

CHAPTER FOUR

Content Review

1. All epithelia exhibit cellularity, polarity, attachment to underlying connective tissue, avascularity, innervation, and high regeneration capacity.
2. The basal lamina contains collagen fibers, as well as both protein and carbohydrate macromolecules that are secreted by the cells of the epithelium. Cells in the connective tissue underlying the epithelium secrete the reticular amina, which contains protein fibers and both protein and carbohydrate macromolecules. These laminae form the basement membrane, which strengthens the attachment and forms a molecular barrier between the epithelium and the connective tissue layers.
3. (a) Simple columnar epithelium lines the stomach lumen; (b) stratified squamous epithelium lines the oral cavity; (c) transitional epithelium lines the urinary bladder; and (d) simple squamous epithelium lines the tiny air sacs of the lungs.
4. (1) Merocrine secretion occurs when small secretory vesicles move to the apical surface of the cell and release their contents by exocytosis. (2) Holocrine secretion occurs when cells fill with an accumulated product and then the entire cell disintegrates, releasing both product and cell fragments. (3) Apocrine secretion occurs when the apical region of the cell pinches off, releasing some cellular fragments and product.
5. All connective tissues share a similar structural plan that includes (1) specific cells that produce (2) protein fibers to strengthen and support the connective tissue, and (3) a packing material called ground substance, within which the cells and protein fibers reside. Together the protein fibers and ground substance form an extracellular matrix.
6. In dense regular connective tissue, collagen fibers are packed tightly and aligned parallel to applied forces. In dense irregular connective tissue, collagen fibers form a scattered meshwork in which individual bundles of fibers extend in all directions.
7. Hyaline cartilage is found in the nose, trachea, larynx (voice box), costal cartilage (the cartilage attached to the ribs), particular ends of long bones, and the fetal skeleton. Hyaline cartilage functions primarily to support soft tissue; it also forms most of the fetal skeleton and thus functions as a model for future bone growth. Fibrocartilage resists compression and is a good shock absorber. It is found in the intervertebral discs, the pubic symphysis, and the menisci of the knee joint. Elastic cartilage is extremely resilient and flexible. It is found within the epiglottis and in the external ear.
8. The four types of body membranes are mucous membranes, which line body passageways, as in the digestive, respiratory, reproductive, and urinary systems; serous membranes, which line body cavities (the parietal layer) and cover organs (the visceral layer); a cutaneous membrane, commonly called the skin and composed of epidermis and dermis; and a synovial membrane, which lines some joints of the skeletal system.
9. Intercalated discs are strong gap junctions between neighboring cardiac muscle cells. They permit the rapid transport of an electrical stimulus (muscle impulse) through many cardiac muscle cells at once, allowing the entire muscle wall to contract as a unit.

10. Skeletal muscle tissue is composed of long, cylindrical, thin muscle cells that often have more than one nucleus. Skeletal muscle cells are striated, attached to the skeleton, and voluntary. Cardiac muscle tissue is confined to the heart wall; its cells are often shorter than skeletal muscle cells, but they are striated like skeletal muscle cells. Cardiac muscle cells are usually branched, and they contain only one or two centrally located nuclei. Cardiac muscle cells are connected by intercalated discs, which are strong gap junctions between the cells. Smooth muscle tissue lacks striations and is involuntary. Smooth muscle is sometimes called visceral muscle because it is found in the walls of most viscera (organs), such as the stomach, urinary bladder, and blood vessels. Its contraction helps propel material.