Review questions for Immune system lecture

Multiple choice review questions:

1) Cells that do phagocytosis include all of the following except
A) neutrophils
B) lymphocytes.
C) macrophages
D) eosinophils

2) The thermoregulatory control center or "thermostat" that regulates the body's response to changes in temperature such as during a fever, is located in the
A) hypothalamus.
B) pituitary.
C) cerebral cortex.
D) adrenal gland.

3) Basophils secrete _____ to dilate blood vessels for the purpose of increasing blood flow and increasing capillary permeability.
A) complement proteins
B) histamine
C) antibodies
D) thromboxane

4) The chemical secreted during an immediate hypersensitivity response, such as hay fever, that is most responsible for the itching, sneezing, tearing, and runny nose, is
A) histamine.
B) antibodies.
C) adrenaline.
D) antigens.

5) Local inflammation is characterized by all of the following except
A) redness.
B) shortness of breath.
C) swelling (edema).
D) pain

6) Which defense mechanism is considered part of the specific immune system?
A) epithelial membranes (such as the skin) that protect body surfaces
B) strong acidity of gastric juice (pH = 1-2)
C) activity of macrophage cells digesting bacteria and viruses
D) activity of lymphocyte cells

7) Which function is a characteristic of B lymphocytes?
A) releasing histamine
B) formation of antibodies
C) generating digestive enzymes for pathogen lysis
D) phagocytosis

8) Which is not **true** of antibodies
A) They are found in the blood
B) They are part of cell-mediated immune system
C) They are proteins
D) They are Y-shaped

9) Which statement about complement proteins is false?
A) Complement proteins are present in body fluids even during times of no infection
B) They are activated by T cells
C) They attack cells covered by antibodies
D) They lyse (break open) pathogen cells

10) The cells that do "clonal expansion" are
A) B and T lymphocytes
B) Bacteria that enter the body before the immune system controls their growth
C) All immune cells
D) Cancer cells

11) Which event does **not** represent an action of the nonspecific immune system?
A) the activation of B lymphocytes to produce antibodies
B) histamine causing vasodilation and increased capillary permeability
C) phagocytosis by neutrophils and macrophages
D) WBCs attracted to site of injury

12) The cell types that are most responsible for presenting foreign antigens to T lymphocytes are
A) B lymphocytes.
B) cancerous cells
C) platelets.
D) macrophages

13) The subpopulation of T lymphocytes that is attacked by the human immunodeficiency virus (HIV) in AIDS victims, is the
A) helper T cells.
B) memory T cells.
C) accountant T cells.
D) killer T cells.

Answers to multiple choice review questions:

1 = B
2 = A
3 = B
4 = A
5 = B
6 = D
7 = B
8 = B
9 = C
10 = A
11 = A
12 = D
13 = A

Fill-in-the-blank review questions:

1) Living things that cause disease (such as bacteria and viruses) are called _____.

2) Bacteria/viruses (circle one) are small cells that reproduce by dividing themselves into two new cells.

3) _____ reproduce by entering the inside of the body's cells, and then forcing the cell to make copies of themselves.

4) A(n) _____ is any molecule that the immune system interacts with; usually these molecules are proteins, carbohydrates, and lipids on the surface of cells.

5) _____ are the blood cells that are part of the immune system. These cells are also called _____.

6) There are _____ (a number) major types of white blood cells.

7) The five major types of white blood cells are: _____, _____, _____, _____, and _____.

13) Pathogens that enter the body can engulfed ("eaten") by white blood cells, a process known as _____. Any WBC that does this is called a(n) _____.

14) The three phagocytes of the immune system are _____, _____, and _____.

15) The main function of neutrophils is to _____.

17) _____cells, which develop from monocytes, are the most voracious of the phagocytes.

20) Basophils secrete _____, which dilates blood vessels (and attracts other leukocytes) so that the immune system can reach and attack an invading organism.

23) Fluid that exits the bloodstream and enters the tissue is called the _____.

24) Excess amounts of tissue fluid are called _____.

25) Excess tissue fluid is eventually returned to the bloodstream after it flows through the vessels, ducts, and nodes of the _____ system.

26) The hollow structures of the lymphatic system where lymph vessels merge are called _____. It is there that the lymph is _____. Because pathogen cells tend to get trapped there, many WBCs are stationed inside these structures.

27) In addition to trapping pathogen cells (which come from outside the body), the lymph nodes can often trap dangerous cells that come from within the body. These rapidly multiplying cells are _____ cells.

28) All the lymphatic vessels in the body merge into two major lymph vessels: The _____ duct and the _____ duct. From these two ducts, the lymph drains back into the blood vessels.

29) Water molecules are part of many fluids in the body, including lymph, tissue fluid, and blood. In the blank spaces below, use the numbers 1 – 6 to indicate the order a molecule of water would encounter the following fluids and body parts, as it moves from the blood to the end of the lymphatic system.

The thoracic duct _____
A lymph node _____
A lymph vessel _____
The plasma _____
Tissue fluid _____
Capillary wall _____

Circle the answer above where the water would re-enter the blood.

Draw a box around the answer above where the water would find large numbers of stationary immune cells

Draw a star over the answer above that swells when we are fighting an infection.

30) The lymphoid organs that help cleanse the upper respiratory tract of pathogens are the _____.

31) The _____ is the lymphoid organ that helps rid the blood of pathogens and filters out _____.

33) During infection, certain immune cells secrete molecules that travel to the body's "thermostat" in the _____ (a region of the body) and reset the body temperature upward, resulting in a. _____

34) As the amount of histamine in the blood increases, blood vessels _____.

35) The body has two lines of defense against attack by foreign invaders: the _____ immune system and the _____ immune system.

36) The _____ is the most important organ of the non-specific immune system, because it simply blocks most pathogens from ever entering the body.

37) The _____ is a set of proteins present in the blood that, when activated, destroy pathogen cell membranes.

38) Many cells, after being infected by a virus, manage to secrete _____ proteins, which inhibit viruses from entering neighboring cells.

39) _____ is an immune response in which body temperature increases. The elevated temperature assists the immune system in two ways: _____ and _____.

40) The four signs of inflammation are _____, _____, _____, and _____.

41) The inflammatory response is part of the specific/non-specific (circle one) immune system.

42) The inflammatory response is initiated when _____ (a type of WBC) releases _____, which makes capillaries _____. This causes the redness and swelling of the inflammation, and allows _____ to pass from the blood into the injured tissue.

43) During inflammation, molecules released by damaged tissue do two things: _____ and _____.

44) The branch of the immune system that is able to recognize specific pathogens and launch powerful attacks against them is the _____ immune system.

45) The cells of specific immune system are the white blood cells that defend the body against specific pathogens. Of the five major types of white blood cells, only one type, the _____, are part of the specific immune system.

46) The two major types of lymphocytes are _____ cells and _____ cells.

47) Each lymphocyte can recognize one/many (circle one) type(s) of foreign antigen. Since there are thousands of different pathogens that could potentially infect the body, there must be one /many (circle one) different lymphocytes.

48) Thanks to the memory B cells and T cells, we have a much stronger and faster immune response against a pathogen we have encountered before. This phenomena is called the _____ of the immune system.

49) For the body to mount a specific defense against a newly encountered pathogen takes _____ (how long?). This response is slow because at the beginning of the infection there may be only a single lymphocyte in the body that happens to bind to that particular pathogen.

50) Re-exposure, even years later, to an antigen that has been responded to before results in a specific defense that takes _____ (how long?) to mount. This is due to the presence of _____ B and T cells made during the first encounter with the pathogen.

51) _____ are Y-shaped molecules in the blood that bind antigens.

52) Antibodies are _____ (a type of macromolecule molecule).

53) _____ are the lymphocytes that produce antibodies.

54) When a B lymphocyte has encountered its foreign antigen (the specific foreign antigen that the B cell is programmed to respond to) the B cell begins to reproduce itself, a process that is called _____ of the lymphocyte.

55) When a B-cell encounters an antigen, it proliferates into two types of cells: One type releases antibodies to the antigen, and the other type are _____ cells that will become active if the pathogen is encountered again in the future.

56) When a lymphocyte (such as a B cell) does clonal expansion, the all the new cells it produces do/do not (circle one) have the same specificity for the same antigen as the original cell that clonally expanded.

57) The antibodies attached to a pathogen slow the spread of the infection in many ways: The antibodies attached to the pathogen simply "get in the way," so to speak, interfering with the functioning of the pathogen cell. Another way that the antibodies fight the pathogen is by linking several pathogens together. The term _____ means when cells are clumped together by antibodies

58) Each antibody can simultaneously bind to _____ (how many?) identical antigens. This is what allows antibodies to agglutinate pathogens containing foreign antigens.

59) Antibodies bound to a pathogen trigger attacks on that pathogen by _____ proteins, which are proteins in the blood that can lyse (tear open) cells.

60) The complement proteins only destroy cells that have antibodies attached to their antigens. This prevents the complement proteins from attacking _____.

66) B lymphocytes provide antibody-mediated immunity. Antibodies are a branch of the specific immune system called the _____ immune system because antibodies are found in the blood and lymph, which are body fluids.

67) _____ are the lymphocytes that attack pathogen cells by direct cell-to-cell contact (unlike B cells, which fight pathogens indirectly by releasing antibody proteins).

68) Unlike B cells, T cells are **not** activated simply by encountering the foreign antigen they are specific for. For a T cell to become activated, it first must encounter a _____ which has digested and displayed the specific foreign antigen that the T cell is programmed to respond to.

69) When a T lymphocyte has encountered its foreign antigen (the specific foreign antigen that the T cell is programmed to respond to) displayed by a macrophage cell, the T cell begins to reproduce itself, a process that is called _____ of the lymphocyte.

70) When an activated T lymphocyte proliferates, are three subpopulations of T lymphocytes that are formed: _____, _____, and _____.

71) Killer T-cells attack pathogen cells by direct cell-to-cell contact. The killer T cell contacts the pathogen cell then injects the pathogen cell with _____.

72) Some T cells are _____ T cells, which remain inactive until the pathogen is encountered again.

73) Some T cells are _____ T cells, which are necessary for B and T lymphocytes to undergo clonal expansion.

74) The branch of the specific immune system that is carried out by T lymphocytes is called the _____ mediated immune system because living cells (T cells, macrophages, and pathogen cells) are all required for its functioning.

75) After each description, write B if it describes a B cell, write T if it describes a T cell, and write M if it describes a Macrophage cell. Some blanks may require more than one answer.

a) Lymphocytes: _____

b) Makes antibodies: _____

c) Part of the humoral immune system: _____

d) Part of the cell-mediated immune system: _____

e) It works with the complement proteins to destroy pathogen cells: _____

f) Has memory cells: _____

g) It requires the help of a macrophage cell to become activated to fight pathogens: _____

76) One way that we medically enhance the immune response against a specific pathogen is to inject a person with non-living antigens from the pathogen (or in some cases, a weakened but living form of the pathogen). This procedure is called a _____. The person will not become sick if they encounter the true pathogen because their immune system has already produced _____ B and T cells against the pathogen.

77) Multiple sclerosis (MS) is a disease where the immune system attacks the body's own tissues. Diseases of this type are called _____ diseases. In MS, the immune system attacks, the _____, which causes the speed of nerve signals to decrease.

78) Transplanting an organ from one person to another is complicated by the fact that the recipient's immune system may "reject the organ" (mount an immune response against it). For this reason, _____ are often given to the organ recipient.

79) A(n) _____ is a excessive (tissue damaging) response by the immune system to a harmless antigen. Examples of such harmless antigens are pollen, cat hair, and dust.

80) _____ is a genetic disease that produces a deficit of the immune system.

81) Acquired immune deficiency syndrome (AIDS) is a disease caused by the _____ virus.

82) AIDS disease is caused by the HIV virus killing _____ (a specific type of lymphocyte).

83) Without helper T cells, the specific immune system cannot function because B cells and killer T cells cannot _____ without the assistance of helper T cells.

Answers to fill-in-the-blank review questions:

1) Pathogens
2) Bacteria
3) Viruses
4) Antigen
5) White blood cells20) Histamine
23) Tissue fluid
24) Lymph
25) Lymphatic
26) Lymph nodes
Filtered
27) Cancer
28) Right lymphatic duct
Thoracic duct
29) 6 (circled)
5 (boxed) (star)
4
1
3
2
30) Tonsils
31) Spleen
Old red blood cells
33) Hypothalamus
Fever
34) Dilate/Become leaky
35) Non-specific
Specific
36) Skin
37) Complement
38) Interferons
39) Fever
Inhibits bacterial growth
Speeds immune system reactions
40) Redness
Swelling
Heat
Pain
41) Non-specific
42) Basophil
Histamine
Dilate/become leaky
White blood cells
43) Activate pain receptors
Attract WBCs
44) Specific
45) Lymphocytes
46) B cells
T cells
47) One
Many
48) Memory
49) About 2 weeks
50) Days
Memory
51) Antibodies
52) Proteins
53) B cells
54) Clonal expansion
55) Memory
56) Do
57) Agglutination
58) Two

59) Complement
60) Self cells (cells of the body)
66) Humoral
67) T cells
68) Macrophage
69) Clonal expansion
70) Killer T cells
Memory T cells
Helper T cells
71) Digestive enzymes
72) Memory
73) Helper
74) Cell-mediated
75) a) B, T
b) B
c) B
d) T
e) B
f) B, T
g) T
76) Vaccination/Immunization
Memory
77) Autoimmune
Myelin sheath on neurons
78) Immunosuppressant drugs
79) Allergy
80) SCID (severe combined immunodeficiency)
81) HIV
82) Helper T cells
83) Clonally expand

Short answer review questions:

1) Fill in the following table about the lymphoid organs.

Lymphoid organ:	Location in body:	Fluid it cleanses and filters:
The spleen		
The tonsils		

2) One of the non-specific body defenses is called the inflammatory response. The inflammatory response, which occurs in an injured tissue, includes (a) making the capillaries leaky, and (b) activating pain receptors. Explain briefly how each of these two functions protects the body.

3) What is the defining difference between the specific and the non-specific immune systems?

4) You receive a flu shot (a vaccination against that year's flu virus). A few months later, you are exposed to a person with the flu. Thanks to the flu shot, your body is able to fight off the virus so quickly that you never feel ill. Explain (a) What was in the flu shot? (b) What did the flu shot change in

your body that allowed you to fight off the flu virus? (c) Why do you have to get the flu shot again next year? Be as specific as possible in your answers.

5) If you are exposed to a pathogen that your body has never encountered before, the immune system makes new B and T cells. Most of the new B and T cells fight the pathogen, but some B and T cells (called memory B cells and memory T cells) do not. Explain why your body makes memory B cells and memory T cells.

6) Multiple sclerosis (MS) is an example of an autoimmune disease. In MS, the immune system attacks the myelin sheath that surrounds neurons, decreasing the efficiency of the nervous system. In lecture, we discussed other examples of autoimmune diseases. Name an autoimmune disease (other than MS) and describe what part of the body is being attacked by the immune system.

7) Patients with autoimmune diseases often treated by giving them hormones that decrease the activity of the immune system. Name the hormones that decrease the immune system's activity: _____ (You may need to review your notes on the endocrine system to answer this question). What is an unintended and dangerous side effect of lowering a patient's immune system activity to treat an autoimmune disease?

8) What is the difference between HIV and AIDS?

9) The HIV virus only destroys helper T cells, which are only a small part of all your immune cells. Explain how HIV can totally destroy the activity of the immune system by infecting only helper T cells.

Answers to short answer review questions:

1)

Lymphoid organ:	Location in body:	Fluid it cleanses and filters:
The spleen	Upper abdominal cavity	Blood
The tonsils	Upper esophagus	Saliva

2) Making the capillaries leaky allows WBCs in the blood to exit the capillary and move into the injured tissue. Activating pain receptors discourages us from using the injured organ until it has repaired itself.

3) The specific immune system mounts attacks against specific pathogen types. The non-specific immune system makes the body less accessible and less hospitable to pathogens in general, but it does not mount attacks against specific pathogen types.

4) (a) The flu shot contained antigens from the flu virus (or perhaps a weakened form of the virus).
(b) The flu shot caused clonal expansion of the B and T cells that are against that particular flu virus.
(c) The flu virus mutates rapidly, so the flu virus of one year is not the same as the flu virus of another year. Flu vaccinations contain only antigens from the flu virus type of the current year. Each year, a new flu vaccination (containing antigens from the latest flu virus) must be obtained.

5) Memory B and memory T cells are made so that the immune system's response time will be much quicker if the same pathogen is ever encountered again. The immune system does not have to begin clonal expansion against the pathogen from just a few B and T cells. Large numbers of memory B and T cells against the pathogen are already present if the same pathogen invades again.

6) Rheumatoid arthritis is an autoimmune disease where the immune system attacks the articular cartilage of the joints. This eventually leads to reduced mobility of the joint and pain.

Another example of an autoimmune disease is lupus. The immune system attacks a wide range of connective tissue types in the body which results in a variety of symptoms, although muscle and joint pain are common among lupus victims.

7) Glucocorticoids (such as cortisone, cortisol, and prednisone) are immunosuppressant steroids. Although these drugs treat the autoimmune disease by suppressing the immune system, an unintended side effect is increased susceptibility to infection because of lowered immune system activity.

8) AIDS is a disease and HIV is the virus that causes AIDS.

9) Helper T cells are necessary for all B cells and T cells to clonally expand when activated by their foreign antigens. The destruction of helper T cells by the HIV virus therefore leaves the immune system unable to produce the large numbers of B and T cells needed to repel pathogens. This results in the death of the patient from pathogens that would normally be easily for the immune system to overcome.