

Histology

Lab .I

There are four basic tissue types in the body are :-

- 1- Epithelial tissues (Epithelium)
- 2- Connective tissues
- 3- Muscular tissues
- 4- Nervous tissues

1-Epithelial tissues

epithelial tissues consist of two types :-

A-Covering or lining epithelial tissues

B- Glandular epithelial tissues

Covering epithelial tissues covers the outer layers or lining of the organs , according to the number of cells layers classified to :-

a-Simple epithelial tissue

- 1-Simple squamous epithelial tissue
- 2- Simple cuboidal epithelial tissue
- 3- Simple columnar epithelial tissue
- 4-pseudostratified columnar epithelial tissue

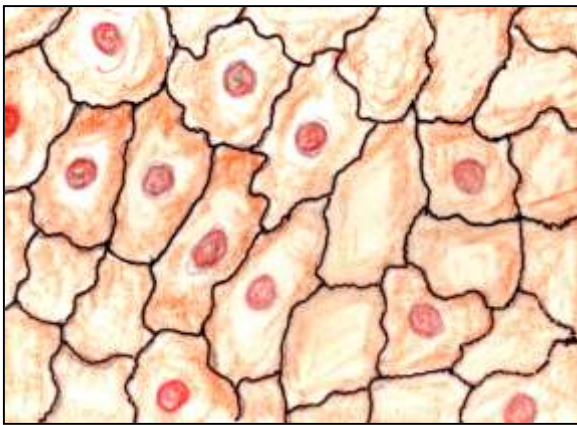
b- Stratified epithelial tissue

- 1- Stratified squamous epithelial tissue
- 2- Stratified cuboidal epithelial tissue
- 3- Stratified columnar epithelial tissue
- 4-Transitional epithelial

Simple epithelial tissue:- composed of only one layer based on basement membrane

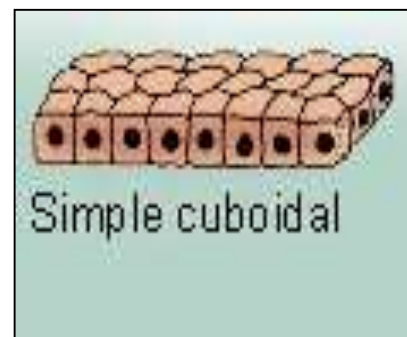
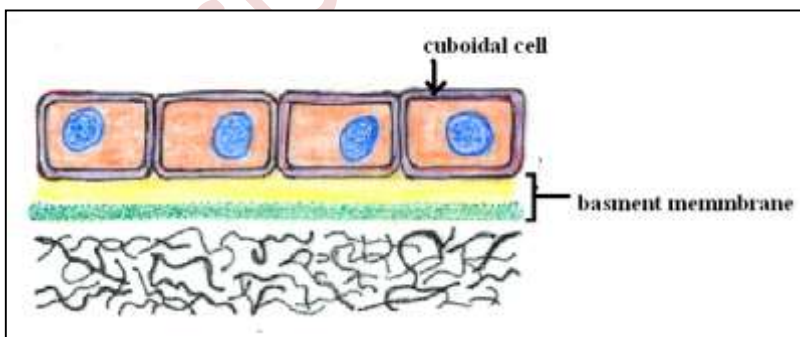
1-Simple squamous epithelial tissue:-

Composed of a single layer of cells which are flat and plate like , lining blood vessels being called endothelium and that lining the abdominal and plural cavities called mesothelium.



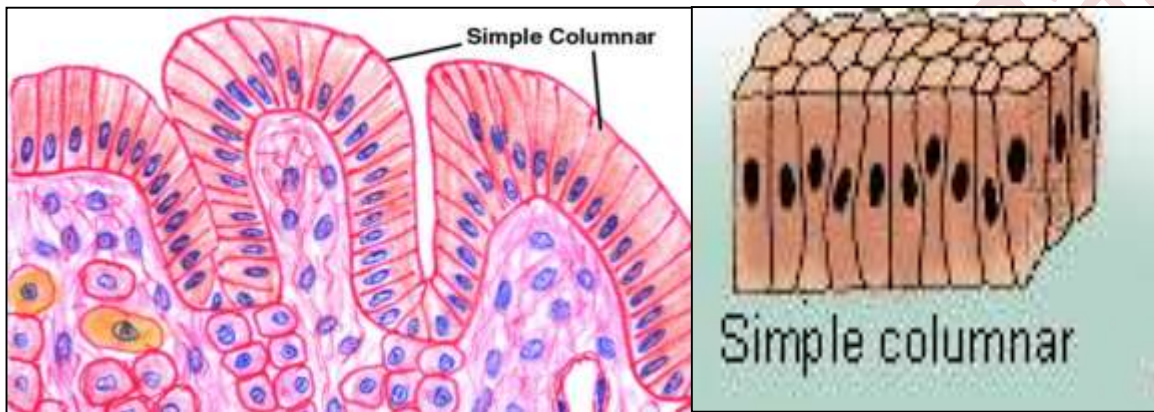
2-Simple cuboidal epithelial tissue:-

Composed of a single layer of cells whose height , width and depth are the same and have centrally placed nucleus . Line small excretory ducts like proximal convoluted tubule kidney ...etc



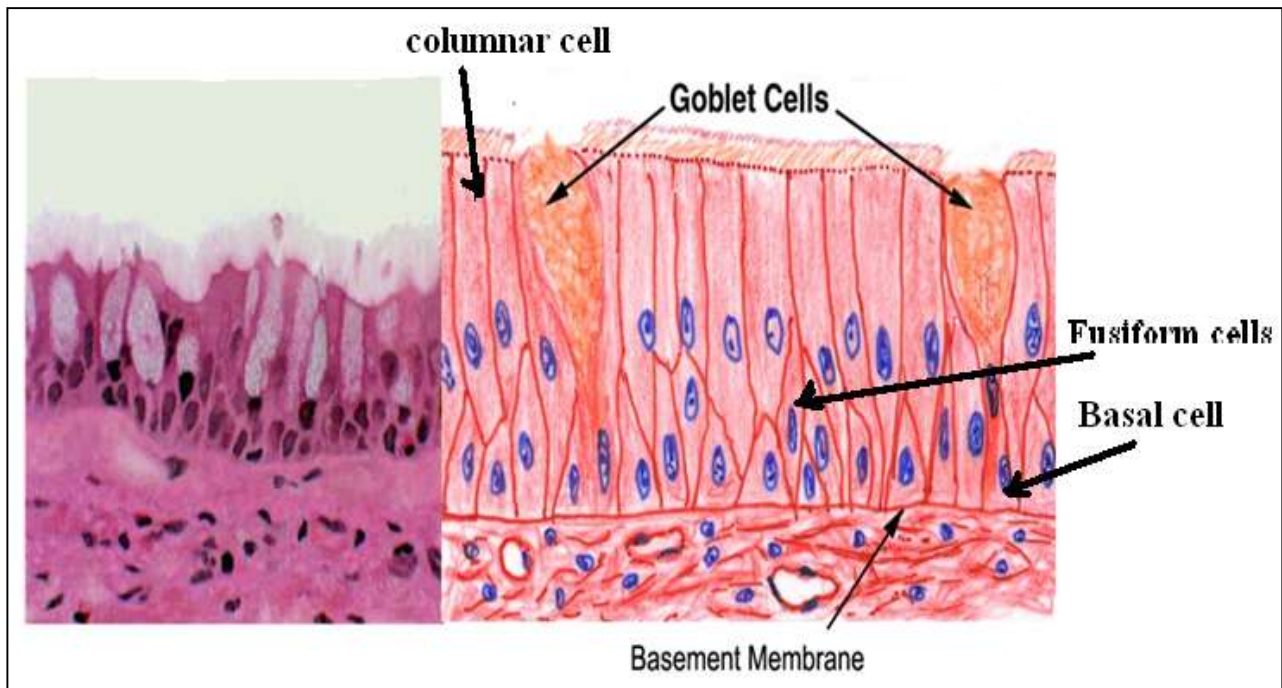
3-Simple columnar epithelial tissue :-

Composed of cells whose height 2-3 times greater than their width, the nuclei of columnar cells are basal, layer, covers the digestive organs (stomach, small and large intestine) in the small intestine it's called brush border. Ciliated Simple columnar epithelial tissue found in oviducts.



4-pseudostratified columnar epithelial tissue :- Several layers of nuclei suggest several layers of cells but in fact all cells are in contact with underlying extracellular matrix and show several layers of nuclei, composed of four types of cells these are :-

- 1- Columnar cells**
- 2- Fusiform cells**
- 3- Basal cells**
- 4- Goblet cells .**



Histology

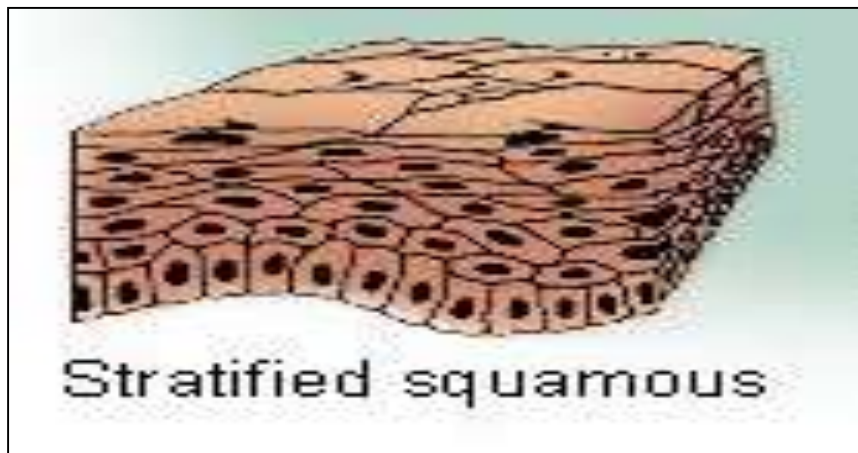
Lab. II

Stratified epithelial tissue :- Composed of more than one layer based on basement membrane , classified to :-

1-Stratified squamous epithelial tissue

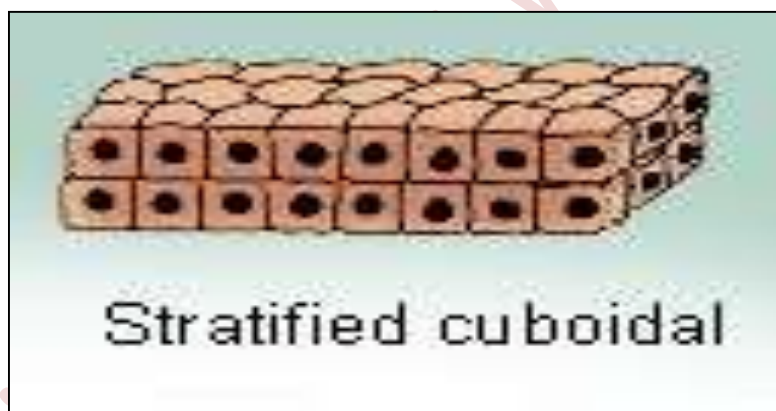
Contains multiple cell layers , the basal cell are cuboidal to columnar , these cells give rise to cells that migrate to word the surface and become squamous . There are two types of stratified squamous epithelial tissue:-

- Non keratinized squamous epithelial tissue which is covering moist cavities such as mouth , esophagus , pharynxetc.
- Keratinized squamous epithelial tissue found on exposed surface of the body such as the skin .



2- Stratified cuboidal epithelial tissue

The surface layer cuboidal in shape , found in the large excretory ducts in the salivary glands and pancreas .

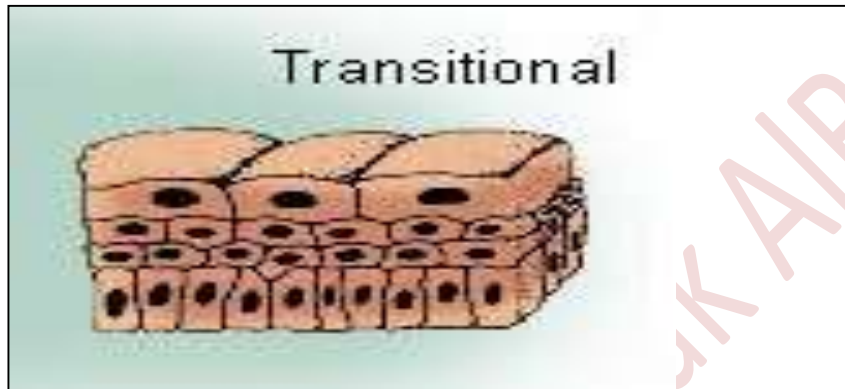


3- Stratified columnar epithelial tissue

Is found in the fornix of conjunctiva while the ciliated Stratified columnar epithelial tissue is found in the larynx .

4-Transitional epithelial tissue

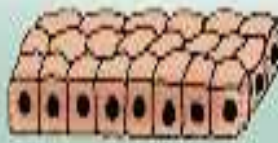
Is found exclusively in the passages of the urinary system . Its composed of several layer of similar cells . this type of tissue allows distention of urinary organs during urine accumulation



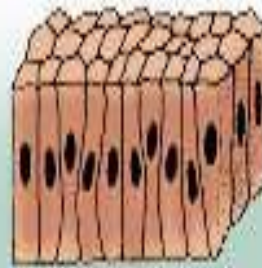
Types of Epithelium



Simple squamous

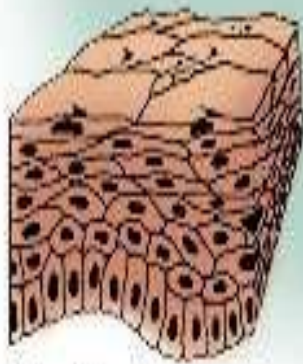
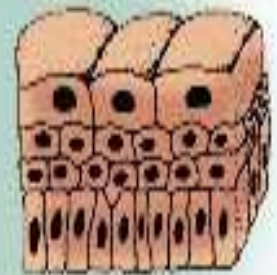


Simple cuboidal

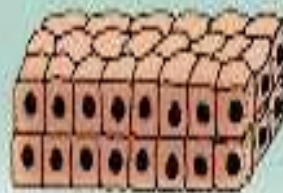


Simple columnar

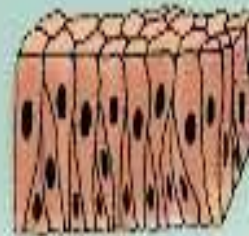
Transitional



Stratified squamous



Stratified cuboidal



Pseudostratified columnar

Histology

Lab III Glandular tissue

cells or parenchyma of the glands developed from epithelial tissue , according to the methods of secreted products of gland the glandular epithelial tissues classified to :-

A-Exocrine glands(excrete their product into ducts)like skin and elementary glands

B- Endocrine glands(secrete their products direct into circulatory system)

C-Mixed glands (like pancreas)

According to the number of the cells the glandular epithelial tissues can be classified to :-

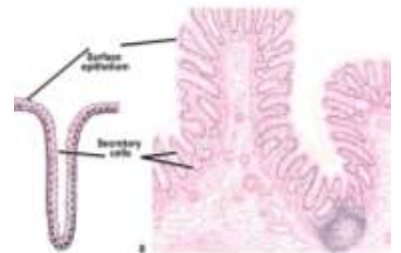
A -Unicellular glands :- like goblet cell in simple columnar epithelial tissue in intestine and pseudostratified columnar epithelial in trachea.

B-multicellular glands:-

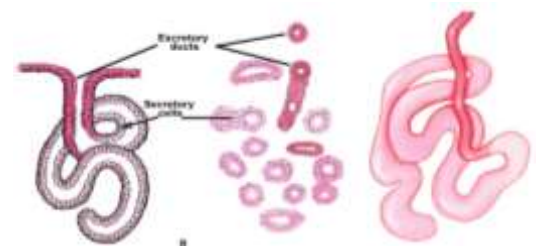
1- Simple glands :- According to the shape of secretory unit of the glands they can be classified to :-

a- Simple Tubular glands :-

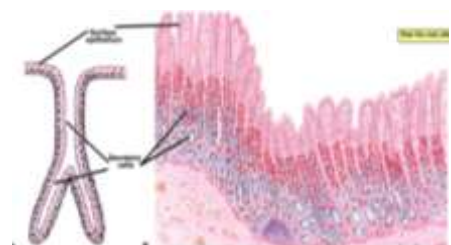
- **Straight tubular gland** (intestinal glands or crypts of Lieberkuhn)



- **Coiled tubular gland** (sweat glands)



- **Branched tubular glands** (pyloric glands)



b- Simple Alveolar glands

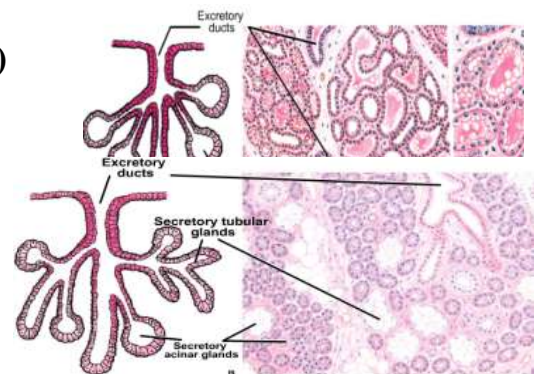
- **Un branched alveolar glands (mucous glands in frog)**
- **Branched alveolar glands (sebaceous glands in the skin)**



2-Compound glands :-

- **Compound tubular glands (testes and kidney)**
- **Compound alveolar glands (mammary gland)**

Compound tubule-alveolar glands (lacrimal glands)



Lab IIII Connective tissue

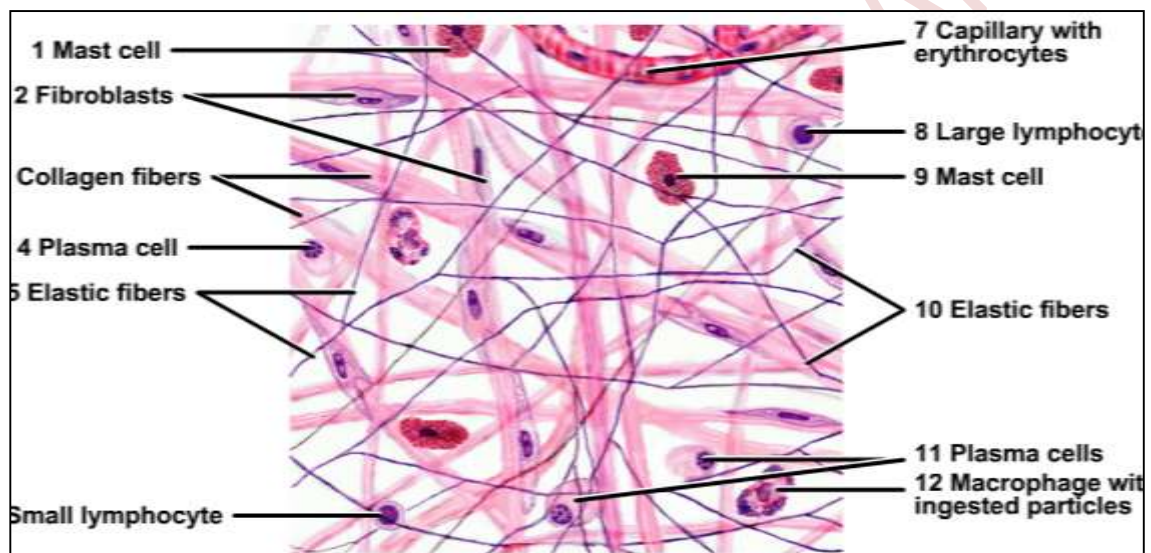
Connective tissue classified to two mainly types :-

- 1- General connective tissue
- 2- Special connective tissue

Types of connective tissues

A-General connective tissue :-

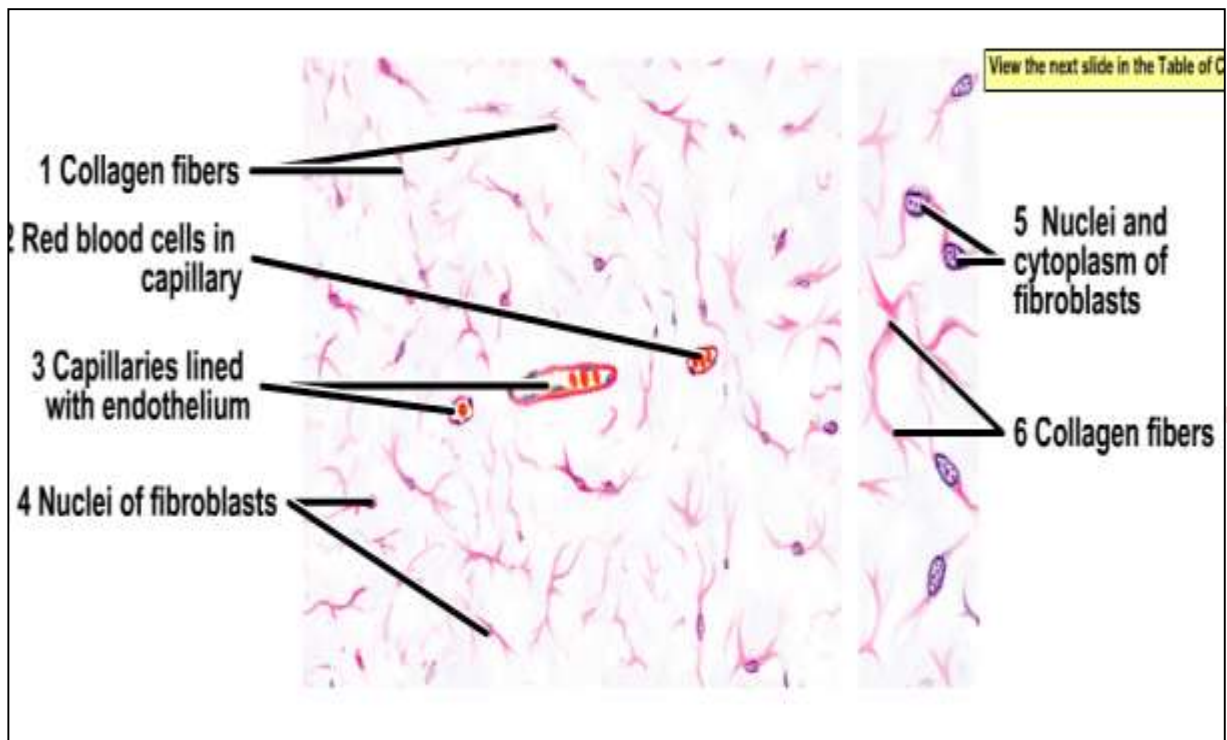
- 1- Loose connective tissues:-



Loose connective tissues

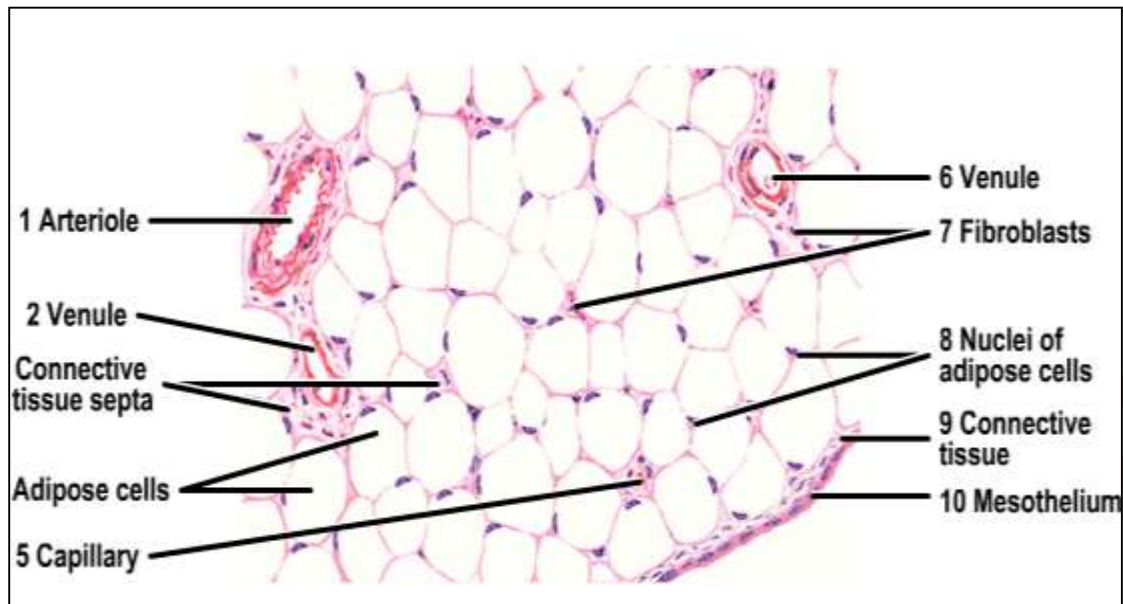
a-Mesenchyme connective tissue :- its embryonic connective tissue consists of semifluid ground substance , numerous fibroblast , collagen fibers

b-Mucoid connective tissue:-its embryonic connective tissue found in (umbilical cord), gel-like ground substance , numerous of fibroblasts and white fibers with less amount elastic and reticular fibers with few number of macrophages and lymphocytes. \



c-Areolar connective tissue:- predominant of collagen fibers, few elastic and reticular fibers , numerous of macrophages , fibroblast , found in the subcutaneous and near blood vessels.

d-Adipose connective tissue :- numerous of fat cells , reticular fibers , few number of fibroblast , lymphocytes , ,mast cell , eosinophil , found in skin , around kidney .



Adipose connective tissue

e-Reticular connective tissues :- numerous of reticulocytes and reticular fibers with few number of blood cells , found in bone marrow

2-Dense connective tissue

a-Dense irregular connective tissue

Numerous of white fibers with few number of yellow and reticular fibers , its found in dermis , pericardium , lymph node ...etc .

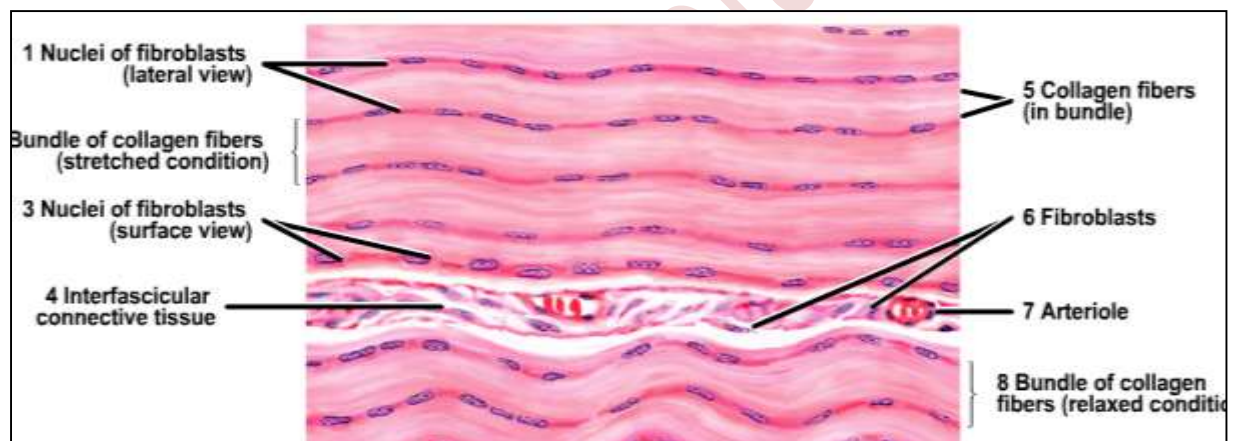
b- Dense regular connective tissue

3-Elastic regular connective tissue :-

Composed of abundant of yellow fibers with few number of fibroblasts and white and reticular fibers, this type of connective tissue found in the ligaments.

4--White fibrous regular connective tissue:-

Present in the tendon. composed of collagen fibers in parallel bundles with rows of fibroblasts which is called in tendon (tendon cell).



White fibrous regular connective tissue(tendon)

B- Special connective tissue

1-Lymph tissue

2-Blood

3-Skeletal connective tissue :-

a-Cartilage

- Elastic cartilage
- Hyaline cartilage
- White fiber cartilage

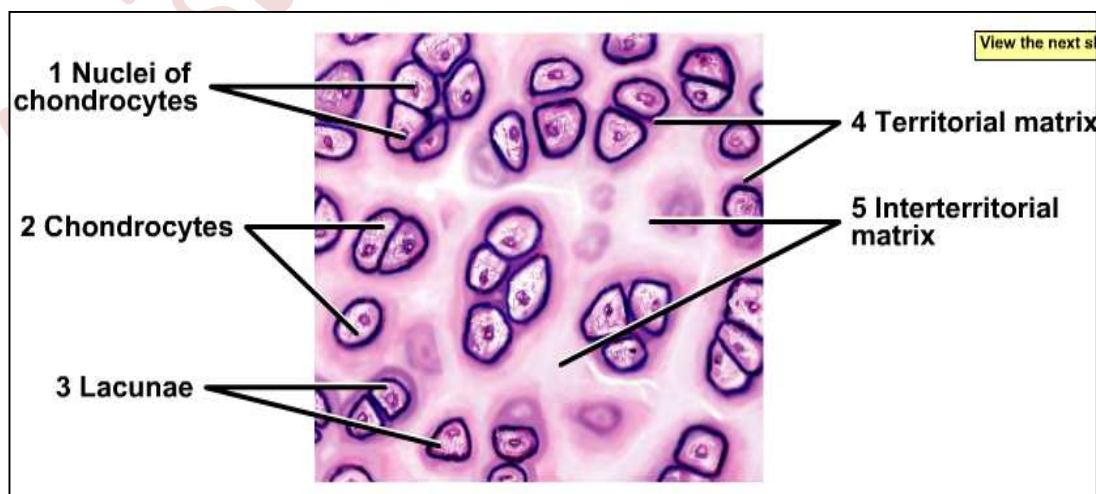
b-Bone :-

- Compact bone
- Spongy bone

Cartilage

Cartilage is a special form of connective tissue , consist of mainly cells called **chondrocytes** (cartilage cell) and **chondroblasts** that synthesized connective tissue ,fibers and ground substance.

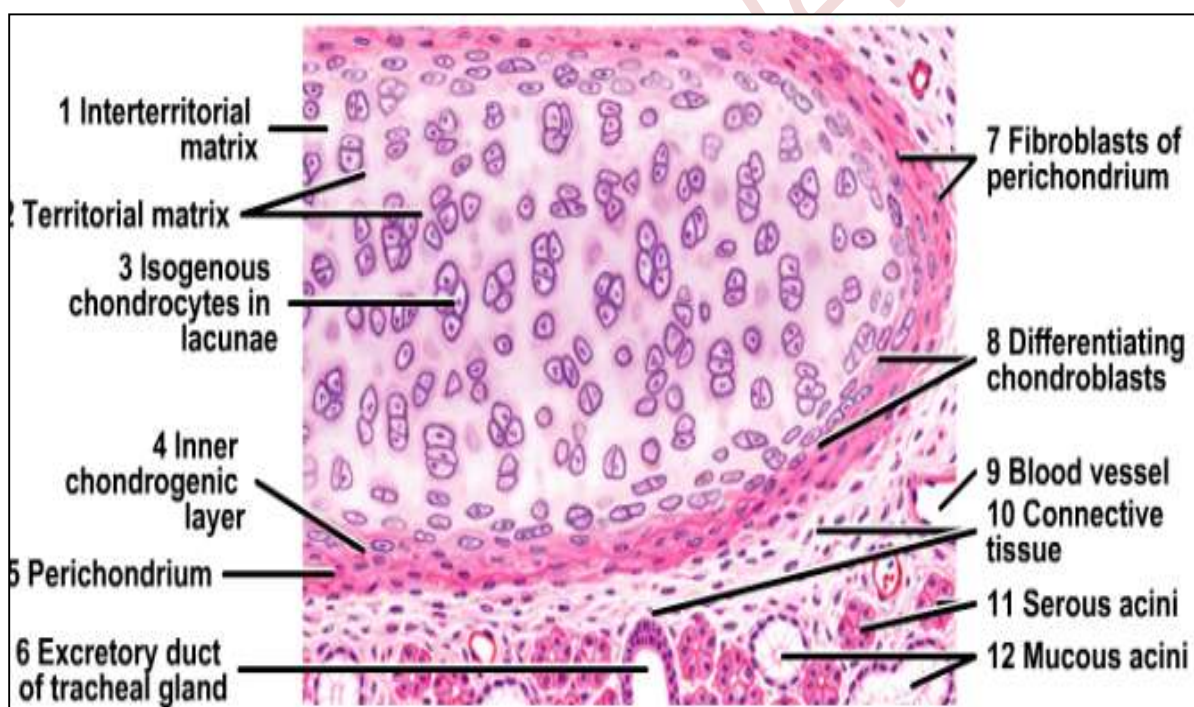
Chondrocyte:- spherical in shape which is located in the small vacuole called **lacunae** in the matrix , with centrally nucleus , some lacunae may contain more than one chondrocyte , these groups of chondrocytes called **cell nests** .



Perichondrium :- Irregular dense connective tissue , rich in blood and lymph vessels and nerve , surrounded the almost hyaline and elastic cartilage ,perchondrium consists of two layer the inner layer called chondrogenic layer which is rich in chondroblasts that secret the cartilage matrix and also produce chondrocytes the second layer its fibrous layer.

1- Hyaline cartilage :-

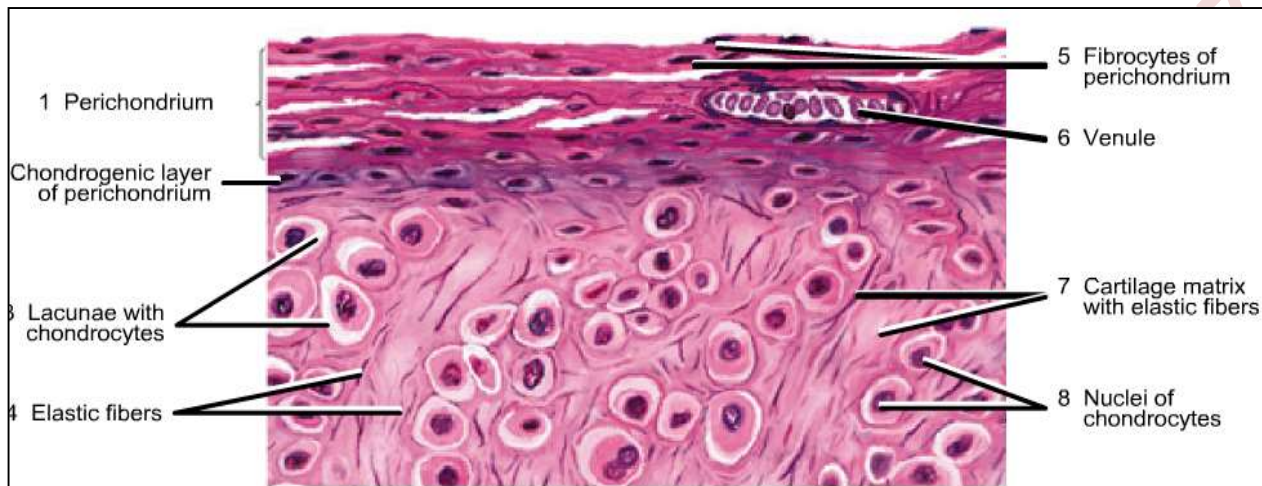
Composed of cartilage cells , white fibers and ground substance with prichondrium , this type of cartilage is found in the costal cartilage , larynx, nose and bronchi.



Hyaline cartilage

2-Elastic cartilage :-

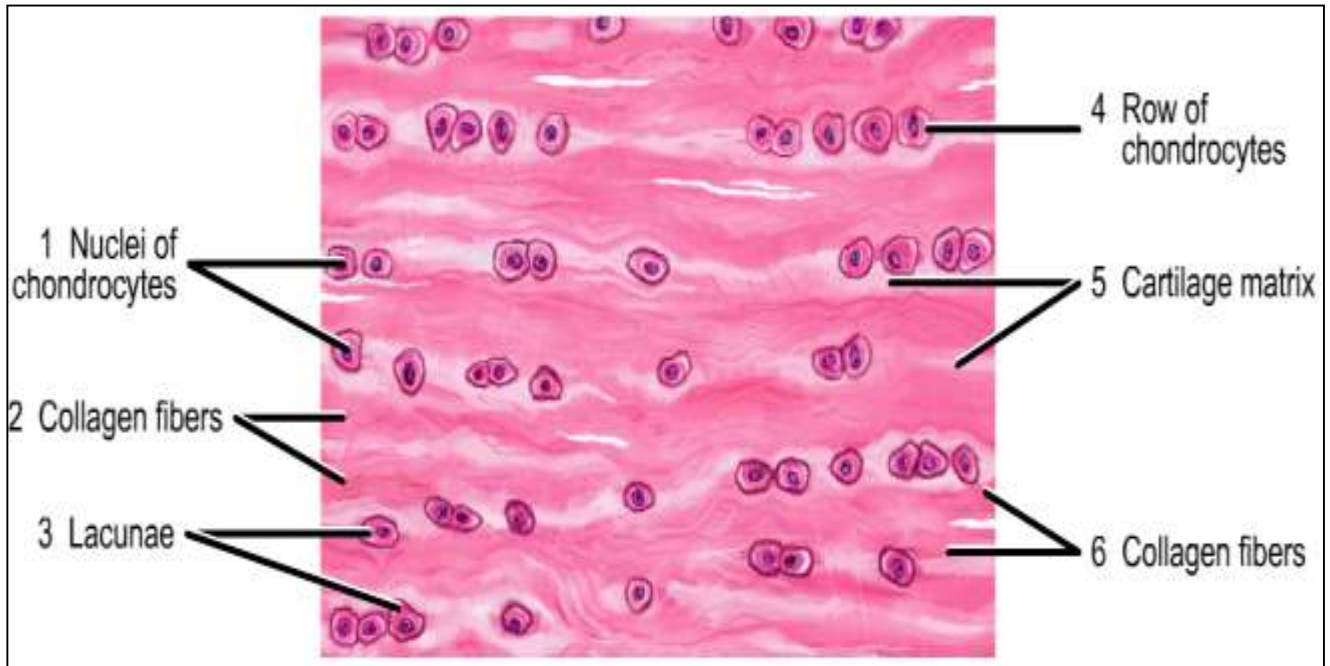
Is similar in appearance to hyaline cartilage except for the presence of numerous branching of elastic fibers in the matrix with perichondrium, its highly flexible found in the epiglottis, Eustachian tube and external ear



Elastic cartilage

2- White- Fibrous cartilage :-

Characterized by large amount of white fibrous connective tissue , without perichondrium this type of cartilage is found in the intervertebrate disc .



White- Fibro cartilage

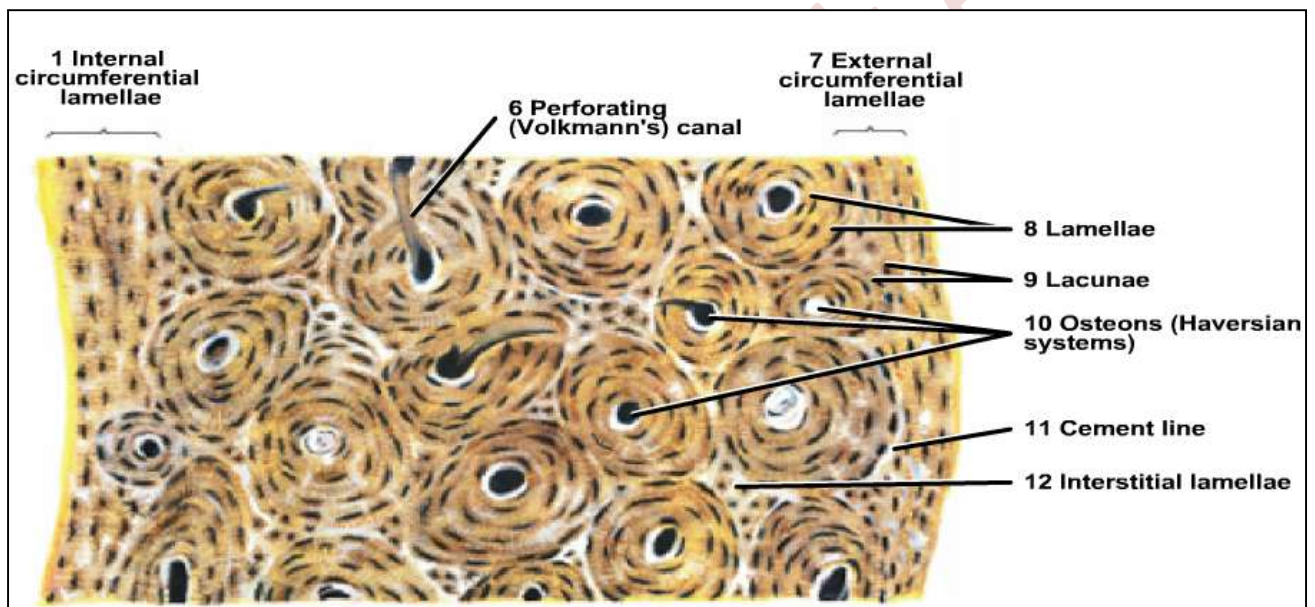
Bone

Bone is a highly specialized support tissue which is characterized by rigidity and hardness .

There are two types of bone:-

1-Compact bone

2-Spongy bone

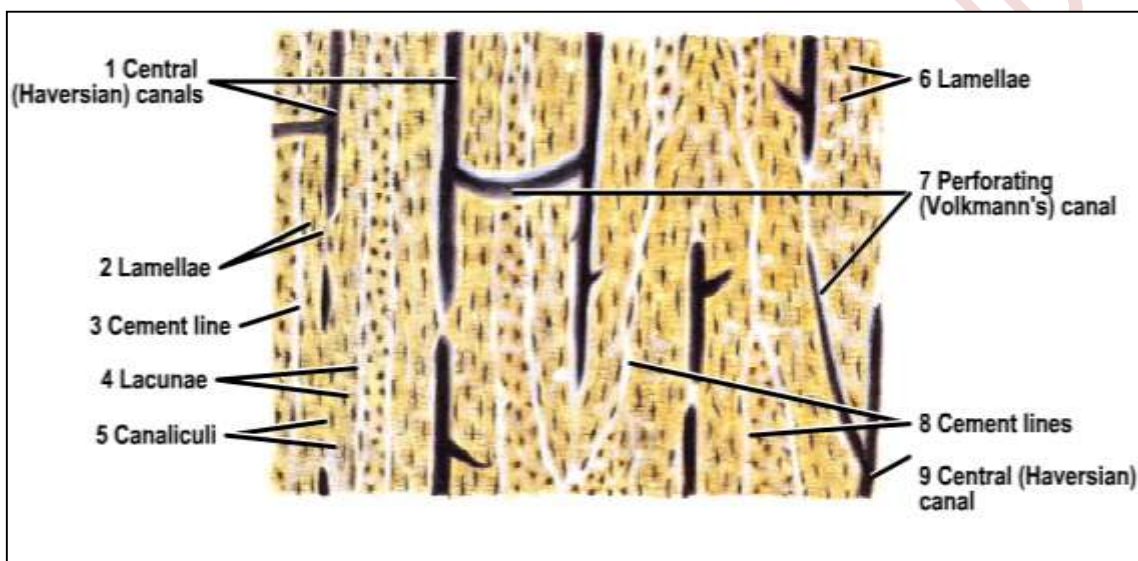


Compact bone(transverse section)

The structural unite of transverse section in compact bone matrix are the osteons (Haversian system)each osteon consist of layers of concentric lamella that are arranged around a central canal (Haversian) . Lamella are thin plates of bone that contain Osteocytes in almond –shaped space radiating from each lacunae in all directions of tiny canals called(canaliculi) .



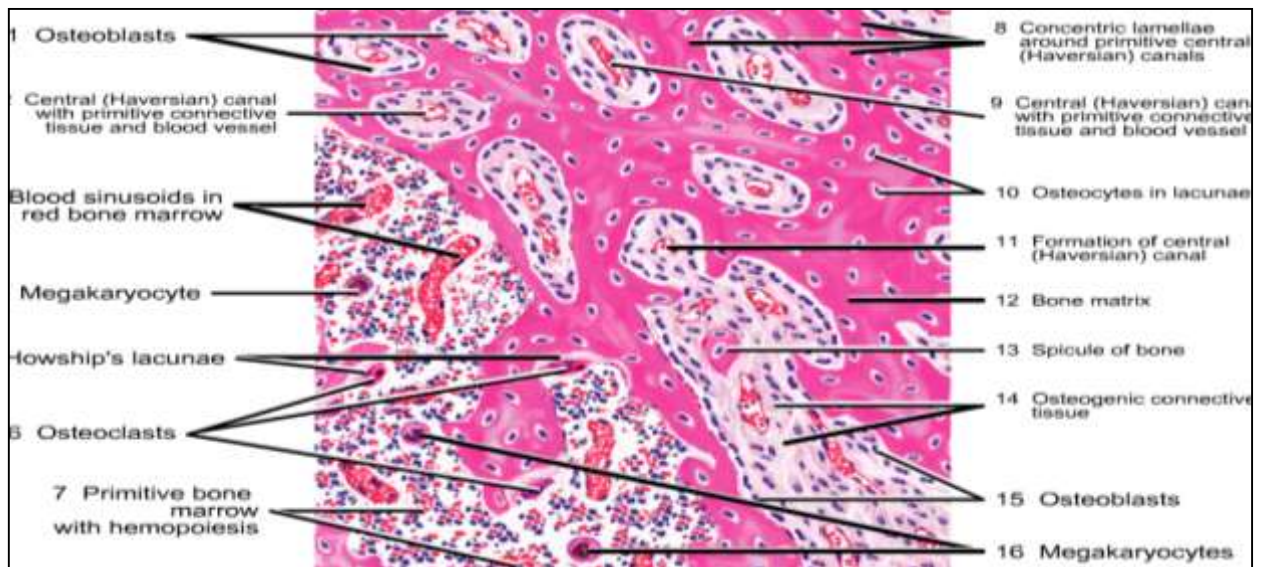
Compact bone An osteon(transverse section)



Compact bone (longitudinal section)

In the longitudinal section each central canal (Haversian canal) is seen as a vertical tube that shows branching which surrounded by lamellae with lacunae and radiating canaliculi . The lamellae , lacunae and osteon (cement line)parallel to the Haversian canal.

Other canals that connect between two Haversian canal and with perosteium called (Volkmans canals) .



Spongy bone

In long bones , the outer cylindrical part is the compact bone while the inner surface of compact bone adjacent to the bone marrow cavity is the spongy bone ,both types of bones have the same microscopic appearance except the Haversian and Volcman canals found in compact bone only.