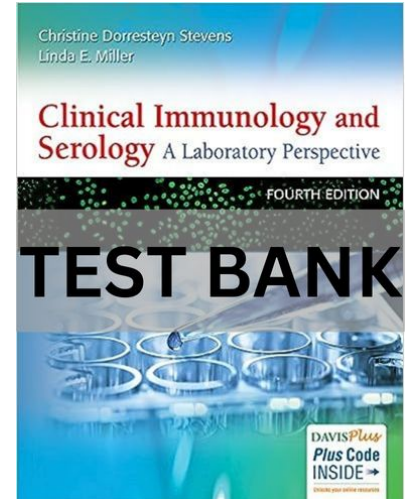


Chapter 1. Introduction to Immunity and the Immune System



Multiple Choice

Identify the choice that best completes the statement or answers the question.

- _____ 1. Eosinophils are involved in the immune response against:
 - A. viruses.
 - B. intracellular bacteria.
 - C. parasites that cannot be phagocytized.
 - D. extracellular bacteria.

- _____ 2. Which of the following are components of both innate and adaptive immune responses?
 - A. Immunoglobulins
 - B. T helper cells
 - C. Macrophages
 - D. B cells

- _____ 3. The process by which leukocytes are attracted to a specific area by chemical messengers is called:
 - A. diapedesis.
 - B. degranulation.
 - C. chemotaxis.
 - D. opsonization.

- _____ 4. Which of the following is a characteristic of natural killer cells?
 - A. They mature in the thymus.
 - B. They are smaller than B and T cells.
 - C. They are a type of lymphocyte.
 - D. They are part of the adaptive immune system.

- _____ 5. Which of the following best describes diapedesis?
 - A. Movement toward increasing concentrations of a cytokine
 - B. Attachment of immunoglobulin to target cells
 - C. Movement through blood vessel walls as cells exit the circulation
 - D. Engulfment of target cells

- _____ 6. The most effective phagocytic and antigen-presenting cell is the:
 - A. neutrophil.
 - B. monocyte.
 - C. dendritic cell.
 - D. macrophage.

- _____ 7. Which of the following is characteristic of natural immunity?
 - A. It involves memory.
 - B. T lymphocytes play a major role.
 - C. It involves specificity.
 - D. Mechanisms are always present and fully functional.

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- _____ 8. All of the following cells are considered part of natural immunity EXCEPT:
- A. eosinophils.
 - B. B lymphocytes.
 - C. monocytes.
 - D. neutrophils.
- _____ 9. Where does the specific immune response to a foreign antigen mainly occur?
- A. Lymph nodes
 - B. Blood
 - C. Bone marrow
 - D. Skin
- _____ 10. Which white cell in the peripheral blood migrates into tissue to become a macrophage?
- A. Eosinophil
 - B. Basophil
 - C. Neutrophil
 - D. Monocyte
- _____ 11. A white blood cell that is 16 to 18 micrometers in diameter, has a horseshoe-shaped nucleus, and is capable of phagocytosis is a:
- A. neutrophil.
 - B. eosinophil.
 - C. basophil.
 - D. monocyte.
- _____ 12. Pasteur's discovery that older bacterial cultures would not cause disease in chickens but would protect them from subsequent infection with more virulent strains is an example of:
- A. attenuated vaccine.
 - B. natural immunity.
 - C. passive immunity.
 - D. cross-immunity.
- _____ 13. Antibodies are secreted by:
- A. plasma cells.
 - B. B cells.
 - C. T cells.
 - D. dendritic cells.
- _____ 14. Which of the following is characteristic of mucosal-associated lymphoid tissue?
- A. It is one of the primary lymphoid organs.
 - B. It clears pathogens from the bloodstream.
 - C. It includes the tonsils and the appendix.
 - D. It includes the liver and spleen.
- _____ 15. Acquired (adaptive) immunity can be characterized as:
- A. nonspecifically activated.
 - B. immediately responsive.
 - C. neutrophil dependent.
 - D. involving memory.
- _____ 16. Which of the following is NOT a characteristic of neutrophils?
- A. Congregate in the marginating pool in blood vessels
 - B. Capable of diapedesis
 - C. Granules that become bright orange with Wright stain
 - D. Segmented nucleus
- _____ 17. The function of NK cells is to:

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- A. produce antibody.
 - B. phagocytize bacteria.
 - C. present antigen to T cells.
 - D. kill target cells such as tumor and virally infected cells.
- ___ 18. All of the following are involved in adaptive immunity EXCEPT:
- A. memory.
 - B. lymphocytes.
 - C. specificity.
 - D. neutrophils.
- ___ 19. Which of the following is NOT a characteristic of a lymph node?
- A. Filters interstitial fluid draining from tissues
 - B. Colonized with T and B cells
 - C. Between 1 and 25 mm in size
 - D. Considered a primary or central lymphoid organ
- ___ 20. All of the following are considered part of natural immunity EXCEPT:
- A. eosinophils.
 - B. lymphocytes.
 - C. acute-phase reactants.
 - D. neutrophils.
- ___ 21. Macrophages that migrate to the liver are called:
- A. alveolar macrophages.
 - B. histiocytes.
 - C. microglial cells.
 - D. Kupffer cells.
- ___ 22. Innate immunity can be characterized as:
- A. specific.
 - B. slow to respond.
 - C. dependent upon neutrophils and macrophages.
 - D. involving memory.
- ___ 23. The ability to resist infection through normally present body functions best characterizes:
- A. autoimmunity.
 - B. natural immunity.
 - C. acquired immunity.
 - D. alloimmunity.
- ___ 24. Which type of cell has a diameter between 10 and 15 micrometers, has a multi-lobed nucleus, and usually comprises more than 50% of circulating leukocytes?
- A. Neutrophil
 - B. Lymphocyte
 - C. Basophil
 - D. Monocyte
- ___ 25. Which of the following is NOT a component or characteristic of natural (innate) immunity?
- A. Repeated exposure to a pathogen does not change the response.
 - B. The response involves acute-phase reactants.
 - C. The response involves phagocytosis.
 - D. The response involves antibodies.
- ___ 26. T cells are mainly concentrated in which region of the lymph nodes?
- A. Primary follicles
 - B. Secondary follicles

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- C. Paracortex
- D. Medulla

- _____ 27. A primary site of antigen trapping and presentation to immune cells is the:
- A. spleen.
 - B. thymus.
 - C. bone marrow.
 - D. brain.
- _____ 28. Hematopoietic stem cells are located in:
- A. the lymph nodes.
 - B. the spleen.
 - C. bone marrow.
 - D. the thymus.
- _____ 29. Which of the following is NOT a characteristic or function of the spleen?
- A. Removes old red blood cells from the circulation
 - B. Filters infectious agents and foreign matter from the blood
 - C. Less than 25 mm in size
 - D. Is considered a secondary lymphoid organ
- _____ 30. T cells mature in:
- A. bone marrow.
 - B. the thymus.
 - C. the lymph nodes.
 - D. the spleen.
- _____ 31. Primary lymphoid organs include which of the following?
- A. Spleen
 - B. Tonsils
 - C. Thymus
 - D. Lymph nodes
- _____ 32. B cells that are actively responding to antigen can be found in:
- A. peripheral blood.
 - B. the primary follicles.
 - C. the germinal centers.
 - D. bone marrow.
- _____ 33. Contact with antigen and activation of B cells normally occurs in:
- A. peripheral blood.
 - B. the connective tissue.
 - C. the thymus.
 - D. the lymph nodes.
- _____ 34. Which best describes lymph nodes?
- A. They line the interior of small blood vessels.
 - B. They are concentrated where appendages join the thorax of the body.
 - C. They are approximately 12 cm in size.
 - D. They are considered primary or central lymphoid organs.
- _____ 35. Which of the following is a characteristic of opsonins?
- A. They are carbohydrates that stimulate T cells.
 - B. They are molecules that coat bacteria, making them more susceptible to phagocytosis.
 - C. They are expressed on the surface of neutrophils.
 - D. They are produced by NK cells.
- _____ 36. "Cluster of differentiation" refers to:

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- A. a category of cell surface proteins used to identify cell types.
- B. aggregates of differentiating stem cells.
- C. groups of antigens that identify a cell as foreign.
- D. the cells that congregate in germinal centers.

- ____ 37. All of the following are commonly found within non-lymphoid tissues EXCEPT:
- A. B cells.
 - B. macrophages.
 - C. mast cells.
 - D. dendritic cells.

Matching

Match each scientist with the appropriate immunological discovery.

- A. Elie Metchnikoff
- B. Edward Jenner
- C. Emil Von Behring
- D. Almoth Wright

- ____ 38. Vaccination
- ____ 39. Opsonization
- ____ 40. Humoral immunity
- ____ 41. Phagocytosis

Chapter 1. Introduction to Immunity and the Immune System

Answer Section

MULTIPLE CHOICE

1. ANS: C PTS: 1
2. ANS: C PTS: 1
3. ANS: C PTS: 1
4. ANS: C PTS: 1
5. ANS: C PTS: 1
6. ANS: C PTS: 1
7. ANS: D PTS: 1
8. ANS: B PTS: 1
9. ANS: A PTS: 1
10. ANS: D PTS: 1
11. ANS: D PTS: 1
12. ANS: A PTS: 1
13. ANS: A PTS: 1
14. ANS: C PTS: 1
15. ANS: D PTS: 1
16. ANS: C PTS: 1
17. ANS: D PTS: 1
18. ANS: D PTS: 1
19. ANS: D PTS: 1
20. ANS: B PTS: 1
21. ANS: D PTS: 1
22. ANS: C PTS: 1
23. ANS: B PTS: 1
24. ANS: A PTS: 1
25. ANS: D PTS: 1
26. ANS: C PTS: 1
27. ANS: A PTS: 1
28. ANS: C PTS: 1
29. ANS: C PTS: 1
30. ANS: B PTS: 1
31. ANS: C PTS: 1
32. ANS: C PTS: 1
33. ANS: D PTS: 1
34. ANS: B PTS: 1
35. ANS: B PTS: 1
36. ANS: A PTS: 1
37. ANS: A PTS: 1

MATCHING

38. ANS: B PTS: 1
39. ANS: D PTS: 1
40. ANS: C PTS: 1
41. ANS: A PTS: 1

Chapter 2. Nature of Antigens and the Major Histocompatibility Complex

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- _____ 1. An antigenic determinant is also called:
A. an immunogen.
B. an epitope.
C. an antibody.
D. a polysaccharide.
- _____ 2. Which of the following would be the most effective immunogen?
A. One that is genetically foreign and has a single epitope
B. One with a molecular weight of less than 10,000 Da
C. One with multiple epitopes with many specificities
D. One with multiple epitopes with a single repeated specificity
- _____ 3. A 50-kDa protein from a bacterial cell that has numerous different epitopes would be called:
A. a hapten but not an antigen.
B. a hapten and an antigen.
C. an antigen but not an immunogen.
D. an immunogen and an antigen.
- _____ 4. Which of the following molecules is the best immunogen?
A. Protein
B. Polysaccharide
C. Nucleic acid
D. Lipid
- _____ 5. Which of the following is a low-molecular-weight molecule that has one binding site for an antibody?
A. Antigen
B. Hapten
C. Immunogen
D. Adjuvant
- _____ 6. Which of the following is NOT a characteristic shared by class I and class II MHC molecules?
A. Expressed co-dominantly
B. Involved in antigen recognition
C. Members of the immunoglobulin superfamily
D. Expressed constitutively on all nucleated cells
- _____ 7. Antigen recognition by CD4-positive T cells requires:
A. class I MHC molecules.
B. class II MHC molecules.
C. class III MHC molecules.
D. no MHC molecules.
- _____ 8. Class II molecules bind to what kind of peptides?

- A. Native peptides
 - B. Processed exogenous
 - C. Processed endogenous
 - D. Any of the above
- ___ 9. Each class II MHC molecule has specificity for:
- A. any endogenous peptide.
 - B. related peptides that share a similar peptide sequence.
 - C. one very specific peptide sequence.
 - D. native, conformational epitopes.
- ___ 10. MHC molecules containing beta-2-microglobulin:
- A. contain alpha and beta transmembrane polypeptides.
 - B. participate in the activation of CD4 T cells.
 - C. are determined by MHC-A, MHC-B, and MHC-C genes.
 - D. are determined by MHC-DR genes.
- ___ 11. The purpose of the invariant chain is to block the peptide-binding site of:
- A. antibody molecules.
 - B. class II MHC molecules.
 - C. class I MHC molecules.
 - D. T-cell receptors.
- ___ 12. Which of the following is a characteristic of MHC-DR, MHC-DP, and MHC-DQ molecules?
- A. Antigen receptors on all lymphocytes
 - B. Antigen receptors on T lymphocytes
 - C. Surface alloantigens on liver and kidney cells
 - D. Expressed co-dominantly (maternal and paternal)
- ___ 13. A processed antigen first encounters and binds to MHC class II molecules in the:
- A. nucleus.
 - B. endoplasmic reticulum.
 - C. endosomal compartment.
 - D. membrane surface.
- ___ 14. A processed antigen first encounters and binds to class I MHC molecules in the:
- A. nucleus.
 - B. endoplasmic reticulum.
 - C. endosomal compartment.
 - D. membrane surface.
- ___ 15. Endogenous peptides binding to MHC-A, MHC-B, or MHC-C molecules on the surface of hepatocytes are critical for the response by:
- A. B lymphocytes.
 - B. T helper cells.
 - C. cytotoxic T cells.
 - D. macrophages.
- ___ 16. Which of the following is likely to be the most immunogenic?
- A. A lipid with a molecular weight of 50,000 Da
 - B. A polysaccharide with a molecular weight of 40,000 Da
 - C. A protein with a molecular weight of 45,000 Da
 - D. A nucleic acid with a molecular weight of 60,000 Da

- ___ 17. Antigens found in different species that trigger a similar antibody response are called:
A. heterophile antigens.
B. haptens.
C. alloantigens.
D. autoantigens.
- ___ 18. The term “human leukocyte antigen” is synonymous with:
A. allele.
B. haplotype.
C. major histocompatibility complex.
D. chromosome.
- ___ 19. The ability to respond to antigen depends on which of the following factors?
A. Age
B. Proper nutrition
C. Genetic predisposition
D. All of the above
- ___ 20. A macromolecule that is capable of eliciting an immune response in an immunocompetent host is called:
A. an antigen.
B. an antibody.
C. a hapten.
D. an acute-phase reactant.
- ___ 21. A bacterial antigen to which the human immune system responds would be classified as:
A. an autoantigen.
B. an alloantigen.
C. a heteroantigen.
D. a holoantigen.
- ___ 22. Which option best describes a finding of Landsteiner's study of haptens?
A. Similar haptens trigger the same antibody response.
B. Spatial configuration is recognized by antibody.
C. Small chemical changes to a hapten do not affect antibody response.
D. A hapten can react with many different antibodies.
- ___ 23. Naturally occurring anti-A and anti-B antibodies are thought to be the result of exposure to which of the following?
A. Heterophile antigens
B. Haptens
C. Alloantigens
D. Autoantigens
- ___ 24. A substance that is too small to stimulate antibody production by itself unless it is attached to a larger carrier molecule is called:
A. an autoantigen.
B. a cross-reacting antigen.
C. a hapten.
D. an alloantigen.
- ___ 25. A determinant site on an antigen that is produced by the folding of the primary chain is known as a:
A. conformational epitope.

- B. linear epitope.
 - C. hapten.
 - D. monovalent epitope.
- ___ 26. If a person has a reaction to poison ivy, this is caused by:
- A. a hapten complexing with a tissue protein.
 - B. a heterophile antigen.
 - C. a T-independent antigen.
 - D. exposure to an adjuvant.
- ___ 27. Aluminum salt in the hepatitis vaccine functions as:
- A. a hapten.
 - B. an adjuvant.
 - C. an immunogen.
 - D. a carrier.
- ___ 28. In antigen processing, the function of transporters associated with antigen-processing proteins is to:
- A. help digest large proteins.
 - B. bind to MHC class II molecules in the endoplasmic reticulum.
 - C. transport digested proteins to MHC class I molecules.
 - D. recognize and digest exogenous protein.
- ___ 29. A substance used to enhance antibody formation is called:
- A. a hapten.
 - B. an adjuvant.
 - C. an immunogen.
 - D. a carrier.
- ___ 30. MHC class I antigens are recognized by which of the following cells?
- A. CD4-positive T cells
 - B. CD8-positive T cells
 - C. B cells
 - D. Macrophages
- ___ 31. Characteristics of MHC class II molecules include which of the following?
- A. Interact with CD8-positive T cells
 - B. Have an alpha chain and beta-2 microglobulin
 - C. Have alpha and beta chains of approximately equal size
 - D. Combine with antigen made inside the cell
- ___ 32. If a mother is MHC A3A14/B5B15/Cw3Cw4 and her child is A3A9/B5B27/Cw4Cw7, which of the following men is the most likely candidate for the father?
- A. A5A9/B5B27/Cw3Cw7
 - B. A9A11/B15B21/Cw1Cw4
 - C. A4A15/B2B27/Cw1Cw5
 - D. A5A9/B17B27/Cw3Cw5
- ___ 33. Which option best describes MHC class I antigens?
- A. They are recognized by helper T cells.
 - B. They are found on all nucleated cells.
 - C. They combine with exogenous antigen.
 - D. They are coded for on chromosome 9.