



ALAYEN UNIVERSITY

ANESTHESIA DEPARTMENT

FIRST STAGE

BIOLOGY

Human body tissue

Introduction

are **Similar cells with a common** **Tissues** •
function.

The study of tissues is called **histology.** •

There are four (4) major types of tissue: •

- Epithelial Tissue** .1
- Connective Tissue** .2
- Muscle Tissue** .3
- Nervous Tissue** .4

Intercellular Junctions

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Tight junctions

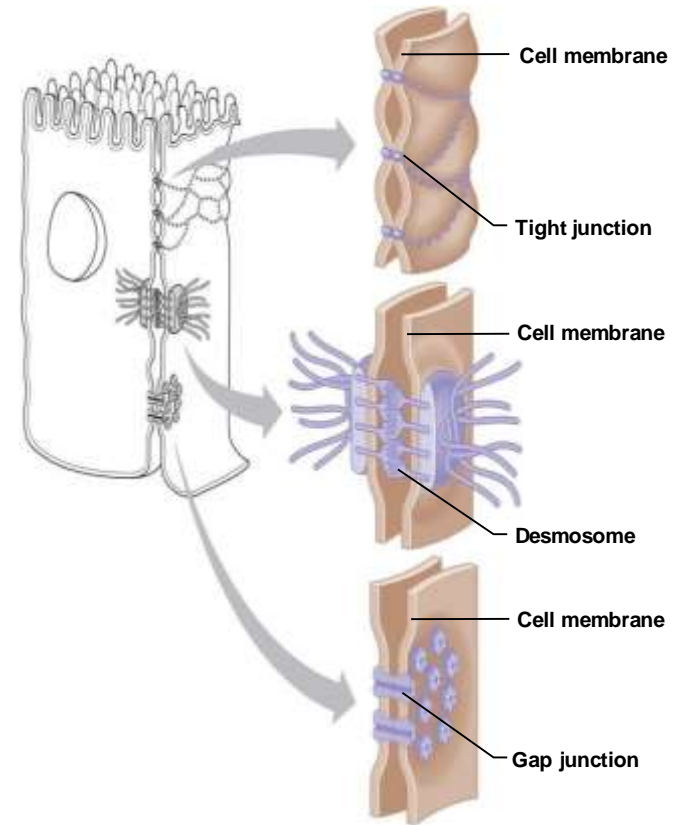
- Close space between cells
- Located among cells that form linings

Desmosomes

- Form “spot welds” between cells
- Located among outer skin cells

Gap junctions

- Tubular channels between cells
- Located in cardiac muscle cells



Epithelial Tissue

General characteristics: •

Cover organs and the body •

Line body cavities •

Line hollow organs •

Have a free surface •

Have a basement membrane •

Are avascular •

Cells readily divide •

Cells tightly packed •

Cells often have desmosomes •

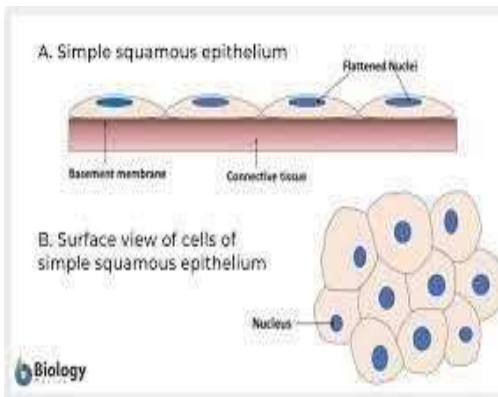
Function in protection, secretion, absorption, and excretion •

Classified according to cell shape and number of cell layers •

Epithelial Tissue

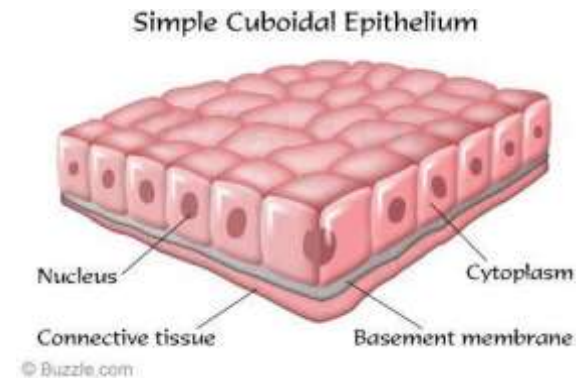
Simple squamous: •

- **Single layer of flat cells**
- **Substances pass easily through**
- **Line air sacs**
- **Line blood vessels**
- **Line lymphatic vessels**



Simple cuboidal: •

- **Single layer of cube-shaped cells**
- **Line kidney tubules**
- **Cover ovaries**
- **Line ducts of some glands**



Epithelial Tissue

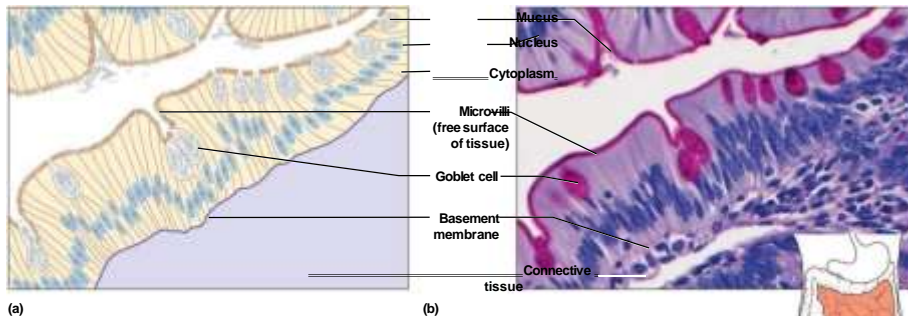
Simple columnar: •

- Single layer of elongated cells
- Nuclei usually near the basement
- Membrane at same level
- Sometimes possess cilia
- Sometimes possess microvilli
- Often have goblet cells
- Line uterus, stomach, intestines

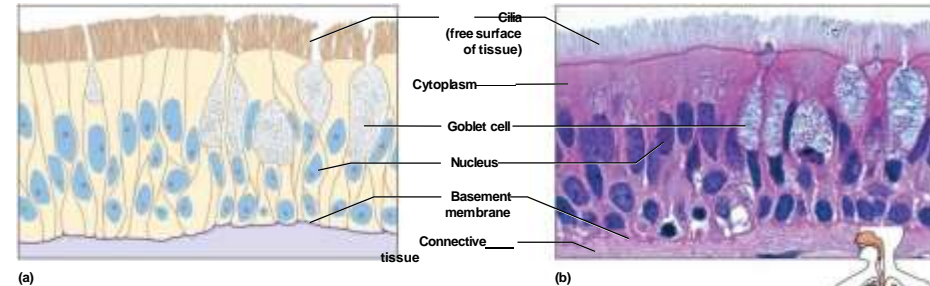
Pseudostratified columnar: •

- Single layer of elongated cells
- Nuclei at two or more levels
- Appear striated
- Often have cilia
- Often have goblet cells
- Line respiratory passageways

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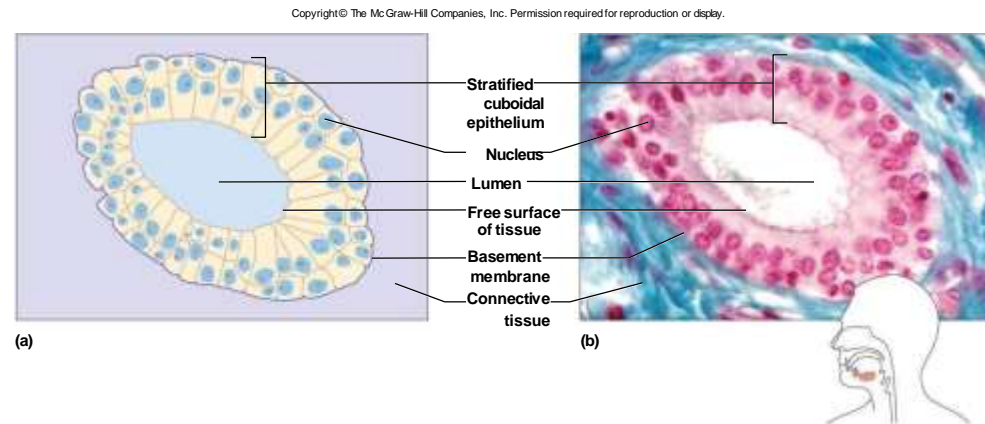
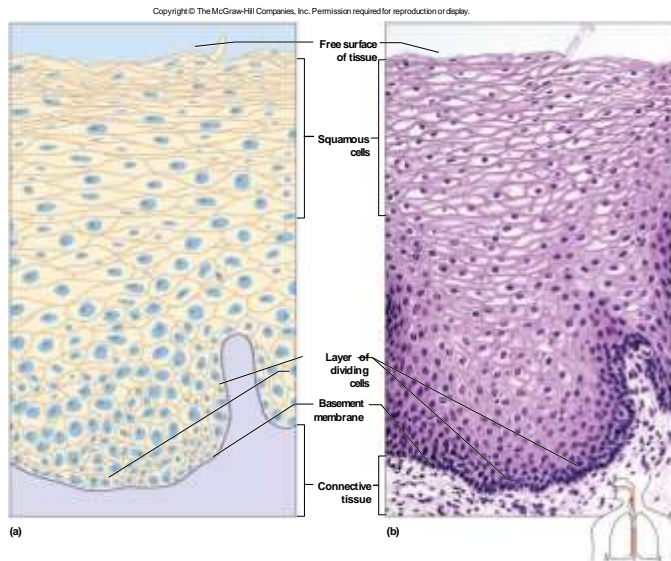
Epithelial Tissue

Stratified squamous: •

- Many cell layers •
- Top cells are flat •
- Can accumulate keratin •
- Outer layer of skin •
- Line oral cavity, vagina, and anal canal •

Stratified cuboidal: •

- 2-3 layers •
- Cube-shaped cells •
- Line ducts of mammary glands, sweat glands, salivary glands, and the pancreas •



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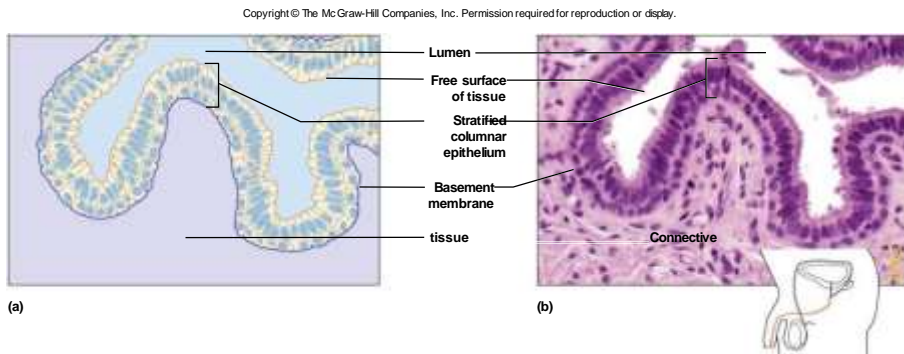
Epithelial Tissue

Stratified columnar:

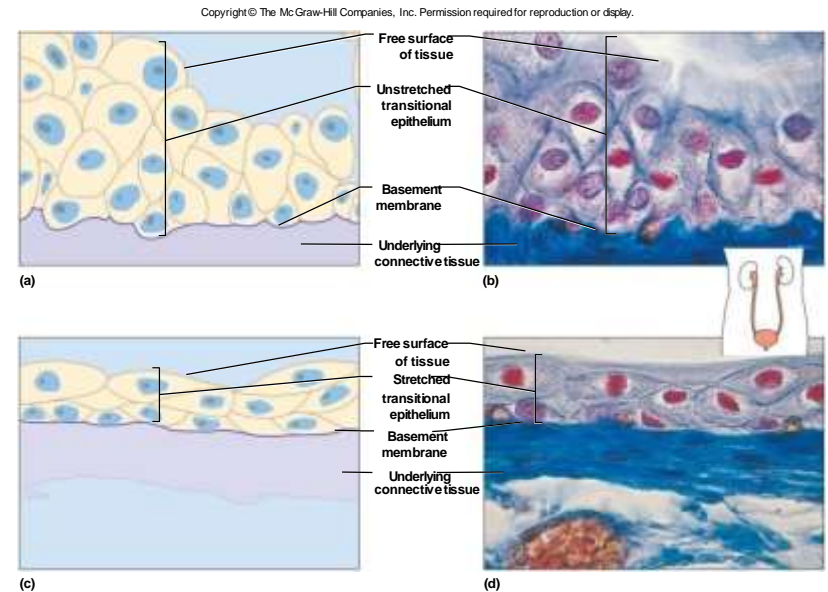
- Top layer of elongated cells
- Cube-shaped cells in deeper layers
- Line part of male urethra and part of pharynx

Transitional:

- Many cell layers
- Cube-shaped and elongated cells
- Line urinary bladder, ureters, and part of urethra



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Glandular Epithelium

Composed of cells that are specialized to produce and •
secrete substances

There are two (2) types: •

Endocrine glands are ductless that secrete hormones •

Exocrine glands have ducts •

Unicellular exocrine gland: •

Composed of one cell •

Goblet cell •

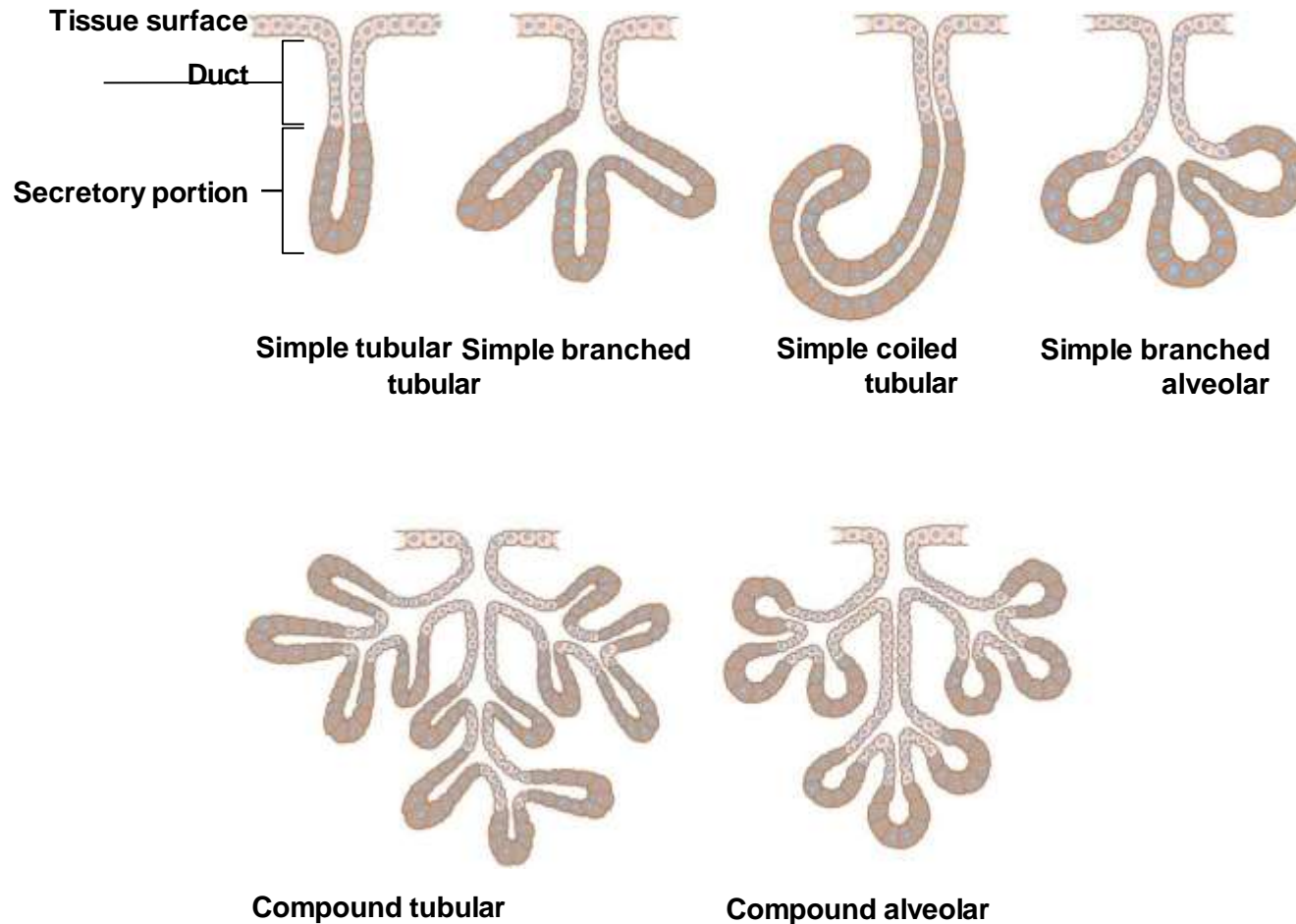
Multicellular exocrine gland: •

Composed of many cells •

Sweat glands, salivary glands, etc. •

Simple and compound •

Structural Types of Exocrine Glands



Types of Glandular Secretions

Merocrine Glands •

- Fluid product •
- Salivary glands •
- Pancreas gland (?) •
- Sweat glands •
- Serous Fluid •

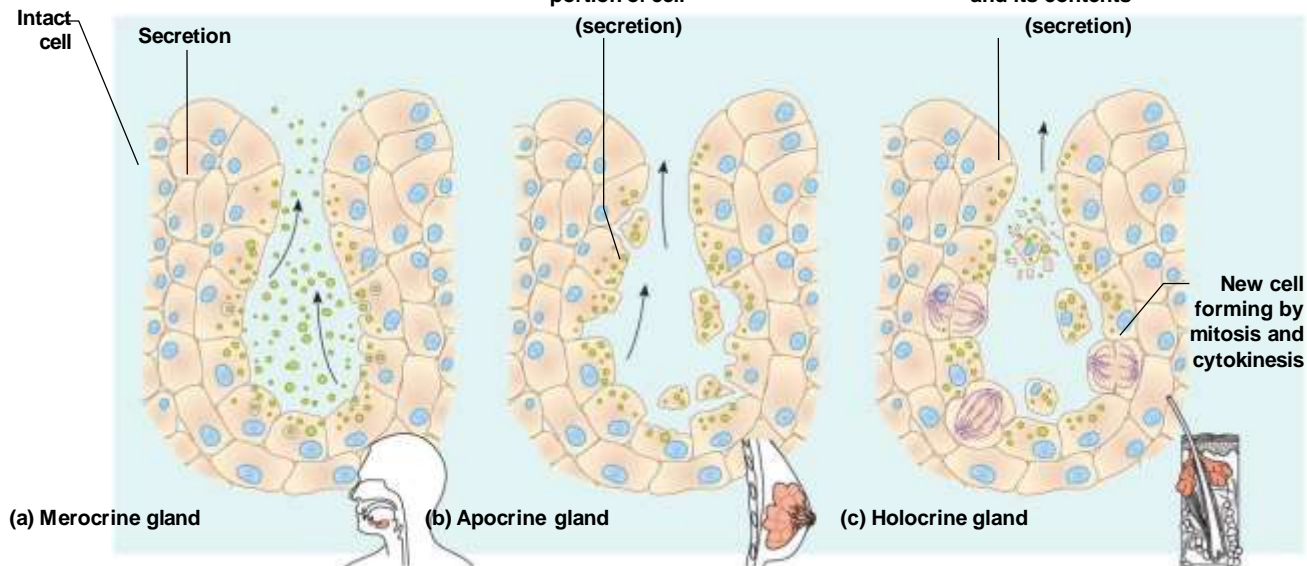
Apocrine Glands •

- Cellular product •
- Portions of cells •
- Mammary glands •
- Ceruminous glands •

Holocrine Glands •

- Secretory products •
- Whole cells •
- Sebaceous glands •

Mucus •



Connective Tissues

General characteristics: •

Most abundant tissue type •

Many functions: •

Bind structures •

Provide support and protection •

Serve as frameworks •

Fill spaces •

Store fat •

Produce blood cells •

Protect against infections •

Help repair tissue damage •

Have an extracellular matrix •

Have varying degrees of vascularity •

Have cells that usually divide •

Connective Tissue

Major Cell Types Present

- **Fibroblasts**

- **Fixed cell**
- **Most common cell**
- **Large, star-shaped**
- **Produce fibers**

- **Mast cells**

- **Fixed cell**
- **Release heparin**
- **Release histamine**

- **Macrophages**

- **Wandering cell**
- **Phagocytic**
- **Important in injury or infection**

Connective Tissue Fiber Types Present

- **Collagenous fibers**

- **Thick**
- **Composed of collagen**
- **Great tensile strength**
- **Hold structures together**
- **Tendons, ligaments**

- **Reticular fibers**

- **Very thin collagenous fibers**
- **Highly branched**
- **Form supportive networks**

- **Elastic fibers**

- **Bundles of microfibrils**
- **embedded in elastin**
- **Fibers branch**
- **Elastic**
- **Vocal cords, air passages**

Connective Tissues

Connective Tissue Proper: • **Specialized Connective Tissue:** •

Loose connective tissue •

Adipose tissue •

Reticular connective tissue •

Dense connective tissue •

Elastic connective tissue •

Cartilage •

Bone •

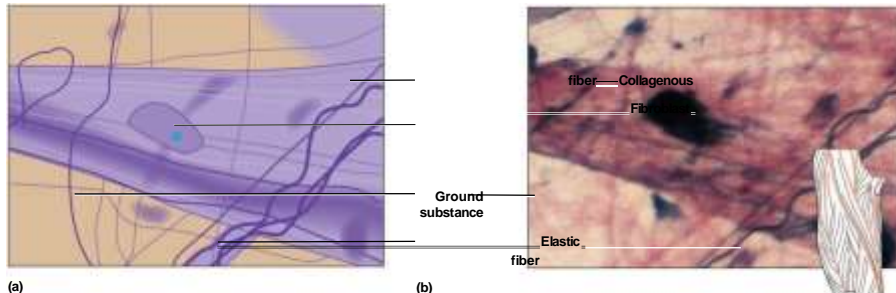
Blood •

Connective Tissue Types

Loose Connective Tissue •

- Mainly fibroblasts •
- Fluid to gel-like matrix •
- Collagenous fibers •
- Elastic fibers •
- Bind skin to structures •
- Beneath most epithelia •
- Blood vessels nourish •
- nearby epithelial cells •
- Between muscles •

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(a)

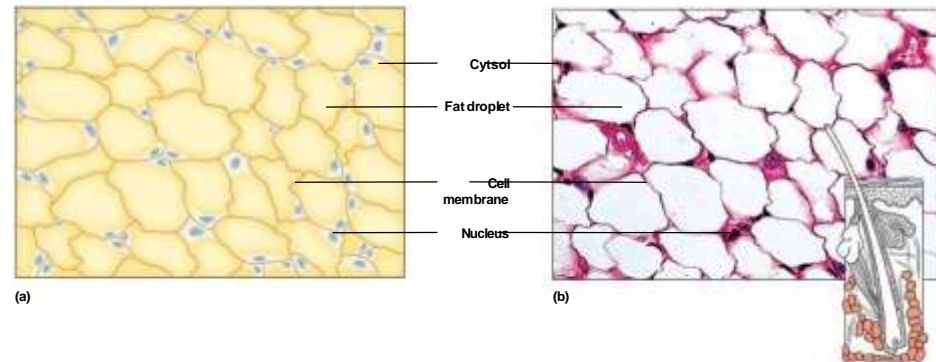
(b)

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Adipose Tissue •

- Adipocytes •
- Cushions •
- Insulates •
- Store fats •
- Beneath skin •
- Behind eyeballs •
- Around kidneys and heart •

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(a)

(b)

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Connective Tissue Types

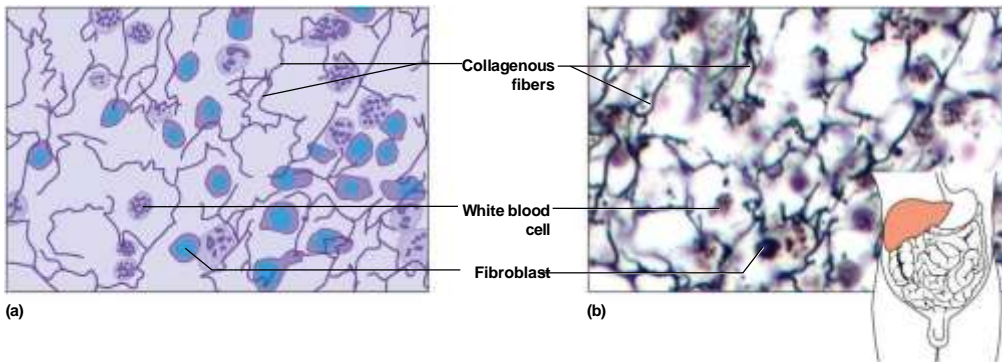
Reticular Connective Tissue •

- Composed of reticular fibers
- Supports internal organ walls
- Walls of liver, spleen, lymphatic organs

Dense Connective Tissue •

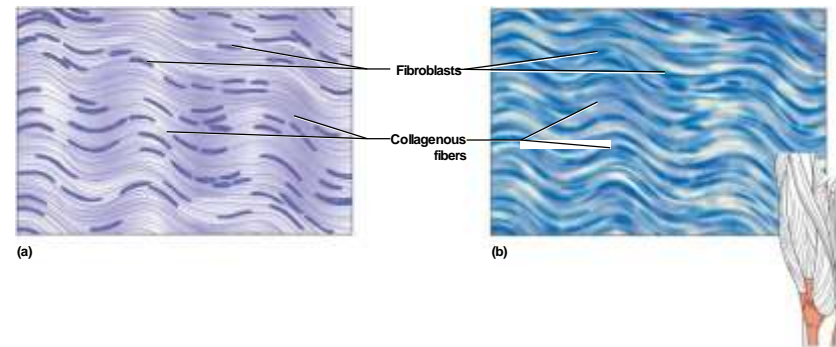
- Packed collagenous fibers
- Elastic fibers
- Few fibroblasts
- Bind body parts together
- Tendons, ligaments, dermis
- Poor blood supply

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Connective Tissue Types

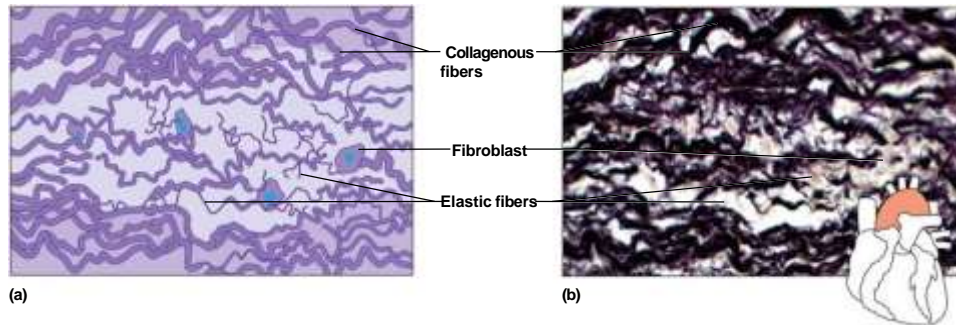
Elastic Connective Tissue •

- Abundant in elastic fibers •
- Some collagenous fibers •
- Fibroblasts •
- Attachments between bones •
- Walls of large arteries, airways, heart •

Bone (Osseous Tissue) •

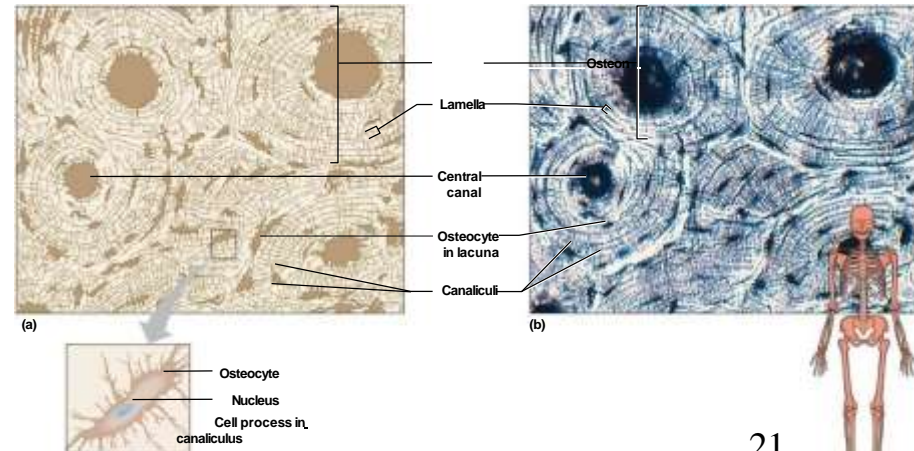
- Solid matrix •
- Supports •
- Protects •
- Forms blood cells •
- Attachment for muscles •
- Skeleton •
- Osteocytes in lacunae •

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Connective Tissue Types

Cartilage •

Rigid matrix •

Chondrocytes in lacunae •

Poor blood supply •

Three (3) types: •

Hyaline Cartilage •

Elastic Cartilage •

Fibrocartilage •

Hyaline cartilage •

Most abundant •

Ends of bones •

Nose, respiratory passages •

Embryonic skeleton •

Elastic cartilage •

Flexible •

External ear, larynx •

Fibrocartilage •

Very tough •

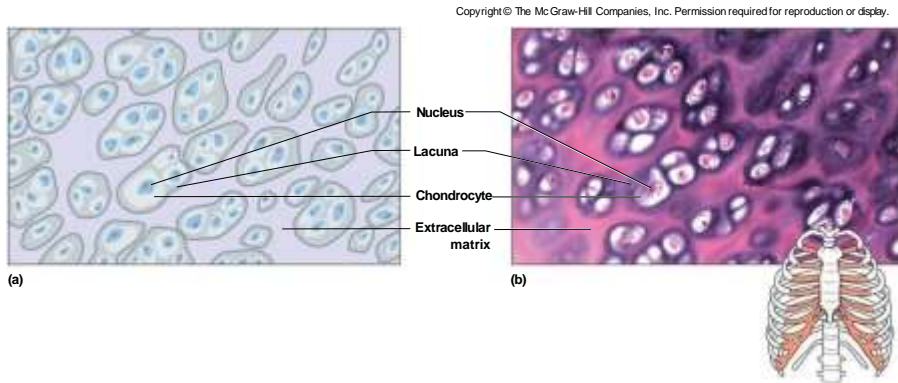
Shock absorber •

Intervertebral discs •

Pads of knee and pelvic girdle •

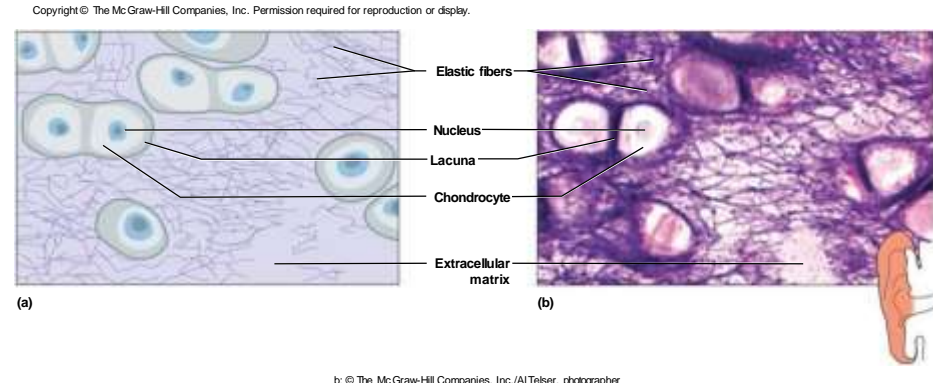
Connective Tissue Types

Three (3) types of cartilage:



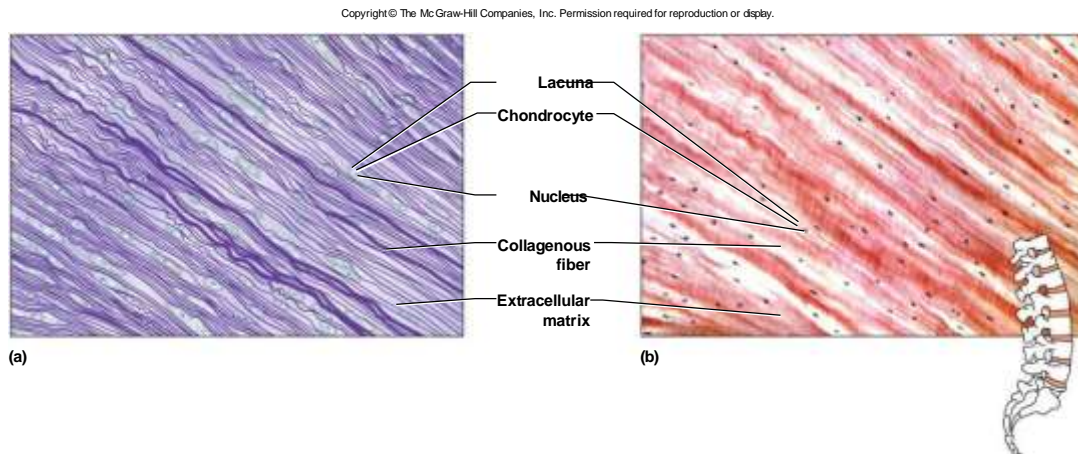
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Hyaline Cartilage



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Elastic Cartilage



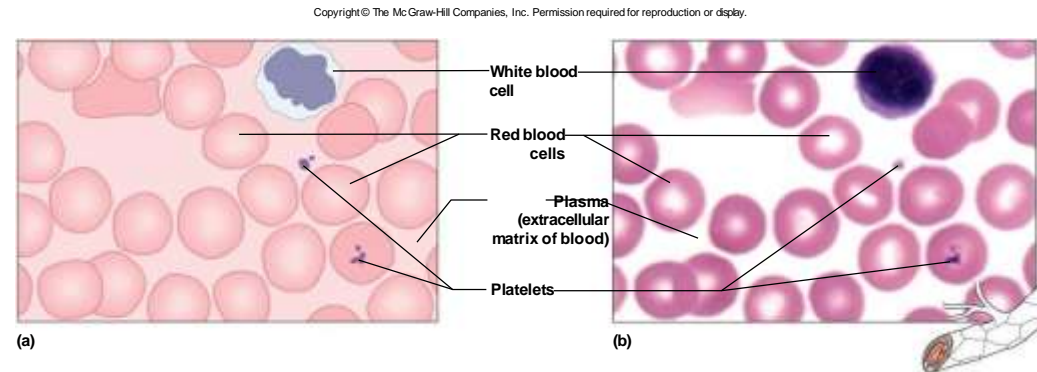
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Fibrocartilage

Connective Tissue Types

Blood •

- Fluid matrix called plasma •
- Red blood cells •
- White blood cells •
- Platelets •
- Transports •
- Defends •
- Involved in clotting •
- Throughout body in blood •
- vessels
- Heart •



Types of Membranes

There are four (4) types of epithelial membranes: •

Serous Membranes .1

- Line body cavities that •
do not open to the
outside
- Reduce friction •
- Inner lining of thorax •
and abdomen
- Cover organs of thorax •
and abdomen
- Secrete serous fluid •

Mucous Membranes .2

- Line tubes and organs •
that open to outside world
- Lining of mouth, nose, •
throat, etc.
- Secrete mucus •

Cutaneous Membranes .3

- Covers body •
Skin •

Synovial Membranes .4

- Composed entirely of •
connective tissue
- Lines joints •

Muscle Tissues

General characteristics: •

Muscle cells also called •
muscle fibers

Contractile •

Three (3) types: •

Skeletal muscle •

Smooth muscle •

Cardiac muscle •

Skeletal muscle •

Attached to bones •

Striated •

Voluntary •

Smooth muscle •

Walls of organs •

Skin •

Walls of blood vessels •

Involuntary •

Non-striated •

Cardiac muscle •

Heart wall •

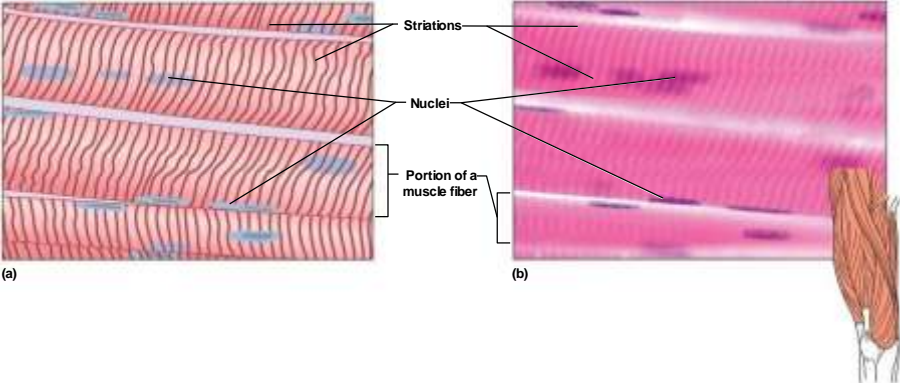
Involuntary •

Striated •

Intercalated discs •

Muscle Tissue

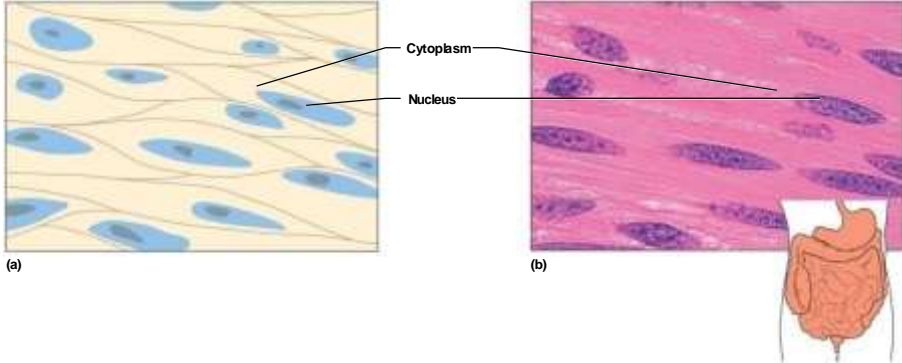
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Skeletal Muscle

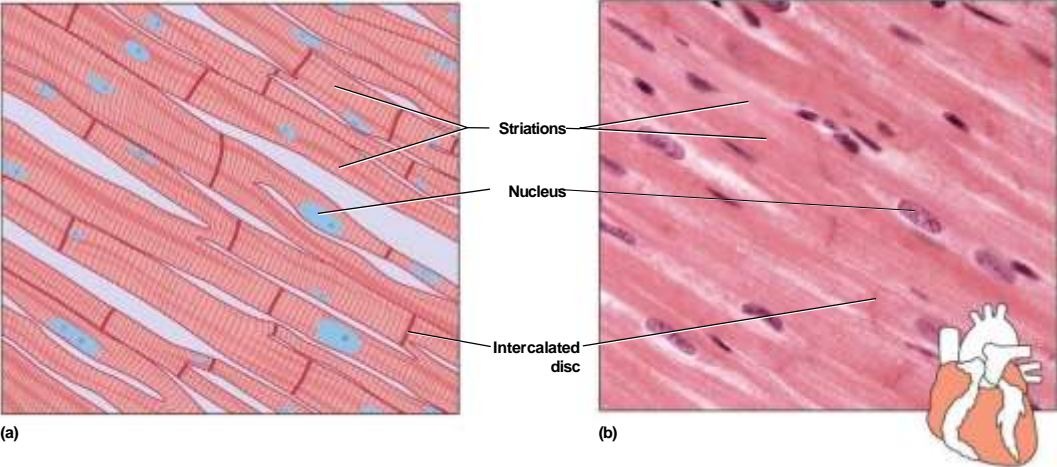
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Smooth Muscle

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Cardiac Muscle

Nervous Tissue

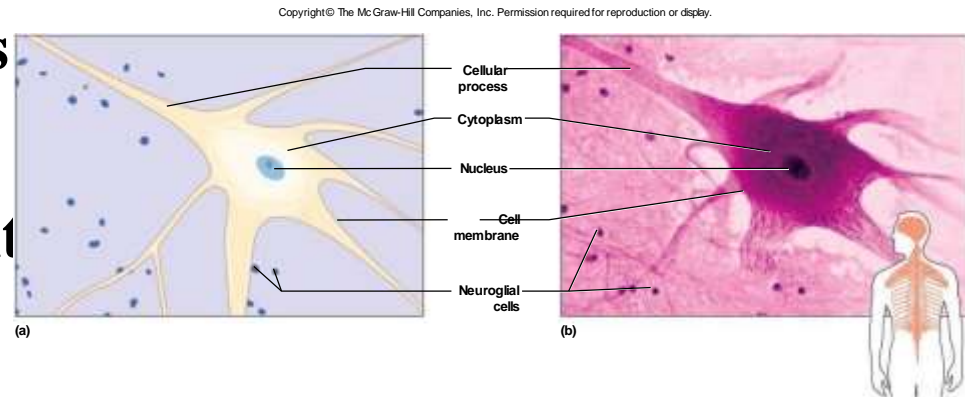
Found in brain, spinal cord, and •
peripheral nerves

Functional cells are neurons

Neuroglial cells support and
bind nervous tissue component

Sensory reception •

Conduction of nerve impulses •



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