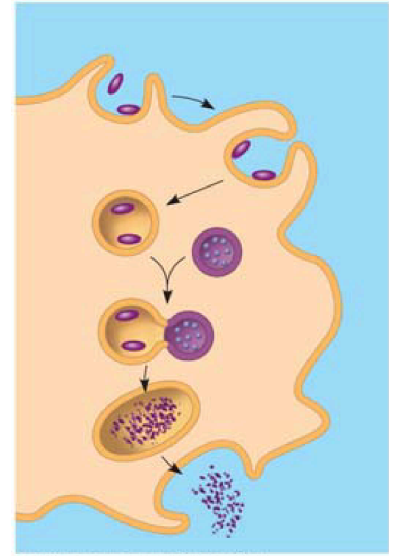


Chapter 43: The Immune System

1. We first encountered *phagocytosis* in Concept 7.5, but it plays an important role in the immune systems of both invertebrates and vertebrates. Review the process by briefly explaining the six steps to ingestion and destruction of a microbe by a phagocytic cell.

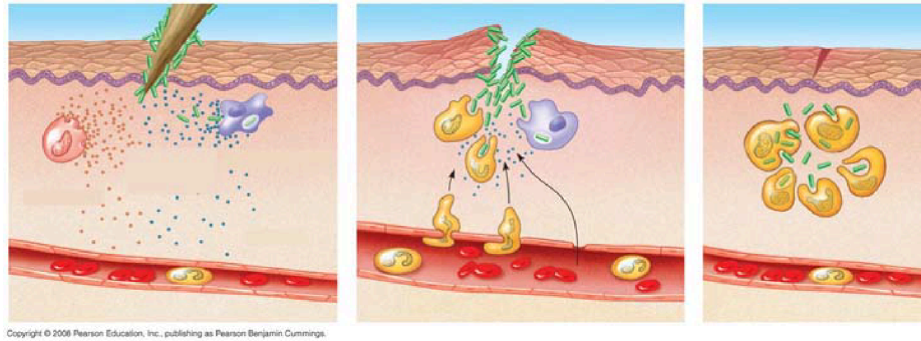


8. Explain the role of the following two antimicrobial compounds.

Interferon

Complement

9. Use the following figure to explain the three steps of an *inflammatory response*.



12. From the first four paragraphs of this concept, summarize where *T cells* and *B cells* develop, and give an overview of their functions. (Note that they are a type of white blood cell known as a *lymphocyte*.)

14. Explain how *cytokines* help coordinate the innate and acquired immune responses.

15. The following brief questions will serve as a primer for immune system recognition.

a. What is an *antigen*?

19. T cells also display only one type of antigen receptor on the surface of the cell. Compare and contrast a T cell with a B cell.

20. *B-cell receptors* recognize and bind to antigens whether they are free antigens (like a secreted toxin) or on the surface of a pathogen. Explain the role of the *major histocompatibility complex (MHC)* to *T-cell receptor* binding.

27. Define the following terms.

Effector cells (AKA Plasma Cells)

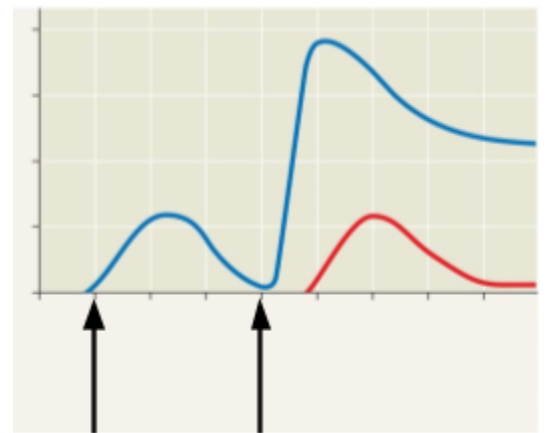
Memory cells

Clonal selection

21. Explain how an infected host cell uses the MHC molecule to display an antigen.

22. Explain the differences between Class I and Class II MHC molecules, noting type of cells that display the molecule, types of diseases involved with each molecule, and what type of T cell recognizes the MHC molecules.

29. Graphs similar to the following have been seen on several AP Biology exams. It depicts the primary and secondary immune response. The first arrow shows exposure to antigen A. The second arrow shows exposure to antigen A again, and also antigen B. Label this graph and then use it to explain the difference between a *primary* and *secondary* immune response.



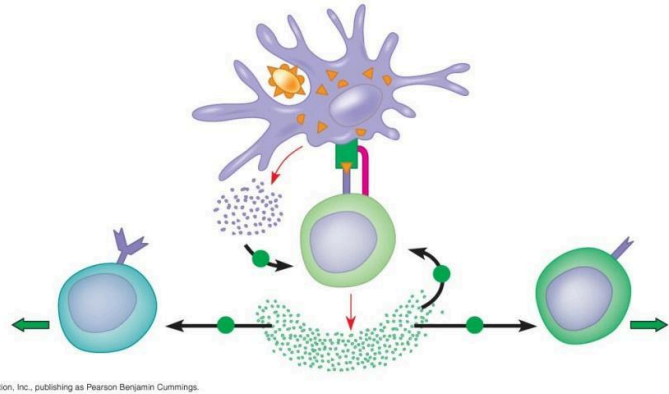
30. Explain fully the function of the two divisions of acquired immunity.

Humoral immune response

Cell-mediated immune response

c. How is an *epitope* related to an antigen?

31. *Helper T cells* play a critical role in activation of both T cells and B cells. In full detail, label and explain the three steps involved using Figure 43.17. This is an important step!



42. Using examples, explain the difference between *active* and *passive immunity*.

43. Describe how *immunizations* can serve as an example of active immunity.

45. Briefly describe the following features of immune rejection.

a. Explain how antibodies against blood types are present.

b. What is the role of MHC in tissue and organ transplants?

46. What are allergies?

49. *Autoimmune diseases* occur when the immune system turns against particular molecules of the body. Describe the cause and symptoms of the following autoimmune diseases.

Lupus

Type 1 diabetes mellitus

Multiple sclerosis

51. Just as our immune system has evolved to thwart pathogens, pathogens have evolved to thwart our immune system. Describe the following pathogen strategies.

Attack on the immune system: HIV

52. Explain how the high mutation rate in surface antigen genes in HIV has hampered development of a vaccine for AIDS. (You might take note that HIV—human immunodeficiency virus—is the virus that causes the disease AIDS—acquired immunodeficiency syndrome. These acronyms are often used incorrectly.)