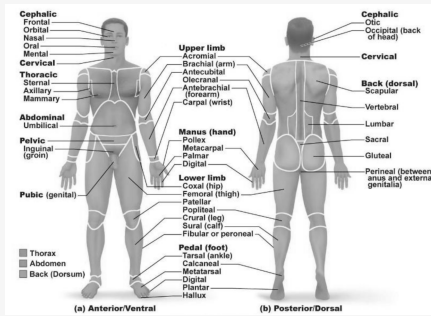


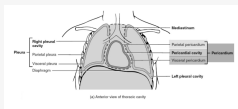
### Directional Terms

Anterior	front of the body, in front. ie nose
Posterior	back of the body, behind ie gluteus
Deep	beneath layers of tissue, closer to internal organs or bone ie heart
Superficial	closer to the surface of the skin ie ribcage is superficial to heart
Distal	further from the midline ie appendages
Proximal	closer to the midline ie elbow is proximal to phalanges
Medial	towards the center of the body
Lateral	towards the side of the body, away from the center
Superior	top of the body ie head
Inferior	bottom of the body ie legs

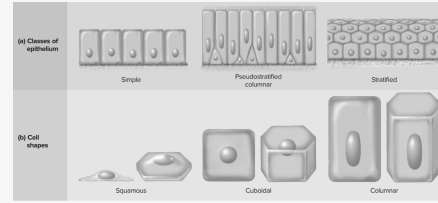
### Body Regions



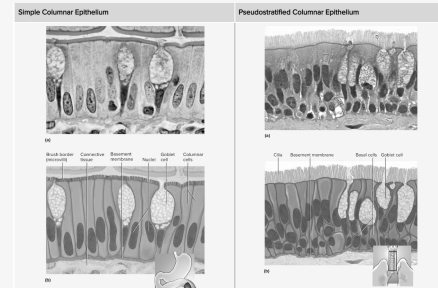
### Pleura and Pericardium



### Epithelial Tissue



### Epithelial Histology



### Simple Epithelium Location and Function

**FIGURE 5.4 Simple Squamous Epithelium.** Section of the small intestine (H&E, 200x). (a) Light micrograph. (b) Labeled drawing. **APR**  
© APR Module 3: Tissues: Histology: Simple Columnar Epithelium (non-keratinized); LM:Medium Magnification

**Microscopic appearance:** Single layer of thin cells, shaped like fried eggs with bulge where nucleus is located; nucleus flattened in the plane of the cell, like an egg yolk; cytoplasm may be so thin it is hard to see in tissue sections; in surface view, cells have angular contours and nuclei appear round.

**Representative locations:** Air sacs (alveoli) of lungs; glomerular capsules of kidneys; some kidney tubules; inner lining (endothelium) of heart and blood vessels; serous membranes of diaphragm, intestines; and some other serous surface mesothelium of pleura, pericardium, peritoneum, and mesenteries.

**Functions:** Allows rapid diffusion or transport of substances through membrane; secretes lubricating serous fluid.

**FIGURE 5.5 Simple Cuboidal Epithelium.** Kidney tubules (H&E, 200x). (a) Light micrograph. (b) Labeled drawing. **APR**  
© APR Module 3: Tissues: Histology: Pseudostratified Columnar Epithelium; LM:Medium Magnification

**Microscopic appearance:** Single layer of square or round cells; in glands, cells often pyramidal and arranged like segments of an orange around a central space; spherical, centrally placed nuclei; with a brush border of microvilli in some kidney tubules; ciliated in bronchioles of lung.

**Representative locations:** Liver; thyroid, mammary, salivary, and other glands; most kidney tubules; bronchioles.

**Functions:** Absorption and secretion; production of protective mucous coat; movement of respiratory mucus.

### Simple and Pseudostratified Epithelium

**FIGURE 5.6 Simple Columnar Epithelium.** Mucosa of the small intestine (H&E, 200x). (a) Light micrograph. (b) Labeled drawing. **APR**  
© APR Module 3: Tissues: Histology: Stratified Squamous Epithelium (non-keratinized); LM:Medium Magnification

**Microscopic appearance:** Single layer of tall, narrow cells; oval or sausage-shaped nuclei, vertically oriented, usually in basal half of cell; apical portion of cell often shows secretory vesicles visible with TEM; often shows a brush border of microvilli; ciliated in some organs; may possess goblet cells.

**Representative locations:** Inner lining of stomach, intestines, gallbladder, uterus, and uterine tubes; some kidney tubules.

**Functions:** Absorption; secretion of mucus and other products; movement of egg and embryo in uterine tube.

**FIGURE 5.7 Ciliated Pseudostratified Columnar Epithelium.** Mucosa of the trachea (H&E, 200x). (a) Light micrograph. (b) Labeled drawing. **APR**  
© APR Module 3: Tissues: Histology: Stratified Squamous Epithelium (non-keratinized); LM:Medium Magnification

**Microscopic appearance:** Looks multilayered; some cells do not reach free surface, but all cells reach basement membrane; nuclei at several levels in deeper half of epithelium; often with goblet cells; often ciliated.

**Representative locations:** Respiratory tract from nasal cavity to bronchi; portions of male urethra.

**Functions:** Secretes and propels mucus.

### Stratified Squamous Epithelium

**FIGURE 5.8 Keratinized Stratified Squamous Epithelium.** Epidermis of the side of the foot (H&E, 200x). (a) Light micrograph. (b) Labeled drawing. **APR**  
© APR Module 3: Tissues: Histology: Stratified Cuboidal Epithelium (non-keratinized); LM:Medium Magnification

**Microscopic appearance:** Multiple cell layers with cells becoming increasingly flat and scaly toward surface; surface covered with a layer of compact dead cells without nuclei; basal cells may be cuboidal to columnar.

**Representative locations:** Epidermis; palms and soles are especially heavily keratinized.

**Functions:** Resists abrasion and penetration by pathogenic organisms; retards water loss through skin.

**FIGURE 5.9 Nonkeratinized Stratified Squamous Epithelium.** Mucosa of the vagina (H&E, 200x). (a) Light micrograph. (b) Labeled drawing. **APR**  
© APR Module 3: Tissues: Histology: Transitional Epithelium; LM:Medium Magnification

**Microscopic appearance:** Some as keratinized epithelium but without the surface layer of dead cells.

**Representative locations:** Tongue, oral mucosa, esophagus, anal canal, vagina.

**Functions:** Resists abrasion and penetration by pathogenic organisms; retards water loss through skin.



### Stratified Cuboidal and Urothelium

**FIGURE 5.10 Stratified Cuboidal Epithelium.** Duct of a sweat gland (H05). (a) Light micrograph. (b) Labeled drawing. **APR**  
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**FIGURE 5.11 Urothelium.** Kidney (H05). (a) Light micrograph. (b) Labeled drawing. **APR**  
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**Microscopic appearance:** Two or more layers of cells; surface cells square or round.

**Representative locations:** Sweat gland ducts; egg-producing vesicles (follicles) of ovaries; sperm-producing ducts (seminal vesicles) of testes.

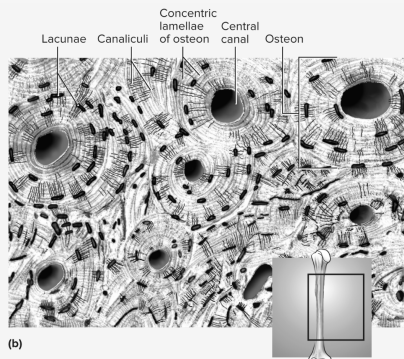
**Functions:** Contributes to sweat secretion; secretes ovarian hormones; produces sperm.

**Microscopic appearance:** Somewhat resembles stratified squamous epithelium, but surface cells are rounded, not flattened, and often bulge at surface; typically five or six cells thick when relaxed and two or three cells thick when stretched; cells may be taller and thinner when urothelium is stretched (as in a distended bladder); some cells have two nuclei.

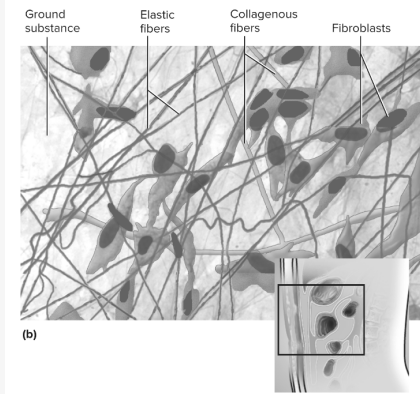
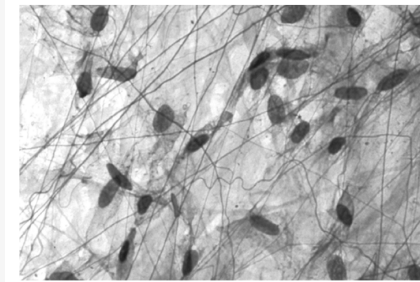
**Representative locations:** Urinary tract—part of kidney, ureter, bladder, part of urethra.

**Functions:** Stretches to allow filling of urinary tract; protects underlying tissues from osmotic damage by urine.

### Connective Tissue: Bone



### Connective Tissue: Fibrous Loose Areolar



### Connective Tissue: Cartilage

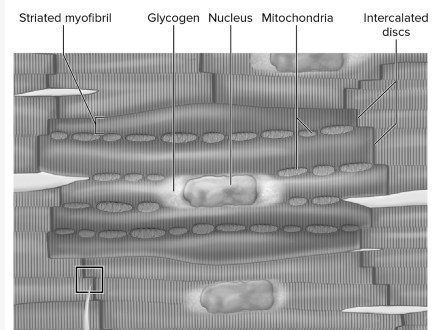
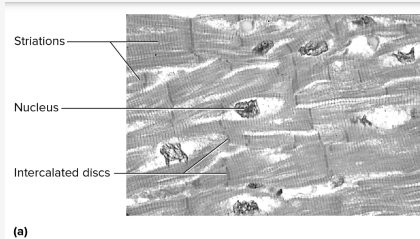
Hyaline Cartilage	Elastic Cartilage	Fibrocartilage
<b>(a)</b>	<b>(a)</b>	<b>(a)</b>
<b>(b)</b>	<b>(b)</b>	<b>(b)</b>

**FIGURE 5.17 Hyaline Cartilage.** Branches (H05). (a) Light micrograph. (b) Labeled drawing. **APR**  
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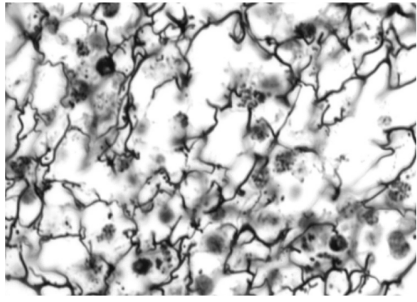
**FIGURE 5.18 Elastic Cartilage.** External view (H05). (a) Light micrograph. (b) Labeled drawing. **APR**  
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**FIGURE 5.19 Fibrocartilage.** Intervertebral disc (H05). (a) Light micrograph. (b) Labeled drawing. **APR**  
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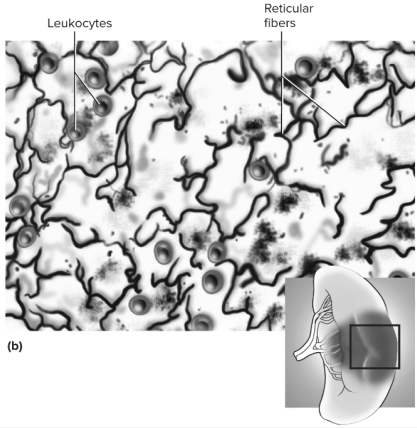
### Muscle Tissue: Cardiac



### Connective Tissue: Fibrous Loose Reticular



(a)



(b)

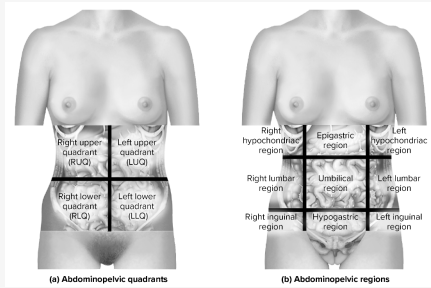


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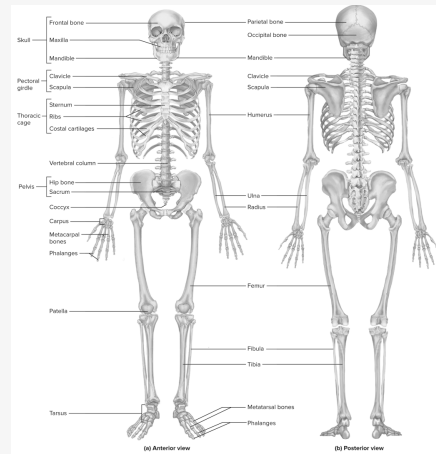
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### Abdominal Regions



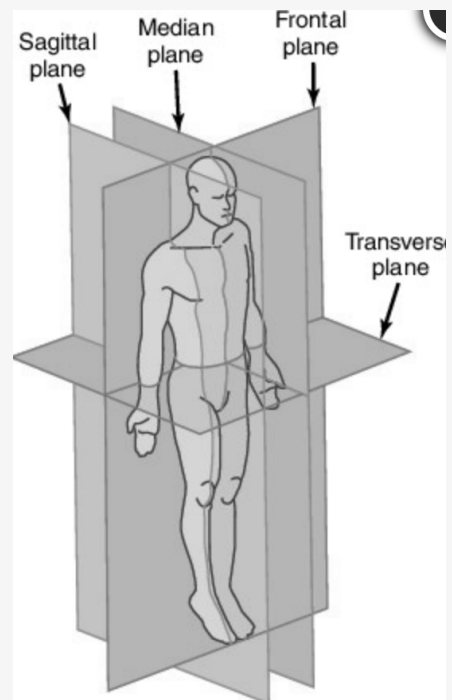
### Appendicular and Axial Skeleton



### Planes of Histological Section

Longitudinal	cut on long axis
Cross/Transverse	cut perpendicular to long axis
Oblique	cut on a slant between a longitudinal and cross section
Fixative	prevents decay/holds sample together (i.e. formalin)
Stain	add stains to provide contrast between tissues or components of cells
Section	– tissue sliced into thin sections 1-2 cells thick (NOTE: sometimes you use smears instead of sections)

### Planes of Section



### Body Position

Supine	back on the ground, facing up
Prone	chest on the ground, facing down
Anatomical Position	Person standing with both feet on the ground, arms at the side with palms facing forward



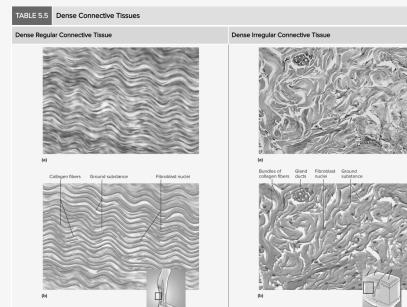
### Primary Tissues

<b>Epithelial</b>	Closely adhering cells, one or more cells thick with upper surface usually exposed to environment or internal surface of the body. Covers body surface, lines body cavities, forms external and internal linings of many organs and constitutes most gland tissue	Functions include protection, secretion, excretion, absorption, filtration, sensation	Location: epidermis, inner lining of digestive tract, liver and other glands
<b>Connective</b>	Most abundant, widely distributed, histologically variable. Includes fibrous, adipose, cartilage, blood and bone. Cells are not in direct contact but surrounded by a matrix	Functions include binding of organs, physical and immune protection, support, movement, storage, heat production, transport.	Location: tendons and ligaments, cartilage and bone, blood

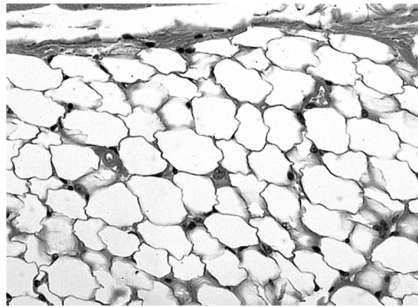
### Primary Tissues (cont)

<b>Nervous</b>	Specialized for communication by means of chemical and electrical signals.	Functions: Neurons detect stimuli quickly and transmit information to other cells. Neuroglia protect and assist neurons. Neurosoma houses the nucleus. It's the center for protein synthesis and genetic control. Dendrites receive signals from other cells and send them to neurosoma. Nerve fibres send out signals.	Location: brain, spinal cord, nerves
<b>Muscular</b>	Composed of elongated, excitable tissue specialized for contraction	Functions: produce movement in body parts, contraction and elongation	skeletal muscles, heart, walls of viscera (smooth muscle)

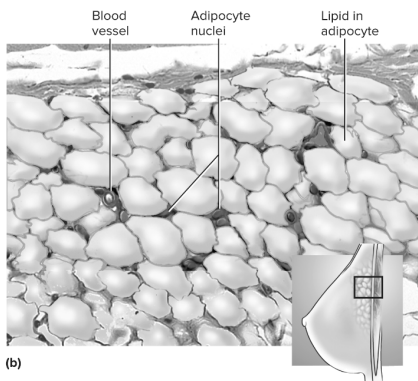
### Connective Tissues: Fibrous Dense



### Connective Tissue: Adipose Loose

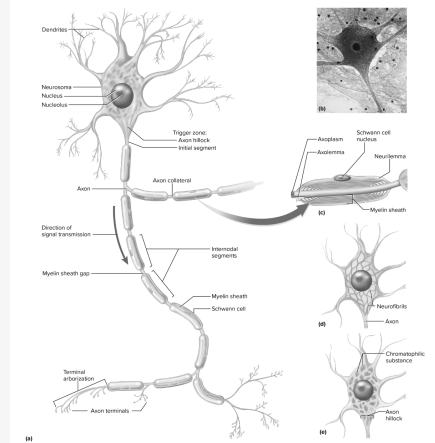


(a)

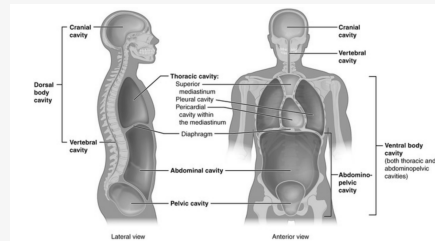


(b)

### Nervous Tissue



### Body Cavities



### Muscle Tissue: Skeletal

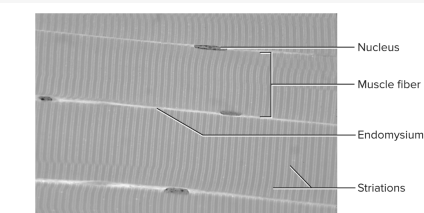
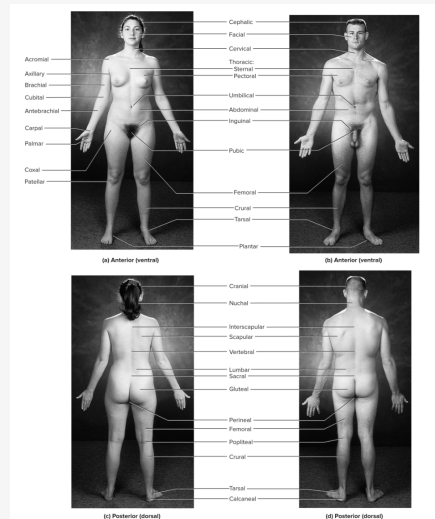


FIGURE 11.1 Skeletal Muscle Fibers. APR

### Body Regions



### Muscle Tissue: Smooth

