Mustansiriyah University
College of Science

Plant and Animal tissues

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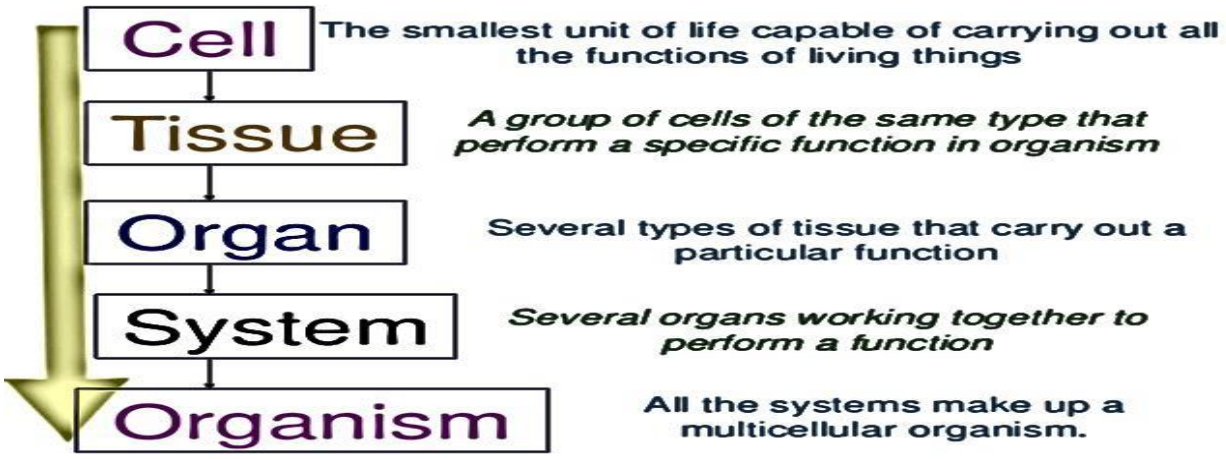
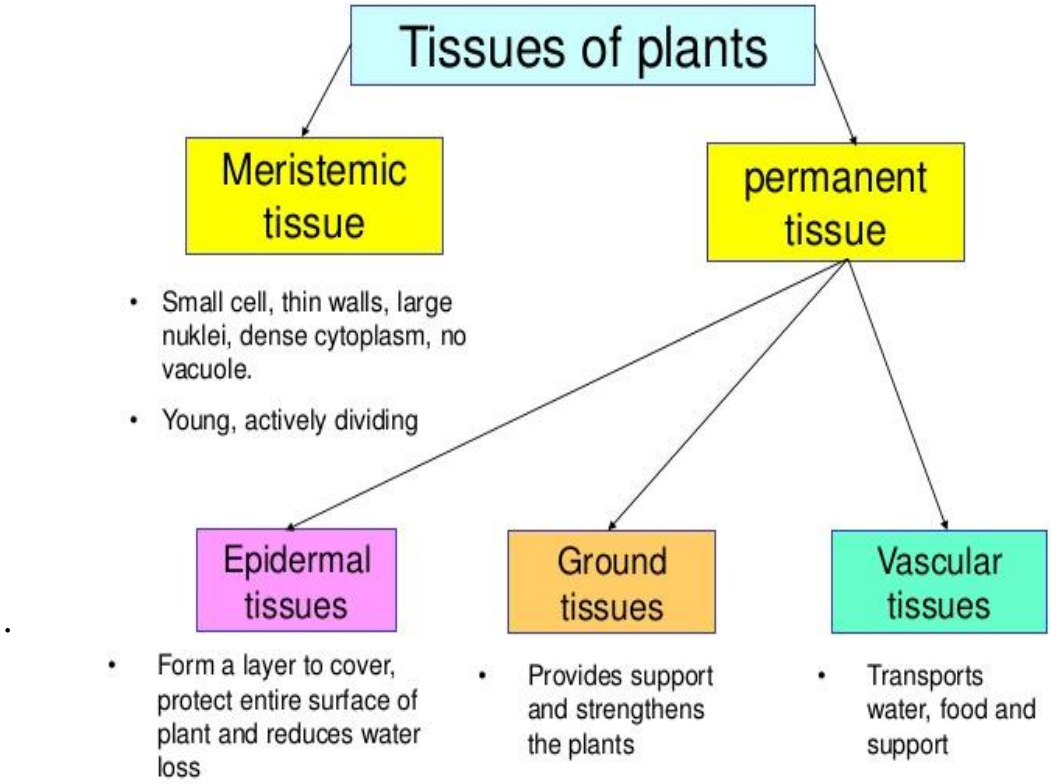
Levels of organization



Plant tissue



Plant tissue can categorized primary into two groups :

1. **Meristematic tissue :** are composed of actively dividing cells that assume different shapes and sizes as they mature. Meristematic tissues are composed of embryonic, undifferentiated cells that play important role in plant growth. to particular regions Apical meristems, found at the growing tips of stems, roots, and in lateral buds are responsible for the sustained increase in length of the plant body.
2. **Permanent plant tissues :** The tissues produced by the lateral meristems are said to be secondary tissues , it consist of mature, differentiated cells.

They can be divided into two groups :

- **Simple tissues** (parenchyma, collenchyma, sclerenchyma) .
- **Complex tissues** (phloem, xylem, and periderm) .

Plants also have different types of tissues. The three main types of permanent plant tissue are:

1. **Dermal tissue** : provides protection and helps reduce water loss.
2. **Vascular tissue** : transports water and nutrients from one part of a plan to another .
3. **Ground tissue** : provides storage and support. Photosynthesis takes place.

❖ Plant organs:

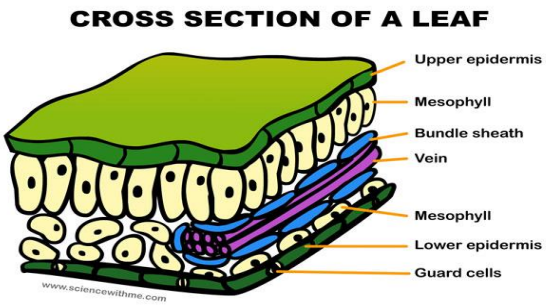
• A leaf is an organ specialized for photosynthesis.

• Each leaf is made of dermal tissue, ground tissue, and vascular tissue.

-Dermal tissue covers the outer surface of a leaf.

-Ground tissue is where photosynthesis takes place. The ground tissue is tightly packed on the top half of the leaf.

-Vascular tissue moves both the food produced by photosynthesis and water throughout the leaf and plant.



❖ Plant systems

• The shoot system includes leaves, stems, and flowers. The shoot system transports food and water throughout the plant .

• The root system anchors the plant and takes in water and nutrients .

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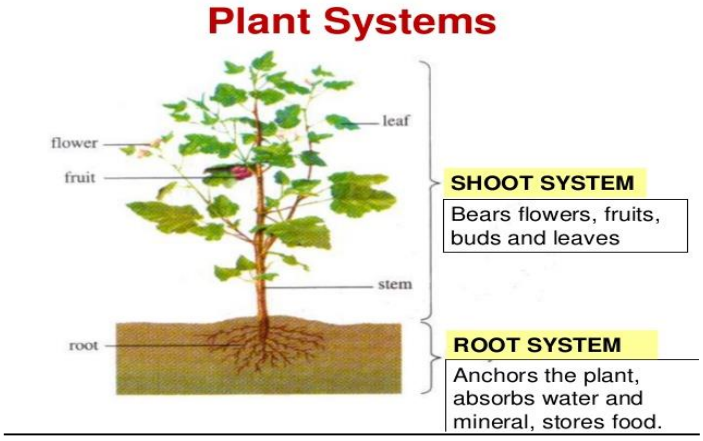
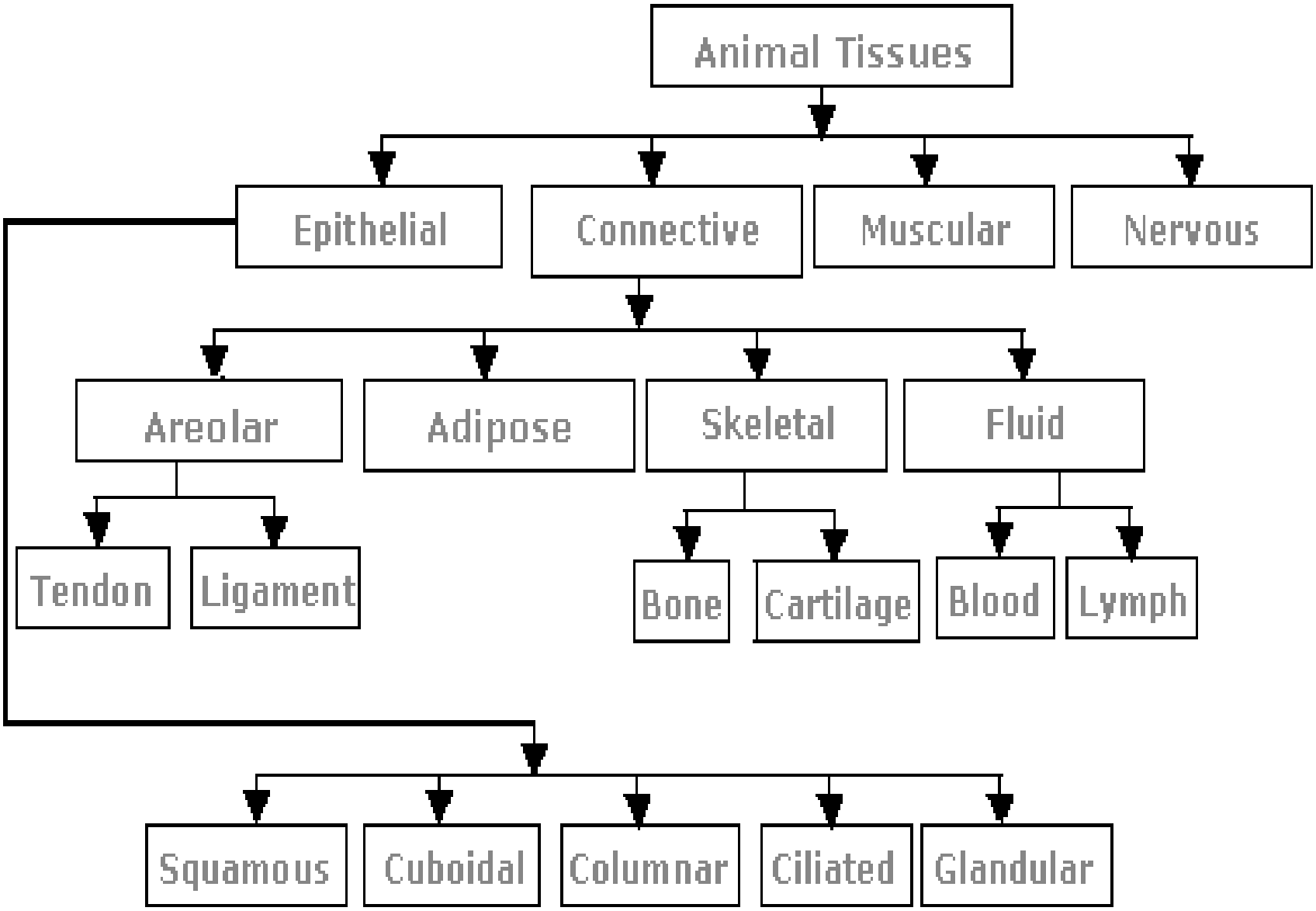



Animal Tissues
Epithelial
Connective
Muscular
Nervous
Areolar
Adipose
Skeletal
Fluid
Tendon
Ligament
Bone
Cartilage
Blood
Lymph
Squamous
Cuboidal
Columnar
Ciliated
Glandular

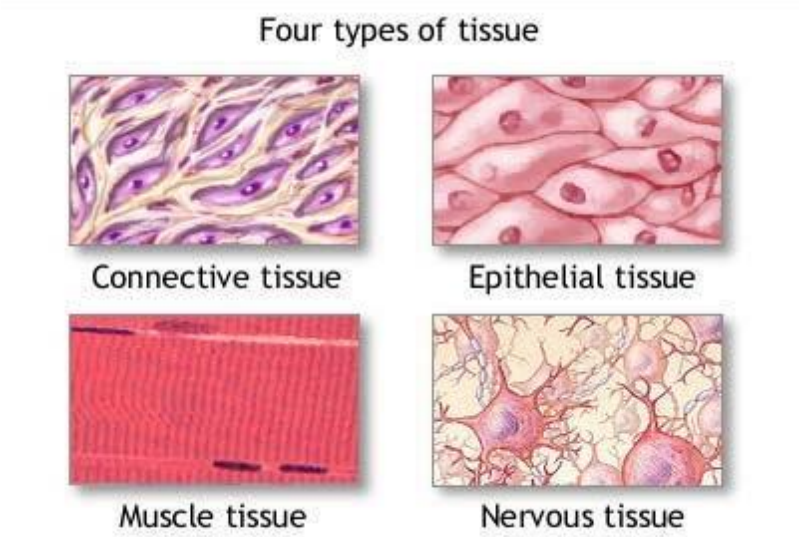
❖ Animals tissue

• **Muscle tissue** makes movement possible.

• **Connective tissue** provides structure and support.

• **Nervous tissue** carries messages to and from the brain.

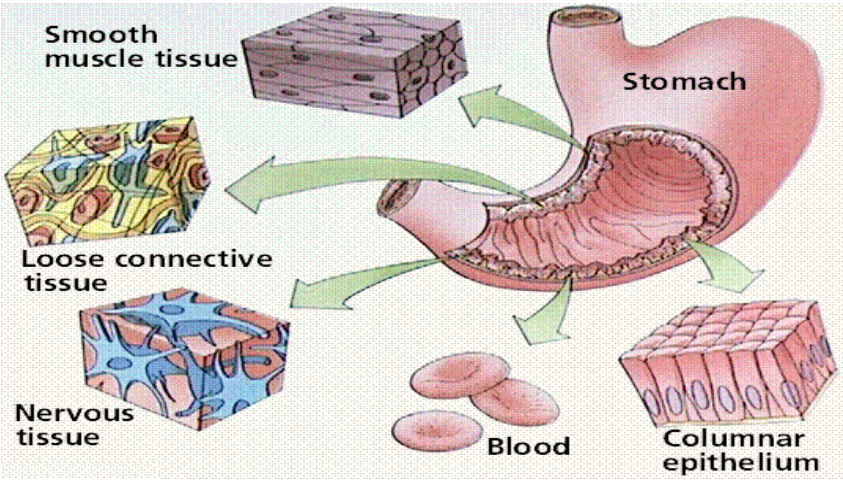
• **Epithelial tissue** forms the protective outer layer of skin and the lining of major organs and internal body cavities .



❖ Animal organs:

• Organs are groups of different tissues working together to perform a particular job.

• Your stomach is an organ that breaks down food . It is made of all four types of tissue. Each type of tissue performs a specific function necessary for the stomach to work properly and break down food .



Muscle tissue contracts and breaks up food .

Epithelial tissue lines the stomach .

Nervous tissue signals when the stomach is full .

Connective tissue supports the stomach wall .

❖ Animal Organ systems

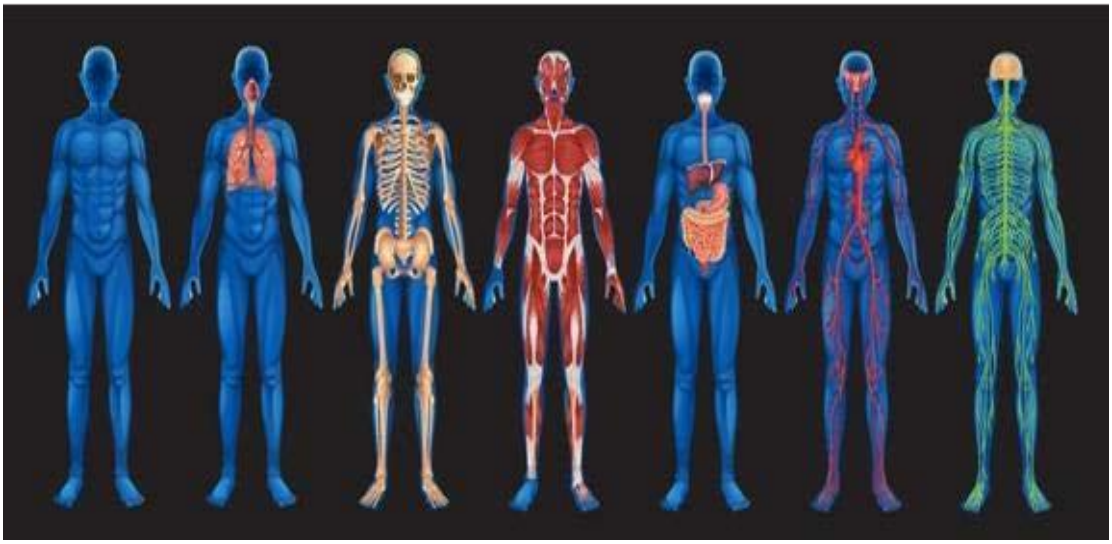
Most organs do not function alone. Instead, organ systems are groups of different organs that work together to complete a series of tasks.

For example, the digestive system is made of the stomach, the small intestine, the liver, and the large intestine. These organs all work together to break down food. Blood absorbs and transports nutrients to cells throughout the body.

❖ Organisms

Multicellular organisms usually have many organ systems . The cells of these systems work together and carry out all the jobs needed for the organism to survive .

For example, the respiratory system and circulatory system carry oxygen to the cells of the muscle tissue of the stomach. The oxygen aids in the survival of muscle tissue cells .



Tissue Type	Epithelial	Connective	Muscle	Nerve
Cell Shape	Flattened, cuboidal, columnar	Irregular or round	Elongated	Cell appendages branched
Cell Arrangement	Single → multilayered	Scattered in matrix	In sheets or bundles	Isolated or networked
Location	Body covering or lining organs or cavities	Supports other organs	Lining internal organs, make skeletal muscles	Concentrated in brain and spinal cord + all over the body
Surface Feature of Cells	Cilia, microvilli	-	-	-
Matrix Type	Basement membrane	Varied – protein fibers + liquid, gelatinous, firm to calcified	-	-
Matrix Amount	Minimal	Extensive	Absent	Absent

Epithelial tissue

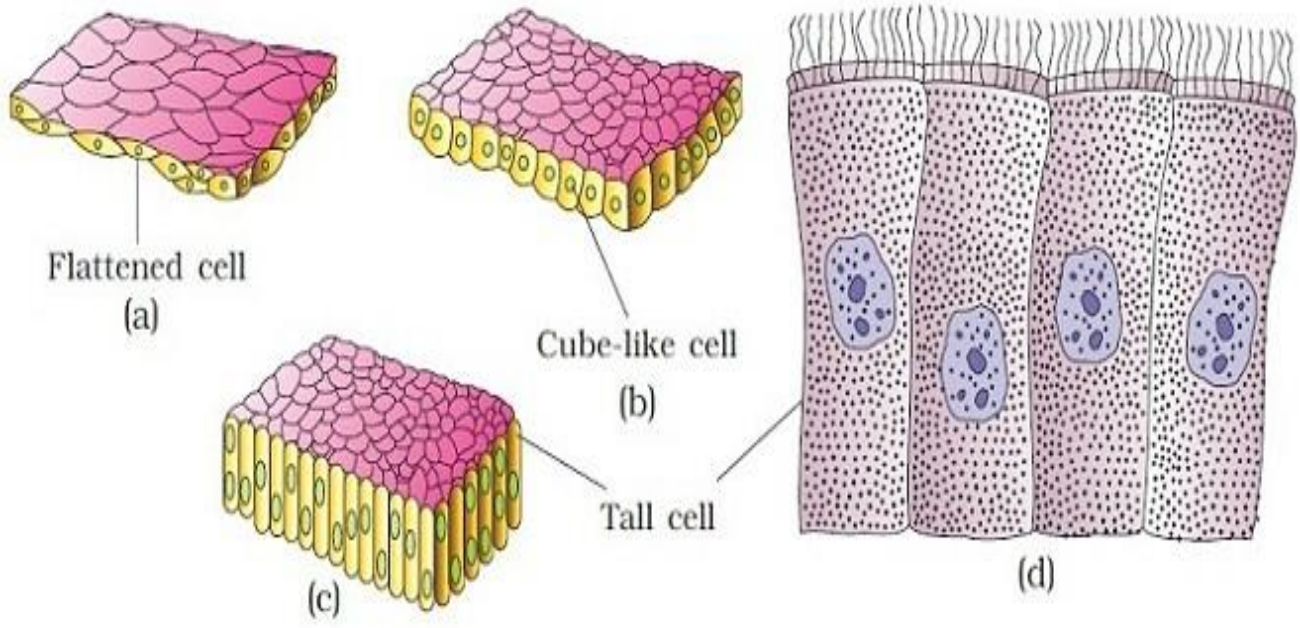
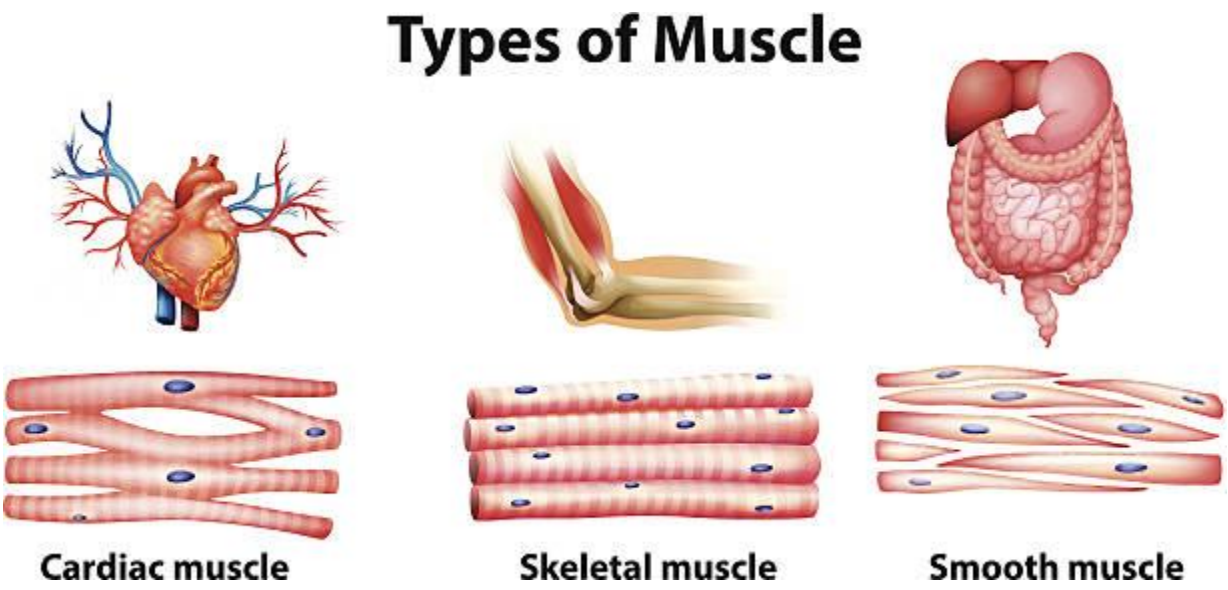
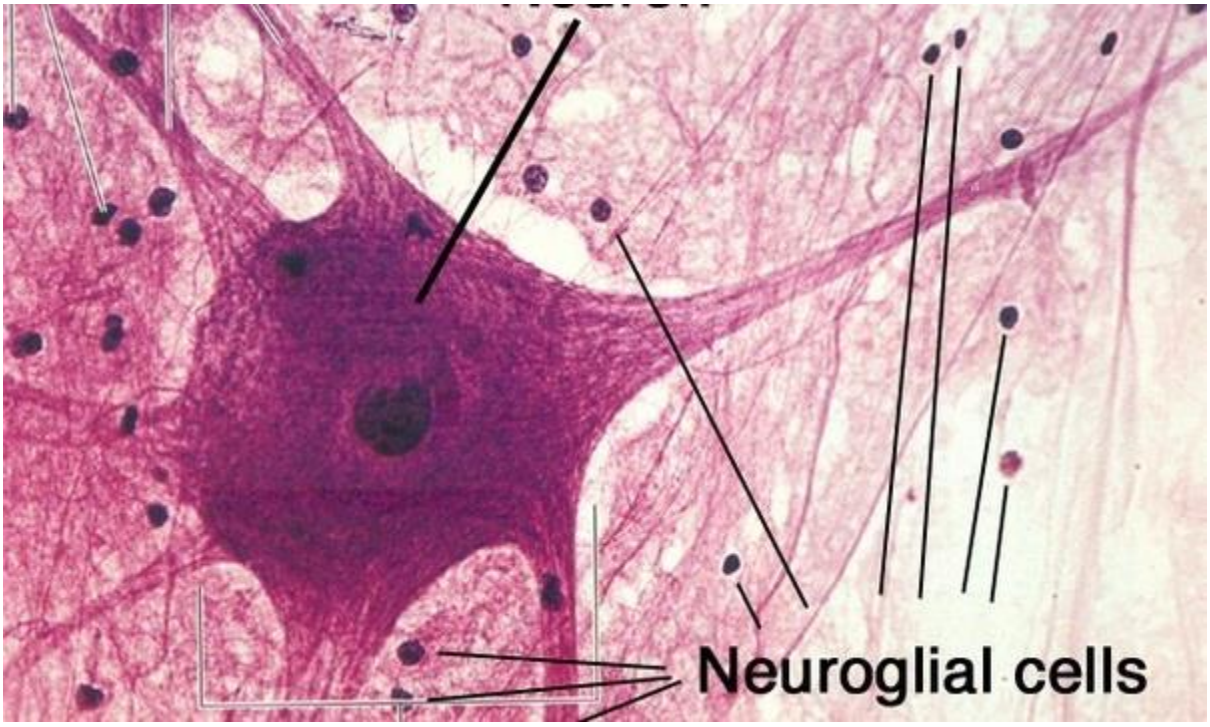


Figure 1. Simple epithelium: (a) Squamous (b) Cuboidal (c) Columnar (d) Columnar cells bearing cilia

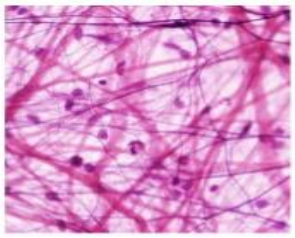
Muscle tissue

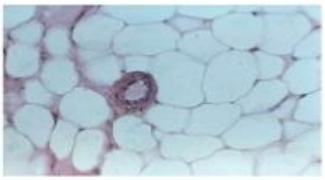


Nervous tissue

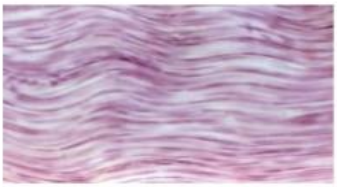


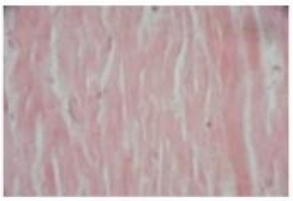
Connective tissue

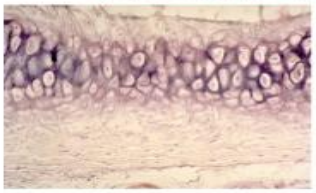




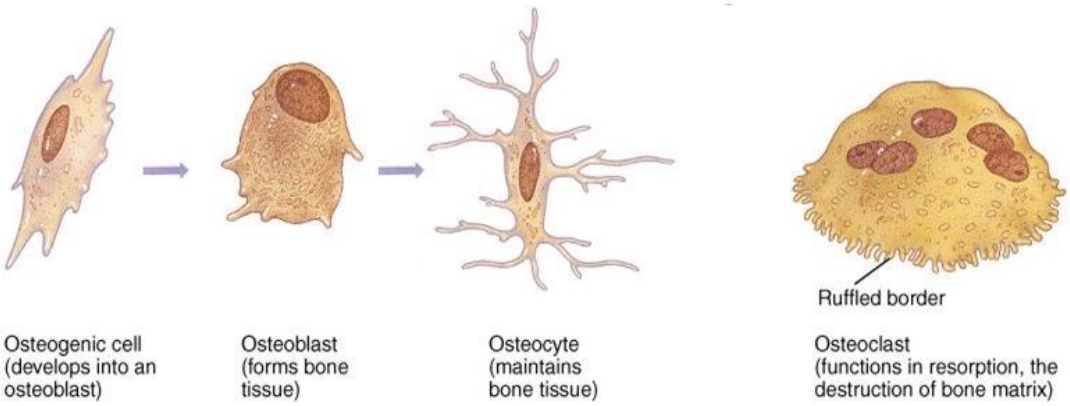
This type of tissue is the most abundant, widespread, and varied of all tissue types in the body. It also has the widest variety of functions.







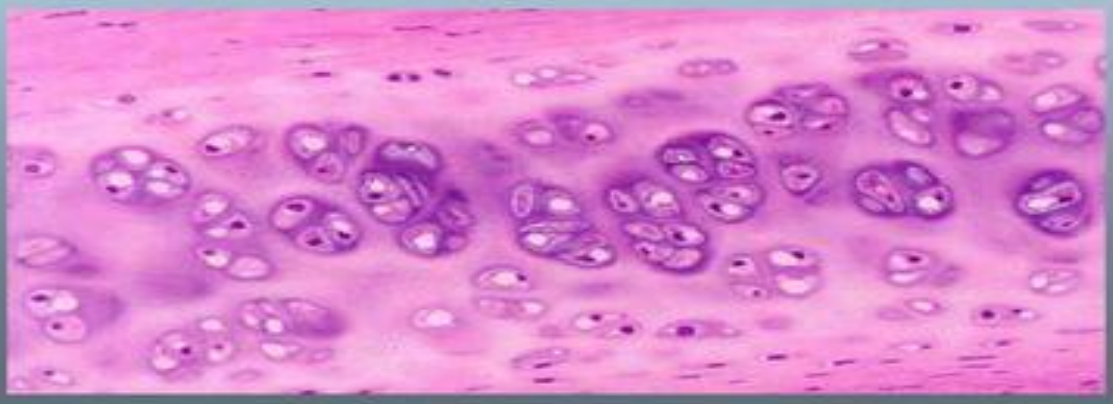
Bone Cell Types



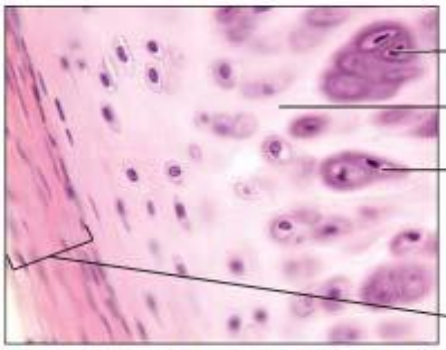
- Osteogenic cells- stem cells.
- Osteoblasts- bone building cells, secrete matrix & collagen fibers.
- Osteocytes- mature bone cells that no longer secrete matrix.
- Osteoclasts- bone digestion.

Cartilage

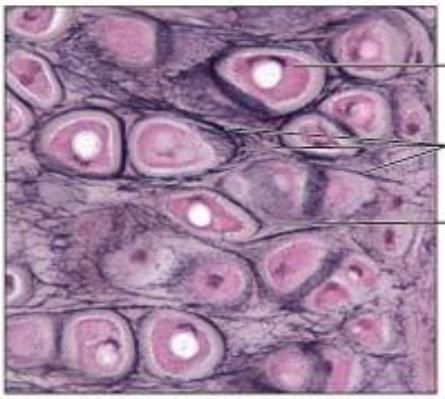
- Cartilage belongs to the skeletal tissues and is a specialized form of connective tissue
- Cartilage is composed of cells, **chondrocytes** (2-5% of the tissue volume only) located in **lacunae** surrounded by an intercellular **matrix**.



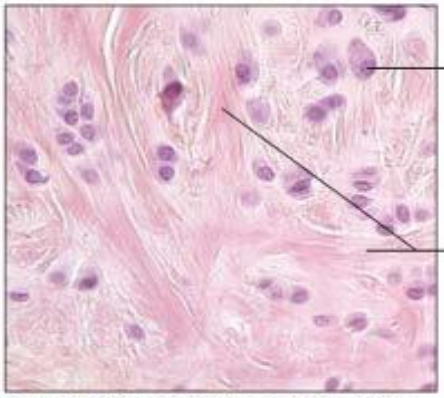
Cartilages in the Adult Body



(a) Hyaline cartilage (180×)



(b) Elastic cartilage (470×)



(c) Fibrocartilage (285×)