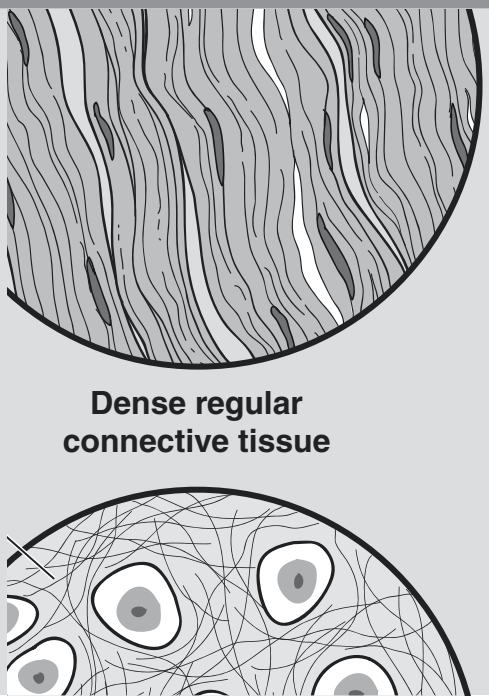
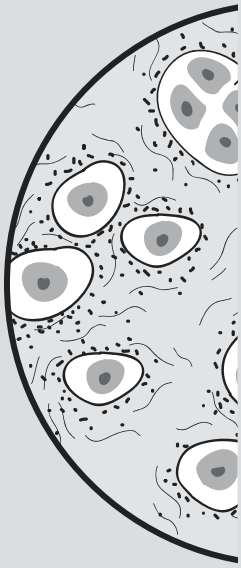
ACTIVITY





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HISTOLOGY AND INTEGUMENT

OBJECTIVES

- ☐ **How to get ready:** Read CHAPTERS 4 AND 5, MCKINLEY ET AL., *HUMAN ANATOMY*, 2024 RELEASE. All text references are for this textbook.
- ☐ Identify each tissue (26 tissues) in a histology photo or microscope slide.
- ☐ Sketch each tissue in the space provided.
- ☐ Identify the features of the integument (skin) on a slide and/or model.
- ☐ **Before next class:** Preview Axial Skeleton terms lists from SLCC Anatomy Laboratory website or your printed laboratory manual and your textbook.

Activity 2

EPITHELIAL TISSUES

Note the following features on each tissue.

CELL SHAPES	NUMBER OF LAYERS	IDENTIFY
squamous	simple	• each tissue as an **epithelium** • specific **type/name of tissue** • **shape** of cells • **number** of cell layers • specific **body location** of each tissue • specialized structures, when relevant • **basement membrane, basal surface, apical surface**
cuboidal	stratified	
columnar	pseudostratified	

TABLE 2-1. Types of epithelial tissues (*10 tissues to identify*)

NAME	BODY LOCATIONS/STRUCTURES	TEXT REFERENCES & SKETCH
☐ **simple squamous epithelium**	**location:** air sacs in lungs (alveoli), lining blood vessels, serous membranes of body cavities	TABLE 4.2A
	structure: single layer of flat cells resembling floor tiles, with a single nucleus in the center of each ☐ basement membrane ☐ apical surface ☐ basal surface	
	function: rapid diffusion, filtration, and some secretion	

TABLE 2-1. Types of epithelial tissues (*10 tissues to identify*)

NAME	BODY LOCATIONS/STRUCTURES	TEXT REFERENCES & SKETCH
□ **non-keratinized**	□ **location:** lining oral cavity, esophagus, vagina, and anus	**TABLE 4.3A**
	□ **structure:** multiple layers of cells; apical cells squamous; surface cells are alive with visible nuclei □ basement membrane □ apical surface □ basal surface	
	□ **function:** protection of underlying tissue	
□ **keratinized stratified squamous epithelium**	□ **location:** epidermis of skin	**TABLE 4.3B**
	□ **structure:** ultiple layers of cells; apical cells squamous; surface cells dead (no visible nuclei) and filled with the protein keratin □ basement membrane □ apical surface □ basal surface	
	□ **function:** protection of underlying tissue	
□ **simple cuboidal epithelium**	□ **location:** lining kidney tubules; ducts of most glands	**TABLE 4.2B**
	□ **structure:** single layer of cells as tall as they are wide; spherical, centrally located nucleus □ basement membrane □ apical surface □ basal surface □ lumen	
	□ **function:** absorption and secretion	
□ **stratified cuboidal epithelium**	□ **location:** large ducts in most exocrine glands	**TABLE 4.3C**
	□ **structure:** two or more layers of cells; cells at apical surface are cuboidal □ basement membrane □ apical surface □ basal surface	
	□ **function:** protection and secretion	

TABLE 2-1. Types of epithelial tissues (*10 tissues to identify*)

NAME	BODY LOCATIONS/STRUCTURES	TEXT REFERENCES & SKETCH
☐ **ciliated simple columnar epithelium**	**location:** lining of uterine tubes	TABLE 4.2D
	structure: single layer of tall, narrow cells; oval shaped nucleus in the basal region of cells ☐ basement membrane ☐ apical surface ☐ basal surface ☐ goblet cells ☐ cilia	
	function: secretion of mucin and movement of mucus along apical surface of epithelium by action of cilia, movement of oocyte	
☐ **nonciliated simple columnar epithelium**	**location:** lining of most of the digestive tract	TABLE 4.2C
	structure: single layer of tall, narrow cells; oval shaped nucleus in the basal region of cells ☐ basement membrane ☐ apical surface ☐ basal surface ☐ goblet cells	
	function: absorption and secretion	
☐ **stratified columnar epithelium**	**location:** rare, found in large ducts of some exocrine glands and in some regions of the male urethra	TABLE 4.3D
	structure: two or more layers of cells; cells at the apical surface are columnar ☐ basement membrane ☐ basal surface ☐ apical surface	
	function: protection and secretion	

TABLE 2-1. Types of epithelial tissues (*10 tissues to identify*)

NAME	BODY LOCATIONS/STRUCTURES	TEXT REFERENCES & SKETCH
□ **pseudostratified columnar epithelium**	**location:** ciliated form lines most of the respiratory tract	TABLE 4.2E
	structure: single layer of cells with varying heights that appear multi-layered; all cells connect to the basement membrane but not all cells reach the apical surface □ basement membrane □ apical surface □ basal surface □ cilia □ goblet cells	
	function: protection; ciliated form also involved with secretion of mucin and movement of mucus across surface with ciliary action	
□ **transitional epithelium**	**location:** lining of urinary bladder, ureters, and part of urethra	TABLE 4.3E
	structure: epithelial appearance varies, depending on whether the tissue is stretched or relaxed; shape of cells on the apical surface changes □ basement membrane □ apical surface □ basal surface	
	function: stretches and relaxes to accommodate urine volume changes	

CONNECTIVE TISSUES

Identify on each slide or image:

- each tissue as a **connective tissue**
- each tissue as **fluid connective tissue vs. connective tissue proper vs. supporting connective tissue**
- for connective tissues proper: identify **loose vs. dense connective tissues**
- specific **name** of each connective tissue
- **cells, fibers, ground substance, or matrix**
- any relevant special structures

Activity 2

TABLE 2-2. Types of connective tissue (*11 tissues to identify*)

		NAME	BODY LOCATIONS/STRUCTURES	TEXT REFERENCES & SKETCH
FLUID CONNECTIVE TISSUE (*1 tissue*)		□ **blood**	**location:** within blood vessels (arteries, veins, and capillaries), and the heart	**TABLE 4.11**
			structure: contains □ erythrocytes □ leukocytes □ platelets □ plasma (matrix)	
			function: varied functions including gas transport, immune response, clotting and transport of nutrients, wastes and hormones	
CONNECTIVE TISSUES PROPER	**LOOSE CONNECTIVE TISSUES** (*3 tissues*): generally have a loose association of fibers in extracellular matrix	□ **areolar connective tissue**	**location:** subcutaneous layer; surrounding organs, papillary layer of the dermis	**TABLE 4.7A**
			structure: vascular, matrix is gel-like with □ fibroblasts □ collagen fibers □ elastic fibers □ ground substance	
			function: surrounds and protects tissues and organs; loosely binds epithelium to deeper tissues; provides nerve and blood vessel packing	
		□ **reticular connective tissue**	**location:** forms stroma of lymph nodes, spleen, thymus, and bone marrow	**TABLE 4.7C**
			structure: ground substance is gel-like liquid; scattered arrangement of □ reticular fibers □ extracellular matrix	
			function: provides supportive framework for spleen, lymph nodes, thymus, and bone marrow	
		□ **adipose connective tissue**	**location:** subcutaneous layer; covers and surrounds some organs	**TABLE 4.7B**
			structure: closely packed □ adipocytes, with nucleus squeezed to one side □ lipid vacuole (fat droplet)	
			function: stores energy; protects, cushions, and insulates	

TABLE 2-2. Types of connective tissue (*11 tissues to identify*)

		NAME	BODY LOCATIONS/STRUCTURES	TEXT REFERENCES & SKETCH
CONNECTIVE TISSUES PROPER	**DENSE CONNECTIVE TISSUES** (*3 tissues*): generally have a dense association of fibers in the extracellular matrix	□ **dense regular connective tissue**	**location:** forms tendons, most ligaments	**TABLE 4.8A**
			structure: □ collagen fibers (densely packed, parallel) □ fibroblast nuclei □ ground substance (scarce)	
			function: attaches muscle to bone and bone to bone; resists stress applied in one direction	
		□ **elastic connective tissue**	**location:** walls of elastic arteries; trachea; bronchial tubes; true vocal cords; suspensory ligaments of penis	**TABLE 4.8C**
			structure: □ elastic fibers (parallel) □ fibroblast nuclei □ ground substance	
			function: allows stretching of some organs	
		□ **dense irregular connective tissue**	**location:** dermis; periosteum covering bone; perichondrium covering cartilage, organ capsules	**TABLE 4.8B**
			structure: □ collagen fibers (bundled; randomly arranged) □ fibroblasts □ ground substance (more than in dense regular connective tissue)	
			function: withstands stresses in all directions; durable	

Activity 2

TABLE 2-2. Types of connective tissue (*11 tissues to identify*)

		NAME	BODY LOCATIONS/STRUCTURES	TEXT REFERENCES & SKETCH
SUPPORTING CONNECTIVE TISSUES: includes bone tissue and 3 cartilage tissues	**BONE** or **OSSEOUS TISSUE** *(1 tissue)*	☐ **compact bone**	**location:** exterior of bones of the body	**TABLE 4.10**
			structure: calcified matrix arranged in ☐ osteons ☐ osteocytes in lacunae ☐ lamellae (concentric) ☐ central canal ☐ canaliculi	
			function: supports soft structures; protects vital organs; provides levers for movement; stores minerals	
	CARTILAGE TISSUES (*3 tissues*)	☐ **hyaline cartilage**	**location:** most of fetal skeleton; covers articular ends of long bones; costal cartilage; most of the larynx, trachea, and nose	**TABLE 4.9A**
			structure: ☐ extracellular matrix ☐ lacunae ☐ chondrocytes ☐ perichondrium (often visible)	
			function: smooth surfaces for movement at joints; model for bone growth; supports soft tissue	
		☐ **fibrocartilage**	**location:** intervertebral discs; pubic symphysis; menisci of knee joint	**TABLE 4.9B**
			structure: ☐ collagen fibers (parallel) ☐ extracellular matrix ☐ lacunae ☐ chondrocytes	
			function: resists compression; absorbs shock in some joints	
		☐ **elastic cartilage**	**location:** external ear; epiglottis of the larynx	**TABLE 4.9C;**
			structure: contains abundant ☐ elastic fibers (branching) ☐ lacunae ☐ chondrocytes	
			function: maintains structure and shape while permitting flexibility	

Activity 2

MUSCLE TISSUES

TABLE 2-3. Types of muscle tissue (*3 tissues to identify*)

NAME	BODY LOCATIONS/STRUCTURES	TEXT REFERENCES AND SKETCH
☐ **smooth muscle**	**location:** walls of hollow internal organs: vessels, airways, stomach, bladder, and uterus	**TABLE 4.12C**
	structure: ☐ muscle fiber (spindle-shaped) ☐ nucleus (centrally located)	
	function: involuntary movements and motion; moves materials through internal organs	
☐ **skeletal muscle**	**location:** attaches to bones or sometimes skin	**TABLE 4.12A**
	structure: ☐ muscle fiber (long, cylindrical, unbranched) ☐ nuclei (multiple per fiber) ☐ striations	
	function: moves skeleton; responsible for voluntary body movements, locomotion, and heat production	
☐ **cardiac muscle**	**location:** heart wall (myocardium)	**TABLE 4.12B**
	structure: ☐ muscle fiber (or cardiomyocyte) short, branched ☐ nucleus (one per cell) ☐ striations ☐ intercalated discs (between cells)	
	function: involuntary contraction and relaxation; pumps blood in the heart	

NERVOUS TISSUE

TABLE 2-4. Nervous tissue (*1 tissue to identify*)

NAME	BODY LOCATIONS/ STRUCTURES	TEXT REFERENCES AND SKETCH
□ **nervous tissue** (from multipolar neuron smear slide)	**location:** brain, spinal cord, peripheral nervous tissue	**TABLE 4.13**
	structure: □ neuron □ soma (cell body) □ axon □ dendrites □ neuroglia (glial cells)	
	function: neurons control and communicate between cells; neuroglia support and protect neurons	

Activity 2

INTEGUMENTARY SYSTEM

Skin and accessory structures

TABLE 2-5. Integumentary system

STRUCTURES TO IDENTIFY ON SKIN MODEL AND/OR SLIDES	TEXT REFERENCES
Layers of the **skin/integument/cutaneous membrane**, from superficial to deep:	**FIG. 5.1; TABLE 5.2**
☐ **EPIDERMIS**—most superficial layer; keratinized stratified squamous epithelium	
☐ Layers of the epidermis: from apical **surface to basement membrane**	**FIG. 5.2**
☐ stratum corneum	
☐ stratum lucidum (thick skin only)	
☐ stratum granulosum	
☐ stratum spinosum	
☐ epidermal dendritic (Langerhans) cells	
☐ stratum basale	
☐ melanocytes	
☐ keratinocytes	
☐ epidermal ridges	
☐ **DERMIS**—deep to the epidermis	**FIG. 5.6**
☐ papillary layer (areolar connective tissue)	
☐ dermal papillae	
☐ reticular layer (dense irregular connective tissue)	
☐ hair follicles	
☐ arrector pili muscles	
☐ sebaceous (oil) glands	
☐ sudoriferous (sweat) glands	
☐ apocrine sweat gland	
☐ merocrine or eccrine sweat gland	
☐ sensory receptors	
☐ tactile (sensory) receptor ***or*** Meissner's corpuscle	
☐ lamellated (pacinian) corpuscle	
☐ **HYPODERMIS OR SUBCUTANEOUS LAYER** (not part of the integument proper)—areolar connective tissue and adipose tissue; often called superficial fascia	

STUDY AIDS FOR HISTOLOGY AND INTEGUMENT

Helpful terms for Histology and Integument

TERMS	DESCRIPTION
lumen	the space inside a structure, such as where blood is transported within a blood vessel
cilia	motile hair-like extension of a cell surface
microvilli	small folds projecting on the apical surface of certain types of epithelial cells, especially those of the small intestine
goblet cells	unicellular epithelial gland cells that secrete mucus
lacunae	cavity or depression
canaliculi	small passageways
papilla	nipple-like projection

Useful etymology for Histology and Integument

PREFIX/SUFFIX	DESCRIPTION
epi-	upon, on
derm-	skin
sub-	under
myo-	muscle
pseudo-	false
trans-	across
vas-	vessel
inter-	between
intra-	within
micro-	small
osteo-	bone
chondro-	cartilage
-blast	embryonic, immature cell
-clast	to break
-cyte	cell
peri-	around