibodies to Viruses

We will complete this session together during our session. After this activity, you should be able to:

1. **Describe** how antigens and epitopes are related.
2. **Explain** why some antibodies that do not bind to epitopes are produced.

### Hands-On Activity

1. Take a few moments to familiarize yourself with the virus and the antibodies using the below images. Find the epitopes on the virus and the binding sites on the antibodies. Let the instructors know if you are having trouble finding anything.



**Figure 1.** Antibody (left), Influenza virus (middle), and Coronavirus (Right)

2. How many different types of epitopes can you identify on the influenza virus?



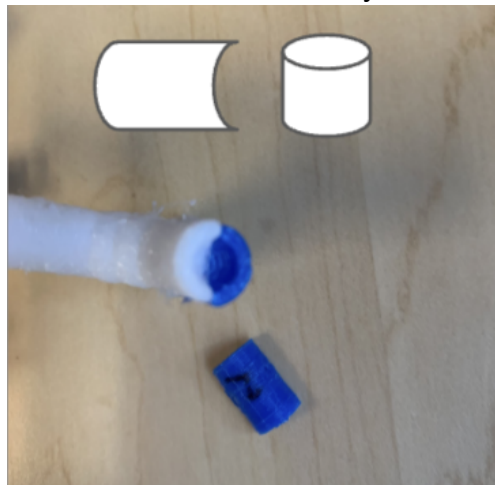
- a. 1
- b. 2
- c. 3
- d. 4



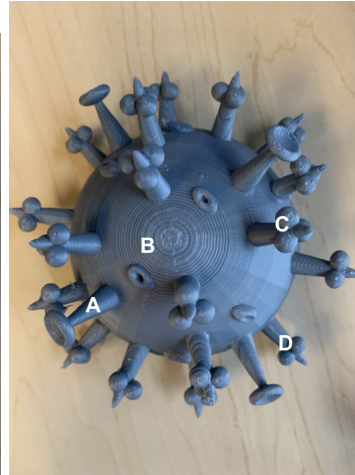
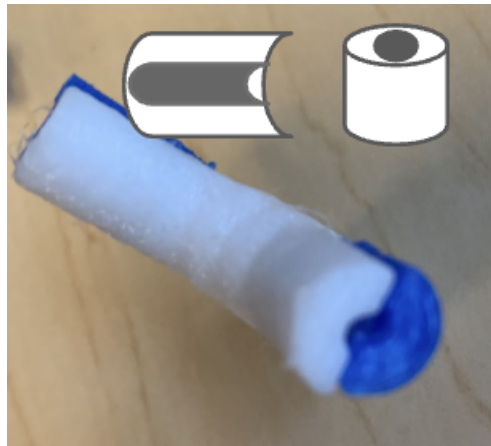
3. The 3D antibodies are composed of:



- a. Blue heavy chains and white light chains
  - b. Blue light chains and white heavy chains
4. Which epitope does this combination of heavy chain 1 and light chain 1 bind?



- a. A
  - b. B
  - c. C
  - d. D
  - e. None of the above
5. Which epitope does this combination of heavy chain 2 and light chain 2 bind?



- a. A
  - b. B
  - c. C
  - d. D
  - e. None of the above
6. Now create new antibodies by combining heavy chain 1 with light chain 2, and heavy chain 2 with light chain 1. Do the new antibodies bind to the epitopes?
- a. They bind better
  - b. They binder more weakly
  - c. There is no difference
7. Do either of the original light/heavy chain combinations bind antigens on the coronavirus?



- a. Yes, one binds
- b. Yes, both bind
- c. No, neither bind



## Discussion Questions

1. Do all antibodies share the same binding region?
2. When an antibody binds to a virus, is it able to recognize every epitope presented by the virus?
3. Why is binding of an antibody to an epitope important in the immune response?
4. What do vaccines have to do with the production of antibodies?