



IMMUNOLOGY VIRTUAL LAB WORKSHEET

INTRODUCTION

Go to <http://www.hhmi.org/biointeractive/immunology-virtual-lab>. Start the Virtual Lab and maximize the screen if you wish. Answer the following questions in the spaces provided.

DIAGNOSIS

1. Where are antibodies found?

2. How can they be used in the laboratory?

3. What does ELISA stand for?

4. What are ELISA assays used for in labs?

5. What are the three important limitations of an ELISA? Explain each.

Limitation	Explanation



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BACKGROUND

1. What test can be used to determine whether a patient has an infectious or autoimmune disease?

2. What does a positive result indicate?

3. The watery fluid of the blood is called _____.

4. What is allowed to react with the target antigen?

5. Detection is possible when _____.

6. Once isolated, the secondary antibody can be _____

7. What is the signaling system?

8. What happens when the appropriate chemical (substrate) is added?

9. How is the test quantified?

10. What does the amount of color reflect?



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LAB NOTEBOOK

Proceed through the entire lab simulation protocol. Be sure to read the captions below the pictures (left side) and the information in the lab notebook (right side). Be sure to "start over" to begin the lab. You CANNOT skip any steps. Answer the following questions as you proceed.

1. What is systemic lupus erythematosus (SLE)?

2. From Figure 1 (click on it), what are the four steps of an ELISA protocol?

- a. _____
- b. _____
- c. _____
- d. _____

3. In step 1, you centrifuge the samples. What does a centrifuge do?

4. What are you preparing in step 2? Why are there three different solutions?

5. In steps 3 and 4, you prepare an ELISA plate. What has the ELISA plate been pretreated with? Why?

a. What is the positive control? (Step 4)

b. What is a primary antibody? Please define.



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c. What is the negative control? (Step 4)

d. Why is it necessary to have a positive and a negative control? (Step 4)

6. Why incubate the plate in step 5?

7. Next, in step 6, the plate is washed. Why wash the plate?

8. In step 7, a secondary antibody is added. What is a secondary antibody? Please define.

a. What is the attached enzyme in this assay? (Step 7)

b. What is the specific substrate for HRP? What color does it produce? (Step 7)

9. How can the yellow color be quantitatively measured? At what wavelength? (Step 10, in "why")

10. Record your results. Indicate on this page and on the computer which boxes turned color.

	A	B	C	+ (positive)	– (negative)
1:2					
1:10					
1:100					

11. Did you complete the ELISA correctly? (Yes/No) _____

If yes, proceed to #12 and #14.

If no, proceed to #13 and #14.

12. What do the results indicate about:

Patient A:

Patient B:

Patient C:

13. Explain what you did wrong and what you will need to do next time. For more information, check your printable summary page. Did your incorrect procedure provide you any results? Explain what went wrong.



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14. This virtual lab was testing for lupus. How is this same test used to test for the presence of HIV? If the results for an HIV test were the same as in this exercise, what would they indicate about the three patients?

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