BIOL 4570
Spring 2008
Exam 1

MULTIPLE CHOICE: Enter the best answer to each question on your scantron form.

1. Toll-like receptors (TLRs) are components of the _____ immune response.
    a. Delayed
    b. Adaptive
    c. Innate
    d. Acquired

2. Which type of cell can differentiate into a plasma cell upon activation?
    a. CD4+ T cell
    b. B cell
    c. CD8+ T cell
    d. Dendritic cell

3. LPS mediates its inflammatory effects via:
    a. CR1
    b. CR2
    c. TLR4
    d. TLR1

4. The T cell receptor recognizes:
    a. Native proteins
    b. MHC
    c. MHC + native proteins
    d. MHC + processed protein

5. Peptides from bacteria that replicate extracellularly would most likely be presented by:
    a. MHC Class I
    b. MHC Class II
    c. T cells
    d. Epithelial cells

6. Which of the following is least likely to be a result of Langerhans cell activation?
    a. Migration to the lymph node
    b. Increased antigen presentation
    c. Migration to peripheral tissues (i.e. skin)
    d. Enhanced T cell activation

7. Bacteria that are opsonized
    a. Die immediately due to loss of cellular integrity
    b. Are less likely to be recognized by the immune system
    c. Divide rapidly
    d. Are phagocytosed at increased rates

8. Which of the following would macrophages be incapable of doing in response to activation?
    a. Secrete cytokines
    b. Activate transcription factors
    c. Release lytic granules
    d. Increase production of reactive oxygen species (ROS)

9. CD8+ T cells are sometimes known as:
    a. CTL
    b. NK cells
    c. NK T cells
    d. Helper T cells

10. Which complement pathway is initiated by antigen/antibody complexes?
    a. Classical pathway
    b. MB lectin pathway
    c. Alternative pathway
    d. PKC pathway

11. Complement proteins can directly kill a bacterium
    a. True
    b. False

12. The antimicrobial and cytotoxic activity of phagocytes is often accompanied by increased production of reactive oxygen species, which is called:
    a. activation of complement
    b. respiratory burst
    c. erythropoiesis
    d. haptenation

13. Which of the following cytokines is most often associated with inflammation?
    a. IL-1
    b. IL-2
    c. IL-4
    d. IL-10

14. Immunoglobulin (Ig) is found:
    a. In serum
    b. Embedded in the B cell membrane
    c. Both A and B
    d. None of the above

15. What role do the small peptide complement cleavage products play?
    a. No role
    b. Inflammatory mediators
    c. Opsonization
    d. Subunits of the membrane attack complex

16. The most important role of chemokines is to:
    a. Activate phagocytes
    b. Suppress inflammation
    c. Activate B cells
    d. Direct cell migration

17. NK cells kill cells with
    a. Increased Class I on the cell surface
    b. Increased Class II on the cell surface
    c. Decreased Class I on the cell surface
    d. Decreased Class II on the cell surface

18. TCRs have _____ antigen binding sites
    a. Monovalent
    b. Divalent
    c. Quadravalent
    d. Decavalent

19. Which of the following binds antigen more tightly?
    a. TCRs
    b. Antibodies

20. Which of the following stabilizes TCR/MHC Class I interactions?
    a. CD4
    b. Ig
    c. CD8
    d. CR4

21. Exogenous peptides are loaded onto Class II in the:
    a. Endosome/lysozome
    b. ER
    c. Golgi
    d. Nucleus

22. Which of the following molecules is most likely to play role in extravasation:
    a. MBL
    b. ICAM-1
    c. CD4
    d. TCR

23. Which of the following do not express class I MHC?
    a. T cells
    b. Dendritic Cells
    c. Macrophages
    d. None of the above

24. MHC Class I tends to bind peptides that are:
    a. 2-3 amino acids
    b. 8-10 amino acids
    c. 15-20 amino acids
    d. >20 amino acids

25. In antibody class switching, joining occurs in the Ig heavy chain gene
    a. C region
    b. V region
    c. D region
    d. J region

26. V(D)J joining occurs at the _____ level
    a. RNA
    b. DNA
    c. Protein

27. Class switching occurs at the _____level
    a. RNA
    b. DNA
    c. Protein

28. In the body there may be two different isotypes of antibody circulating that have the same V region
    a. True
    b. False

29. B cells can express surface Ig with multiple antigen specificities.
    a. True
    b. False

30. Before class switching, B cells express
    a. IgM
    b. IgA
    c. IgE
    d. IgG

31. Which of the following isotypes of antibodies is associated with allergy?
    a. IgM
    b. IgA
    c. IgE
    d. IgG

32. Which component of the TCR variable region has the most contacts with the peptide that is bound to MHC?
    a. CDR1
    b. CDR2
    c. CDR3
    d. CDR4

33. V(D)J joining is mediated by
    a. MHC
    b. Proteosome
    c. RAG-1/RAG-2
    d. Kinases

34. The TCR is comprised of two identical chains
    a. True
    b. False

35. Recombination occurs in immunoglobulin:
    a. Heavy chains
    b. Light chains
    c. Both A and B
    d. None of the above

36. What mostly random process, which occurs in the germinal centers of lymphoid organs, is the basis for affinity maturation?
    a. Class-switching
    b. Somatic hypermutation
    c. Granuloma formation
    d. Germ-line hypermutation

RESEARCH MINUTE QUESTIONS

37. Mast cell recognition of double-stranded RNA likely occurs through:
    a. Fc receptors
    b. Surface Ig
    c. MHC Class II
    d. TLR-3

38. CD4+CD8+ (double positive/DP) T cells are:
    a. Mature
    b. Immature

39. Mutation in RAG-2 can result in a deficiency in
    a. B Cells
    b. T cells
    c. Both A and B
    d. None of the above

40. CD4+ T cells suppress the response to some pathogens and augment the response to other pathogens.
    a. True
    b. False

ESSAY (10 points each)

1. Discuss the four main processes that generate diversity in lymphocyte antigen receptors. In particular, which processes are unique to B cells and at what stages of development do these processes occur?
2. You and your friends are walking through Centennial Olympic Park on a beautiful spring day. The grass looks particularly inviting so you take off your shoes to walk across the lawn. Suddenly you feel a sharp pain and notice that you have cut your foot on a broken, dirt-encrusted crack pipe. Describe the molecular and cellular details of the immediate immune reactions that would occur in your foot and what you might expect to occur over the next week.