Chapter Study Guide (W2023)
Introduction to the Immune System
The Lymphatic System

Section 12.1

1 Some estimate that humans are built out of 50 trillion cells. Plus, we are a host for many other type of organisms that cohabitate with us! What type of cell outnumber our cells 10:1? What type of cell "is our cell type"? How can you tell the difference between the two cell types? If you weight all the "other type of cells", then how much would they weigh?

2 What is the structure and function of the lymphatic system? (slide # 4)

3 What is the relationship between the lymphatic system and the immune system? (slide # 5)

4 How is interstitial fluid redirected into lymphatic capillaries? What structure makes this possible? Why is this good?

5 What are the three functions of the lymphatic system?

6 What is the difference between lymphatic tissues and lymphatic organs? What are the three lymphatic organs? What feature distinguishes the two?

7 What organs and tissues do not have lymphatic capillaries?

8 The lymph must drain back into the general blood circulation. How is the body drainage subdivided? What two ducts deliver the lymph back into the blood? Where? (note: this is important lab information) Is there a pump to move lymph? Explain

9 What are the two functions of a lymph node? How is the structure of the afferent and efferent lymphatic vessels well suited for the nodes function?

10 How is the location and structure of the three tonsils well suited for their function? Explain. What are the tonsilar crypts? (Three tonsils and location? lab objective)

11 The spleen is the largest lymphatic organ. What does the spleen filter? What type of pulp is inside the spleen? Function?

12 What is the thymus? (We will cover this topic in more detail later.)

13 What are the immune system's three separate lines of defenses? What are the key features for each defense? What does innate mean? What does non specific resistance mean? What does it mean to be acquired or adaptive? What are the two key features of the adaptive immunity?

Section 21.2

We have already covered the formed elements in detail and you should already have flash cards made to learn the function of these WBCs. I will not make new study guide questions for information already covered in previous lectures.

14 What are WBC responsible for? What does it mean to say WBC are nomadic? Significance? What do WBC hunt for? How do we describe a cluster of WBC forming to destroy a pathogen? What happens after the pathogen is destroyed?

15 What is the difference between lymphatic tissue and lymphatic organs?

16 Where are three locations where you would expect to find lymphatic tissue? What is MALT? What is BALT? Significance? Why are these locations "logical"?

17 What are the primary lymphatic organs? What are the secondary lymphatic organs?

Section 21.3

18 What is a pathogen?

19 How may we damage tissue?

20 What are the immune system's three lines of defenses? Summarize the key features in each. What two features make adaptive immunity so special? (This you should already know!)

21 What two WBC create the immune systems "cellular response"?

22 What is the function of the Tc? Where is the pathogen located? How does the Tc eliminate the pathogen? When the Tc is activated, what new type of cell is created? Where will this new cell rest? What will occur if same bacteria reenters the body again? What happens to Tc after pathogen are defeated?

23 If a host cell is infected by a bacteria, there will also be the similar bacteria outside host cells. What cell is activated against the same bacteria living outside host cells? What does this newly activated cell "morph" into? What type of molecule is produced by this newly formed WBC? What two things will this molecule do? What type of cell is formed but not active during this initial infection but will rest in the lymph nodes and wait for a second exposure to be activated?

24 How do you characterize the different factors of the first line of defense? Examples

25 How is the second line of defense different than the first line of defense? Three categories?

26 What is a natural killer cell (NK)? What makes these cells unique? What function do they share with Tc?

27 Where are toll like receptors located (TLR)? Are these receptors specific antigen receptors or general purpose antigen receptors? Where are pathogen associated molecular patterns located (PAMP)? What type of cells have TLR?

28 What is the function of interferon? What type of cell will release interferon? What type of WBC migrate to area in response to interferon's release?

29 What is complement? Where do you place complement in the three lines of defense system? After complement is activated, what are the four outcomes? Explain significance of each.

30 What is the general purpose of inflammation? What are the four cardinal signs of inflammation? What might also occur with inflammation? What four steps occur in an inflammatory event? What connective tissue cell migrates into the area?

31 What cell is the first responder to the inflamed area? What will it do? What is this called? What are the mast cells doing now? Significance?

32 How much do neutrophil count increase in a bacterial infection? When do eosinophil numbers increase?

33 What is pus? What is an abscess?

34 What is fever? What initiates fever? Where is the bodies "thermostat" located? What type of cells release pyrogens? What is a required growth factor for bacterial growth? How does fever help to reduce this growth factor? What cell in our body has a lot of this growth factor? Does it now make sense to know bacteria want to kill RBC?

35 Why are you cold at the beginning of a bacterial infection? What do you know when the fever breaks? Why do you perspire when the fever breaks?

Section C21.4

36 What is the dual nature of adaptive immunity system? Why do we need two form of adaptive immunity? (slide #1 & #47))

37 Where are T and B cells made (Born)? Where are T and B cells educated? Education means what? What occurs when T and B cells are deployed? To where? What phase describes T and B cells when they are first deployed? (slide #2)

38 What must happen for a deployed T and B cell to be activated? What occurs during "recognize" stage? What other cell must come into play in order to complete the recognize stage? What occurs during the react stage? What type of new cells are formed in the remember state? Do they play a role in the current infection? (slide #2)

39 What is an antigen? What makes good antigens? Bad antigens? What is the difference between an antigen and epitope? What do host cells do with epitopes? What molecule are used to display epitope on the outside surface of the cells plasma membrane? What cells are "antigen processing cells" (APC)? (see slide #54)

40 What is a hapten? Why do doctors always ask you if you are allergic to penicillin?

41 What are major hitocompantability proteins (MHCP)? How are type-I and type II used? (study slides 8 -11) You need to know how APC, Tc, and Th cells work to accomplish adaptive immunity.

42 How do host cells tell the immune system they are infected by pathogen?

43 How are cytotoxic T cells activated?

44 How are helper T cells activated?

45 How are NK cells activated?

46 What three cells are APC? What type of MHCP do these APC have? What is the significance?

47 How are B cells activated? What is the APC for B cells? What is the difference between full and partial activation of B cells? What do B cells morph into? How many antibodies may a plasma cell make every second and for how long? What do antibodies do?

48 What is the difference between B cells and plasma cells cytoplasm? Explain

49 What are M cells? Function? Significance? What other tissue do M cells remind you of?

Section 21.5 - Antibody Mediated Immunity Classification

50 What is the difference between natural and artificial?

51 What is the difference between active and passive?

52 What are the four possible forms of acquired immunity and give examples for each?

Section 21.6 - Antibodies

53 What type of molecule are antibodies? What other term describes this molecule? How many types of antibodies are there? MADGE?

54 What two antibodies may activate complement?

55 What antibody make up the majority in blood?

56 What antibody may cross the placenta? What antibody is found in breast milk? First antibody secreted after exposure to antigen? Mast cell receptor? B cell receptor?

57 What is agglutination?

58 What is the difference between first and second exposure?

21.7 - Hypersensitivity

59 What is hypersensitivity?

60 What are the four different types of hypersensitivity?

61 What is hemolytic disease of the newborn? Explain the mechanism?

21.8 - Autoimmunity and Immunodeficiency Diseases

62 What causes an autoimmune disease?

63 What is the cause of severe combined immunodeficiency disease?

64 What is the cause of AIDS?