Name:_____ **ID#**_____

I. Medical And Veterinary Immunology, Term Test #1 – September 24, 2004

This test contains 30 total questions. You have 50 minutes to complete the test. There are two types of questions – Type I questions require the one best answer (Questions 1-25). Type II Questions (Questions 26-30) require you to chose all the relevant statements which are correct. No extra time will be provided to complete the computer answer sheet. You are to hand in this test with the answer sheet at the conclusion of the test. A complete test, with answers, will be posted next week.

Type I Questions: Mark the best answer. A, B, C, D, or E.

1. The common myeloid progenitor
   A. Resides in lymph nodes
   B. Can give rise to granulocytes and monocytes
   C. Is very efficient at phagocytosis
   D. Arises from the common lymphoid progenitor
   E. All of the above.

Answer – B

2. The immune system makes use of many tissues in the body. These tissues are broadly divided into 2 groups, the primary and secondary lymphoid organs. Which of the following statements regarding these tissues is NOT TRUE?
   A. Primary lymphoid organs are the site of innate immune response
   B. The lymph nodes and spleen are organs specialized to trap antigen and initiate adaptive immune response
   C. The bone marrow and thymus are primary lymphoid organs
   D. Lymphocytes develop in the primary lymphoid organs
   E. Recirculating lymphocytes continually migrate through secondary lymphoid organs

Answer - A

3. Lymph nodes and spleen are highly organized lymphoid structures that share the following feature:
   A. T lymphocytes are found mostly in the perarteriolar lymphoid sheath
   B. Antigen enters through the afferent lymph
   C. Macrophages and plasma cells are found in the medullary cords
   D. Germinal centers with proliferating B cells can form during an immune response
   E. None of the above.

Answer - D

4. Which of the following statements regarding the pluripotent hematopoietic stem cell (HSC) is NOT TRUE?
    A. The HSC can give rise to lymphoid progenitors and myeloid progenitors
    B. An animal devoid of HSCs would not generate granulocytes
    C. The HSC resides in the bone marrow
    D. The HSC can divide as well as differentiate
    E. The HSC can only differentiate, not divide.

Answer – E

5. The majority of cells found in the paracortical area of lymph nodes are:
    A. Plasma cells
    B. T cells
    C. B cells
    D. Macrophages
    E. Dendritic Cells

Answer – B

6. Antigens from sites of infection reach lymph nodes via:
    A. Afferent lymphatic vessels
    B. Efferent lymphatic vessels
    C. Lymph node arteries
    D. Lymph node veins
    E. Thoracic duct

Answer - A

7. Which of the following statements regarding B cell epitopes is NOT TRUE?
    A. An antigen can contain many different epitopes
    B. An epitope can be made of a continuous stretch of amino acids
    C. An epitope can be made of a discontinuous stretch of amino acids
    D. Similar epitopes can be found on different antigens
    E. An epitope is always immunogenic.

Answer - E

8. Which of the following cells are myeloid cells
    A. Neutrophils
    B. Granulocytes
    C. Basophils
    D. Macrophages
    E. All of the above

Answer - E

9. Antigens A and B are injected into an animal at the same time. If it is the first exposure of the animal to B but the second exposure to A, which of the following would you expect?
    A. A very short lag phase before production of antigen A-specific antibody starts
    B. Very slow decline of antigen A-specific antibody concentration
    C. Production of high levels of A-specific antibody
    D. Production of low levels of B-specific antibody
    E. All of the above.

Answer - E

10. Opsonization serves to:
    A. Neutralize antigens
    B. Enhance phagocytosis of bacteria by macrophages
    C. Enhance killing of cells by T cells
    D. Allow conjugate formation between target cells and cytotoxic T-cells
    E. Localize bacteria to the spleen and lymph nodes.

Answer - B

11. Which of the following cells is considered to be the blood borne precursor to tissue macrophages?
    A. Granulocyte
    B. Monocyte
    C. Neutrophil
    D. Mast cell
    E. Lymphocyte

Answer - B

12. Which of the following is the best answer. Mast cells have the following characteristics and/or functions.
    A. Mast cells are potent cellular mediators of anti-bacterial inflammatory responses
    B. Mast cells can be found in inflammatory sites
    C. All mast cell types have high concentrations of histamine
    D. Mast cells produce inflammation not only through mediators contained within their granules, but also through the production of cytokines and prostaglandins/leukiotrienes.
    E. All of the above

Answer - E

13. Which of the following types of molecular bond do not contribute to the strength of interaction between antibody and antigen.
    A. Hydrogen bonds
    B. Van der waals forces
    C. Electrostatic bonds
    D. Covalent bonds
    E. Hydrophobic interactions

Answer - D

14. Which of the following does not apply to "innate" immune mechanisms
    A. Absence of specificity
    B. Activation by a stimulus
    C. Involvement of multiple cell types
    D. A memory component
    E. Soluble and cellular factors

Answer - D

15. The following properties render a substance immunogenic:
    A. high molecular weight
    B. chemical complexity
    C. sufficient stability and persistence after injection
    D. all of the above
    E. all of the above are essential but not sufficient

Answer - E

16. Haptens
    A. Require carrier molecules to be immunogenic
    B. Bind to specific antibodies when homologous carriers are not employed
    C. Interact with specific antibody even if the hapten is monovalent
    D. Cannot stimulate antibody responses without carriers
    E. All of the above.

Answer - E

17. An immunologic adjuvant is a substance that
    A. Reduces the toxicity of the immunogen
    B. Enhances the immunogenicity of haptens
    C. Enhances hematopoiesis
    D. Enhances the immune response against the immunogen
    E. Enhances immunologic cross-reactivity.

Answer – D

18. An antibody made against the antigen tetanus toxoid (TT) reacts with it even when the TT is denatured by disrupting all disulfide bonds. Another antibody against TT fails to react when the TT is similarly denatured. The most likely explanation can be stated as follows:
    A. The first antibody is specific for several epitopes expressed by TT
    B. The first antibody is specific for the primary amino acid sequence of TT, whereas the second is specific for conformational determinants
    C. The second antibody is specific for disulfide bonds
    D. The first antibody has a higher affinity for TT
    E. The first antibody has a higher affinity for flu virus.

Answer - B

19. A patient is admitted with multiple bacterial infections and is found to have a complete absence of C3. Which complement-mediate function would remain intact in such a patient?
    A. Lysis of bacteria
    B. Opsonization of bacteria
    C. Generation of anaphylatoxins
    D. Generation of Neutrophil chemotactic factors
    E. None of the above

Answer - E

20. Active fragments of C5 can lead to the following, except
    A. Contraction of smooth muscle
    B. Vasodilatation
    C. Attraction of leukocytes
    D. Attachments of lymphocytes to macrophages
    E. All of the above

Answer - D

21. Which component(s) of complement could be missing and still leave the remainder of the complement system capable of activation by the alternative pathway?
    A. C1, C2, and C3
    B. C3 only
    C. C2, C3, and C4
    D. C1, C2, and C4
    E. C1, C3, and C4

Answer – D

22. Which of the following is NOT involved in leukocyte migration?
    A. Integrins
    B. Mucins
    C. Selectins
    D. MHC Molecules
    E. Immunoglobulin Superfamily CAMs

Answer D

23. Which of the following inflammatory mediators is involved in promoting vasodilation during inflammation?
    A. LTB_4
    B. LTD_4
    C. PGE_2
    D. Bradykinin
    E. LTE_4

Answer – C

24. Which of the following inflammatory mediators is involved in promoting leukocyte chemotaxis during inflammation
    A. Serotonin
    B. Bradykinin
    C. C5a
    D. LTE_4
    E. Histamine

Answer - C

25. Which of the following is NOT one of the described "Cardinal Signs" of inflammation?
    A. Heat
    B. Pain
    C. Swelling
    D. Bleeding
    E. Redness

Answer - D

Name:_____ **ID#**_____

Type II Questions:

For each of the following questions, mark
A if 1, and 3 are correct
B if 2 and 3 are correct
C if 1, 2, and 3 are correct
D if 4 is correct
E if 5 is correct.

26. Which of the following statements characterize (s) a secondary/memory antibody response?
    1. Shorter lag time
    2. Specific to primary antigen
    3. Greater magnitude of response
    4. Shorter decline phase
    5. No need for antigen recognition

Answer - C

27. Injection into a rabbit of a small chemical compound (the hapten) coupled to a larger protein produces antibodies against:
    1. No antibodies because the hapten is not immunogenic
    2. The hapten
    3. The protein
    4. Only against the protein
    5. Only against the hapten

Answer - B

28. Elimination of bacteria by opsonization involves:
    1. Coating bacteria with complement
    2. Neutralization of bacterial toxins
    3. Recognition of the bacteria-bound complement fragments by receptors on phagocytes
    4. Prevention of bacterial adhesion to endothelial cells
    5. Binding of antibodies to receptors on bacteria.

Answer - A

29. Lymphocytes in a lymph node
    1. Include both B and T cells
    2. Can arrive through the afferent lymph
    3. Can arrive from the blood
    4. Can arrive through the efferent lymph
    5. All of the above

Answer - C

30. The C5a fragment
    1. Can increase vascular permeability
    2. Can induce expression of adhesion molecules by endothelial cells
    3. Is a potent chemoattractant
    4. Is a vital component of the Membrane Attack Complex
    5. Has no effect on blood flow

Answer - C