Vaccine Research Project

Part I: Cells of the Immune System

Go to the following link and complete the click and learn activity and answer the questions as you proceed through the activity slides.

https://www.hhmi.org/biointeractive/cells-immune-system

Answer the following questions 1. Name one type of cell involved in each of the following processes:

1. Name one type of cell involved in each of the following processes:

a. Innate immunity:

b. Adaptive immunity:

c. Both adaptive and innate immunity:

2. Define *innate immune system*.

3. Where are the cells of the adaptive immune system found in humans?

4. Watch the video on slide 3 and answer the following.

a. How do B cells react to antigens?

b. Which cells conduct the immune system?

c. Which immune cells kill infected cells?

5. What is the purpose of humoral immunity?

6. How does antibody specificity arise?

7. Outline the specific steps involved in antibody production in response to infection with human immunodeficiency virus (HIV).

8. Define *antigen*.

9. A macrophage is also referred to as an antigen-presenting cell. Explain why that is an appropriate term.

10. Why is antigen-presentation important in fighting infection?

11. A T cell is a type of white blood cell that has surface receptors that recognize antigens. Does an individual T cell have the ability to recognize more than one type of antigen? Explain your answer.

12. Explain the relationship between the antigen-presenting cells and helper T cells.

13. Watch the video on slide 8 and answer the following questions.

a. What specifically results from the release of cytokines by helper T cells?

b. What is the problem with helper T cells carrying out this function in HIV infection?

14. What role do cytotoxic T cells play in fighting infection?

15. What two molecules on the surface of a cytotoxic T cell help the cell recognize infected cells?

16. What is the role of ubiquitin in host cells? Be specific.

17. What is the role of an MHC class 1 protein? Be specific.

18. What is the relationship between an MHC class 1 protein and a cytotoxic T cell?

19. What is a potential problem with respect to the timing for when a cytotoxic T cell recognizes a virally infected cell?

20. Summarize the main difference between the action of MHC class 1 and MHC class 2.

Part II: Research a vaccine

Select a vaccine and create **single flyer in google classroom (see template)** that presents the following information:

1. Name of vaccine
2. Disease that it prevents
3. How the disease is spread, symptoms and effects of the disease (e.g., death rate, transmission rate, how it's transmitted, short- and long-term complications, etc.)
4. How that vaccine works (e.g., what type of vaccine it is, who is recommended to get it, and at what age, etc.)
5. Is there any controversy with your vaccine? (E.g., is it believed to cause specific issues, is it being used less, etc.)
6. Provide data/a graph showing the numbers of deaths OR infections from your disease before AND after the vaccine was introduced.
7. Add any final thoughts or interesting information that you deem relevant!
8. You must have 5 scientific references and use your own words!

You may use a combination of words and diagrams as appropriate. Be prepared to share your knowledge with classmates.

Total 50 points