Matching Questions

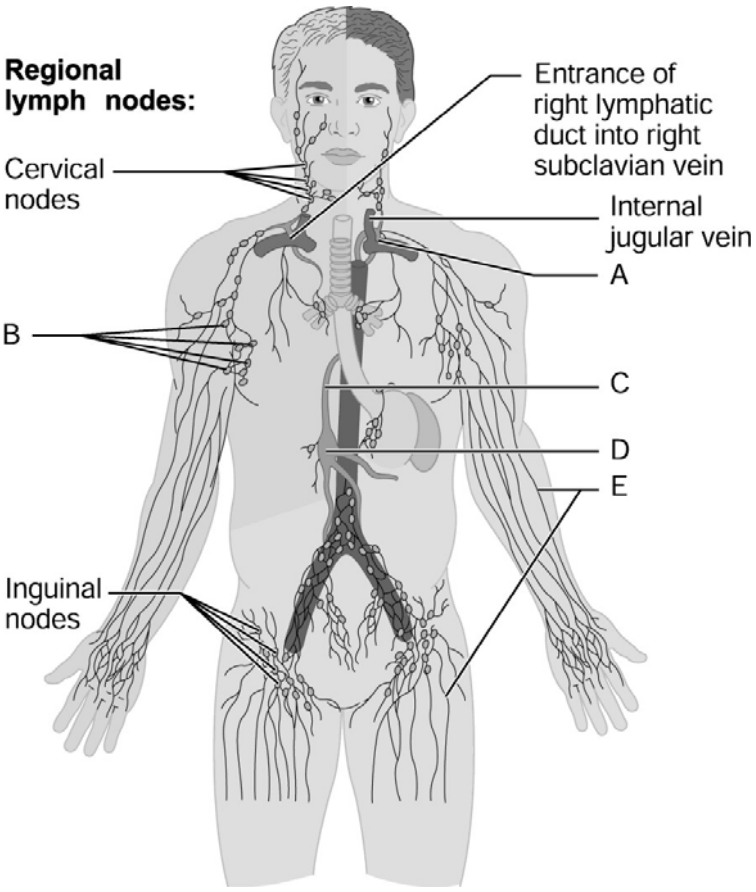

Figure 20.1

Using Figure 20.1, match the following:

1) Axillary node(s).
   Answer: B
   Diff: 2 Page Ref: 776; Fig. 20.2a

2) Cisterna chyli.
   Answer: D
   Diff: 2 Page Ref: 776; Fig. 20.2a

3) Entrance of thoracic duct into subclavian vein.
   Answer: A
   Diff: 2 Page Ref: 776; Fig. 20.2a

4) Thoracic duct.
   Answer: C
   Diff: 2 Page Ref: 776; Fig. 20.2a

5) Lymphatic collecting vessels.
   Answer: E
   Diff: 3 Page Ref: 776; Fig. 20.2a

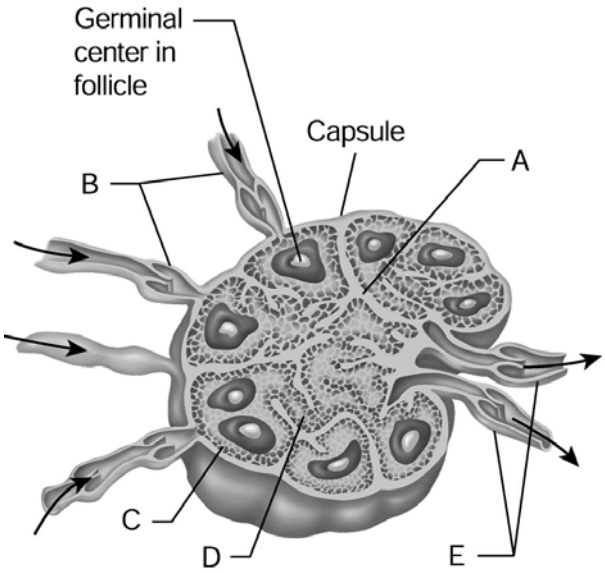

Figure 20.2

Using Figure 20.2, match the following:

6) Efferent vessels.
Answer: E
Diff: 2 Page Ref: 778; Fig. 20.4a

7) Cortex.
Answer: C
Diff: 2 Page Ref: 778; Fig. 20.4a

8) Cords.
Answer: D
Diff: 2 Page Ref: 778; Fig. 20.4a

9) Trabecula.
Answer: A
Diff: 2 Page Ref: 778; Fig. 20.4a

10) Afferent vessels.
Answer: B
Diff: 2 Page Ref: 778; Fig. 20.4a

11) Medulla.
Answer: D
Diff: 2 Page Ref: 778; Fig. 20.4a

Match the following:

12) Protein-containing fluid within lymphatic vessels.
Answer: B
Diff: 1 Page Ref: 774

13) Stores blood platelets.
Answer: A
Diff: 1 Page Ref: 779-780

14) Part of MALT.
Answer: C
Diff: 1 Page Ref: 782

15) Receives lymph from most of the body.
Answer: D
Diff: 2 Page Ref: 775

16) Small organs intimately associated with lymphatic vessels.
Answer: E
Diff: 2 Page Ref: 778

17) Largest lymphatic organ.
Answer: A
Diff: 2 Page Ref: 779

18) Isolated clusters of lymph follicles found in the wall of the small intestines.
Answer: C
Diff: 2 Page Ref: 782

A) Spleen

B) Lymph

C) Peyer's patches

D) Thoracic duct

E) Lymph nodes

True/False Questions

1) Peyer's patches are clusters of lymphoid tissue found primarily in the large intestine.
Answer: FALSE
Diff: 1 Page Ref: 782

2) The lymphatics function to absorb the excess protein-containing interstitial fluid and return it to the bloodstream.
Answer: TRUE
Diff: 1 Page Ref: 774

3) Lymph always flows away from the heart.
Answer: FALSE
Diff: 1 Page Ref: 774

4) Lymphatic capillaries are permeable to proteins.
Answer: TRUE
Diff: 1 Page Ref: 775

5) Digested fats are absorbed from the intestine by the lymph capillaries.
Answer: TRUE
Diff: 1 Page Ref: 775

6) Chyle is delivered to the blood via the lymphatic system.
Answer: TRUE
Diff: 1 Page Ref: 775

7) All lymphoid organs develop from mesoderm.
Answer: FALSE
Diff: 1 Page Ref: 783

8) About 3 liters of fluid are lost to the tissue spaces every 24 hours and are returned to the bloodstream as lymph.
Answer: TRUE
Diff: 1 Page Ref: 775

9) Because lymph vessels are very low-pressure conduits, movements of adjacent tissues are important in propelling lymph through the lymphatics.
Answer: TRUE
Diff: 1 Page Ref: 776

10) Lymphoid tissue is mainly reticular connective tissue.
Answer: TRUE
Diff: 1 Page Ref: 777

11) Lymphocytes reside temporarily in lymphoid tissue, then move to other parts of the body.
Answer: TRUE
Diff: 1 Page Ref: 777

12) All the lymphoid organs are well developed before birth.
Answer: FALSE
Diff: 1 Page Ref: 783

13) An infected lymph gland is called a bubo.
Answer: TRUE
Diff: 1 Page Ref: 779

14) The largest lymphatic vessels are called lacteals.
Answer: FALSE
Diff: 2 Page Ref: 775

15) The cisterna chyli collects lymph from the lumbar trunks draining the upper limbs and from the intestinal trunk draining the digestive organs.
Answer: FALSE
Diff: 2 Page Ref: 775

16) If even a small part of the spleen is left in a ten-year-old child, it will most likely regenerate itself.
Answer: TRUE
Diff: 1 Page Ref: 781

17) The thymus lacks T cells.
Answer: FALSE
Diff: 1 Page Ref: 781

Multiple-Choice Questions

1) Small organs associated with lymphatic vessels are termed _____.
A) lymph follicles
B) lymph nodes
C) axillary nodes
D) cisterna chyli

Answer: B
Diff: 1 Page Ref: 778

2) Which of the following would *not* be classified as a lymphatic structure?
A) pancreas
B) spleen
C) tonsils
D) Peyer's patches of the intestine
Answer: A
Diff: 1 Page Ref: 779

3) The distal portion of the small intestine contains clumps of lymph follicles called _____.
A) islets of Langerhans
B) Peyer's patches
C) rugae
D) villi
Answer: B
Diff: 1 Page Ref: 782

4) Both lymph and venous blood flow are heavily dependent on _____.
A) the pumping action of the heart
B) skeletal muscle contractions and differences in thoracic pressures due to respiratory movement
C) contraction of the vessels themselves
D) two-way valves
Answer: B
Diff: 1 Page Ref: 775-776

5) The thymus is most active during _____.
A) fetal development
B) childhood
C) middle age
D) old age
Answer: B
Diff: 1 Page Ref: 781

6) Which lymphatic structure drains lymph from the right upper limb and the right side of the head and thorax?
A) lumbar trunk
B) thoracic duct
C) right lymphatic duct
D) cisterna chyli
Answer: C
Diff: 1 Page Ref: 775

7) What effect does age have on the size of the thymus?
A) The size of the thymus increases continuously from birth to death.
B) The size of the thymus decreases continuously from birth to death.
C) The thymus is *not* affected by age.
D) The thymus initially increases in size and then decreases in size from adolescence through old age.
Answer: D
Diff: 1 Page Ref: 781

8) The lymphatic capillaries are _____.
A) more permeable than blood capillaries
B) less permeable than blood capillaries
C) equally permeable to blood capillaries
D) completely impermeable
Answer: A
Diff: 1 Page Ref: 774

9) Antibodies that act against a particular foreign substance are released by _____.
A) T lymphocytes
B) plasma cells
C) lymph nodes
D) medullary cords
Answer: B
Diff: 1 Page Ref: 777

10) Lymph leaves a lymph node via _____.
A) efferent lymphatic vessels
B) afferent lymphatic vessels
C) the cortical sinus
D) the subscapular sinus
Answer: A
Diff: 1 Page Ref: 779

11) By secreting hormones, the thymus causes what cells to become immunocompetent?
A) basophils
B) lymphocytes
C) macrophages
D) monocytes
Answer: B
Diff: 1 Page Ref: 781

12) Functions of the spleen include all of those below *except* _____.
A) removal of old or defective blood cells from the blood
B) crypts that trap bacteria
C) storage of blood platelets
D) storage of iron
Answer: B
Diff: 1 Page Ref: 779-780

13) When the lymphatics 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
Answer: B
Diff: 1 Page Ref: 776

14) Select the correct statement about lymph transport.
A) Under normal conditions, lymph vessels are very high-pressure conduits.
B) Lymph transport is faster than that occurring in veins.
C) Lymph transport is only necessary when illness causes tissue swelling.
D) Lymph transport depends on the movement of adjacent tissues, such as skeletal muscles.
Answer: D
Diff: 1 Page Ref: 775-776

15) Select the correct statement about lymphocytes.
A) The two main types are T cells and macrophages.
B) B cells produce plasma cells, which secrete antibodies into the blood.
C) T cells are the precursors of B cells.
D) T cells are the only form of lymphocyte found in lymphoid tissue.
Answer: B
Diff: 1 Page Ref: 777

16) Select the correct statement about lymphoid tissue.
A) Once a lymphocyte enters the lymphoid tissue, it resides there permanently.
B) Lymphoid macrophages secrete antibodies into the blood.
C) Lymphoid tissue is predominantly reticular connective tissue.
D) T lymphocytes act by ingesting foreign substances.
Answer: C
Diff: 1 Page Ref: 775

17) A ring of lymphoid tissue that appears as a swelling of the mucosa in the oral cavity is called a(n) _____.
A) tonsil
B) thymus
C) Peyer's patch
D) appendix
Answer: A
Diff: 1 Page Ref: 781

18) Which is *not* a mucosa-associated lymphatic tissue?
A) tonsil
B) thymus
C) Peyer's patch
D) appendix
Answer: B
Diff: 1 Page Ref: 782

19) Peyer's patches are found in the _____.
A) stomach
B) small intestine
C) large intestine
D) spleen
Answer: B
Diff: 1 Page Ref: 782

20) Lymph collecting or pooling from the lower extremities would first pool in the _____ before moving on up.
A) thoracic duct
B) inguinal nodes
C) cisterna chyli
D) azygos
Answer: C
Diff: 1 Page Ref: 775

21) What is a bubo?
A) a wall in a lymph node
B) a lobe of the spleen
C) an infected Peyer's patch
D) an infected lymph node
Answer: D
Diff: 1 Page Ref: 779

22) What is the function of a Hassall's corpuscle?
A) It increases the surface area of the thymic cortex.
B) It assists in the production of lymphocytes.
C) It forms the blood-thymus barrier.
D) It has *no* known significant function.
Answer: D
Diff: 1 Page Ref: 781

23) Particularly large clusters of lymph nodes occur in all of the following locations *except* the _____.
A) inguinal region
B) cervical region
C) axillary region
D) lower extremities
Answer: D
Diff: 2 Page Ref: 778

24) Digestive tract-associated lymphatic tissue includes all of the following *except* _____.
A) Peyer's patches
B) palatine tonsils
C) lingual tonsils
D) islets of Langerhans
Answer: D
Diff: 2 Page Ref: 782

25) Functions of the lymphatic system include _____.
A) transport of excess tissue fluid to the blood vascular system
B) transport of red blood cells to the blood vascular system
C) maintenance of blood pressure in the venous circulation
D) excretion of excess dietary fat
Answer: A
Diff: 2 Page Ref: 774

26) The tonsils located at the base of the tongue are the _____.
A) lingual tonsils
B) palatine tonsils
C) pharyngeal tonsils
D) Peyer's tonsils
Answer: A
Diff: 2 Page Ref: 781

27) Which of the following is *not* a normal component of lymph?
A) water
B) plasma proteins
C) red blood cells
D) ions
Answer: C
Diff: 2 Page Ref: 774

28) A sentinel node is _____.
A) a lymph node found in the intestinal lamina propria
B) the first node at the junction of all the lumbar trunks
C) a small node in the spleen
D) the first node to receive lymph from an area suspected to be cancerous
Answer: D
Diff: 2 Page Ref: 783

Fill-in-the-Blank/Short Answer Questions

1) The _____ are the simplest lymphoid organs and are found at the entrance to the pharynx.
Answer: tonsils
Diff: 2 Page Ref: 781

2) The appendix, tonsils, and Peyer's patches are collectively called _____.
Answer: MALT
Diff: 2 Page Ref: 782

3) Highly specialized lymph capillaries called _____ are present in the villi of the intestinal mucosa.
Answer: lacteals
Diff: 2 Page Ref: 775

4) The thoracic duct of the lymphatic system empties into the _____.
Answer: left subclavian vein
Diff: 2 Page Ref: 775

5) Lymph nodes have more _____ lymphatic vessels than _____ lymphatic vessels.
Answer: afferent; efferent
Diff: 2 Page Ref: 779

6) Of the organs in the lymphatic system, only the _____ becomes *less* important as you get older.
Answer: thymus
Diff: 2 Page Ref: 781

7) Tonsils have blind-ended structures called _____.
Answer: crypts
Diff: 2 Page Ref: 782

8) Hassall's corpuscles are always found in the lighter-colored _____ regions of the thymus.
Answer: medullary
Diff: 2 Page Ref: 781

9) The _____ pulp of the spleen forms cuffs around the central arteries.
Answer: white
Diff: 2 Page Ref: 780

10) Lymphatic _____ are formed from the union of the largest collecting vessels.
Answer: trunks
Diff: 2 Page Ref: 775

11) Describe the structural and functional relationship of the vessels of the blood vascular system and the lymphatic system.
Answer: Vessels of the blood vascular system are relatively high-pressure conduits compared to vessels of the lymphatic system. The same mechanisms that promote venous return in blood vessels act within lymphatic vessels. Because lymphatics are usually packaged together in connective tissue sheaths with blood vessels, the pulsating expansions of the nearby arteries also promote lymph flow.
Diff: 2 Page Ref: 774-775

12) Describe the mechanisms by which lymphatic fluid is moved through the lymphatics.
Answer: Lymphatic fluid is moved through the lymphatics by the milking action of active skeletal muscles, pressure changes within the thorax during breathing, valves to prevent backflow, and pulsation of adjacent arteries.
Diff: 2 Page Ref: 775-776

13) What is the consequence of obstruction of the lymphatics?
Answer: Obstruction of the lymphatics results in edema distal to the obstruction.
Diff: 2 Page Ref: 776

14) Where are the lymph node aggregations most dense?
Answer: Lymph node aggregations are most dense near the body surface in the inguinal, axillary, and cervical regions of the body.
Diff: 2 Page Ref: 778

15) What is the special role of the thymus gland?
Answer: By secreting hormones, the thymus gland causes T lymphocytes to become immunocompetent.
Diff: 2 Page Ref: 781

16) Name the tonsils and state their body locations.
Answer: Palatine tonsils are located on either side at the posterior end of the oral cavity. The lingual tonsils lie at the base of the tongue. The pharyngeal tonsils are in the posterior wall of the nasopharynx.
Diff: 2 Page Ref: 781, 782

17) List the functions of the spleen.
Answer: The spleen's main functions are to remove aged or defective blood cells and platelets from the blood and to store or release some of the breakdown products of RBCs to the blood for processing by the liver. Other functions include acting as a blood filter and reservoir, serving as a site for erythrocyte production in developing embryos, storing blood platelets, and providing a site for lymphocyte proliferation and immune surveillance and response.
Diff: 2 Page Ref: 779-780

18) Characterize lymph transport in terms of rate, volume, and ability to change.
Answer: Lymph transport is sporadic and much slower than that occurring in veins. About 3 liters of lymph enters the bloodstream in a 24-hour period. An increase in physical activity will cause lymph flow to increase, balancing the greater rate of fluid outflow from the vascular system.
Diff: 2 Page Ref: 775-776

19) In the thymus, what is the difference in the lymphocyte density of the cortex versus the medulla?
Answer: The cortex contains densely packed, rapidly dividing lymphocytes; the medulla contains fewer lymphocytes.
Diff: 2 Page Ref: 781

20) Contrast the structure of blood and lymph capillaries.
Answer: Lymphatic capillaries weave between the tissue cells and blood capillaries. Although similar to blood capillaries, lymphatic capillaries differ structurally in the following ways: (1) The endothelial cells forming the walls of lymphatic capillaries are not tightly joined. Their edges loosely overlap one another, forming flaplike minivalves. (2) Bundles of fine filaments anchor the endothelial cells to surrounding structures so that any increase in interstitial fluid volume separates the cell flaps, exposing gaps in the wall rather than causing the lymphatic capillary to collapse. (3) Lymphatic capillaries are blind-ended.
Diff: 3 Page Ref: 774

21) How does the lymphatic system both help and hinder the spread of cancer through the body?
Answer: Lymph nodes help rid the body of cancer cells by immune mechanisms. Lymph vessels may also be used to spread cancer cells throughout the body if immunity is not effective against the cancer cells.
Diff: 3 Page Ref: 779

22) How does the structure of a lymph node allow lymphocytes and macrophages to perform their protective function?
Answer: Macrophages ingest microorganisms and cellular debris. Lymphocytes monitor the lymphatic stream for the presence of antigens and mount an immune response. Because there are fewer efferent vessels draining the node than afferent vessels that feed it, the flow of lymph through the node stagnates somewhat, allowing time for the lymphocytes and macrophages to work.
Diff: 3 Page Ref: 778-779

23) Explain the term MALT. What is its function?
Answer: MALT is an acronym for mucosa-associated lymphatic tissue. It includes Peyer's patches, the appendix, and the tonsils in the digestive tract, and lymphoid follicles in the walls of the bronchi. Collectively, MALT acts to protect these systems from foreign material.
Diff: 2 Page Ref: 782

24) How is the skeletal system tied to the lymphatic system?
Answer: 1. The lymphatic system removes excess fluids in the periostea.
2. The lymphocytes protect the bones from pathogens.
3. Parts of the skeletal system produce the lymphocytes found in the lymphatic system.
Diff: 2 Page Ref: 780-781

Clinical Questions

1) A mother takes her son to the doctor and describes the following symptoms that she has observed. The child is running a fever, has flulike symptoms, and his lymph glands are very swollen and sore to the touch. Of what significance are the swollen and sore lymph glands?
Answer: When tissues are inflamed, such as due to a bacterial infection, lymphatic capillaries develop openings that permit the uptake of the pathogens. The inflammation and pain indicate lymph nodes infected by microorganisms.

Diff: 3 Page Ref: 777-779

2) A woman had a mastectomy that included the removal of axillary lymph nodes on her left side. What can she expect regarding her left arm and why?
Answer: Removal of the axillary lymph nodes results in severe localized edema since the lymphatic vessels are also lost. She can expect chronic edema along the arm, although some lymphatic drainage is eventually reestablished by regrowth of the vessels.
Diff: 3 Page Ref: 778

3) A man involved in a traffic accident is rushed to the emergency room of a hospital with severe internal bleeding. Examination reveals a ruptured spleen. What is the treatment of choice and what is the likely long-term outcome (prognosis)?
Answer: Surgical removal of the spleen is indicated. The prognosis is very good, as the functions of the spleen are taken over by the liver and bone marrow.
Diff: 2 Page Ref: 781

4) While passing through a village on safari you notice a man with one enormous leg and one normal-sized leg. What could have caused the increased size of the swollen leg?
Answer: The man has elephantiasis, which is caused by parasitic worms that get in the lymph system and reproduce to proportions that block the vessels. The swelling is due to edema.
Diff: 3 Page Ref: 783

5) Lymphedema may occur as a complication after a radical mastectomy, in which lymph nodes have been removed. Explain why it might occur.
Answer: Anything that prevents the normal return of lymph to the blood, such as blockage of the lymphatics by tumors or removal of lymphatics during surgery, results in severe localized edema (lymphedema).
Diff: 2 Page Ref: 776

6) A nurse palpated enlarged lymph nodes. Describe signs and symptoms that help to distinguish cancerous lymph nodes from infected lymph nodes.
Answer: Tender nodes are usually due to inflammation, whereas hard, fixed nodes are suggestive of malignancy.
Diff: 3 Page Ref: 779

7) Describe why the prognosis of cancer is best when there is no detectable spread from the region of the primary tumor to the lymph nodes.
Answer: The lymphatic system consists of a meandering network of lymphatic vessels. Cancer cells that break free from the primary tumor can metastasize via the lymph system.
Diff: 3 Page Ref: 779

8) As the human immunodeficiency virus (HIV) progresses, some individuals develop persistent generalized lymphadenopathy. Explain why this may occur.
Answer: This may occur because lymph nodes are overwhelmed by a large number of virus particles trapped in the nodes.
Diff: 3 Page Ref: 779, 783