Microscopic Identification of Human Tissues

Human Biology (ANE106)

Year 1/ Spring semester

Lab 1

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Anesthesia Department

Introduction to Tissues

A tissue is a group of similar cells working together to perform a function.

Types of tissues

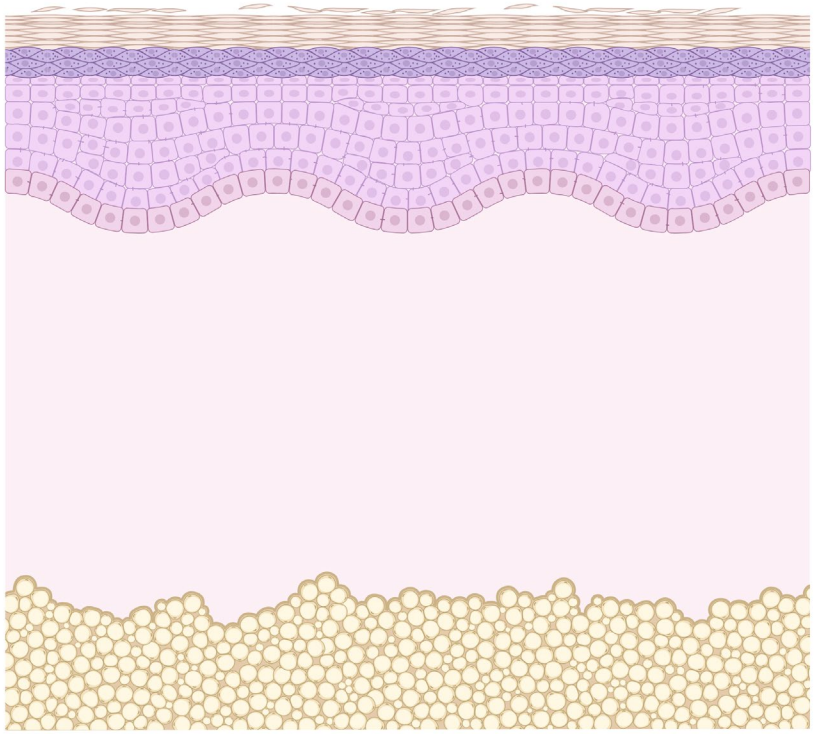
- Epithelial tissue
- Connective tissue
- Nervous tissue
- Muscle tissue

Epithelial tissue

Epithelial tissue covers the body surface and lines internal organs.

Characteristics:

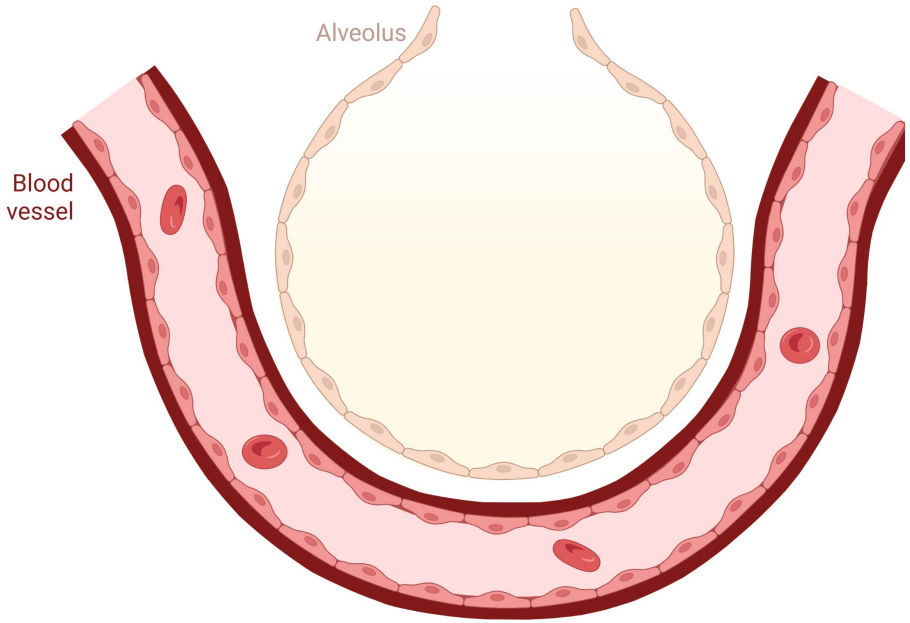
- Tightly packed cells
- Little extracellular matrix
- Has apical (free) surface
- Avascular



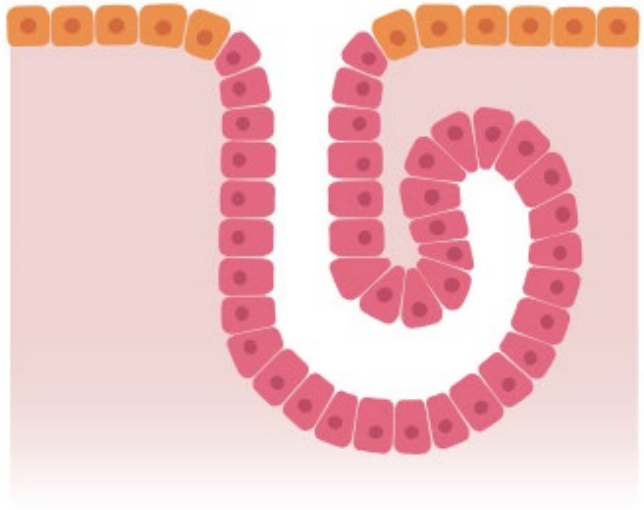
Epithelial tissue

- **Types to Identify:**

1. **Simple squamous**
   - Flat cells, thin: For diffusion
   - Found in alveoli and blood vessels



2. **Simple cuboidal**
   - Cube-shaped: for secretion
   - Found in kidney tubules

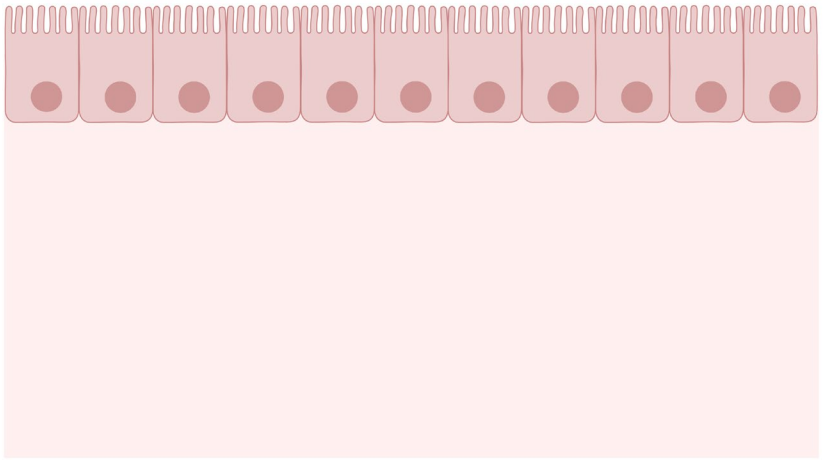


Epithelial tissue

Types to Identify:

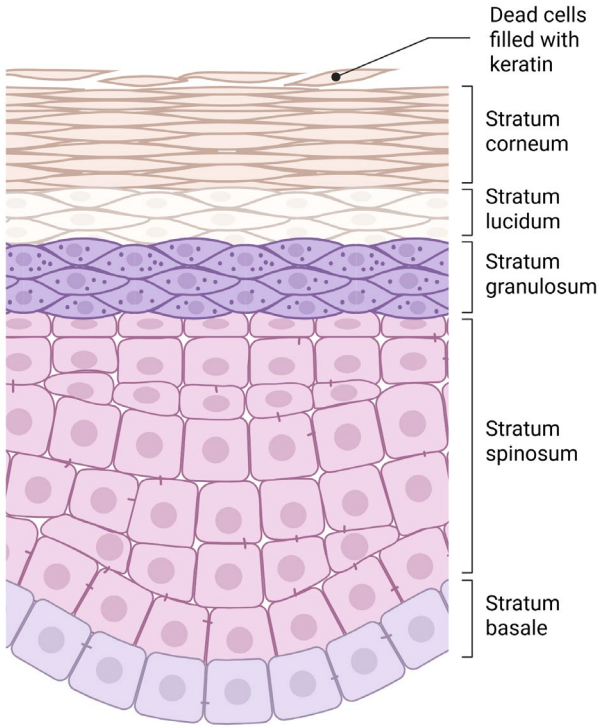
3. Simple columnar

- Tall cells, may have microvilli/goblet cells
- Found in the intestine



4. Stratified squamous

- Many layers: for protection
- Found in skin

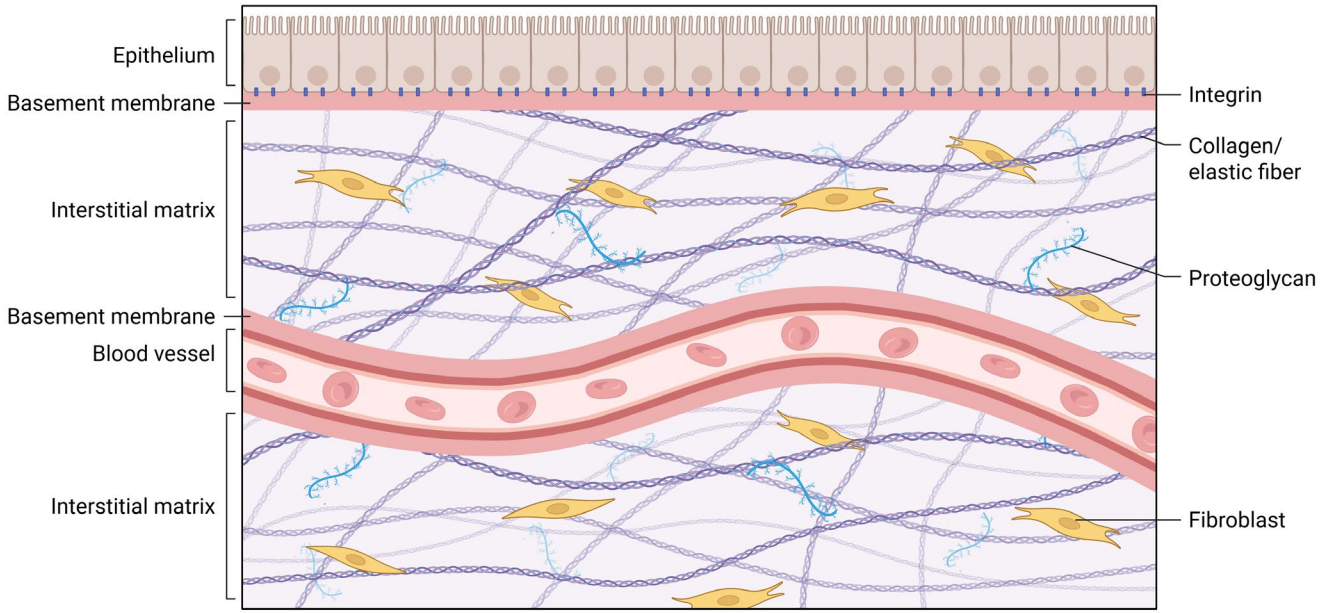


Connective Tissue

Connective tissue supports, connects, and protects body structures.

Characteristics

- Cells scattered
- Abundant extracellular matrix
- May have fibers (collagen, elastic)



Connective Tissue

Adult connective tissues

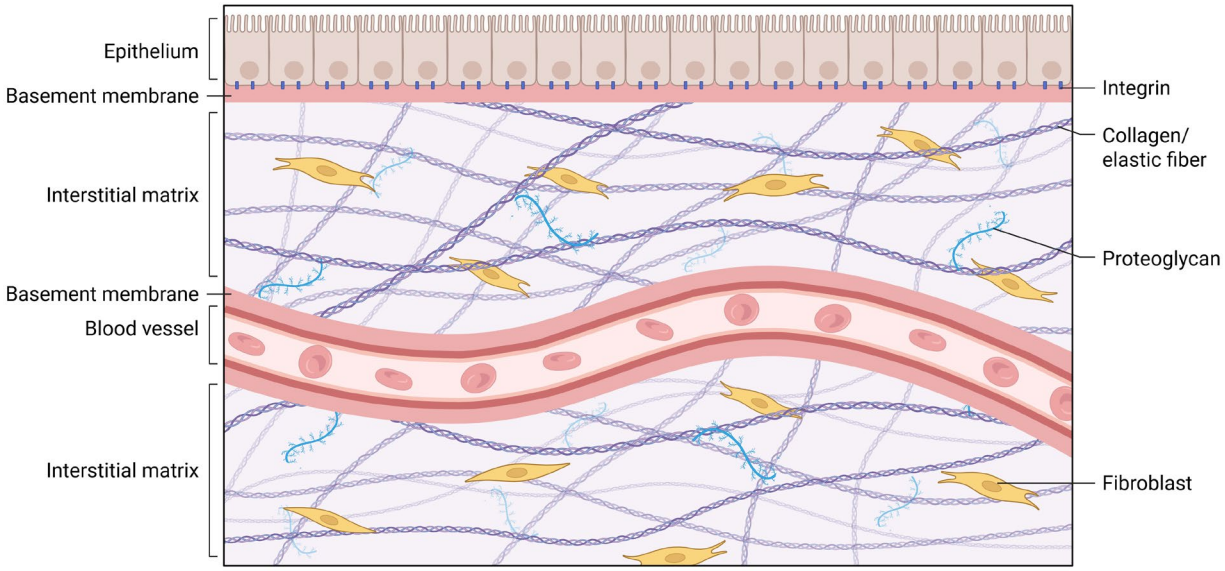
1. Ordinary connective tissue
   a) Loose (areolar)
   b) Reticular
   c) Adipose
   d) Dense (Regular & Irregular)

2. Specialized connective tissues
   a) Supporting tissues
      - Cartilage
      - Bone
   b) Blood

Connective Tissue

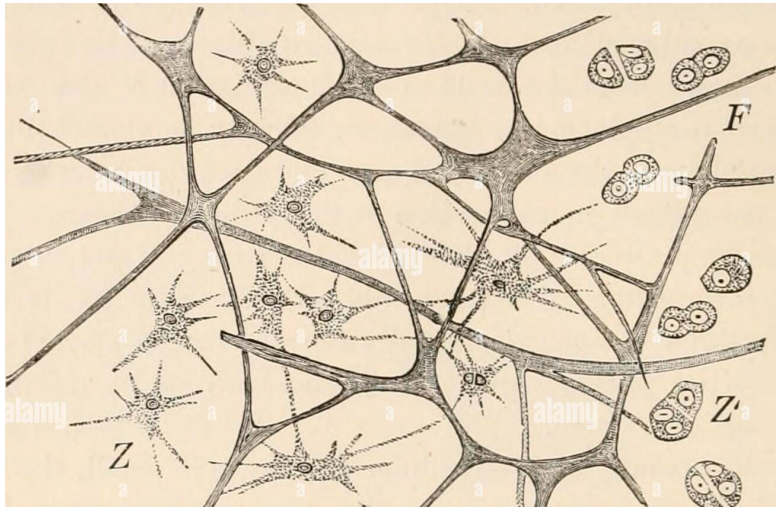
Loose (Areolar)

- Soft, loosely arranged fibers and cells
- Functions in support, binding, and packing tissues
- Found under epithelia and around organs



Reticular

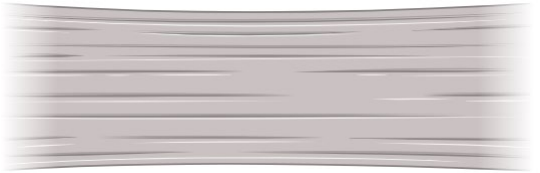
- Network of thin reticular fibers
- Forms a **supportive framework** for organs like lymph nodes and spleen



Connective Tissue

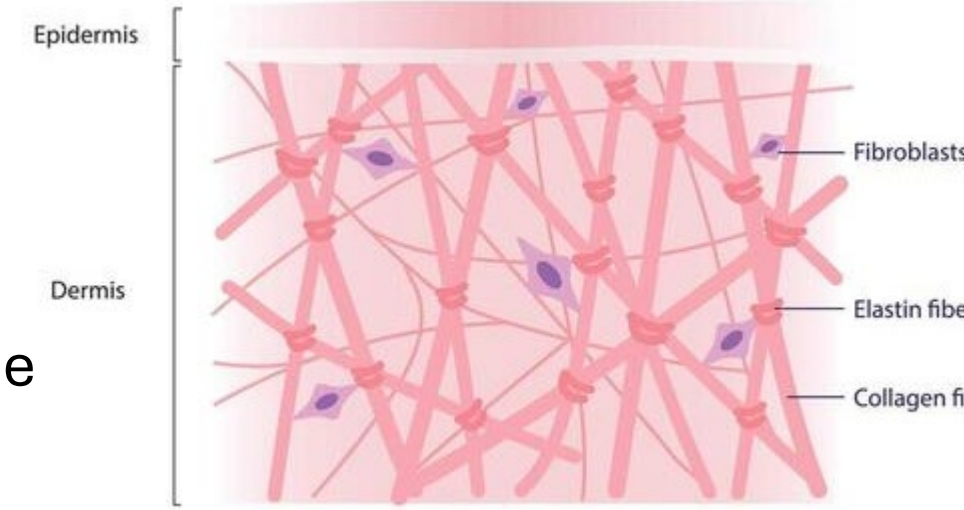
Adipose

- Composed mainly of fat cells (adipocytes)
- Functions in energy storage, insulation, and protection



Dense Connective Tissue (Regular & Irregular)

- Characterized by abundant collagen fibers and few cells
- Provides strong structural support and resistance to tension

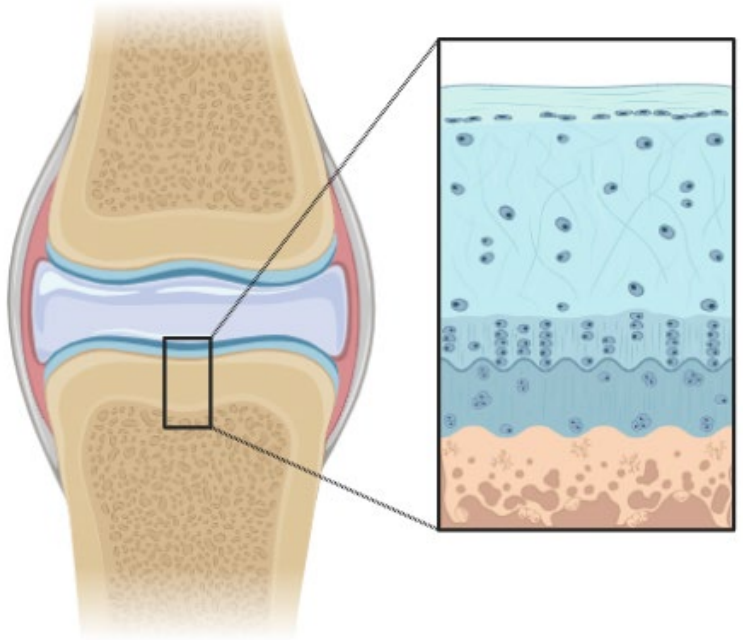


- Dense regular: fibers arranged in parallel. Found in tendons, ligaments
- Dense irregular: fibers arranged randomly. Found in the dermis of the skin.

Connective Tissue

Cartilage

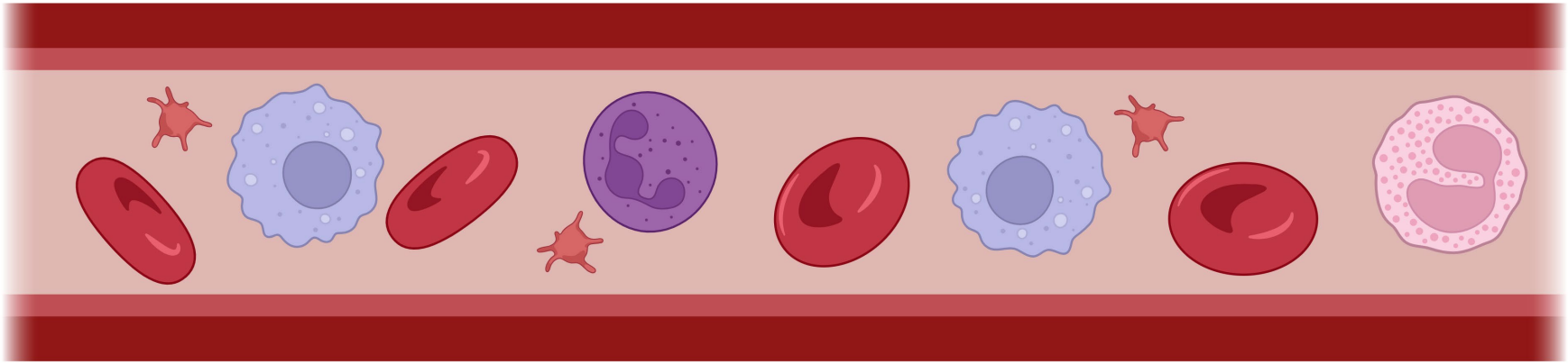
- Firm, flexible matrix
- Cells: chondrocytes in lacunae
- Provides support and cushioning (joints, nose, ear)



Connective Tissue

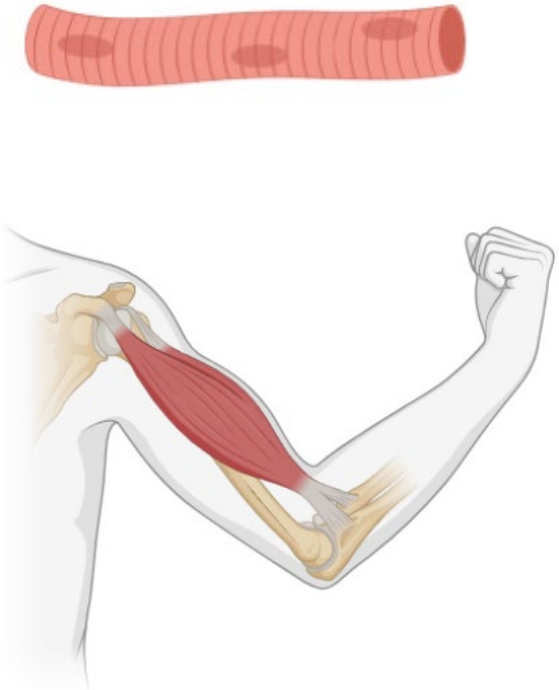
Blood

- Fluid connective tissue
- Cells (RBCs, WBCs, platelets) suspended in plasma.
- Functions in transport, immunity, and clotting.



Muscle Tissue

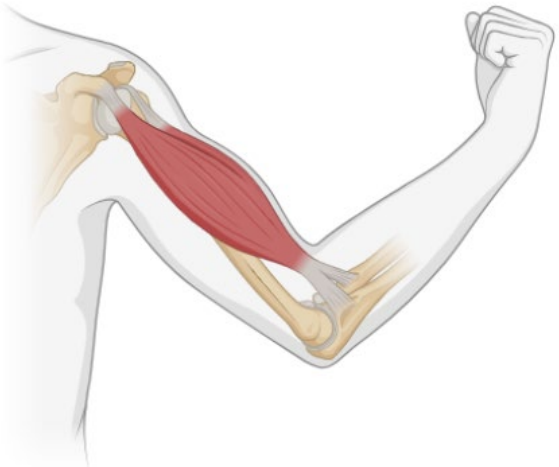
Muscle tissue is specialized for contraction and movement.



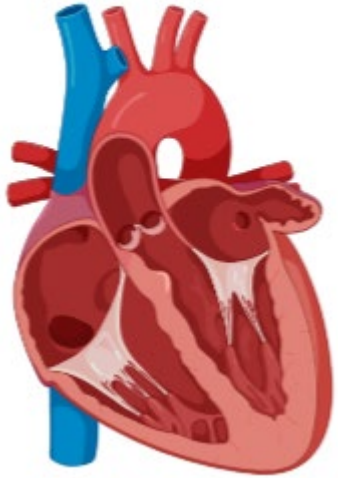
Muscle Tissue

Types:

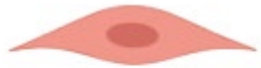
1. Skeletal muscle



2. Cardiac muscle



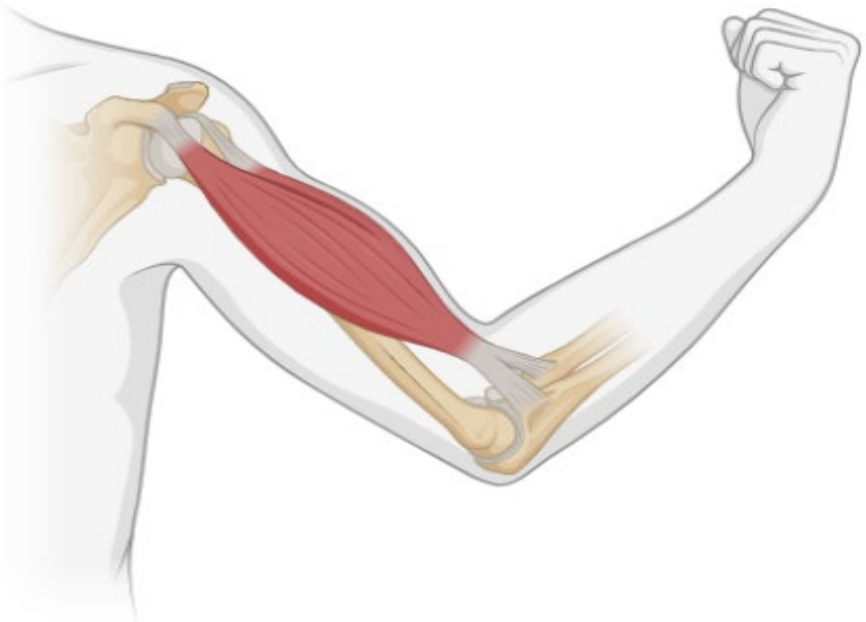
3. Smooth muscle:



Muscle Tissue

Skeletal muscle:

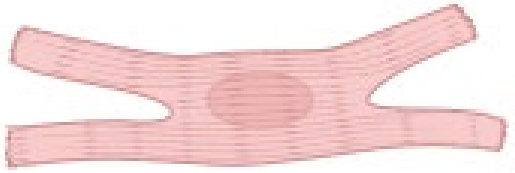
- Voluntary
- Long, striated, multinucleated

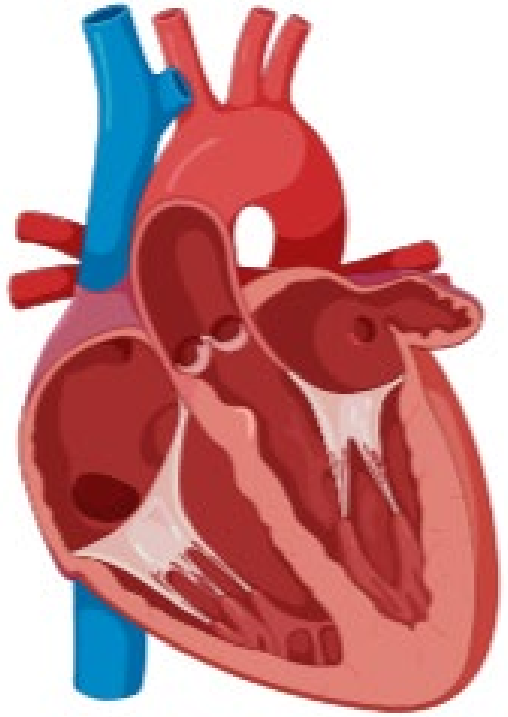


Muscle Tissue

Cardiac muscle:

- Striated, branched cells
- Found in Heart
- Involuntary





Muscle Tissue

Smooth muscle:

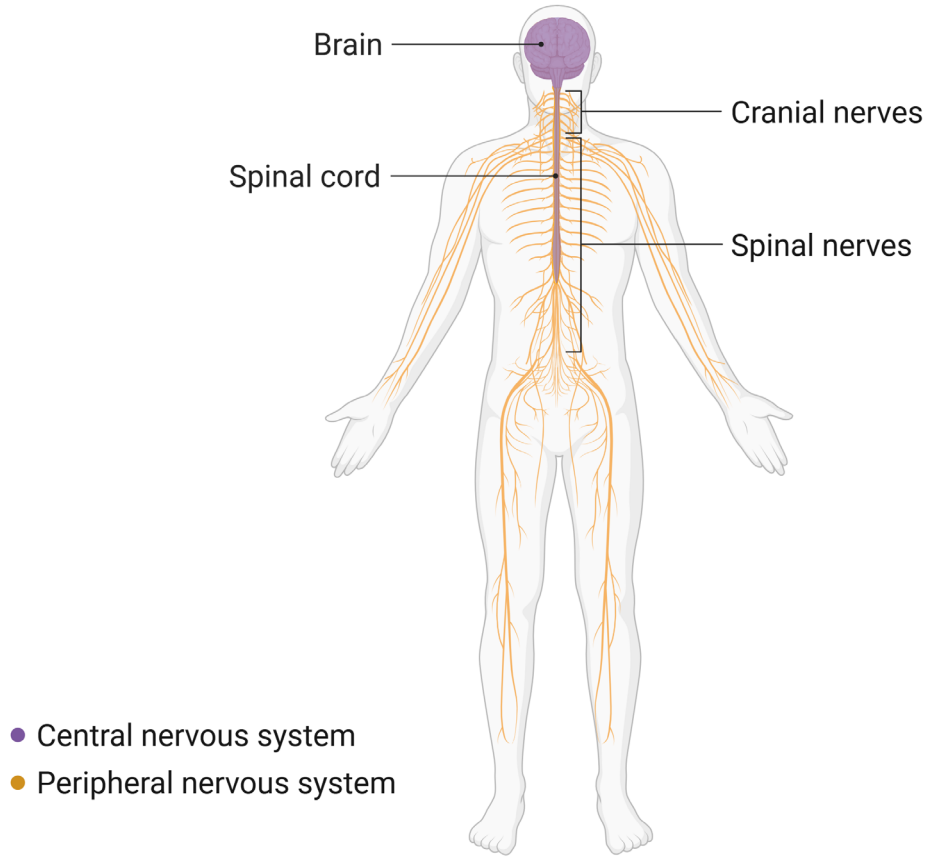
- No striations
- Found in organs (intestine, vessels)
- Involuntary

Nervous Tissue

Nervous tissue is responsible for communication and control.

Characteristics

- Large cell body
- Long processes (axon, dendrites)

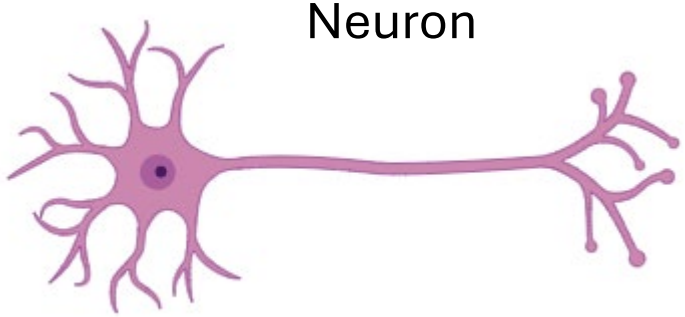


Nervous Tissue

Main cells:

- **Neurons:** transmit signals

Neuron

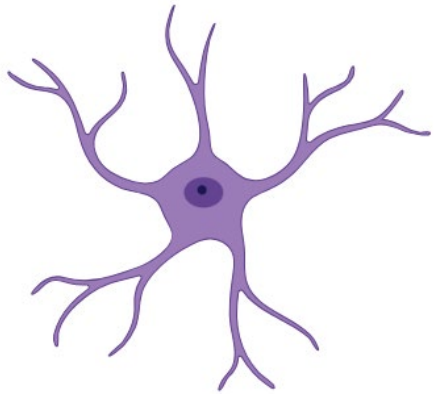


- **Glial cells:** support neurons

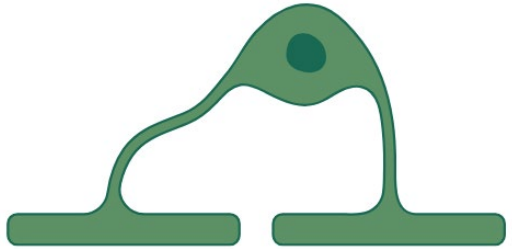
  Ex/ Astrocyte, oligodendrocyte,

  Schwann cell, ependymal cell

Astrocyte

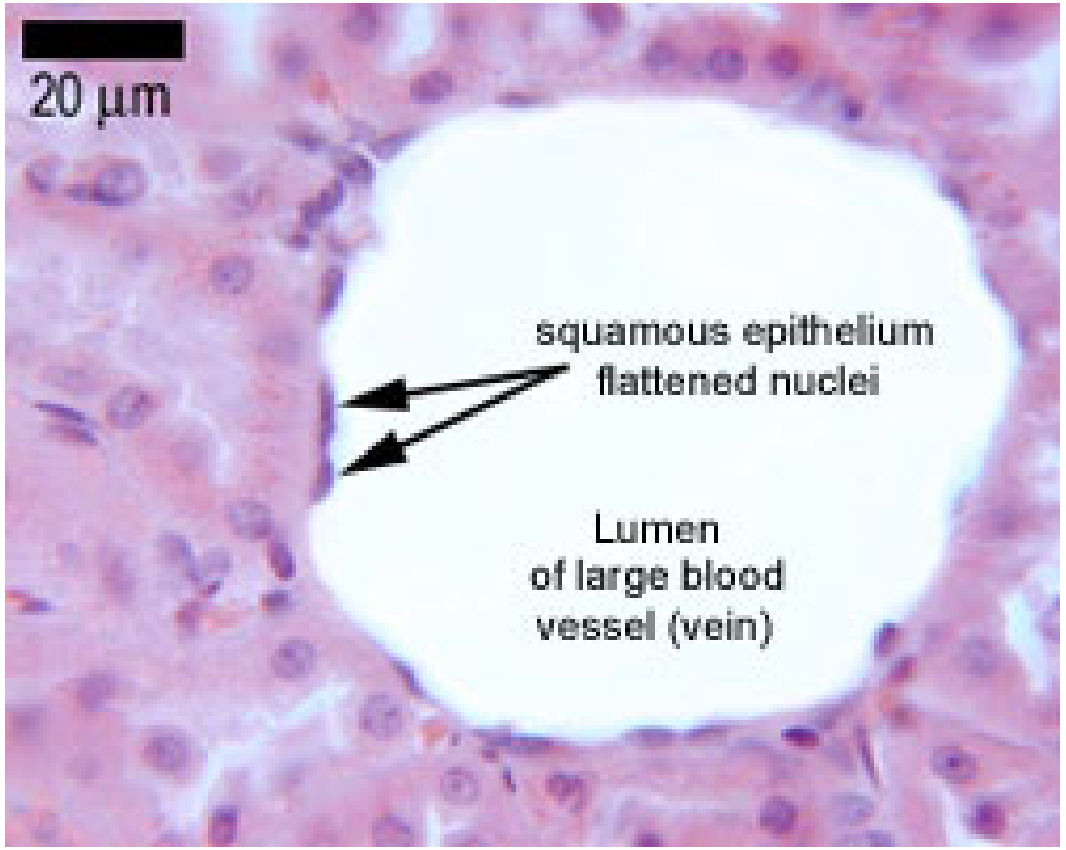


Oligodendrocyte

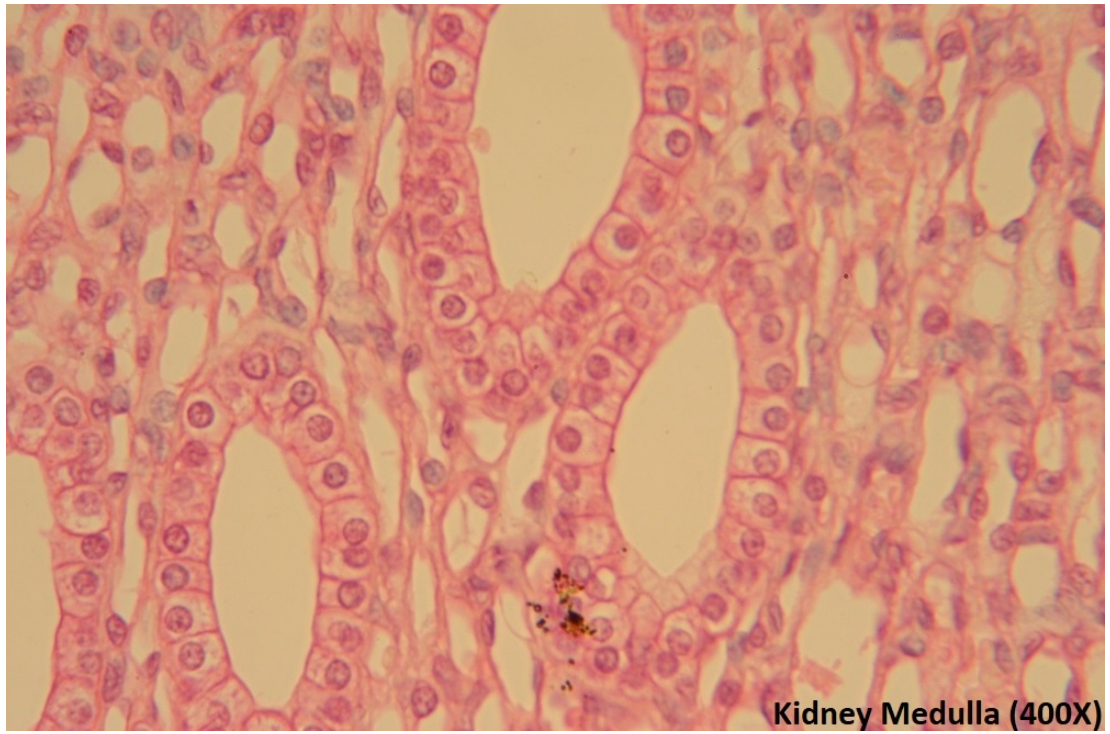


Observation and Identification of Human Tissue Slides

Simple squamous epithelium

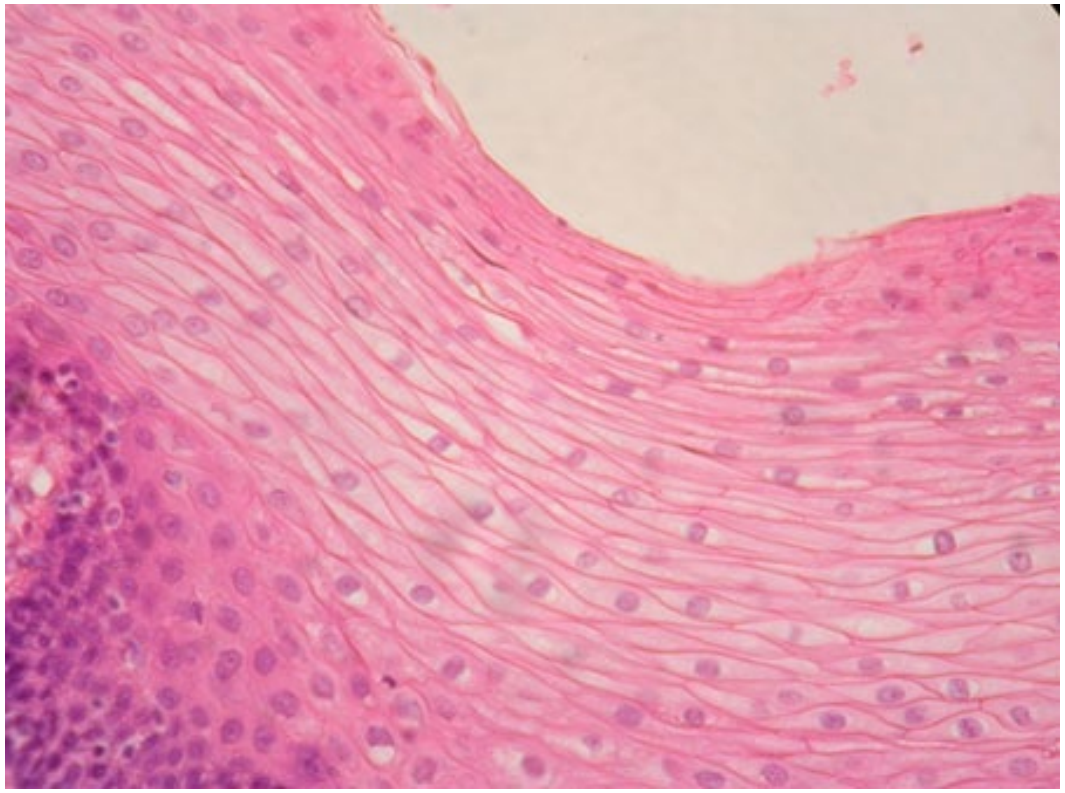


Simple cuboidal epithelium

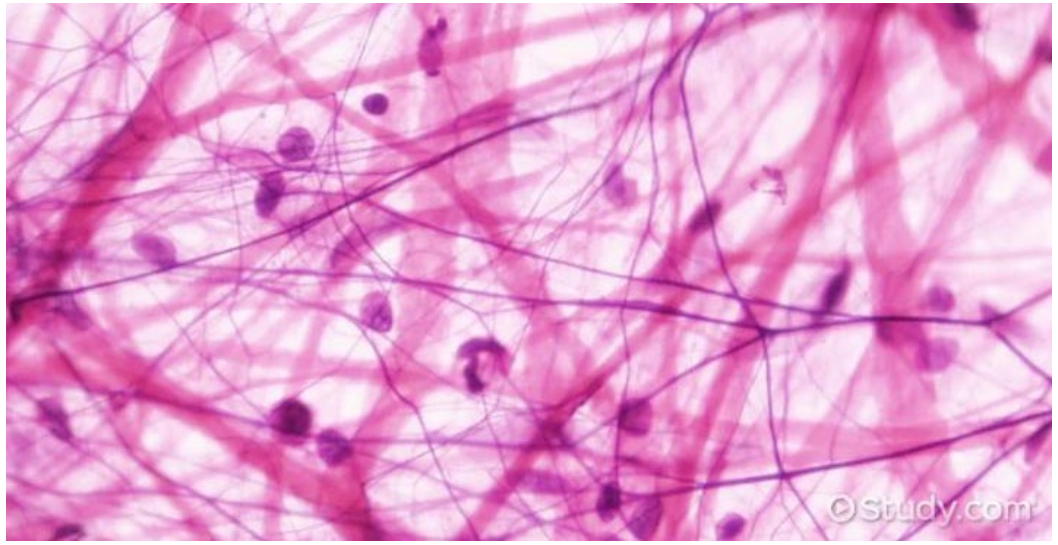


Simple columnar epithelium

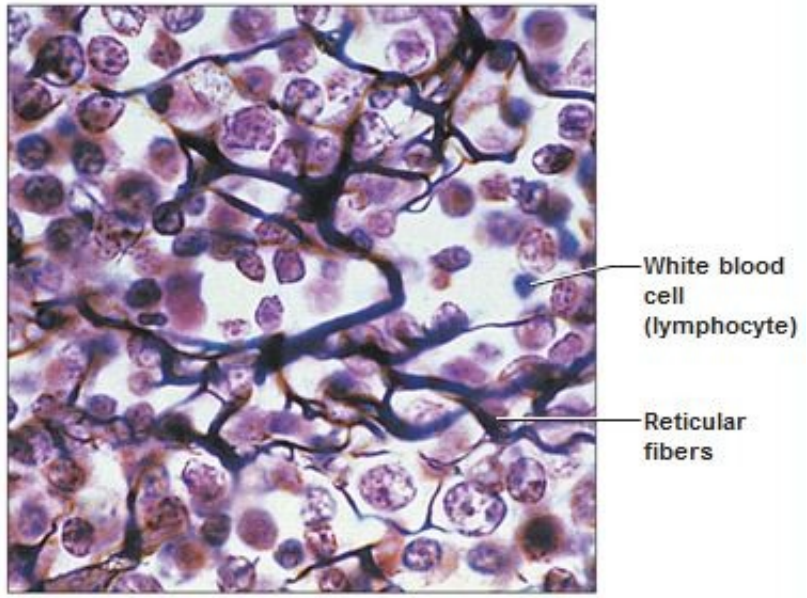
Stratified squamous epithelium



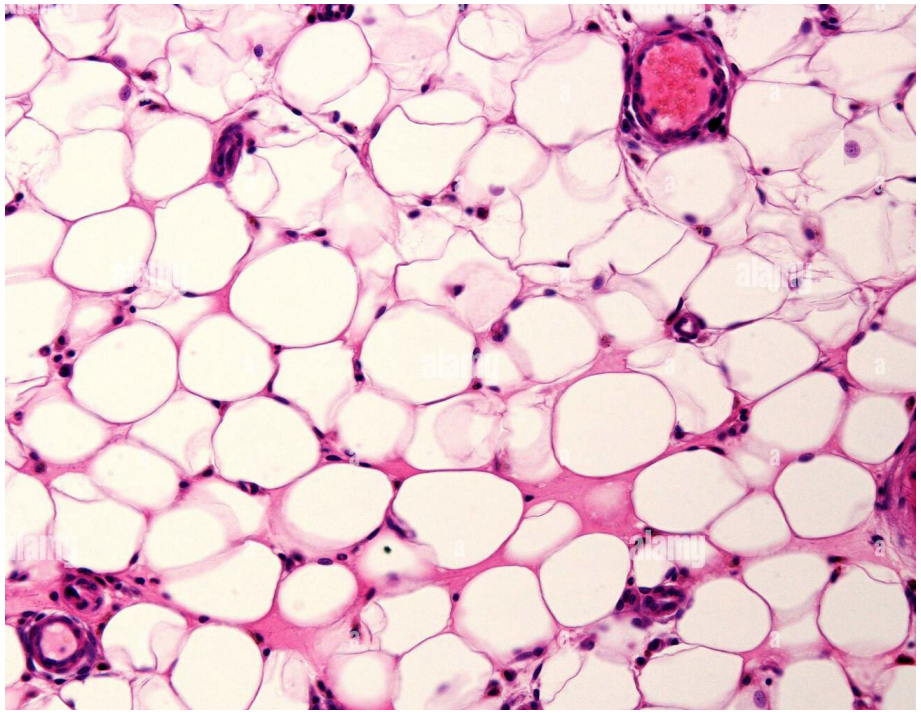
Areolar connective tissue



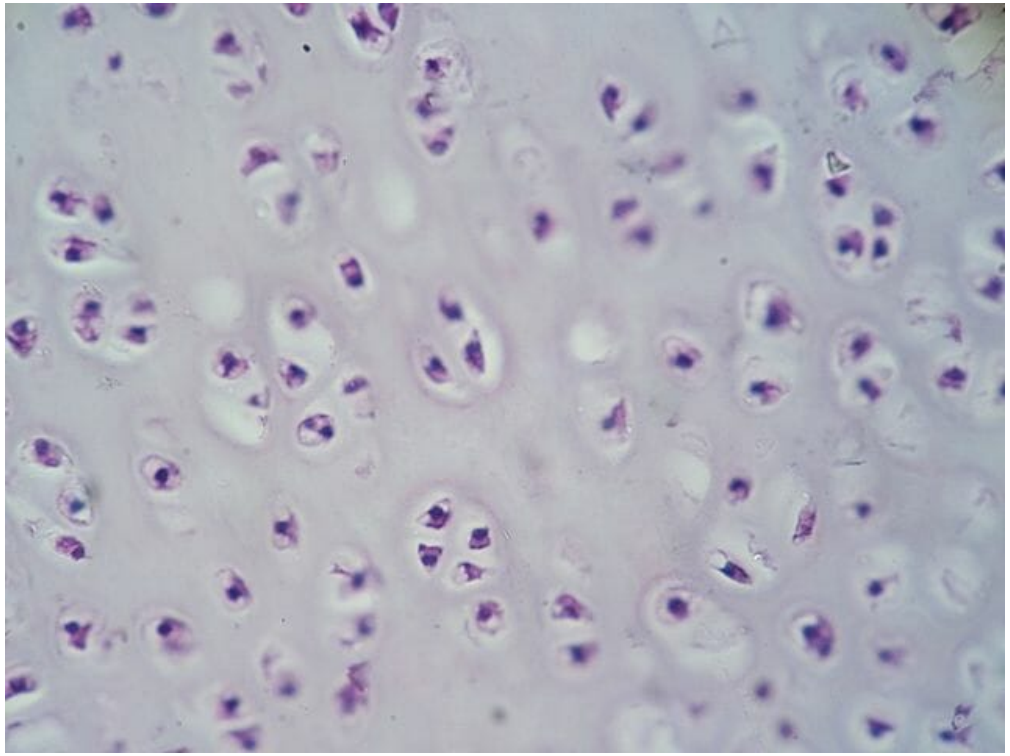
Reticular connective tissue



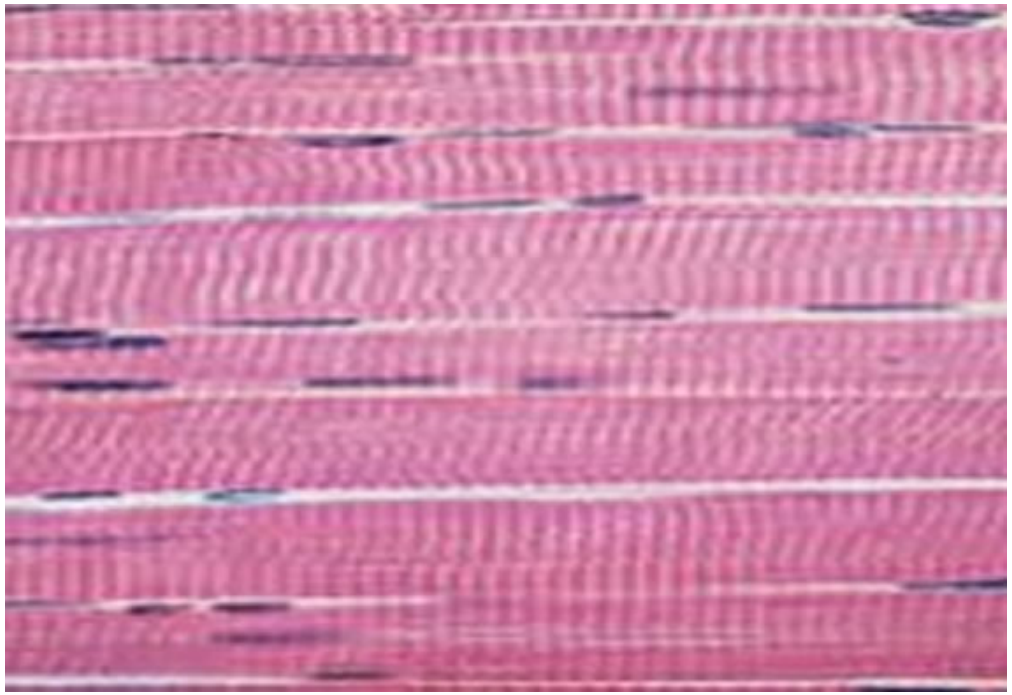
Adipose connective tissue



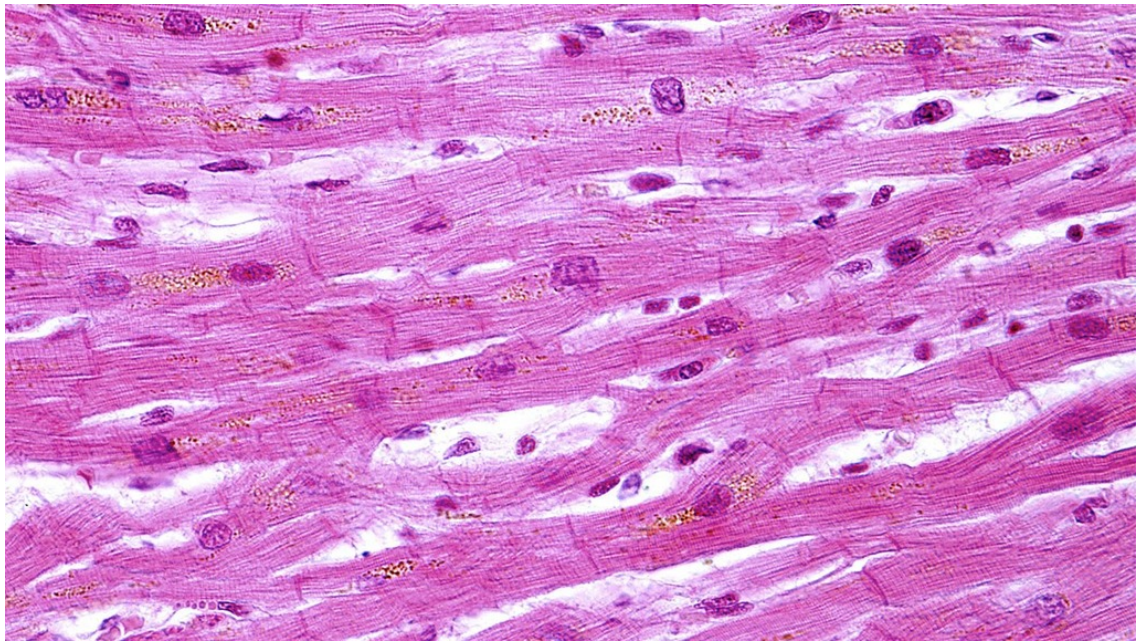
Cartilage tissue



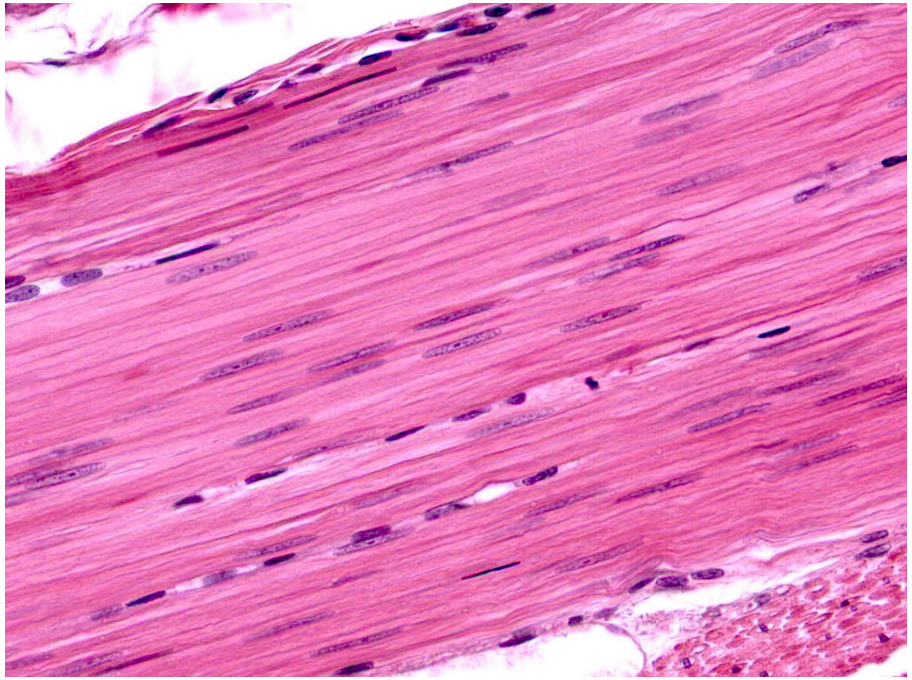
Skeletal muscle tissue



Cardiac muscle tissue



Smooth muscle tissue



Neural tissue