เนื้อเยื่อสัตว์

Animal Tissues

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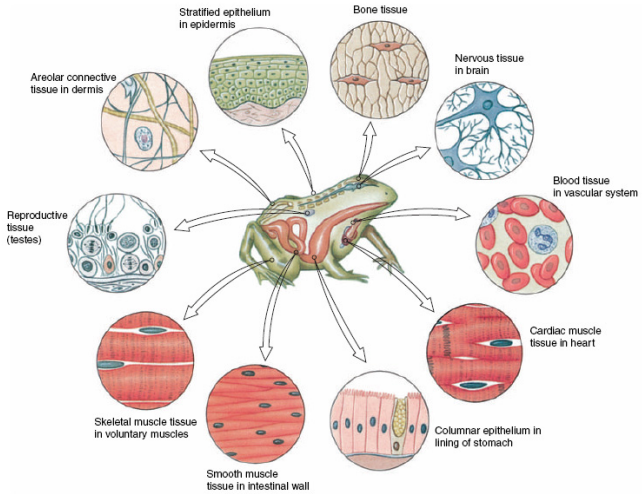
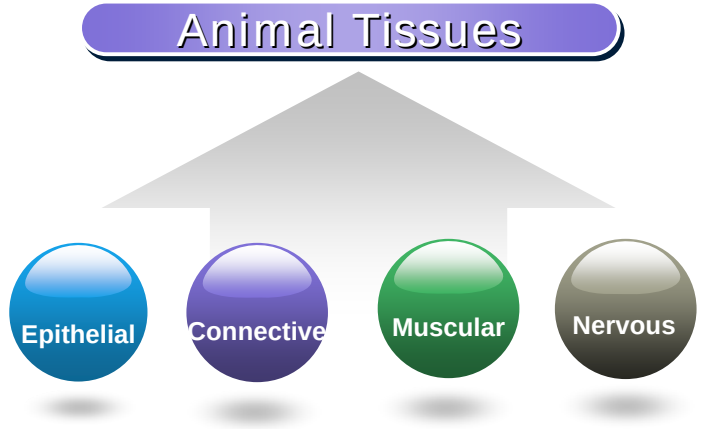
Objective:

1. เพื่อให้ทราบการจำแนกชนิดของเนื้อเยื่อสัตว์
2. เพื่อให้สามารถแยกลักษณะของเนื้อเยื่อสัตว์แต่ละชนิด
3. เพื่อให้รู้จักหน้าที่ของเนื้อเยื่อแต่ละชนิด
4. เพื่อให้สามารถบอกตำแหน่งที่พบเนื้อเยื่อแต่ละชนิด

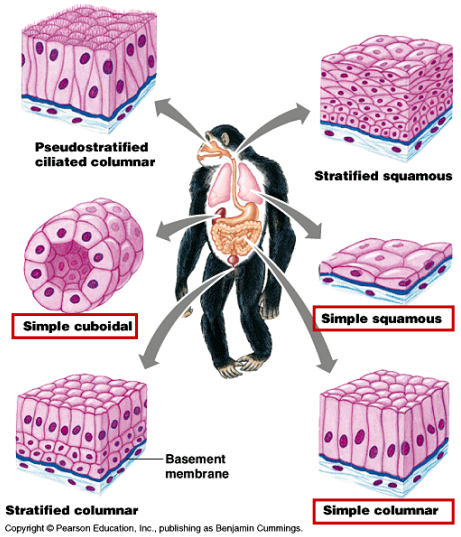
Animal Tissues:



Type of Animal Tissues:



Epithelial Tissues or Epithelium:



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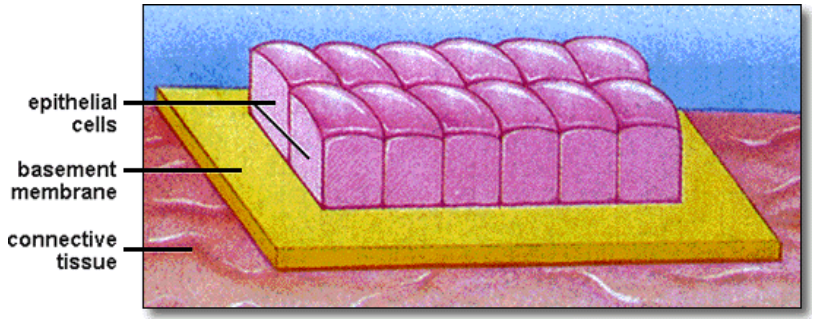
Epithelial Tissues or Epithelium:



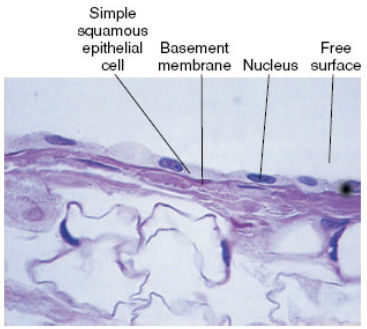
Epithelial Tissues or Epithelium:

simple squamous epithelium | simple cuboidal epithelium | simple columnar epithelium

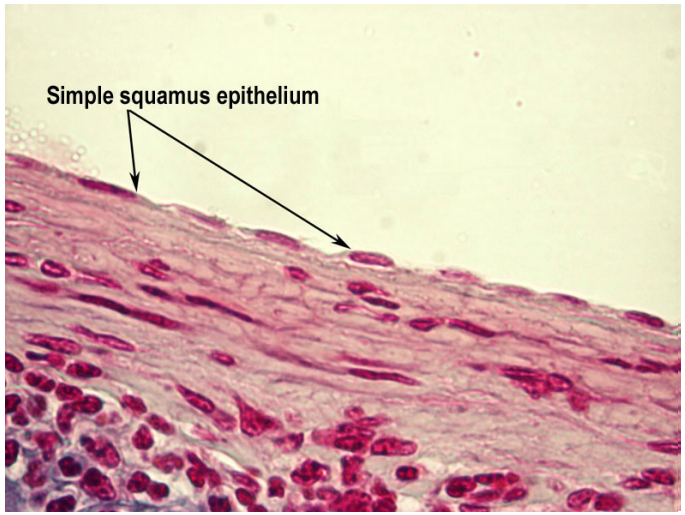
Epithelial Tissues or Epithelium:

Squamous epithelium

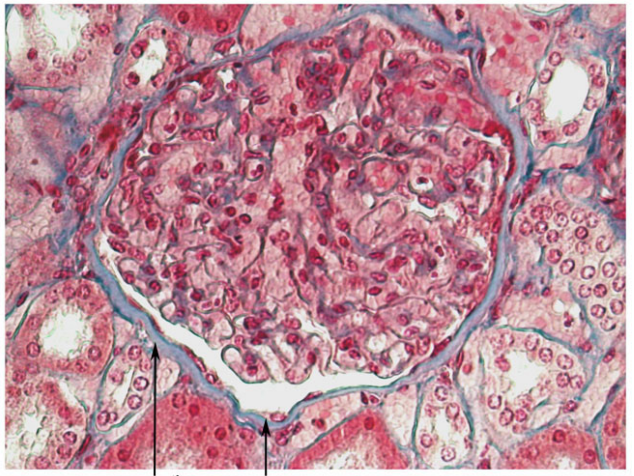
Simple squamous epithelium, composed of flattened cells that form a continuous delicate lining of blood capillaries, lungs, and other surfaces where it permits the passive diffusion of gases and tissue fluids into and out of cavities.



Epithelial Tissues or Epithelium:



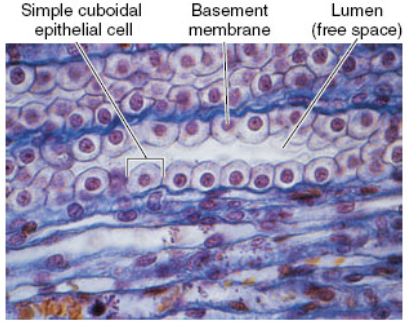
Epithelial Tissues or Epithelium:



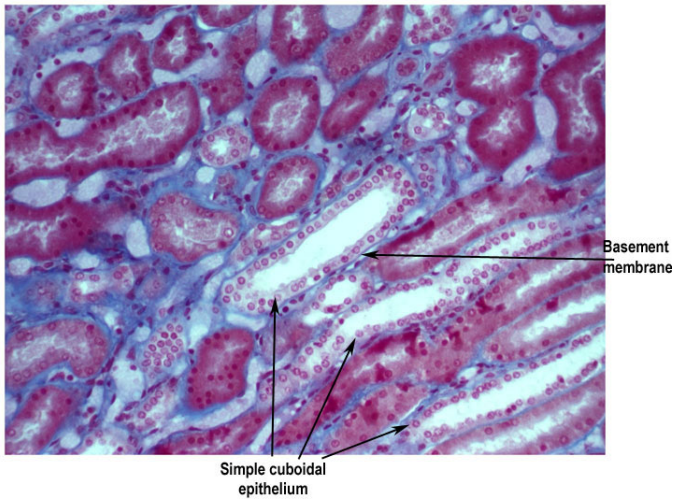
Epithelial Tissues or Epithelium:

Cuboidal epithelium

Simple cuboidal epithelium is composed of short, boxlike cells. Cuboidal epithelium usually lines small ducts and tubules, such as those of the kidney and salivary glands, and may have active secretory or absorptive functions.



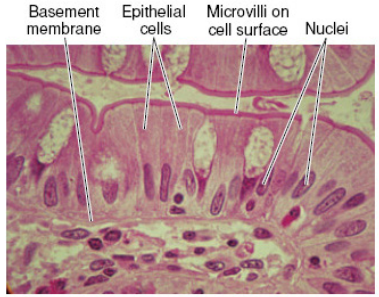
Epithelial Tissues or Epithelium:



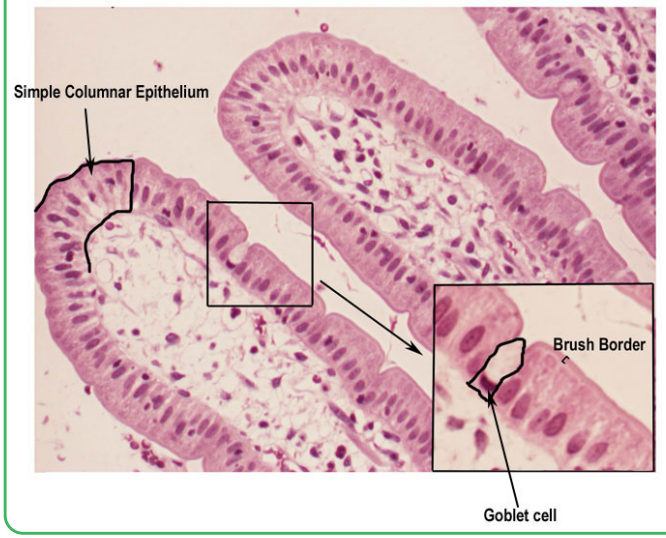
Epithelial Tissues or Epithelium:

Columnar epithelium

Simple columnar epithelium resembles cuboidal epithelium, but the cells are taller and usually have elongate nuclei. This type of epithelium is found in highly absorptive surfaces such as the intestinal tract of most animals. The cells often bear minute, fingerlike projections called microvilli that greatly increase the absorptive surface. In some organs, such as the female reproductive tract, the cells are ciliated.



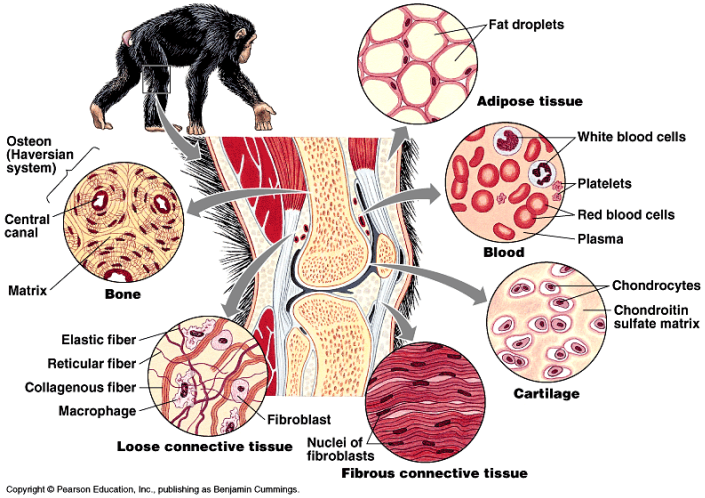
Epithelial Tissues or Epithelium:



Epithelial Tissues or Epithelium:

Ciliated columnar epithelium

Connective Tissues:



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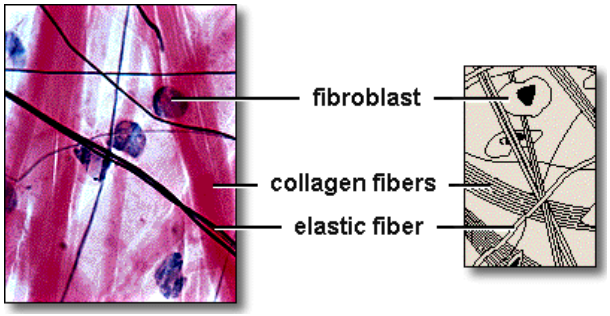
Connective Tissues:

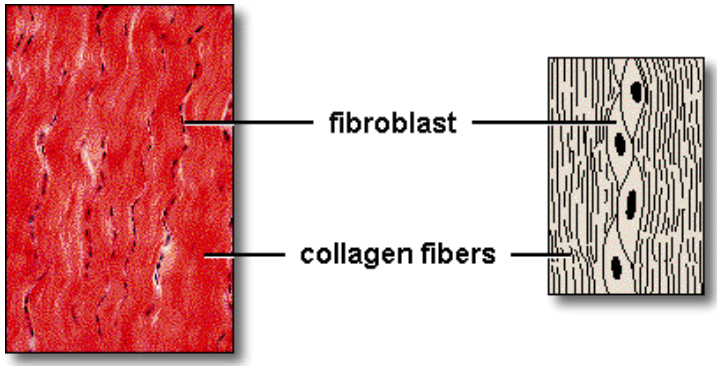
Loose connective tissue



Loose connective tissue, also called areolar connective tissue, is the "packing material" of the body that anchors blood vessels, nerves, and body organs. It contains fibroblasts that synthesize the fibers and ground substance of connective tissue and wandering macrophages that phagocytize pathogens or damaged cells. The different fiber types include strong collagen fibers (thick and red in micrograph) and thin elastic fibers (black and branching in micrograph) formed of the protein elastin. Adipose (fat) tissue is considered a type of loose connective tissue.

Connective Tissues:

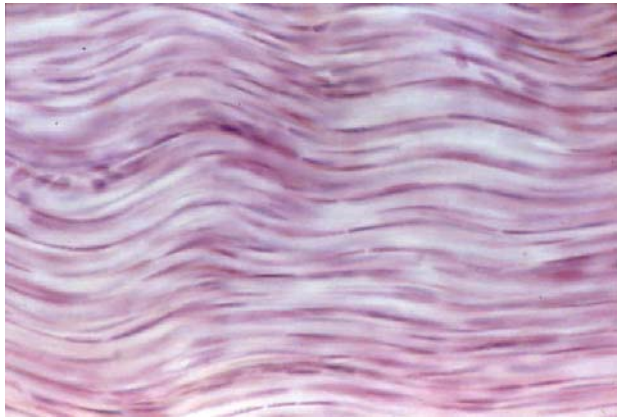
Dense connective tissue



Dense connective tissue forms tendon, ligaments, and fasciae (fa'sha), the latter arranged as sheets or bands of tissue surrounding skeletal muscle. In tendon (shown here) the collagenous fibers are extremely long and tightly packed together.

Connective Tissues:

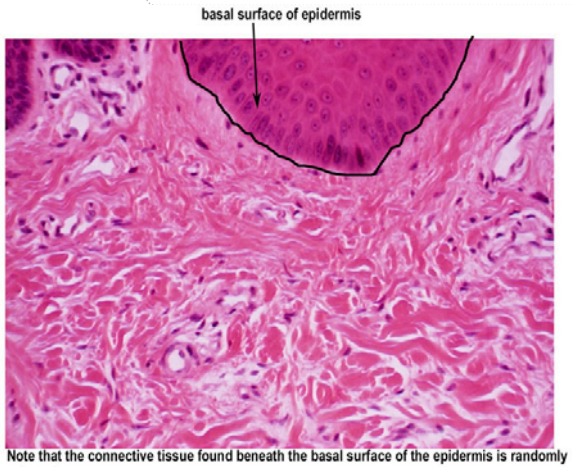
Regular dense connective tissue



- tendon
- ligament

Connective Tissues:

Irregular dense connective tissue

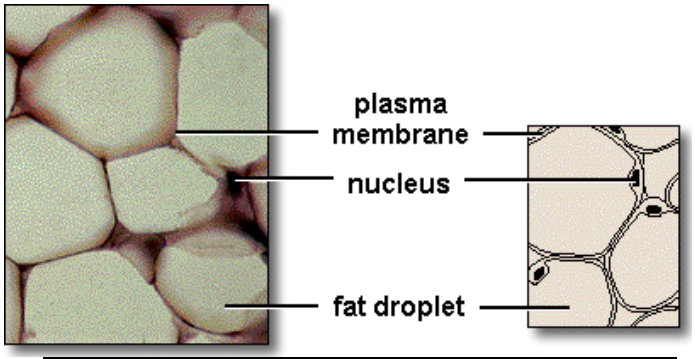


Note that the connective tissue found beneath the basal surface of the epidermis is randomly oriented.

- dermis
- periosteum
- perichondrium

Connective Tissues:

Adipose tissue

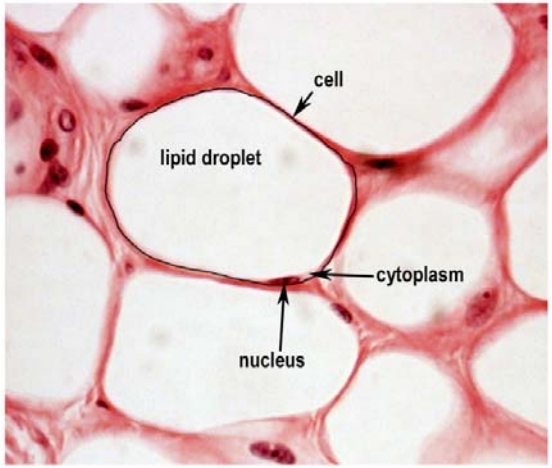


Adipose Connective Tissue (400x)

This connective tissue is found in the subcutaneous layer, behind the eyes, around the heart, around the kidneys, and in the yellow bone marrow.

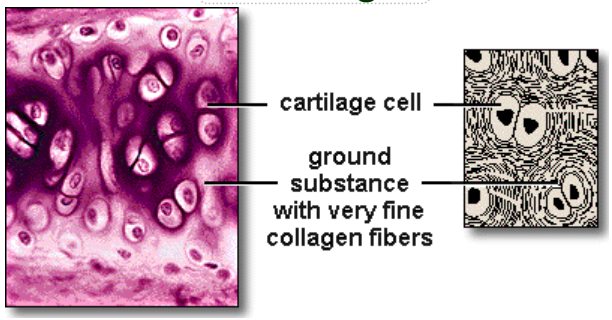
Connective Tissues:

Adipose tissue



Connective Tissues:

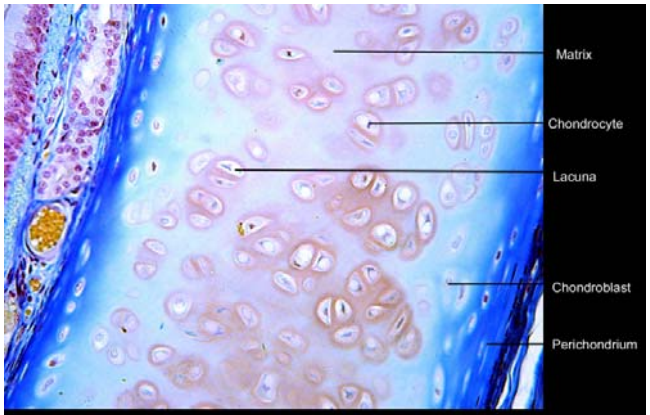
Cartilage



Cartilage is a vertebrate connective tissue composed of a firm gel ground substance (matrix) containing cells (chondrocytes) living in small pockets called lacunae, and collagen or elastic fibers (depending on the type of cartilage). In hyaline cartilage shown here, both collagen fibers and matrix are stained uniformly purple and cannot be distinguished one from the other. Because cartilage lacks a blood supply, all nutrients and waste materials must diffuse through the ground substance from surrounding tissues.

Connective Tissues:

Hyaline cartilage

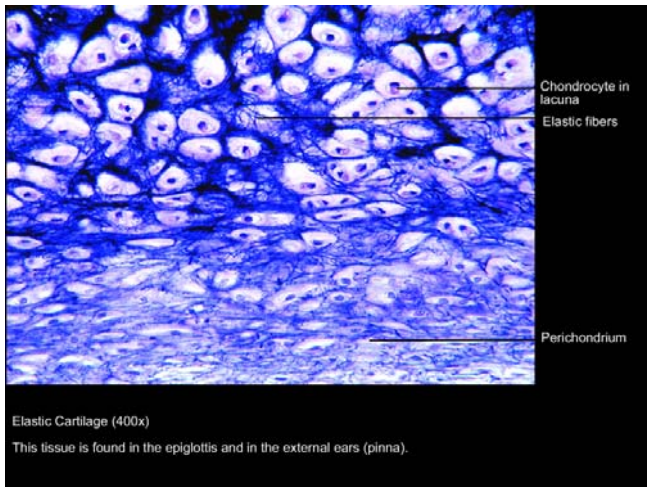


Hyaline Cartilage (400x)

This cartilage type is found on the ends of articulating bones, in the nose, trachea, bronchi, costal cartilage, on the ends of articulating bones, and it makes up the embryological skeleton.

Connective Tissues:

Elastic cartilage

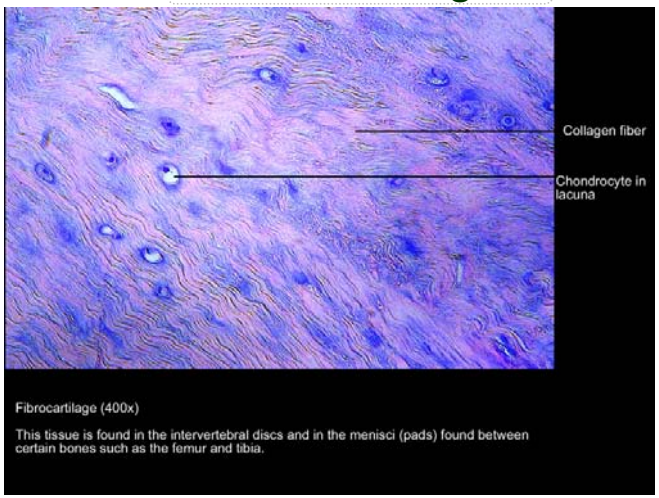


Elastic Cartilage (400x)

This tissue is found in the epiglottis and in the external ears (pinna).

Connective Tissues:

Fibrocartilage

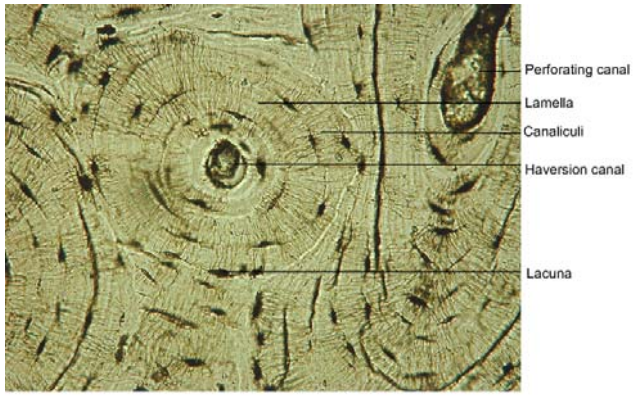


Fibrocartilage (400x)

This tissue is found in the intervertebral discs and in the menisci (pads) found between certain bones such as the femur and tibia.

Connective Tissues:

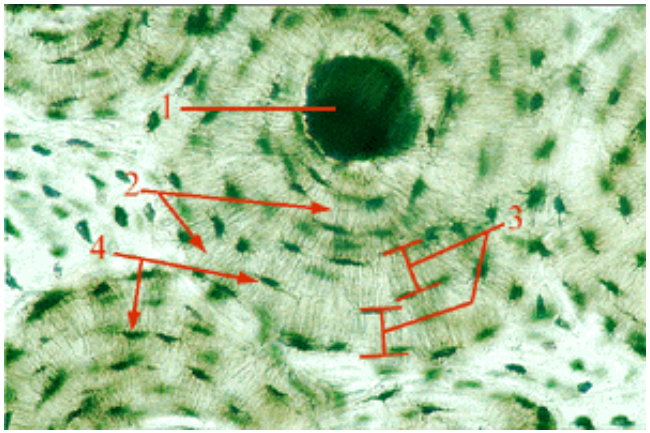
Bone



Compact Bone (100x)

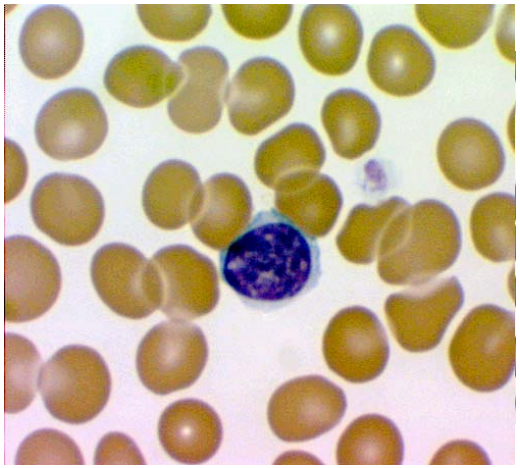
Connective Tissues:

Bone



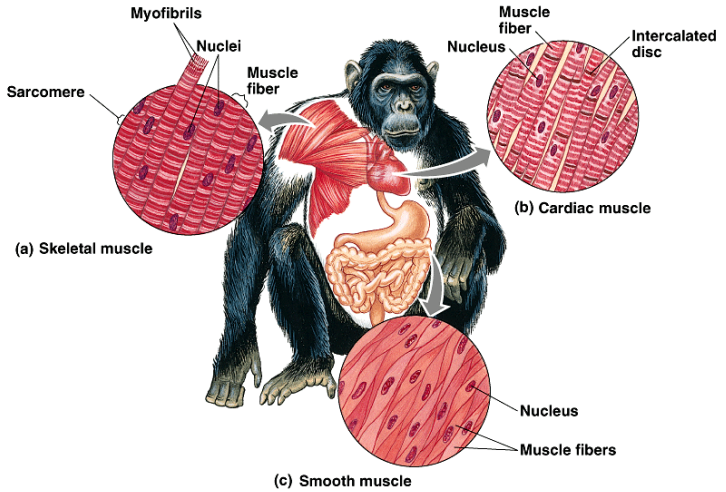
Connective Tissues:

Blood



- blood cells or form elements
  - Red blood cell (erythrocyte)
  - White blood cell (leukocyte)
    - granulocytes
    - agranulocytes
      - Neotrophil
      - Lymphocyte
  - Platelets (thrombocytes)
- plasma

Muscular Tissues:



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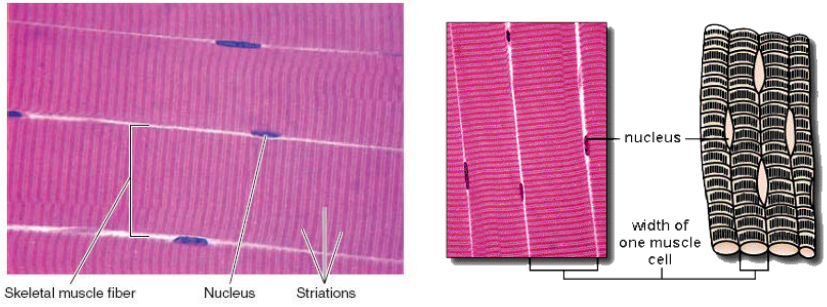
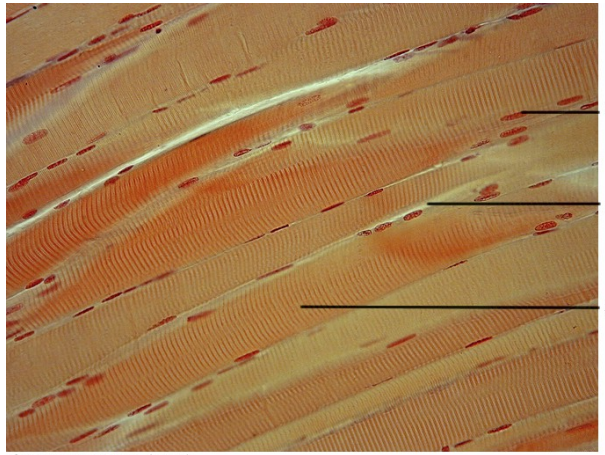
Muscular Tissues:

Skeletal muscle or voluntary striated muscle



Skeletal muscle is a type of striated muscle found in both invertebrates and vertebrates. It is composed of extremely long, cylindrical fibers, which are multinucleate cells that may reach from one end of the muscle to the other. Viewed through the light microscope, the cells appear to have a series of stripes, called striations, running across them. Skeletal muscle is called voluntary muscle (in vertebrates) because it contracts when stimulated by nerves under conscious cerebral control.

Muscular Tissues:

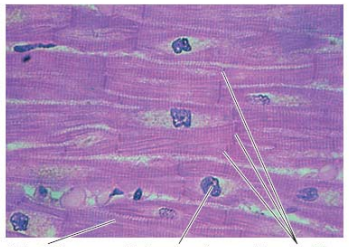


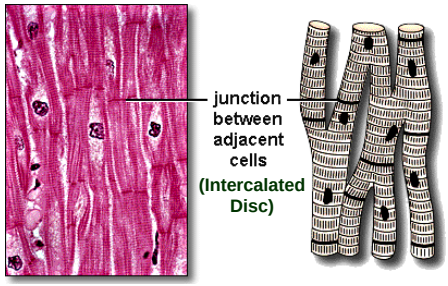
Skeletal Muscle l.s. (400x)

Skeletal muscle tissue is the most abundant muscle tissue in the body. This tissue is made up of long, cylindrical, striated, multinucleate cells that are at times under voluntary control.

Muscular Tissues:

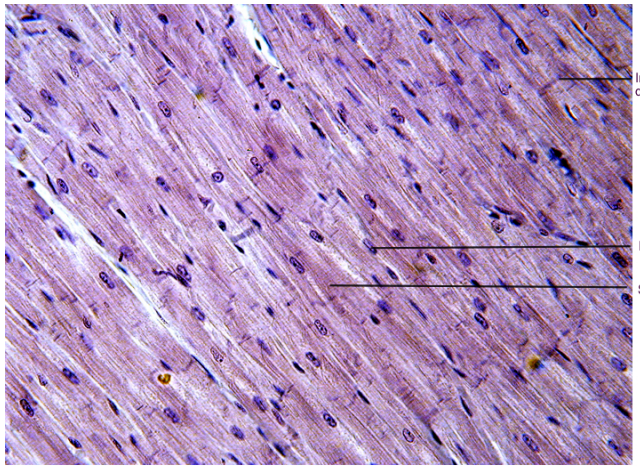
Cardiac muscle or involuntary striated muscle





Cardiac muscle is another type of striated muscle found only in the vertebrate heart. The cells are much shorter than those of skeletal muscle and have only one nucleus per cell (uninucleate). Cardiac muscle tissue is a branching network of fibers with individual cells interconnected by junctional complexes called intercalated discs. Cardiac muscle is considered involuntary muscle because it does not require nerve activity to stimulate contraction. Instead, heart rate is controlled by specialized pacemaker cells located in the heart itself. However, autonomic nerves from the brain may alter pacemaker activity.

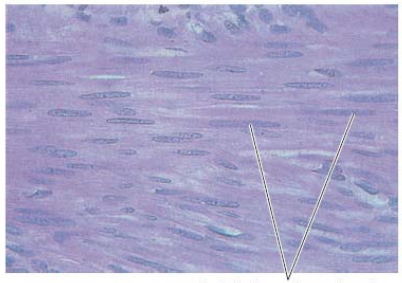
Muscular Tissues:



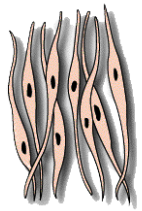
Cardiac Muscle (400x)

Muscular Tissues:

Smooth muscle or involuntary muscle



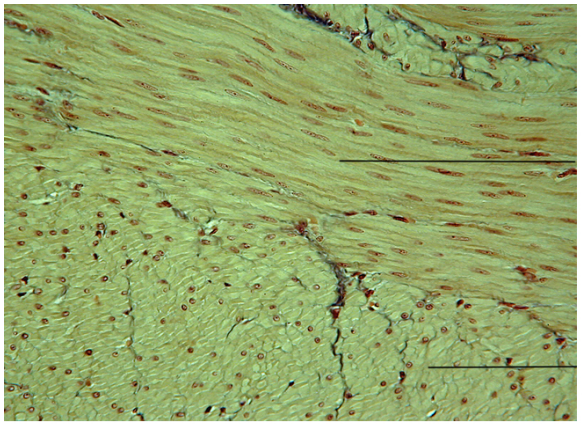
Nuclei of smooth muscle cells



(cells teased apart for clarity here)

Smooth muscle is nonstriated muscle found in both invertebrates and vertebrates. Smooth muscle cells are long, tapering strands, each containing a single nucleus. Smooth muscle is the most common type of muscle in invertebrates in which it serves as body wall musculature and lines ducts and sphincters. In vertebrates, smooth muscle lines the walls of blood vessels and surrounds internal organs such as the intestine and uterus. It is called involuntary muscle in vertebrates since its contraction is usually not consciously controlled.

Muscular Tissues:

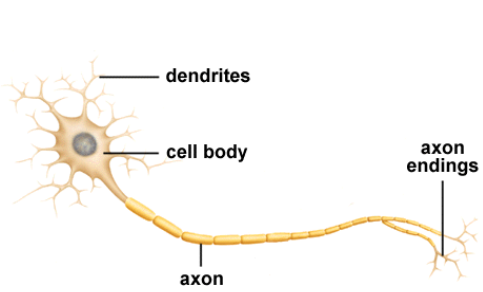


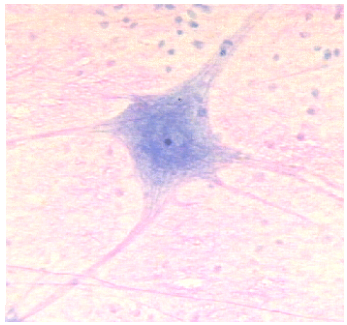
Smooth Muscle (400x)

This muscle tissue is characterized by a lack of striations and tapered cells. This tissue is involuntary. This tissue is found in the G I tract, urinary bladder, uterus, blood vessel walls, airways of the lungs, iris of the eye, and arrector pili muscles.

Nervous Tissues:

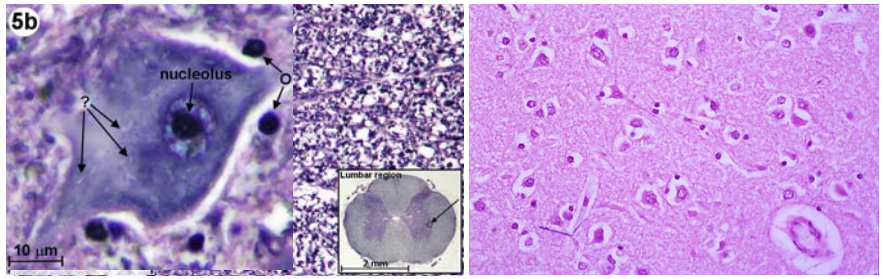
Nerve cells or neurons





Nervous Tissues:

Nerve cells or neurons



spinal cord **cerebrum**