

ANSWERS TO CHAPTER 4

CONTENT LEARNING ACTIVITY

Epithelial Tissue

1. Free surface; 2. Basement membrane

Classification of Epithelium

1. Simple cuboidal; 2. Stratified columnar; 3. Transitional; 4. Simple squamous; 5. Pseudostratified; 6. Stratified squamous
1. Transitional epithelium; 2. Pseudostratified epithelium; 3. Simple columnar epithelium; 4. Simple squamous epithelium

Structural and Functional Relationships

1. Stratified epithelium; 2. Simple epithelium
1. Squamous; 2. Cuboidal or columnar
1. Smooth; 2. Cilia; 3. Microvilli
1. Tight junctions; 2. Desmosomes; 3. Gap junctions

Glands

1. Exocrine; 2. Endocrine
1. Simple straight tubular; 2. Simple acinar (alveolar); 3. Compound tubular; 4. Compound acinar (alveolar)

Connective Tissue

1. Collagen fibers; 2. Reticular fibers; 3. Elastic fibers; 4. Proteoglycans
1. Blast cells; 2. Cyte cells; 3. Clast cells; 4. Macrophages; 5. Mast cells

Connective Tissue Classification

1. Protein fibers; 2. Protein fibers + ground substance; 3. Liquid

1. Dense connective tissue; 2. Loose (areolar) connective tissue; 3. Adipose tissue
1. Hyaline cartilage; 2. Fibrocartilage; 3. Elastic cartilage; 4. Bone
1. Chondrocytes; 2. Osteocytes; 3. Lacunae
1. Cartilage; 2. Lacuna; 3. Chondrocyte; 4. Adipose; 5. Fat droplet; 6. Bone; 7. Lacuna; 8. Dense connective tissue; 9. Fibroblast

Muscle Tissue

1. Skeletal muscle; 2. Cardiac muscle; 3. Smooth muscle

Nervous Tissue

1. Cell body; 2. Dendrites; 3. Axon; 4. Neuroglia

Membranes

1. Mucous membranes; 2. Serous membranes; 3. Other membranes
1. Pleural; 2. Pericardial; 3. Peritoneal

Inflammation

1. Mediators of inflammation; 2. Dilation, Increased permeability; 3. Edema; 4. Neutrophils; 5. Pain; 6. Disturbance of function

Tissue Repair

1. Regeneration; 2. Replacement; 3. Labile; 4. Stable; 5. Permanent
1. Fibrin; 2. Scab; 3. Macrophage; 4. Granulation tissue; 5. Scar; 6. Wound contracture

QUICK RECALL

1. Protecting underlying structures, acting as barriers, permitting the passage of substances, secreting substances, and absorbing substances
2. Simple squamous, simple cuboidal, simple columnar, stratified squamous, pseudostratified, and transitional epithelium
3. Tight junctions, desmosomes, and gap junctions
4. Exocrine and endocrine
5. Enclosing and separating tissues and organs, connecting tissues to one another, supporting and moving, storing, cushioning and insulating, transporting, and protecting
6. Dense connective tissue, loose or areolar connective tissue, and adipose tissue
7. Hyaline cartilage, fibrocartilage, and elastic cartilage
8. Skeletal, cardiac, and smooth muscle
9. Mucous and serous membranes
10. Redness, heat, swelling, pain, and disturbance of function
11. Labile, stable, and permanent

WORD PARTS

1. epithelium
2. squamous
3. acinar
4. desmosome; hemidesmosome
5. chondrocyte; osteocyte
6. endocrine; exocrine

MASTERY LEARNING ACTIVITY

1. A. The tissue is simple (one cell layer thick), squamous (flat cells) epithelium (covers a surface).
2. A. Because the description specified two or more layers, only stratified and pseudostratified epithelium are possible candidates for a correct answer. Of these two choices, stratified epithelium has only the deepest layer in contact with the basement membrane. Pseudostratified epithelium has all cells contacting the basement membrane.
3. E. Muscle tissue, not epithelial tissue, is capable of contraction. The other statements are true for epithelial tissue.
4. B. Protection is more often a function of stratified epithelium. As outer cell layers are damaged, they can be replaced by deeper layers. Filtration, absorption, and diffusion are functions of simple epithelium.
5. D. Microvilli function to increase the surface area of epithelial cells. They are found on the free surface of cells involved in absorption or secretion, such as the lining of the small intestine. Blood vessels are lined with simple squamous epithelium, the nasal cavity is lined with pseudostratified ciliated epithelium, and serous membranes have simple squamous epithelium on their surface.
6. A. Desmosomes provide mechanical strength. Gap junctions provide a way for materials to be exchanged between cells. Tight junctions prevent extracellular materials from passing between cells.
7. B. Pseudostratified ciliated epithelium is found in the nasal cavity and in the trachea. The cilia move mucus with entrapped particles and microorganisms to the back of the throat, where it is swallowed. This helps to keep the respiratory tract clear. The digestive tract has simple columnar epithelium; it is not ciliated. Kidney tubules have simple cuboidal epithelium, and the urinary bladder has transitional epithelium.
8. C. Transitional epithelium is composed of cells that can flatten and slide over each other. This allows stretching of the tissue and makes transitional epithelium an ideal lining for the urinary bladder.
9. D. The gland is a compound (many branches) acinar or alveolar (end of ducts expanded into a saclike structure).
10. A. Fibroblasts secrete the ground substance and fibers of connective tissue. Adipose cells are cells within loose connective tissue that store fat droplets. Osteoblasts secrete the fibers and mineral salts that compose bone. Macrophages are cells capable of phagocytosis, while mast cells are nonmotile cells that release chemicals promoting inflammation.
11. B. The characteristics are consistent with dense connective tissue, which is the type found in tendons and ligaments. Parallel collagen fibers give strength in one direction; this is a characteristic necessary for tendons and ligaments, which make muscle to bone and bone to bone connections.
12. E. Adipose tissue is a type of connective tissue. It acts as a protective cushion (around the kidneys, for example) and acts as a heat insulator under the skin.
13. E. Hyaline cartilage is found in cartilage on the ends of bones and in the costal cartilages. The external ear contains elastic cartilage, and the disks between the vertebrae consists of fibrocartilage.
14. B. You simply had to know that blood is an example of connective tissue.
15. D. Skeletal muscle cells are long, cylindrical, striated, have many nuclei per cell, and are under conscious control. Unlike cardiac muscle, they have no intercalated disks.
16. C. Dendrites are extensions from the nerve cell that receive action potentials and conduct them toward the cell body. The cell body contains the nucleus of the cell. Axons conduct action potentials away from the cell body.
17. E. The question requires that one must know what tissue types are components of the upper arm. Epithelial (part of the skin), connective tissue (part of the skin and material around muscle), muscle, and nervous tissue (especially if pain is a result) would be penetrated.
18. D. Cavities that open to the exterior are lined by mucous membranes. Serous membranes line the trunk cavities that do not open to the exterior. Synovial membranes line joints, and periosteum covers bones.
19. E. Chemical mediators such as histamine, kinins, prostaglandins, and leukotrienes are released or activated in tissue following injury to the tissue. They cause dilation, increase vascular permeability, and stimulate neurons.
20. D. Skin and mucous membrane cells continue to divide throughout life. Muscle and nerve tissue cells cannot divide, and if killed, they are usually replaced by connective tissue. Connective tissue cells do not actively divide, but can regenerate if an injury occurs.



FINAL CHALLENGES



1. The tissue is transitional epithelium, a stratified epithelium that lines organs such as the urinary bladder and ureters. When the organ is stretched, the cells of transitional epithelium become squamouslike; and when the organ is not stretched, the cells are roughly cuboidal in shape.
2. Ligaments join bones to bones and usually do not stretch. This holds the bones in proper relationship to each other. One would not expect elastic fibers because it would allow the ligaments to stretch, possible causing misalignment of the bones.
3. The elastic fibers would be expected in the ligaments connecting the bones of the back (vertebrae). These ligaments allow the spine to stretch and then return to its original position. They allow flexibility, but return the bones to the correct position. The vertebrae's bony processes help to prevent misalignment.
4. Cartilage heals slowly after an injury because it has no blood supply; thus cells and nutrients necessary for tissue repair do not easily reach the damaged area. Torn cartilage in the knee causes pain, irritation to the joint, and can lead to arthritic conditions if not removed.