IMMUNOBIOLOGY, BIOL 537
Exam # 2
Spring 1997

Name _____

I. TRUE-FALSE (1 point each)

Which of the following is TRUE or FALSE relating to immunogenicity of an antigen and T and B cell responsiveness to antigen?

_____ 1. Substances with a molecular weight less the 5000-10,000 are poor immunogens.

_____ 2. Molecules that cannot be degraded by APCs are poor immunogens for T cell responses and many B cell responses.

_____ 3. Doses of antigen that are too high cause lymphocytes to enter a state of non-responsiveness.

_____   4. The CD4 cell is said to be class I restricted.

_____ 5. B cells recognize antigen when soluble antigen binds to their membrane bound antibody in association with MHC class II molecules.

_____ 6. B cell epitopes in native proteins can contain sequential (linear) or nonsequential (interactions of folds with AAs not in linear sequence) amino acids.

_____ 7. The TCR is highly specific for antigenic epitopes that are not associated with MHC.

_____ 8. The MHC protein is highly specific for antigenic epitopes.

_____ 9. The B cell surface bound immunoglobulin is highly specific for antigenic epitopes.

_____ 10. If the light and heavy chains of an immunoglobulin are separated using 2-β mercaptoethanol, each variable region by itself would specifically react with antigenic epitopes.

Which of the following statements are TRUE or FALSE concerning immunoglobulin molecules?

_____ 11. Enzymatic digestion using papain causes the formation of 2 Fab fragments and one Fc fragment.

_____ 12. Most immunoglobulin molecules are composed of one of the heavy chain classes and both of the light chain classes.
_____ 13. For the pentameric IgM molecule, there is only one J-protein molecule.

_____ 14. IgE has the shortest ½ life of the immunoglobulin molecules.

_____ 15. The only immunoglobulin molecules that have an extra constant domain are IgM and IgG.

_____ 16. IgD is the first immunoglobulin to be present on maturing B cells.

_____ 17. IgE has a greater affinity to antigen than does IgG and therefore will bind to low dosage levels of antigen preferentially over IgG.

Which of the following statements are TRUE or FALSE concerning antigen-antibody reactions?

_____ 18. For precipitation to occur, both the antigen and antibody must be multivalent.

_____ 19. Most antigens induce a polyclonal response.

_____ 20. A papain digest of anti-sheep red blood cell (S_{RBC}) antibodies can agglutinate sheep red blood cells.

_____ 21. In Hemagglutination inhibition tests, the level of antibody can be determined by examining the amount of complement that is able to lyse RBCs.

_____ 22. The optimal concentration ratio of antigen-to-antibody both for precipitation and agglutination reactions is 2:1 since most antibodies have an ability to bind to two antigen epitopes.

Which of the following statements are TRUE or FALSE concerning B cell activation?

_____ 23. All B cells bearing receptors that can bind to self-MHC are selected during positive selection in the bone marrow.

_____ 24. The BCR molecule acts as both a signal transduction molecule and it helps in binding to antigen epitopes.

_____ 25. Activated APCs, like macrophages, have membrane bound B7 which helps to stimulate T cell responsiveness.

_____ 26. T-independent B cell activation is MHC class II restricted.

_____ 27. When B cells undergo class shift, the idiotypic portion of the different classes of antibodies remains the same.

_____ 28. Lymphokines released by T$_{helper}$ cells control what antibody is made by B cells in response to antigen.

_____ 29. During the normal course of a humoral response, the affinity of the Ig on B cells increases towards the stimulating antigen, this is called affinity maturation.

_____ 30. During the response to most antigens, there is both a cellular and humoral response.

II. FILL-IN (2 points each)

31. The double immunodiffusion technique described in the book and class is also called the _____ technique.

32. The unusual light chain that is associated with the μ heavy chain on pre-B cells, and is only temporary, is called a _____ light chain.

33. The two classes of light chains are called _____ and _____.

34. The antibody classes that are able to activate complement are _____ and _____.

35. The membrane bound receptor for cytoplasmic PKC is called _____.

36. An antibody that is made against an antibody is called an _____.

37. The antibody that induces mast cell degranulation is _____.

38. Two second messengers involved in signal transduction are _____ and _____.

39. Complement binds to the _____ portion of an antibody only when the antibody is associated with _____.

40. The type of antigen that will be processed by an APC and expressed on an MHC class I molecule is an _____ antigen.

III. Short-Answer

41. Set-up and describe an **ELISA** assay to determine whether a person has antibodies in their serum to influenza. (5 points)

43. You are at a party and unfortunately for yourself you were not thinking about the immunology you have learned! Someone that you did not know very well is looking very yellow, but comes up to you and says that they have the most incredible tasting drink, and they want you to try some. You drink from their glass, and it and it does taste really good. However, you find out the next day that they had hepatitis and the virus infects you. Describe how you and your body will attack this foreign agent to keep you from getting sick, or at the least to keep your symptoms from getting too bad. (i.e., describe your immunological response!!) (10 points)

44. Define the following: (one of these will be extra credit!!) (3 points each)

a. Invariant chains–

b. TAP proteins–

c. Proteosome–

d. MHC class I restricted–

e. Cytosolic pathway of antigen processing–

f. Endocytic pathway of antigen processing–

g. Immature B cell–

h. Thymus-independent B cell–

i. Mitogen–