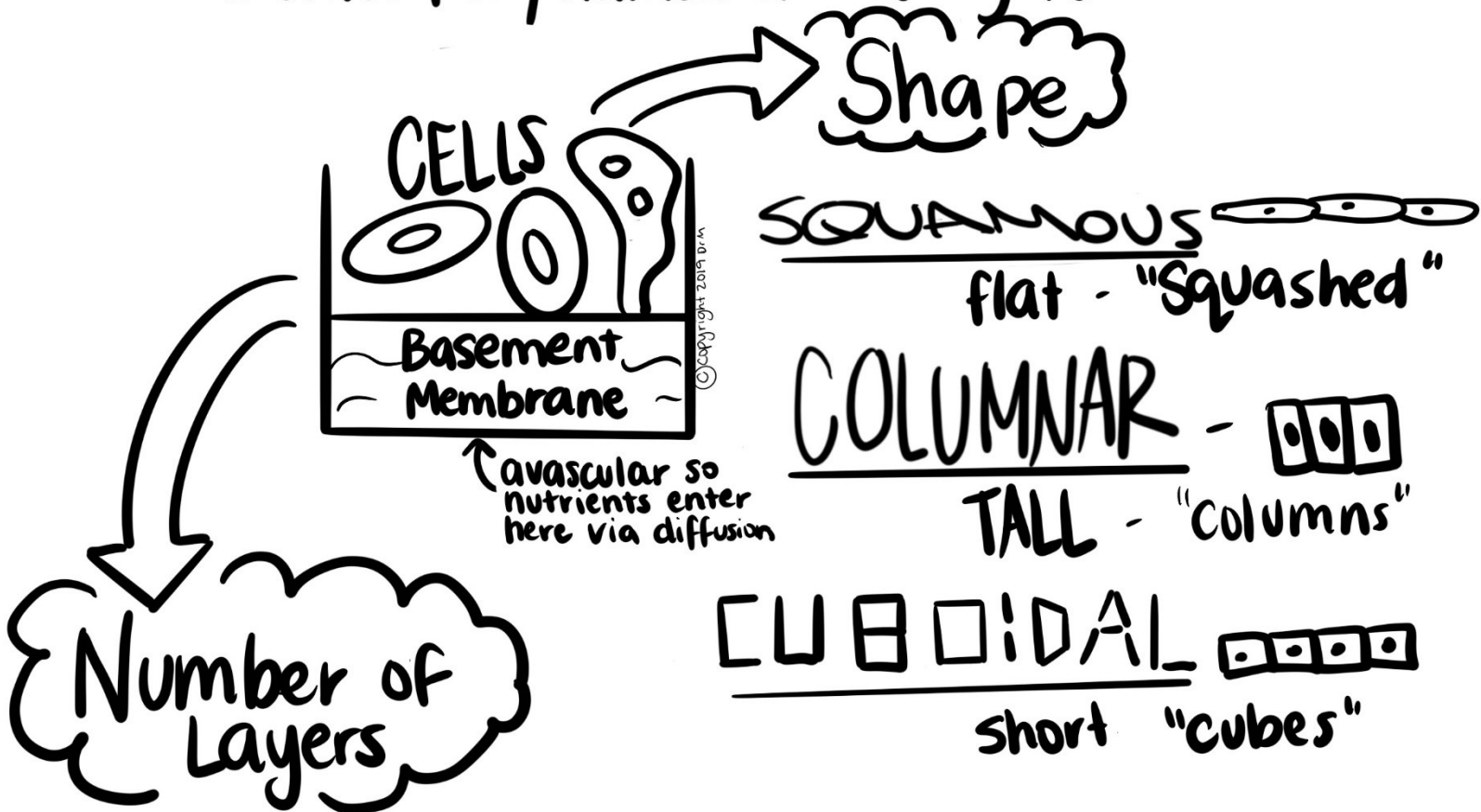


# EPITHELIAL TISSUE Basics

- \* Avascular, get nourishment via diffusion
- \* Lines outer surfaces of organs and blood vessels and inner surfaces of cavities of many organs
- \* Cells are arranged in sheets over a basement membrane.
- \* Classified/named according to:



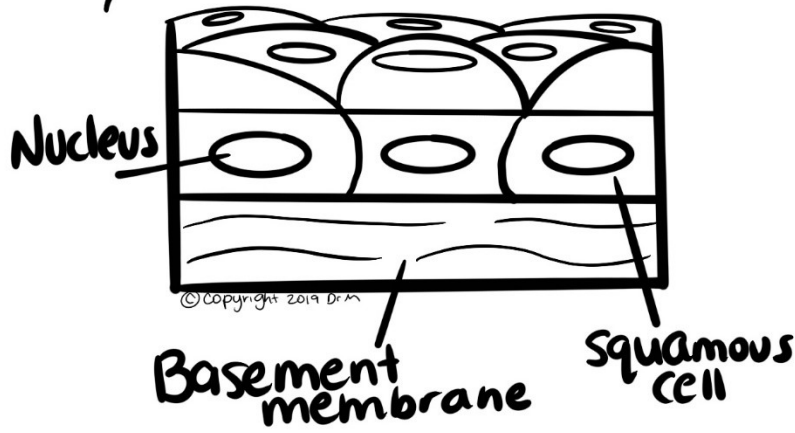
• Simple - 1 cell layer

→ Pseudostriated - 1 cell layer but different heights  
"fake layers"

• Stratified - 2+ cell layers

# EPITHELIAL TISSUE

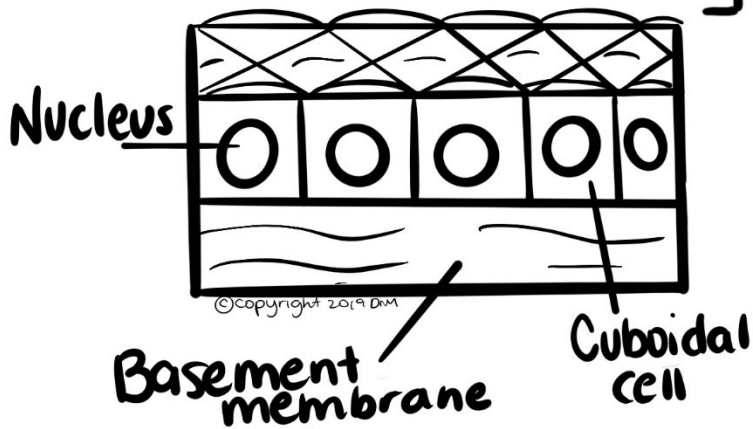
Simple



## SIMPLE SQUAMOUS

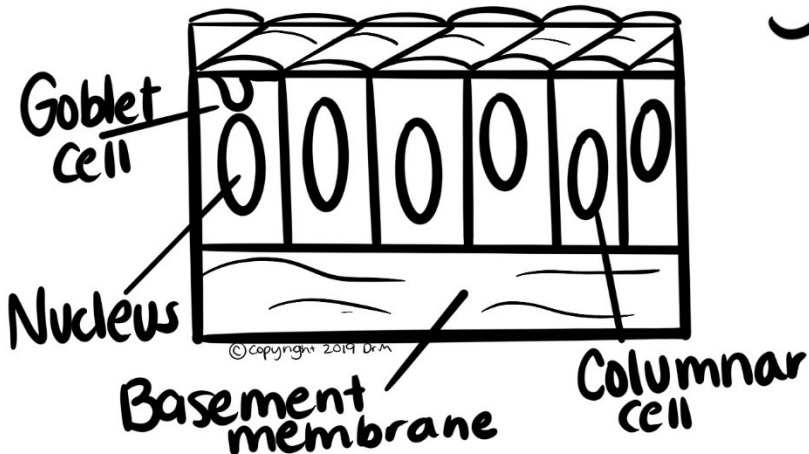
- Thin, flat cells in a single layer
- Found lining blood vessels and heart
- Function - diffusion

## SIMPLE CUBOIDAL



- Single layer of cube-shaped cells
- Found in walls of small ducts of glands and lining ovary & many kidney tubules
- Function - secretion; absorption

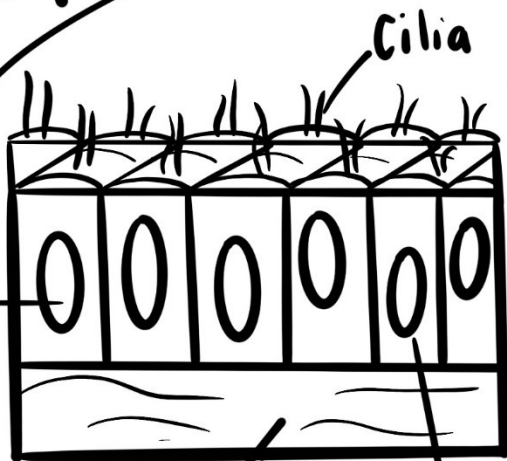
## SIMPLE COLUMNAR



- Single layer of TALL cells
- May contain goblet cells (secrete mucus)
- Found lining digestive tract
- Function - Absorption, Secretion, & produce mucus

# EPITHELIAL TISSUE

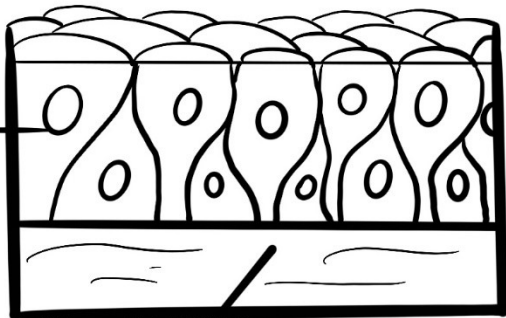
Simple



## CILIATED-COLUMNAR

- Single layer of TALL cells that have cilia
- Found lining respiratory tract & oviduct
- Function- Secretion & Absorption

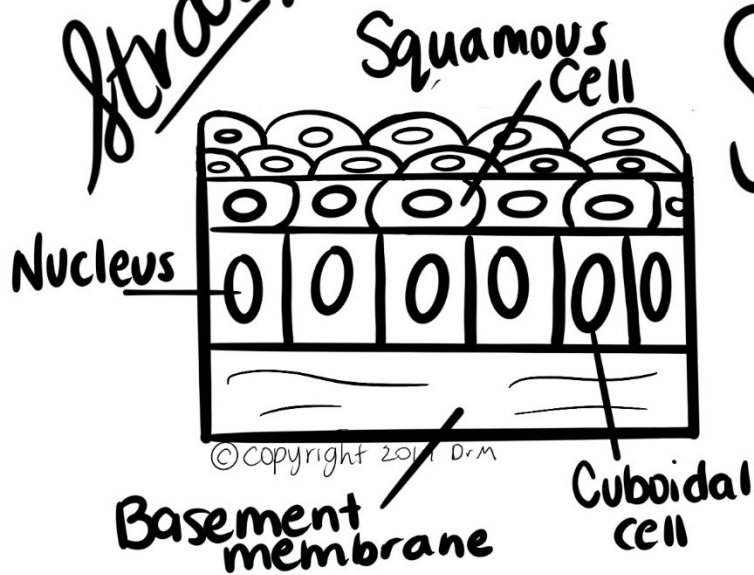
## PSEUDOSTRATIFIED



- Cells are a single layer but appear stratified due to differences in height.
- "Fake layers"
- Found lining respiratory tract & male reproductive tract
- Function- secretion, absorption, & protection

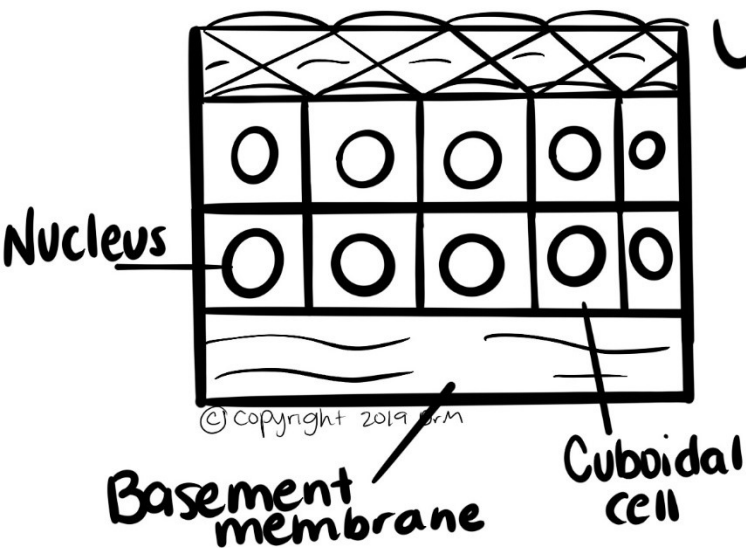
# EPITHELIAL TISSUE

Stratified



## Stratified SQUAMOUS

- Basal layer low columnar or cuboidal. Outer layer very flat  $\rightarrow$  squamous cells.
- Can contain keratin (on palms and soles)
- Found in skin & lining esophagus and mouth
- Function - protection

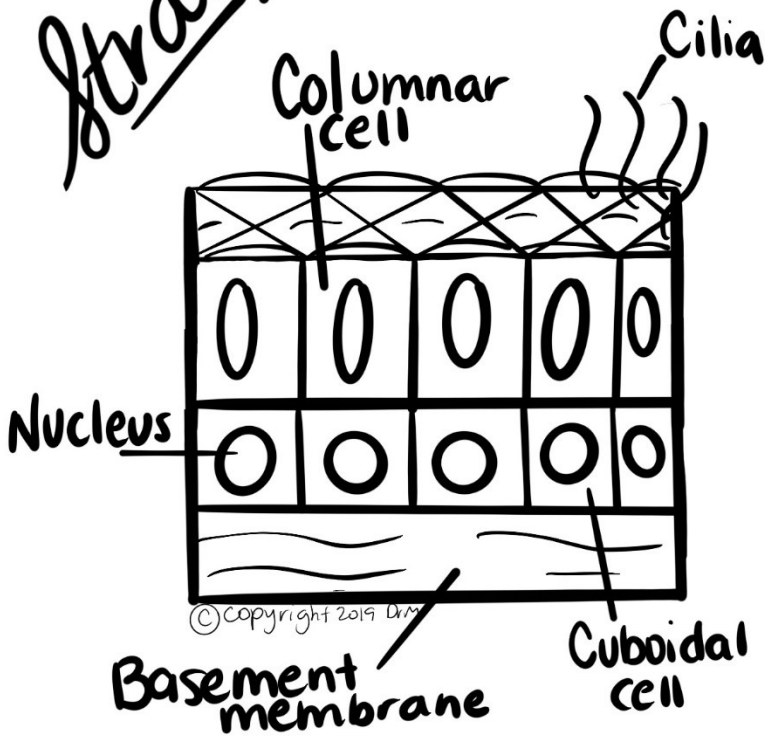


## Stratified CUBOIDAL

- Rare, usually only 2 layers
- Found in some sweat and mammary glands; also in conjunctiva of eye
- Function - secretes and protects

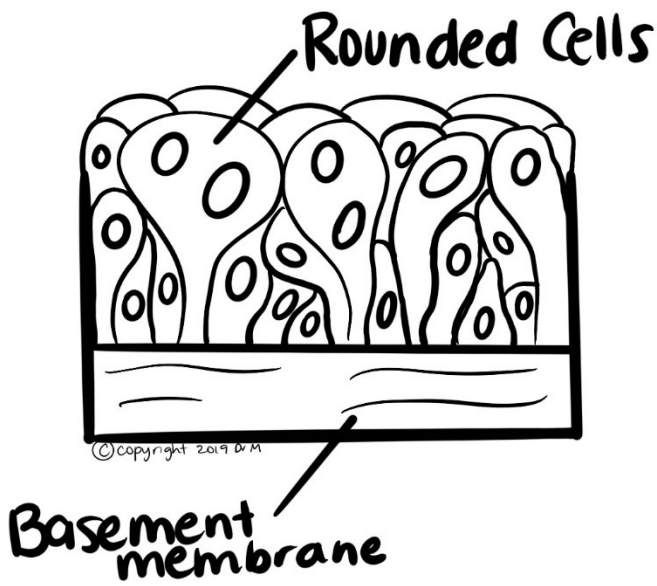
Stratified

# EPITHELIAL TISSUE



## Stratified COLUMNAR

- Rare
- Basal are cuboidal & upper are COLUMNAR
- May be ciliated
- Found lining male reproductive tract
- Function- secrete & protect



## Transitional

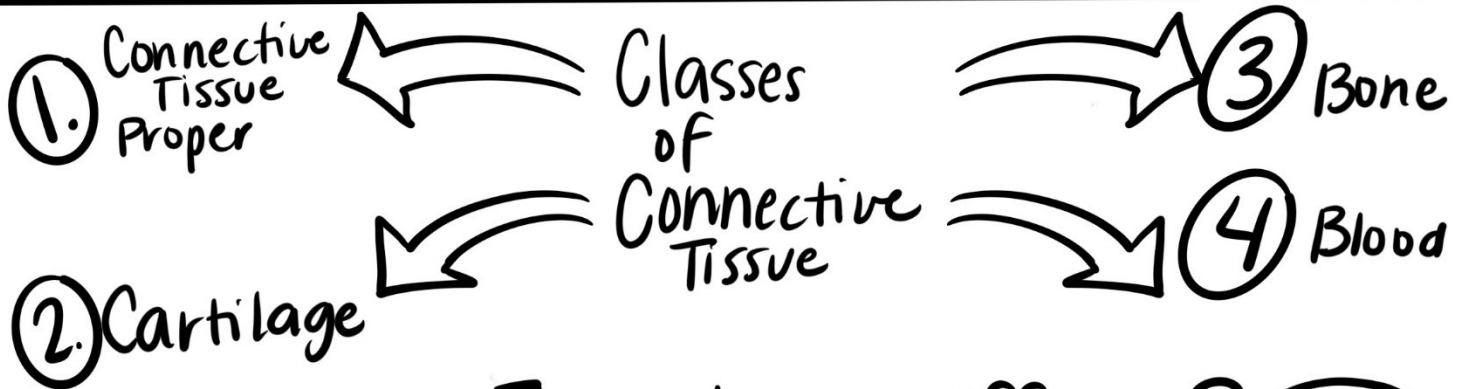
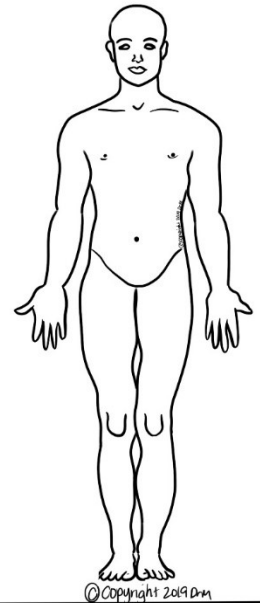
- Surface cells are rounded
- Found lining urinary organs
- Function- Stretches

# CONNECTIVE TISSUE Basics

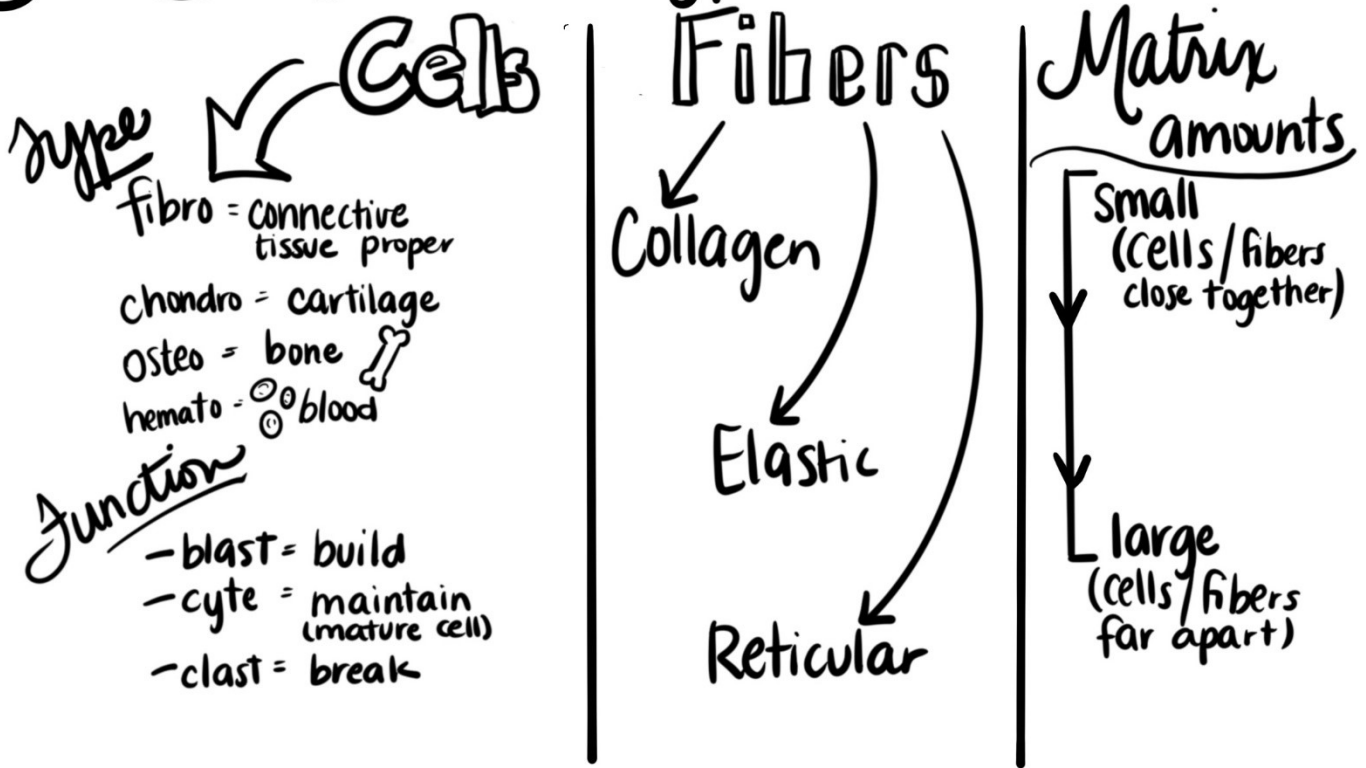
\* Found everywhere in the body  
↳ most abundant and widely distributed tissue type

\* Made of living cells surrounded by a matrix

\* Functions - bind parts together, support & protect organs, insulate, store fuel, and transport substances

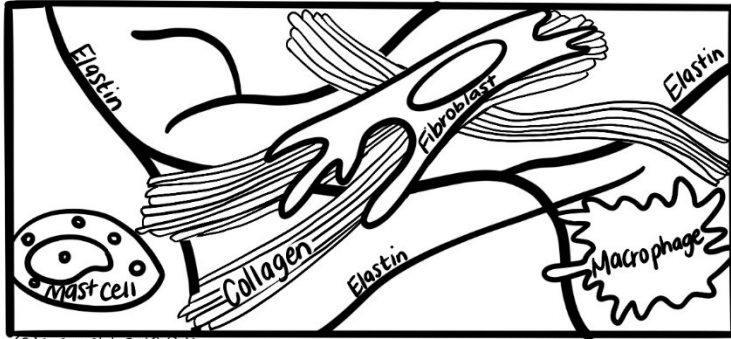


## Tissue types differ in



# Loose CONNECTIVE TISSUE Proper

## Areolar (LOOSE)

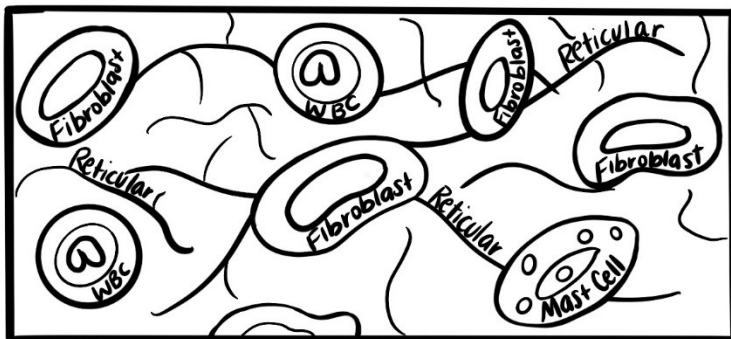


- Made of scattered cells with collagen and elastin fibers
- Fills spaces, surrounds organs, blood vessels, and nerves
- Function - holds organs in place by attaching epithelial tissue to underlying tissue

## Adipose (FAT)



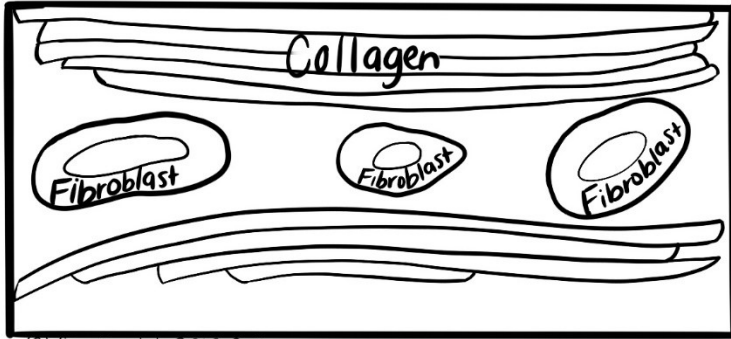
- Very little matrix
- Each cell has a large droplet of fat
- Found behind eyes, palms, soles, abdomen, and hips
- Functions - cushions & insulates body, stores energy in fat



## Reticular

- Delicate matrix of reticular fibers & fibroblasts
- Found in the soft structures of liver, lymph nodes, and spleen
- Functions - forms framework of organs, binds smooth muscle cells together

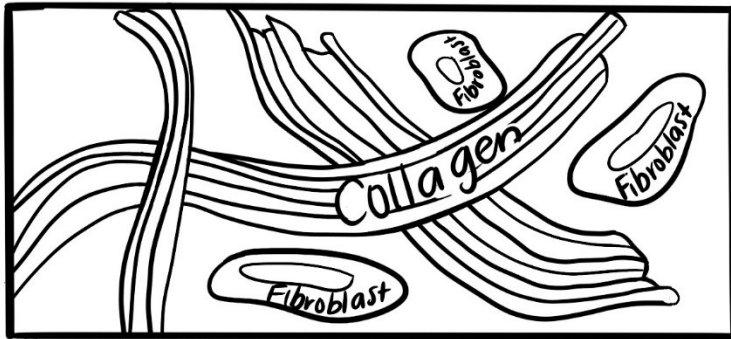
# Dense CONNECTIVE TISSUE Proper



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## Dense Regular

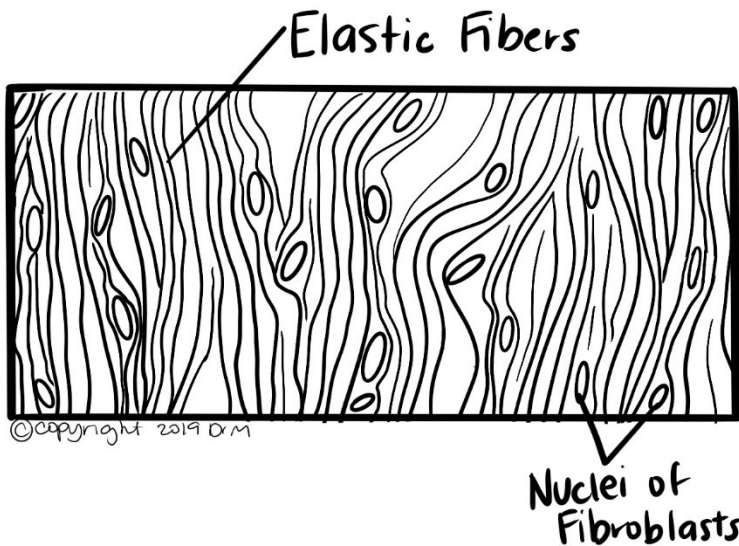
- Densely-packed parallel bundles of collagen
- Fibroblast cells are present but scarce
- Make up tendons (bind muscle to bone) and ligaments (bind bones to bones)
- Function - provides connections between different tissues



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## Dense Irregular

- Collagen fibers in many directions
- Found in dermis of skin and capsules of organs
- Function - provides strength and resists tearing in many directions



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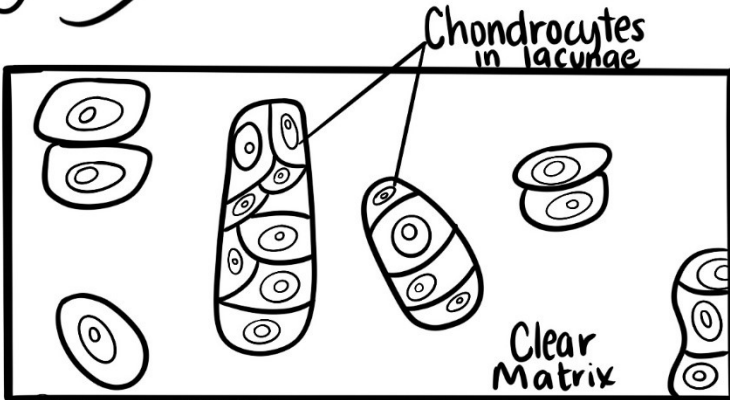
## Elastic

- High concentration of elastic fibers
- Found in walls of large arteries, in some ligaments between vertebrae in neck, and in vocal cords
- Function - allows tissue to return after being stretched

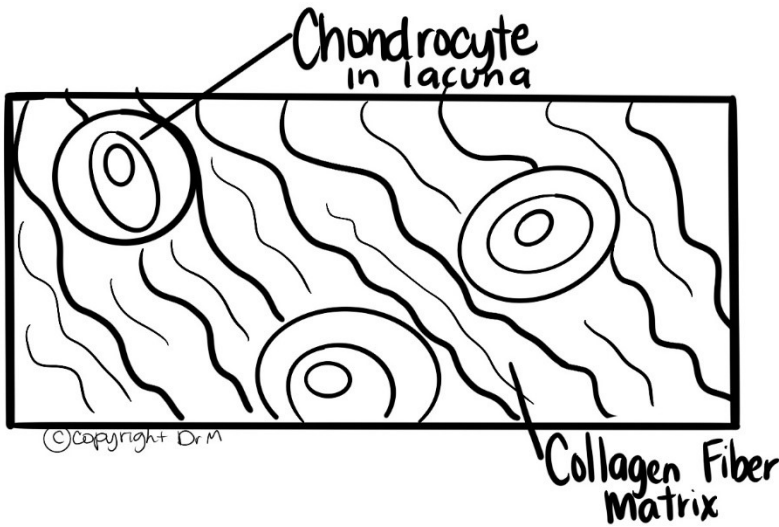


# Cartilage

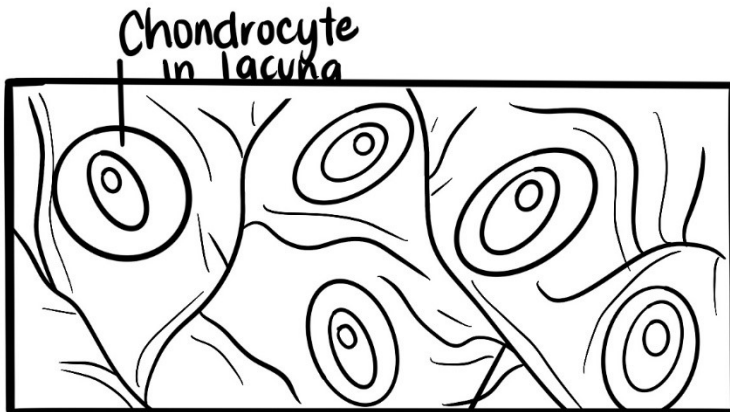
## CONNECTIVE TISSUE



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### Hyaline Cartilage

- Clear matrix with very little collagen
- "Hyaline" means glass
- Found at ends of bones at joints and sternum, nose, trachea, and larynx
- Function- reduces friction and absorbs shock between bones at joints

### Fibrocartilage

- Strong due to large amount of collagen fibers in matrix
- Found in knee and intervertebral disks
- Function- absorbs shock

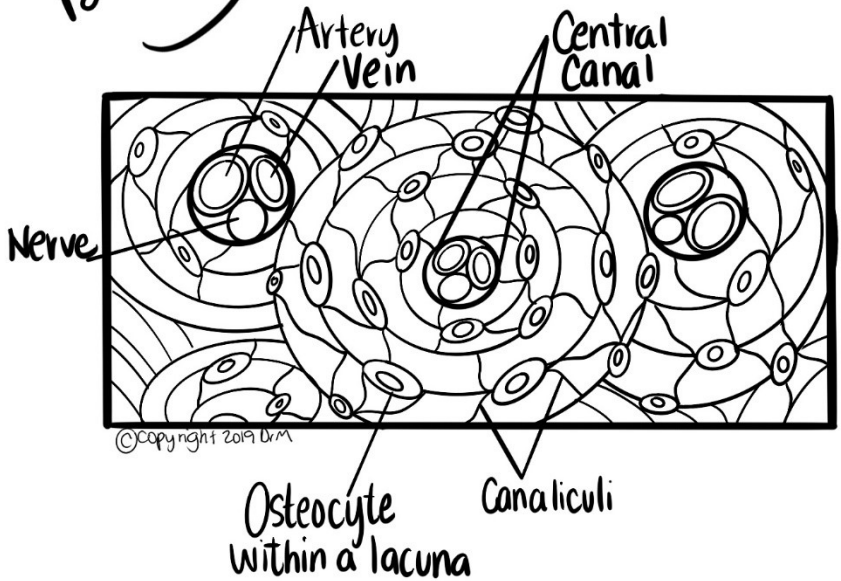
### Elastic Cartilage

- Contains many single elastin fibers in matrix
- Found in ears and epiglottis
- Function- flexibility to withstand repeated bending

# Bone & Blood

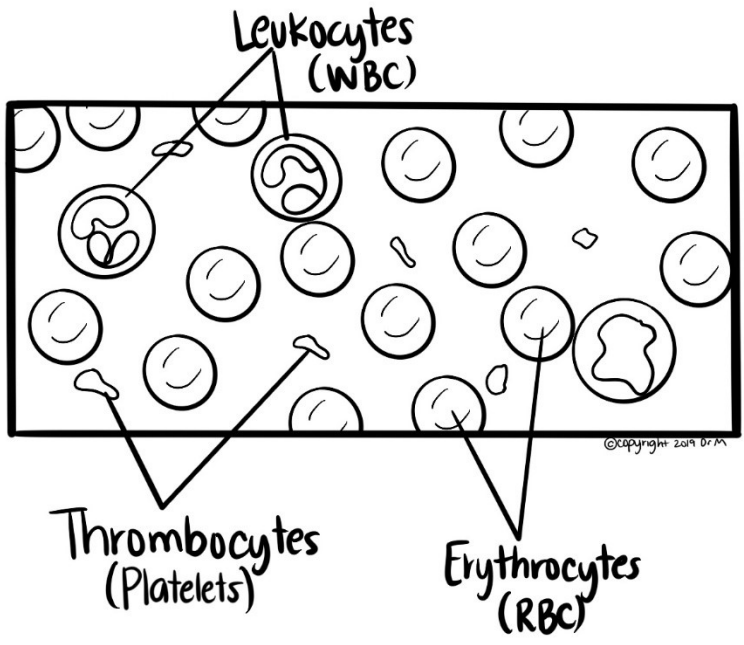
## CONNECTIVE TISSUE

### Osseous (Bone)



- Osteocytes in a non-living matrix
- Hard yet strong and light
- Composed of several types of cells (osteoclasts, osteoblasts, and osteocytes) responsible for remodeling and maintaining the skeleton
- Function - serves as framework for the body (skeleton)

### BLOOD



- Has a liquid matrix contained within vessels
- Fibers in matrix are soluble proteins that precipitate during clotting
- Contains 3 types of cells:
  - Erythrocytes - red blood cells
  - Leukocytes - white blood cells
  - Thrombocytes - platelets
- Function - transports  $O_2$ /nutrients to cells and  $CO_2$ /wastes away from cells

# MUSCLE TISSUE Basics

- \* Highly vascularized
- \* Cells have striations (stripes)
- \* Nuclei sometimes lie outside cells



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\* Primary job is

movement



Involuntary  
(Smooth & Cardiac)

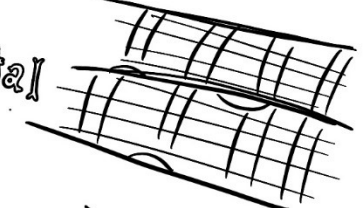
Voluntary  
(Skeletal)

## Types of Muscle



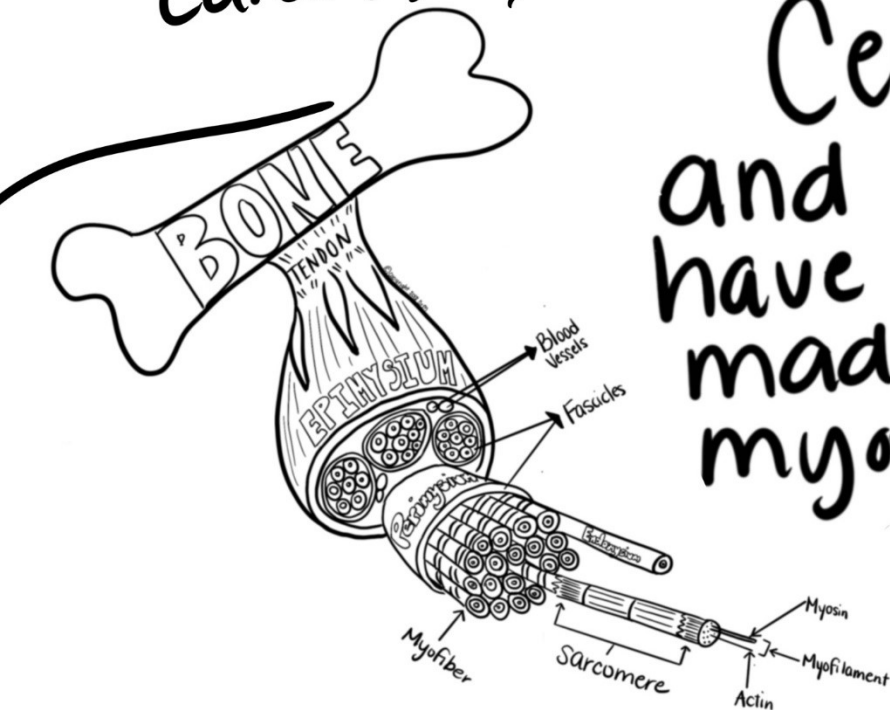
smooth

Skeletal



Cardiac

Cells are long, and cylindrical & have myofilaments made of actin and myosin for contraction



# MUSCLE TISSUE

## smooth

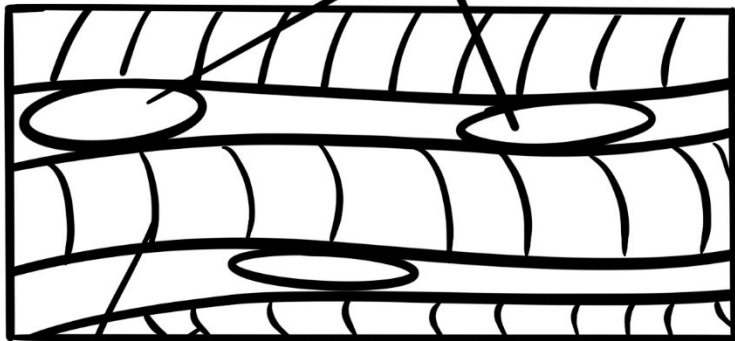


Nucleus

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- Tapered cells
- Non-striate
- Involuntary
- Makes up inner walls of organs

## Skeletal



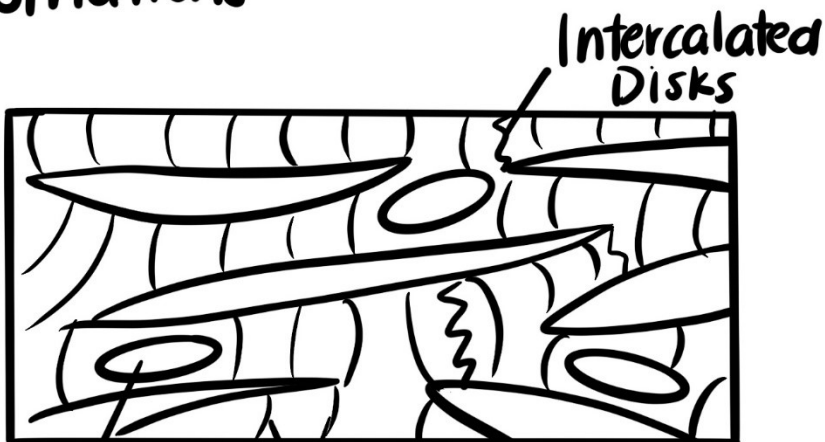
Nuclei

Striations

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- Cells with multiple nuclei
- Striated
- Voluntary
- Found attached to bones

## Cardiac



Intercalated Disks

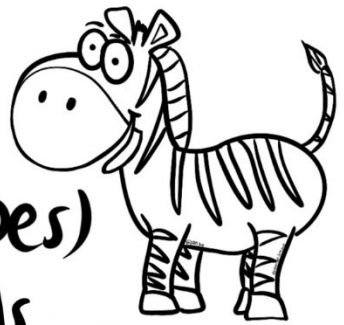
Nucleus

Striations

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- Branched cells joined with intercalated disks
- Faint striations
- Involuntary
- Found only in heart

# MUSCLE TISSUE Basics



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- \* Highly vascularized
- \* Cells have striations (stripes)
- \* Nuclei sometimes lie outside cells

\* Primary job is

movement

Voluntary (Skeletal)

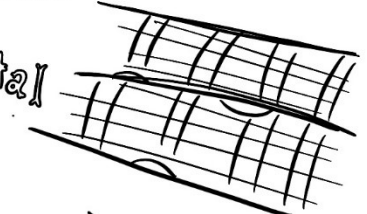
Involuntary (Smooth & Cardiac)

## Types of Muscle



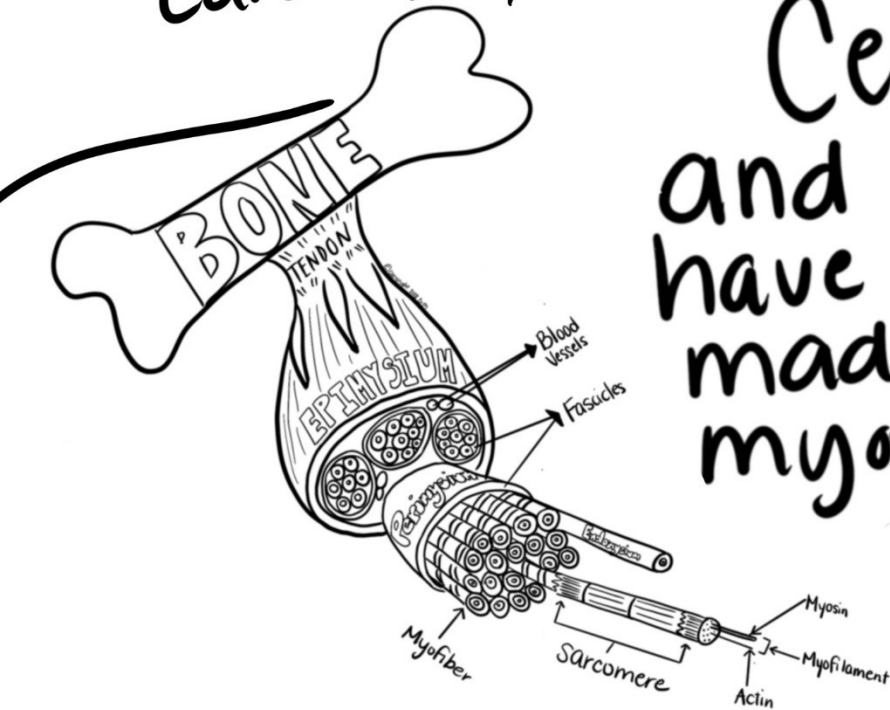
smooth

Skeletal

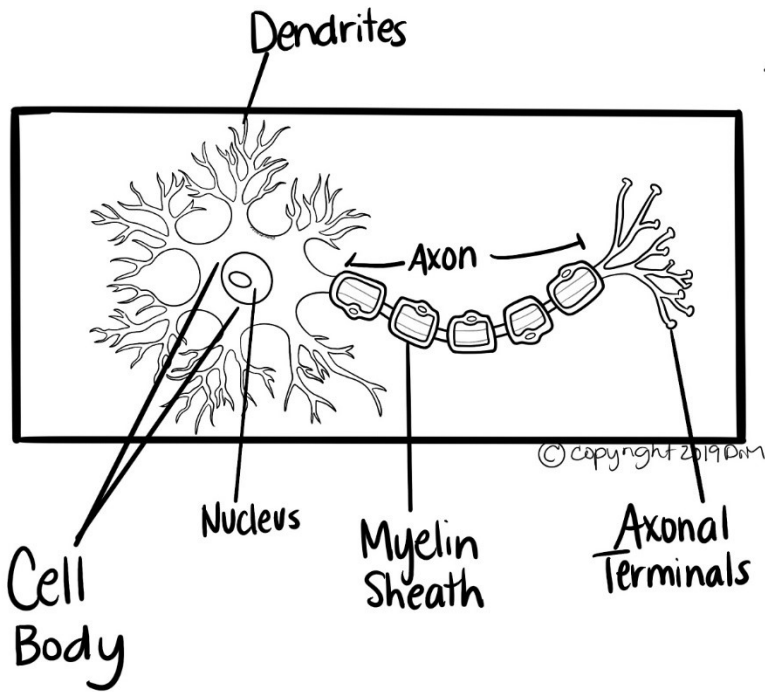


Cardiac

Cells are long, and cylindrical & have myofilaments made of actin and myosin for contraction



# Nervous TISSUE



## Neuron

- Branching cell
- Long cytoplasmic extension
- Consists of dendrites, cell body, and axon
- Found in brain, spinal cord, and nerves
- Job is to conduct impulses