

Chapter 21, The Lymphatic and Immune Systems

“Apply What You Know” Answers

- p. 805—Both lymphatic and blood capillaries are composed of a simple squamous endothelium. In a continuous blood capillary, the endothelial cells are closely joined, with only narrow intercellular clefts between them. In a lymphatic capillary, there are gaps between the endothelial cells large enough to let even bacteria and metastatic cancer cells pass; the endothelial cells are anchored by filaments to neighboring tissue cells; and the gaps between the cells can be opened and closed by valvelike flaps of the endothelium. These differences are important in the functions of the respective systems. The blood circulatory system must retain erythrocytes, platelets, and proteins in the bloodstream, but the lymphatic system must be able to pick up protein, pathogens, and contaminants from the tissues, returning the protein to circulation and directing pathogens to the lymph nodes where they can be detected and activate an immune response.
- p. 807—The subclavian arteries have a high blood pressure that would force blood into the low-pressure lymphatics. The subclavian veins, by contrast, have a low blood pressure and draw lymph into the bloodstream.
- p. 821—Redness, swelling, and heat are true signs because they are observable to another person; pain is a symptom because it can be experienced only by the person with the inflammation.
- p. 823—The pain of inflammation results partly from prostaglandins. Aspirin blocks the action of cyclooxygenase and thus inhibits prostaglandin synthesis.
- p. 827—Clonal deletion is a case of apoptosis, the normal death of cells that have no further purpose to serve.
- p. 829—Cytotoxic (killer) T cells and natural killer (NK) cells both attack host cells that have become cancerous or infected with viruses, but NK cells do not depend on specific recognition and are thus part of the nonspecific defense system.
- p. 835—IgM is a pentamer with 10 antigen-binding sites, whereas the others are monomers with 2 or dimers with 4. Thus, IgM can bind more antigen molecules together than the other classes of immunoglobulins can.