Lymphatic System

1. All of the following organs actively FIGHT pathogens EXCEPT:
   a. Cervical lymph nodes
   b. Tonsils
   c. Spleen
   d. Thymus
   e. Axillary lymph nodes

2. T lymphocytes gain immunocompetence within the:
   a. Bone marrow
   b. Thyroid
   c. Spleen
   d. Bursa of Fabricius
   e. None of the above

3. Which of the following are functions of the lymphatic system?
   1. Removal of excess fluid from tissues
   2. Absorption of fat from the digestive tract
   3. Defending the body against pathogenic organisms
      a. 1, 2, and 3
      b. 1 and 3
      c. 1 and 2
      d. 2 and 3

4. Lymph is moved through lymphatic vessels because of:
   a. Skeletal muscle contraction
   b. Ventricular contraction
   c. Flapping of the lymphatic valves
   d. Pumping by the smooth muscle of the lymphatic capillaries

5. Which of the following does NOT empty into the thoracic duct?
   a. Lymph from the right leg
   b. Intestinal trunk
   c. Left jugular trunk
   d. Right subclavian trunk

6. As lymph flows through a lymph node, which of the following would it go through LAST?
   a. Medullary sinus
   b. Subcapsular sinus
   c. Afferent lymphatic vessel
   d. Cortical sinus

7. All of the following are functions of the spleen EXCEPT:
   a. Production of complement proteins
   b. Removal of old RBCs from the blood
   c. Storage of blood platelets
   d. Fetal RBC production
8. Which of the following is TRUE?
   a. Tonsils are entirely surrounded by a connective tissue capsule.
   b. Tonsils contain crypts which can help trap pathogens.
   c. The palatine tonsil is superior to the pharyngeal tonsil.
   d. The lingual tonsils are often referred to as the adenoids.

9. Most of the body's mucosa-associated lymphatic tissue can be found in the ________ tract and the ________ tract.
   a. Respiratory and digestive
   b. Respiratory and reproductive
   c. Gastrointestinal and urinary
   d. Reproductive and urinary

10. Which of the following cells produces the fibers that form the structural framework of most lymphatic organs?
    a. Reticular cells
    b. Mononuclear fibrocytes
    c. Binuclear fibrocytes
    d. Macrophages

11. Lymphoid follicles are usually found in all of the following EXCEPT the:
    a. Distal small intestine
    b. Appendix
    c. Lymph node cortex
    d. Tonsils
    e. All of the above contain lymphoid follicles!

12. Which of the following is TRUE of lymphatic capillaries?
    a. They empty into lymphatic collecting vessels.
    b. They're practically impermeable to fluid and proteins.
    c. They are abundant in teeth and bone.
    d. They receive blood directly from venules.

13. There are typically _________ afferent lymphatic vessels entering a lymph node than there are efferent lymphatic vessels leaving a lymph node. This causes the flow of lymph to _______ as it passes through the lymph node.
    a. More - slow down
    b. More - speed up
    c. Fewer - slow down
    d. Fewer - speed up
Lymphatic System

14. Which of the following is NOT a lymphoid organ?
   a. Spleen
   b. Inguinal lymph node
   c. Cervical lymph node
   d. Thyroid
   e. Palatine tonsil

15. Which of the following is closest to the diaphragm?
   a. Lingual tonsil
   b. Spleen
   c. Peyer's patches
   d. Right lymphatic duct

16. Which of the following does NOT refer to a tonsil?
   a. Palatine
   b. Pharyngeal
   c. Uvula
   d. Lingual
   e. Adenoids

17. Which of the following cells could be found in a lymphoid organ?
   a. B lymphocytes
   b. T lymphocytes
   c. Plasma cells
   d. Macrophages
   e. All of the above

18. Which of the following is TRUE of lymph nodes?
   a. There are an average of 35 lymph nodes in the human body
   b. Lymph nodes are not surrounded by a connective tissue capsule
   c. Lymph nodes are the only lymphoid organs with afferent and efferent lymphatic vessels
   d. The number of living microorganisms in an efferent lymphatic vessel is always greater than the number of living microorganisms in an afferent lymphatic vessel
   e. None of the above

19. The spleen:
   a. Is the only lymphoid organ in the abdominal cavity
   b. Is involved in mineral storage and red blood cell destruction
   c. Is served by the splenic artery, which is a branch of inferior mesenteric artery
   d. Contains primarily white pulp which is involved in red blood cell synthesis
   e. Is the smallest of the lymphoid organs

20. Which of the following is CORRECT?
   a. The thymus and the thyroid are both lymphoid organs
   b. Lymph nodes are the only lymphoid organs that contain lymphocytes
   c. All lymphoid organs contain both efferent and afferent lymphatic vessels
   d. Peyer’s patches are found within the distal small intestine
   e. None of the above

21. Which of the following is TRUE of lymph nodes?
Lymphatic System

a. They contain more efferent than afferent lymphatic vessels
b. They are surrounded by a capsule made of fibrous epithelial tissue
c. They contain mostly T lymphocytes in their superficial cortex
d. They function as filters of lymph
e. More than one of the above is TRUE

22. Which of the following is TRUE of lymph nodes?
   a. There are less than 50 of them in the average adult
   b. None are found in the inguinal region
   c. They do NOT contain macrophages
   d. Their stroma contains reticular fibers
   e. None of the above

23. __________ are clusters of lymphatic nodules located beneath the epithelial lining of the small intestine.
   a. Tonsils
   b. Adenoids
   c. Immune complexes
   d. Peyer’s patches
   e. Red pulp

24. Lymphatic capillaries are:
   a. More permeable than blood capillaries
   b. Less permeable than blood capillaries
   c. Equally permeable to blood capillaries
   d. Completely impermeable

25. When lymphatic vessels are blocked due to tumors, the result is:
   a. Shrinkage of tissues distal to the blockage due to inadequate delivery of lymph
   b. Severe localized edema distal to the blockage
   c. Increased pressure in the lymphatics proximal to the blockage
   d. Abnormally high lymph drainage from the distal region
   e. Severe localized edema proximal to the blockage

26. Which of the following is NOT a normal component of lymph?
   a. Water
   b. Plasma proteins
   c. Ions
   d. Red blood cells
   e. Leukocytes

27. Diffuse lymphatic tissue:
   a. Is often found beneath mucous membranes
   b. Is a tissue that lacks cells
   c. Is NOT found within the digestive tract
   d. Usually functions to promote bacterial and viral replication
   e. 2 of the above

28. Which of the following is NOT TRUE?
Lymphatic System

a. There are no “lymphatic arteries”
 b. Lymphatic capillaries are more permeable than blood capillaries
 c. Lymphatic capillaries and blood capillaries are found in bone and teeth.
 d. Lymphatic capillaries called lacteals are involved in fat absorption.
 e. Lymphatic vessels contain valves.

29. Which of the following is TRUE?
   a. Lymphatic vessels pass through lymph nodes.
   b. There are only 2 lymphatic ducts.
   c. The thoracic duct begins as the cisterna chyli
   d. Blockage of the right lymphatic duct could cause the right arm to swell.
   e. All of the above

30. An inability to move lymph could result in edema.
   a. The above statement is TRUE
   b. The above statement is FALSE

31. Which of the following is NOT TRUE?
   a. There are 100’s of lymph nodes within the body.
   b. Each lymph node is surrounded by a dense connective tissue capsule.
   c. Reticular fibers help support lymphocytes and macrophages within a lymph node.
   d. The lymph node cortex primarily contains B lymphocytes
   e. There are fewer afferent lymphatic vessels than efferent lymphatic vessels

32. Which of the tonsils is the most superior?
   a. Palatine
   b. Labial
   c. Pharyngeal
   d. Lingual
   e. Choroidal

33. Peyer’s patches are found in the:
   a. Proximal stomach
   b. Distal small intestine
   c. Liver
   d. Pancreas
   e. Rectum

34. Which of the following is TRUE of the tonsils?
   a. The most superior are the palatine tonsils.
   b. The lingual tonsils are often referred to as the adenoids.
   c. Tonsils are totally covered by a connective tissue capsule.
   d. The structure of tonsils facilitates exposure to bacteria for the purpose of building immunological memory.
   e. 2 of the above.

35. Which of the following is TRUE of the thymus?
Lymphatic System

a. Surgical removal of the thymus from a 3 month old child could affect B lymphocyte development, but NOT T lymphocyte development.
b. An adult thymus will contain more adipocytes than the thymus of a 13yr old.
c. The thymus is the only lymphoid organ that directly fights pathogens.
d. The thymus is located anterior to the sternum and inferior to the diaphragm.
e. The thymus is the only example of diffuse lymphatic tissue in the thoracic cavity.

36. Which of the following is TRUE of the spleen?
   a. The spleen is located in the lower right hand quadrant of the abdominal cavity.
   b. The spleen consists primarily of white pulp, which functions in RBC recycling.
   c. The spleen is the only lymphoid organ that entirely lacks white blood cells.
   d. If the spleen is surgically removed, many of its blood cleansing functions can be taken over by the liver.
   e. The spleen is the only lymphoid organ that contains both afferent and efferent lymphatic vessels.

37. The majority of the body’s lymph drains from the:
   a. Right lymphatic duct into the right subclavian vein
   b. Left lymphatic duct into the left subclavian artery
   c. Thoracic duct into the right subclavian vein
   d. Cisterna chyli into the abdominal vena cava
   e. Right lymphatic duct into the thoracic duct

38. The major function of the ____________ is blood “cleansing.”
   a. Thymus
   b. Spleen
   c. Peyer’s patches
   d. Lymph nodes
   e. Cortex

39. Which of the following is NOT TRUE?
   a. The majority of the spleen is composed of white pulp, lymphocytes suspended on reticular fibers.
   b. The cortex of a lymph node is packed with lymphoid follicles.
   c. Large superficial clusters of lymph nodes are found in the axillary, cervical, and inguinal regions.
   d. Lymphoid organs are characterized by a connective tissue capsule.
   e. Diffuse lymphatic tissue is prominent within mucous membranes.

40. The cells that produce the connective tissue framework of most lymphoid organs are the ____________.
   a. Endothelial cells
   b. Fibrocytes
   c. Histiocytes
   d. Reticular cells
   e. None of the above

41. The specialized lymphatic capillaries found in the intestinal villi are known as:
   a. Entrails
   b. Lymphoids
   c. Lacteals
   d. Thymosins
   e. None of the above
Lymphatic System

42. Which of the following is TRUE?
   a. There are usually more proteins in lymph than in plasma.
   b. Lymphatic capillaries in the kidneys are known as lacteals.
   c. The thoracic duct will receive lymph that was formed in the right kidney.
   d. Lymph empties into the vascular system near the beginning of the subclavian arteries.
   e. Differentiated T lymphocytes are referred to as plasma cells.

43. Which of the following is TRUE?
   a. Reticular cells are an example of an antibody-secreting leukocyte.
   b. Diffuse lymphatic tissue is prominent within mucous membranes.
   c. Lymphoid follicles are usually surrounded by a connective tissue capsule.
   d. Several regions of the body lack lymph nodes, including the axillary, cervical, and lumbar areas.
   e. There are typically more efferent lymphatic vessels than afferent lymphatic vessels associated with a lymph node.

44. Which of the following is TRUE?
   a. The spleen is located on the left side of the abdominal cavity just superior to the diaphragm.
   b. The primary function of the spleen is erythropoiesis.
   c. The majority of the spleen consists of white pulp.
   d. Surgical removal of the thymus would be more detrimental to a 35yo than to a 5yo.
   e. The pharyngeal tonsils are found in the posterior nasopharynx.

45. Lymph nodes:
   a. Typically have more efferent than afferent lymphatic vessels.
   b. Contain reticular cells and lymphocytes and function to cleanse lymph.
   c. Are only found in the inguinal, cervical, and axillary regions.
   d. Are shaped like a biconcave disk.
   e. Have a cortex and medulla but lack a connective tissue capsule.

46. The adult thymus:
   a. Is more active than the infant thymus.
   b. Contains adipocytes and fibrous connective tissue.
   c. Directly removes pathogens from the lymphatic circulation.
   d. Has both afferent and efferent lymphatic vessels.
   e. Is an avascular tissue.

47. The spleen is found on the _______ side of the abdominal cavity just _________ to the stomach.
   a. Right – medial
   b. Right – lateral
   c. Left – medial
   d. Left – lateral

48. Which of the following is TRUE of the tonsils?
   a. The pharyngeal tonsil is the most inferior.
Lymphatic System

b. The palatine tonsils are found just under the tongue.
c. Tonsils are characterized by the presence of crypts.
d. Tonsils usually do not contain any lymphocytes.
e. Tonsils are fully encapsulated by connective tissue.

49. Large lymphoid follicles found in the ____________ are known as Peyer’s patches.
   a. Proximal colon
   b. Distal small intestine
   c. Stomach
   d. Appendix
   e. Rectum

50. Which of the following would NOT be drained by the thoracic duct?
   a. Right lumbar trunk
   b. Left bronchomediastinal trunk
   c. Lymph from the right leg
   d. Right jugular trunk
   e. Intestinal trunks

51. Antibodies are produced by ____________.
   a. Dendritic cells
   b. Memory B cell
   c. Killer T cells
   d. Plasma cells
   e. Macrophages

52. Lymphatic collecting vessels are linked to lymphatic ducts by:
   a. Lymphatic capillaries
   b. Lacteals
   c. Lymphatic trunks
   d. Lymphatic arteries
   e. Anastomoses

53. Put the following in the correct order for lymph flow:
   1. Subcapsular sinus
   2. Afferent lymphatic vessel
   3. Cortical sinus
   4. Efferent lymphatic vessel
   5. Medullary sinus

   a. 1,2,3,4,5
   b. 2,1,3,5,4
   c. 2,3,5,1,4
   d. 3,2,5,1,4
   e. None of the above are correct

54. Which of the following organs contains these structures:
   - Connective tissue capsule
Lymphatic System

- Afferent lymphatic vessels
- B lymphocytes
- T lymphocytes

a. Spleen
b. Lymph node
c. Thymus
d. Pharyngeal tonsil
e. Appendix

Use the following answer choices for the next 5 items.

a. Spleen
b. Thymus
c. Tonsils
d. All of the above
e. None of the above

55. Red blood cell graveyard.
56. Contains afferent lymphatic vessels.
57. Forms a ring around the pharynx.
58. Site of T lymphocyte maturation.
59. Site of B lymphocyte maturation.

Use the following answer choices for the next 3 items:

a. Increase
b. Decrease
c. Stay the same

60. As the diameter of the right lymphatic duct decreases due to the presence of a growing tumor, the circumference of the right arm will most likely:

61. As lymph flows from an afferent lymphatic vessel to an efferent lymphatic vessel, you would expect the number of pathogens within it to:

62. If the left lumbar trunk was blocked by a mass of parasites, the size of the left leg would:

In each of the next 6 items two quantities are given. If quantity A is the larger of the two then choose A as your answer. If quantity B is the larger of the two then choose B as your answer. If the two quantities are equal then choose C as your answer.

63. a. Average number of proteins in 5ml of blood
   b. Average number of proteins in 5ml of lymph

64. a. Percentage of the body drained by the right lymphatic duct
   b. Percentage of the body drained by the thoracic duct

65. a. Number of pathogens in the average efferent lymphatic vessel
   b. Number of pathogens in the average afferent lymphatic vessel

66. a. Volume of lymph carried by the thoracic duct
   b. Volume of lymph carried by the right lymphatic duct
Lymphatic System

67. a. Number of primary lymphoid organs in the human body
    b. Number of secondary lymphoid organs in the human body

68. a. Typical number of afferent lymphatic vessels going to a lymph node
    b. Typical number of efferent lymphatic vessels leaving from a lymph node

The next 4 items are TRUE/FALSE

69. Lacteals are specialized lymphatic capillaries found within the villi of the intestinal mucosa

70. The thoracic duct empties directly into the azygos vein

71. Large lymphatic vessels have 3 tunics and contain smooth muscle

72. The expansion/recoil of arteries with each ventricular contraction plays no role in lymph movement

The next 7 items are Short Answers.

73. Identify the organ where T lymphocytes mature.

74. Name the 3 main tonsils.

75. Identify the location and function of lacteals.

76. Name a region of the body that contains prominent superficial lymph nodes.

77. Identify the clusters of lymphatic nodules in the distal small intestine.

78. Name each of the lymphatic trunks that drain the following areas:
    a. Arm
    b. Leg
    c. Head
    d. Lung

79. Mrs. Jackson, a 59-year-old woman, has undergone a left radical mastectomy (removal of the left breast and left axillary lymph nodes and vessels). Her left arm is severely swollen and painful, and she is unable to raise it more than shoulder height. Explain her signs and symptoms. Can she expect to have relief from these symptoms in time? How so?