Al- Mustaqbal College University

Department Of Medical Instrumentation

Techniques Engineering

Anatomy and Physiology

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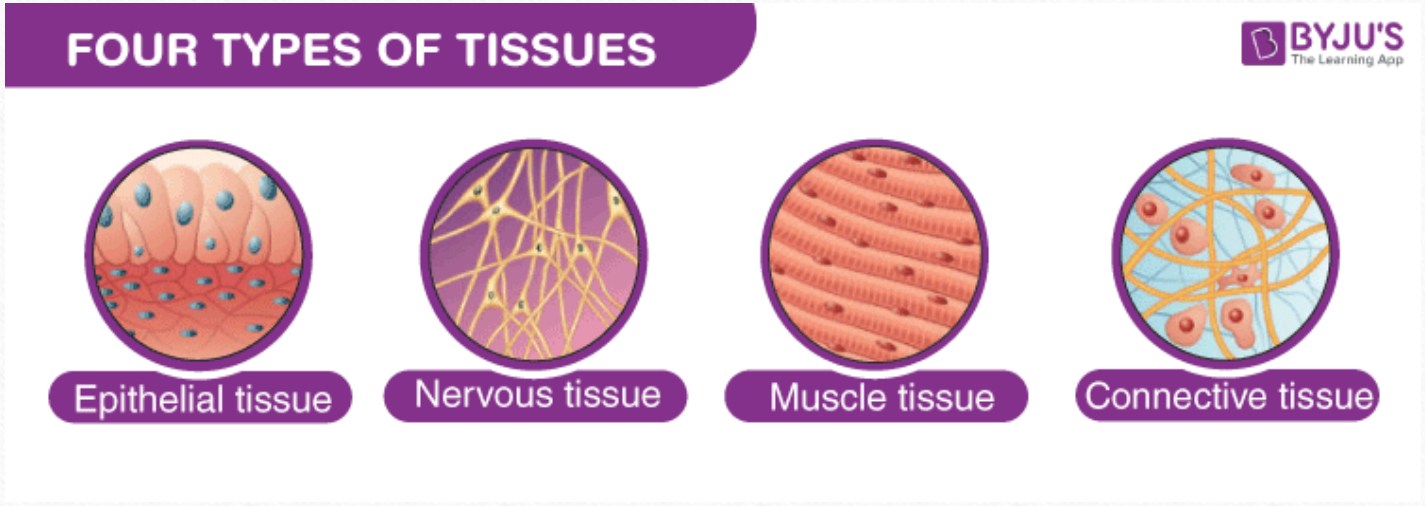
# *Tissue level of organization*



# TISSUES:-

Are group of cells and cell products with similar structure and function.

This means that the cells within a tissue have similar anatomy and physiology and these cells make all of the other components of the tissue.

Tissues are made of two interacting components: cells and extracellular matrix (ECM).

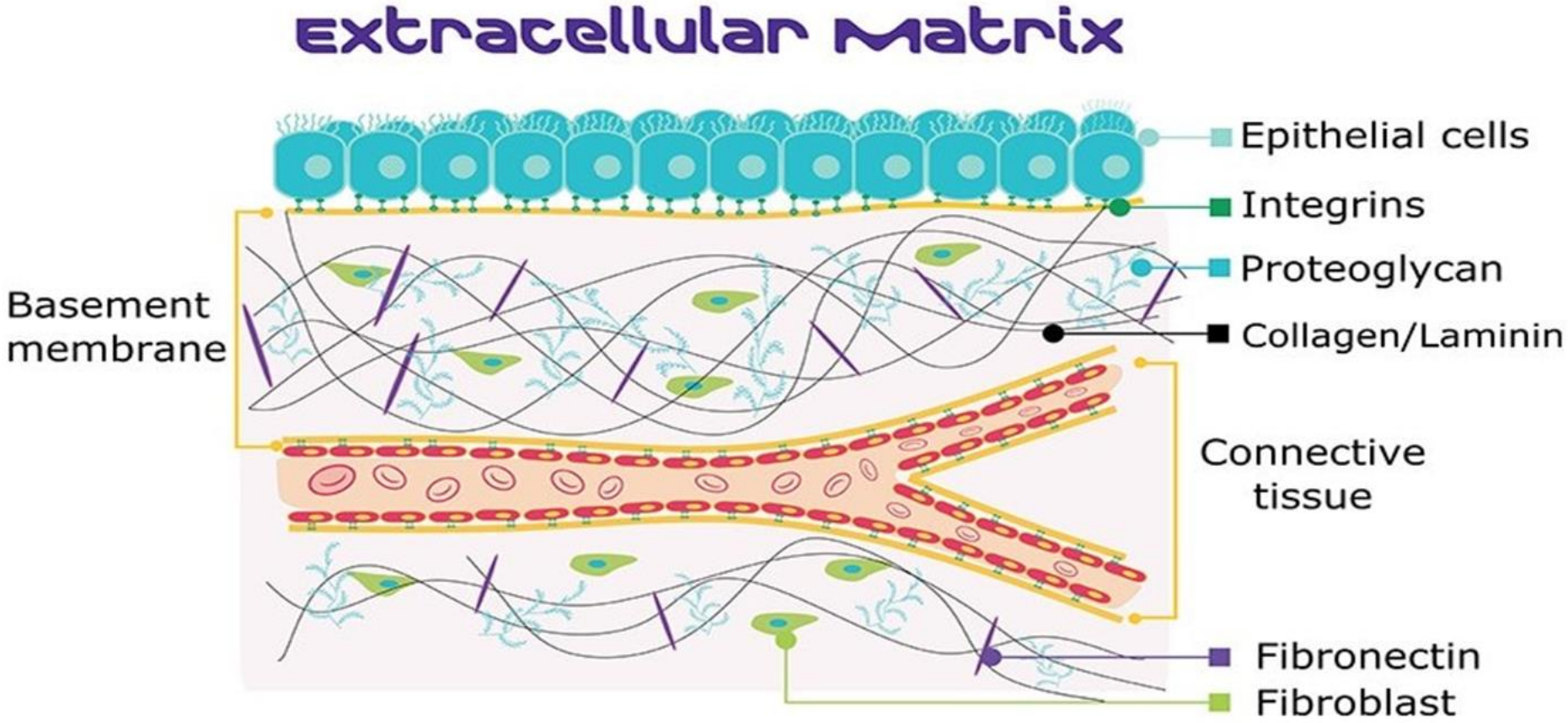
The ECM consists of many kinds of molecules, most of which form complex structures, such as collagen fibrils and basement membranes.

# The functions of ECM

a- supports for the cells

b- transporting nutrients to the cells

c- carrying away their wastes and secretory products.



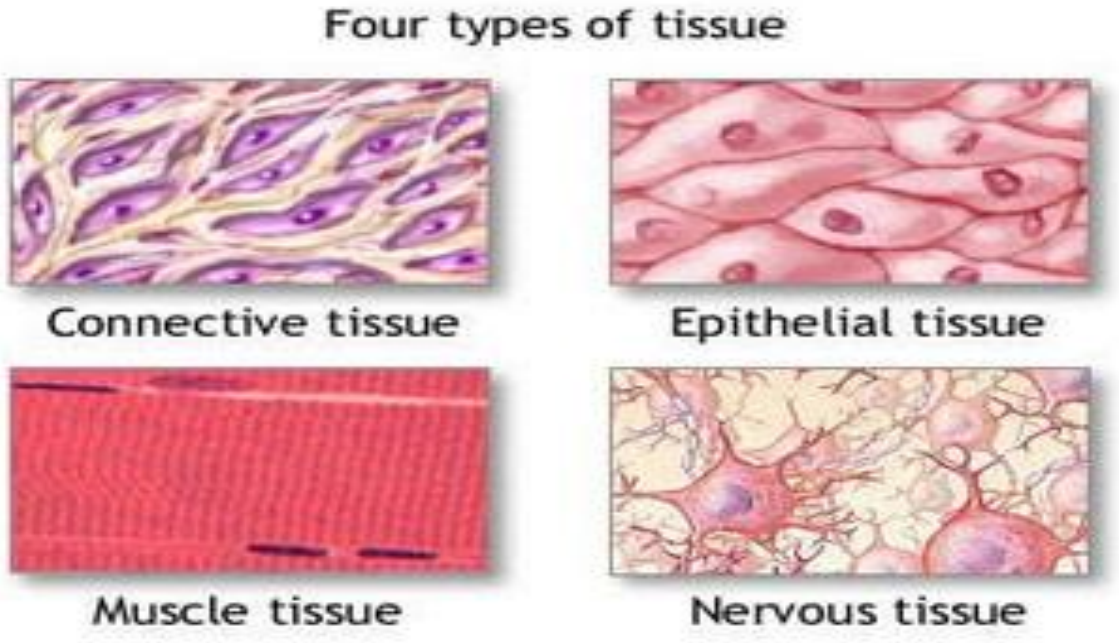
There are four basic types of tissue :

1. Epithelium (epithelial tissue): covers body surfaces, lines body cavities, and forms glands .

2. Connective tissue: underlies or supports the other three basic tissue

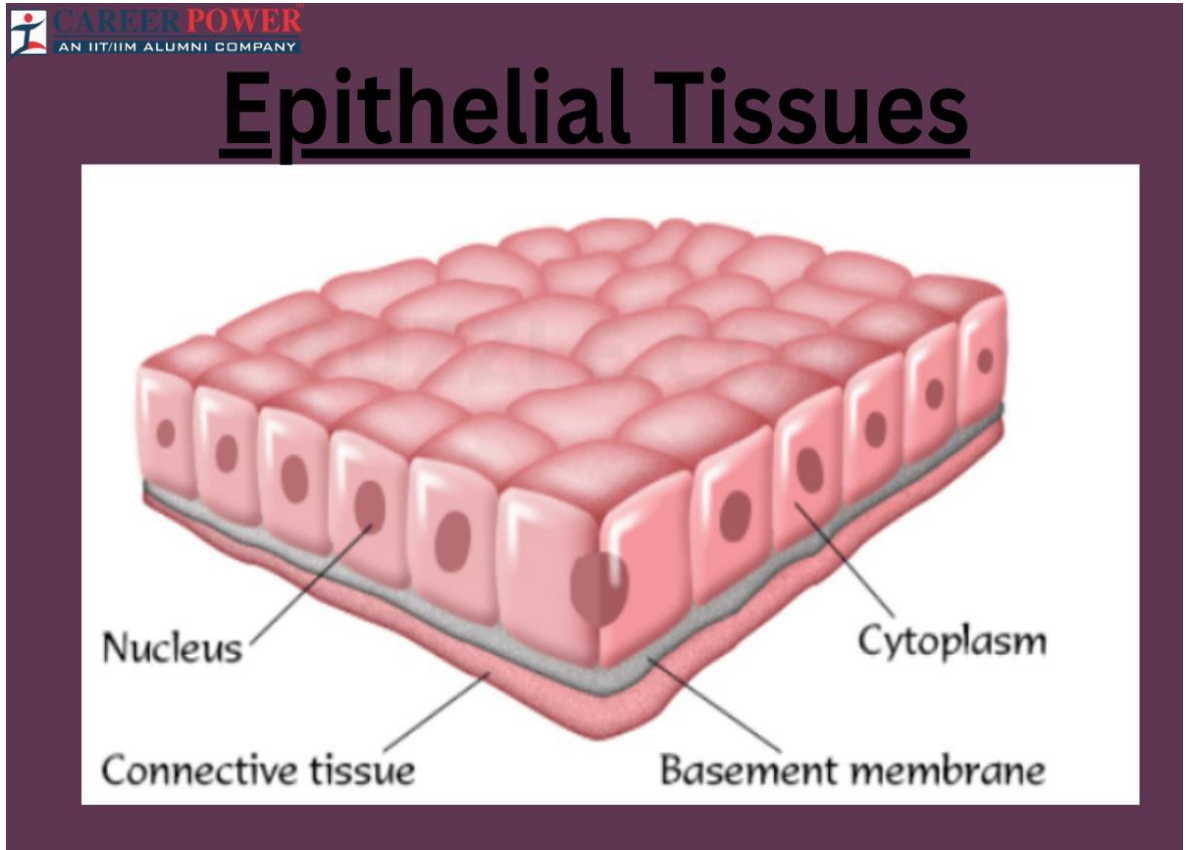
3. Muscle tissue: is made up of contractile cells and is responsible for movement

4. Nerve tissue: receives, transmits information to control the activities of the body



**1-Epithelial tissues** are thin tissues that covers a body surface or lines a body cavity.

They form the external skin, the inner lining of the mouth, digestive tract, secretory glands, the lining of hollow parts of every organ such as the heart, lungs, eyes, ears, the urogenital tract, as well as the brain and central canals of the spinal cord



## Functions of epithelial tissue : •

1- covering ,lining and Protection surface (skin)

2-Absorption (intestine)

3-Secretion (epithelia of glands)

4-sensation (sensory cells)

5-contractility ( sweat and mammary gland)

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**

**B- stratified epithelial tissue**

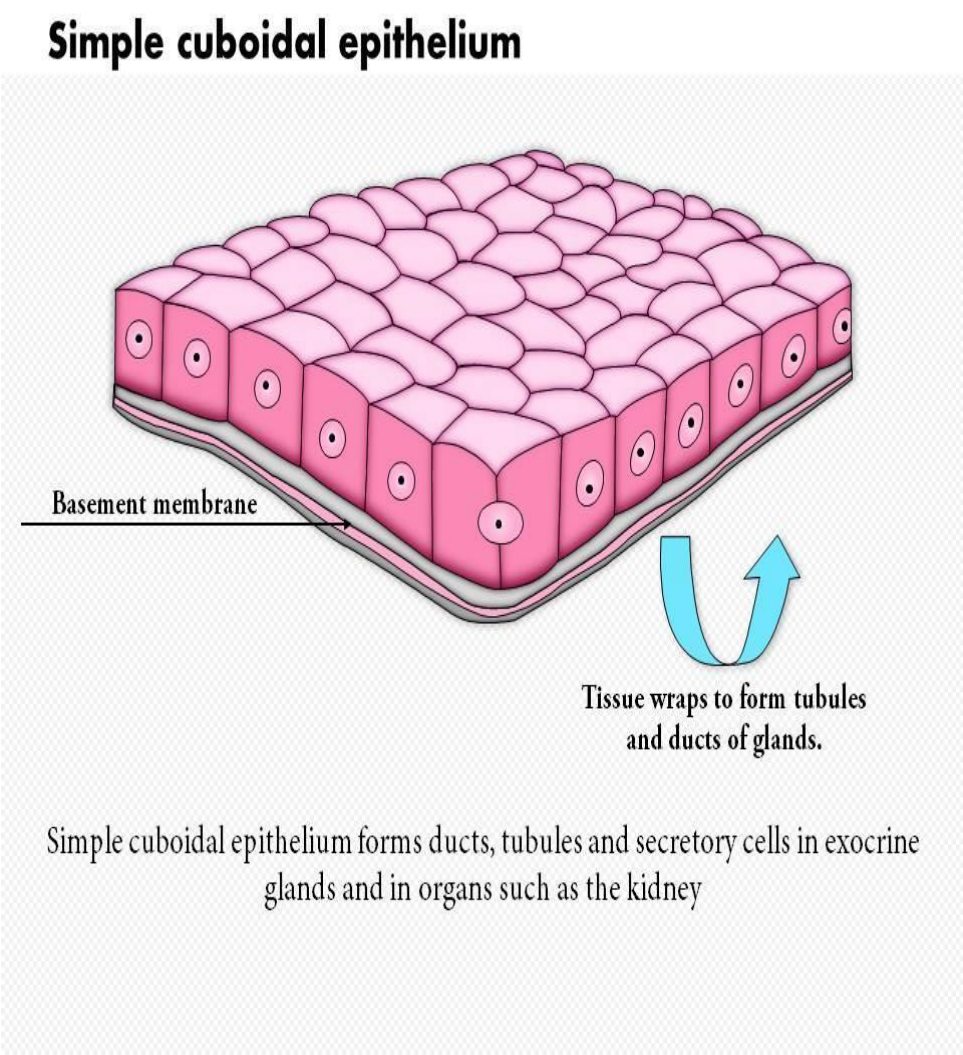
## A-Simple epithelial tissue

composed of only one layer based on basement - membrane

1-Simple cuboidal epithelial tissue:-

**Location**: secretory ducts of small glands, kidney tubules

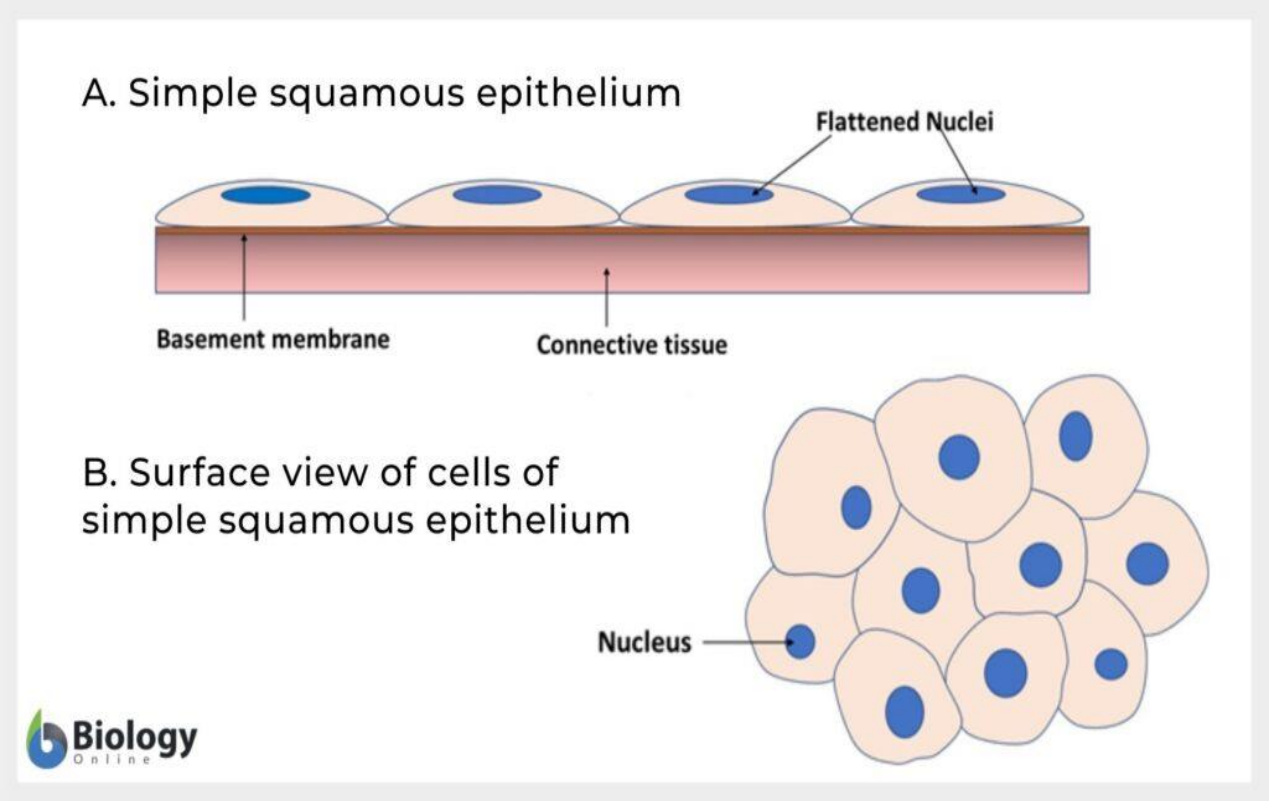
**Function**: allows secretion and absorption



## 2-Simple squamous epithelial tissue:-

**Location**: blood and lymphatic vessels being called endothelium, lining the abdominal and plural cavities called mesothelium.

**Function**: secrets lubricating substance, allows diffusion and filtration

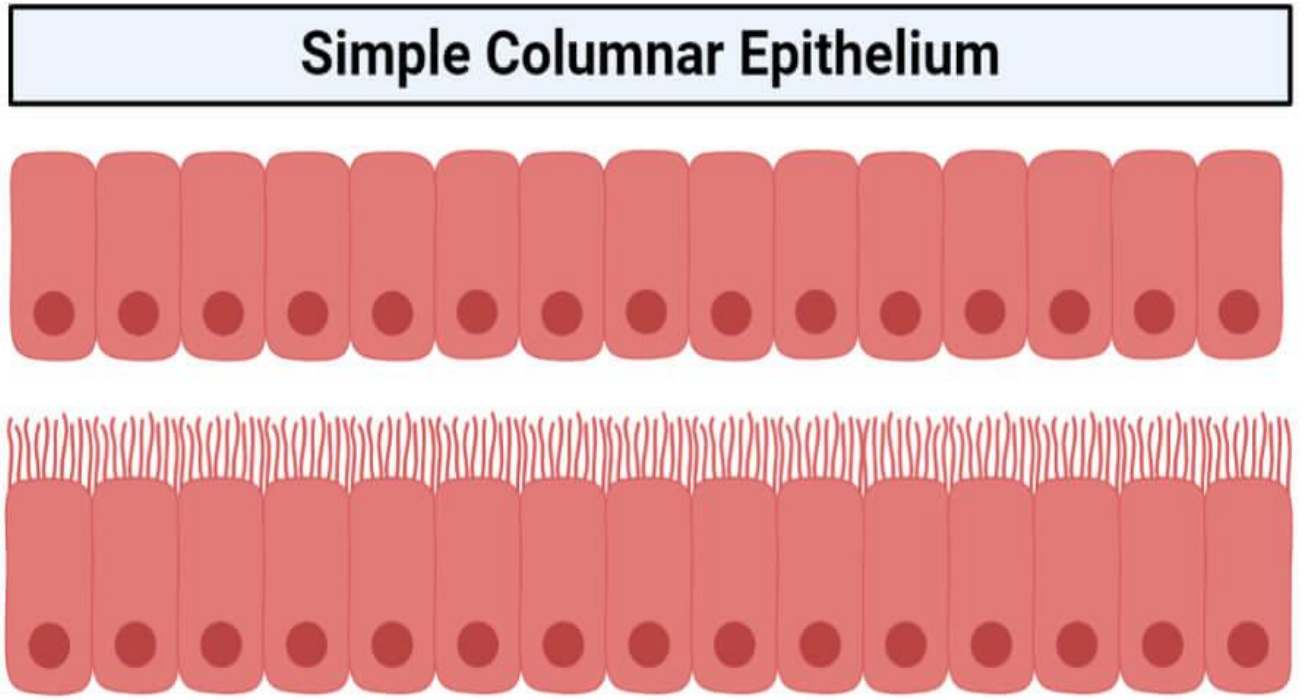


## 3-Simple columnar epithelial tissue :- •

**Location**: bronchi, uterine tubes, uterus called ciliated columnar ; and cover

digestive tract, bladder - called non ciliated columnar epithelium

**Function**: allows absorption, secretes mucous and enzymes



4-Pseudostratified columnar epithelial tissue :- are tissues formed by a single layer of cells that give the appearance of being made from multiple layers, especially when seen in cross section.

**Location**: trachea and most of the upper respiratory tract (ciliated cells)

**Function**: secretes mucus which is moved with cilia


**Pseudo-stratified Columnar Ciliated Epithelium**

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

**1-Stratified squamous epithelial tissue**

There are two types of stratified squamous epithelial tissue:

* Non keratinized squamous epithelial tissue which is covering moist cavities such as mouth , esophagus , pharynx

* Keratinized squamous epithelial tissue found on exposed surface of the body such as the skin .

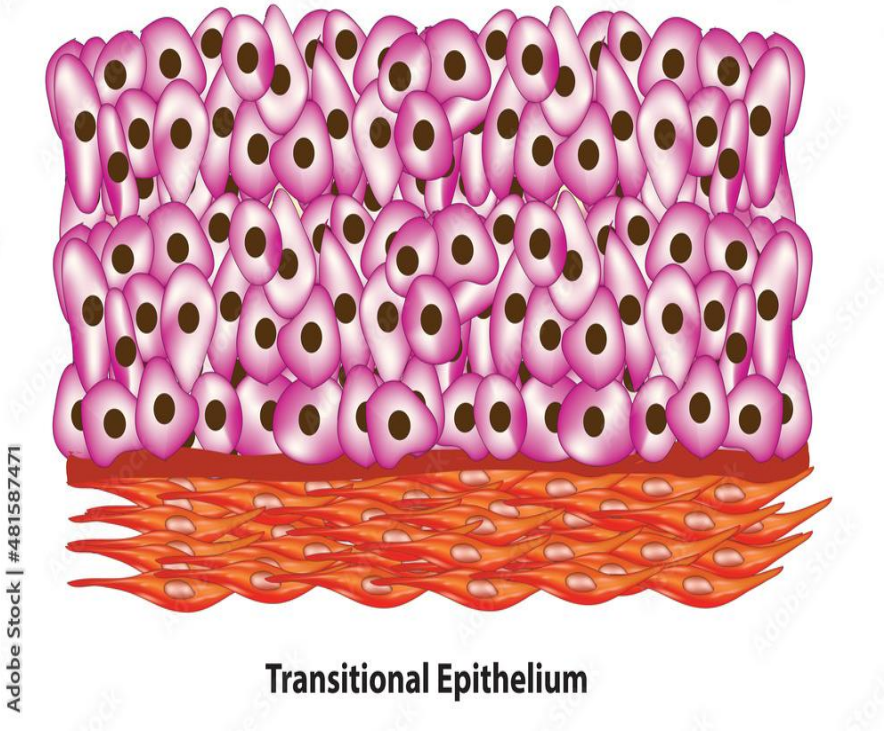
2- **Stratified cuboidal epithelial tissue** :- found in the large excretory ducts in the salivary glands and pancreas .

## 3- Stratified columnar epithelial tissue

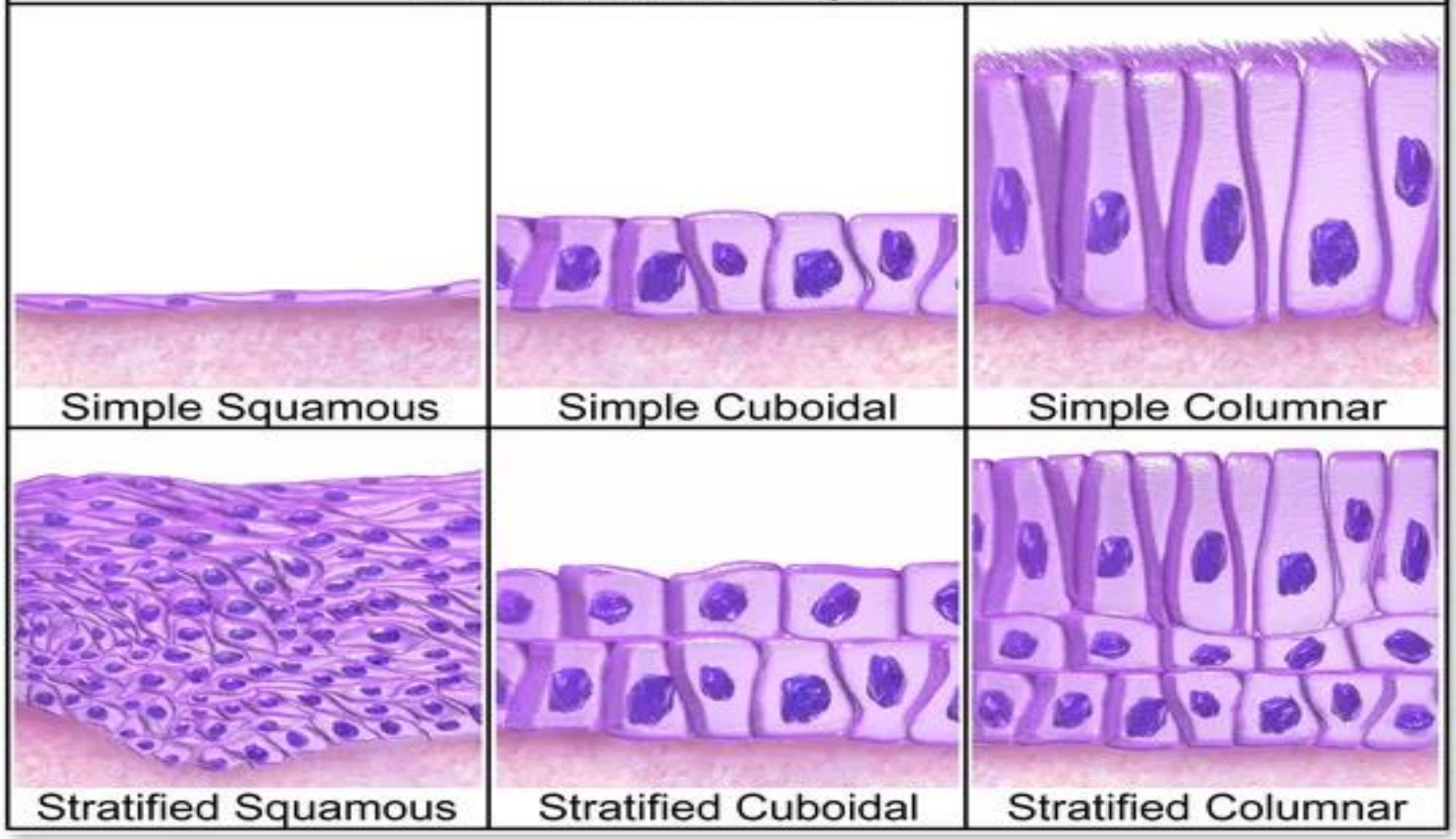
Is found in the conjunctiva of the eye while the ciliated Stratified columnar epithelial tissue is found in the larynx .

## 4-Transitional epithelial tissue

Is found exclusively in the passages of the urinary system .



# Classification of Epithelium

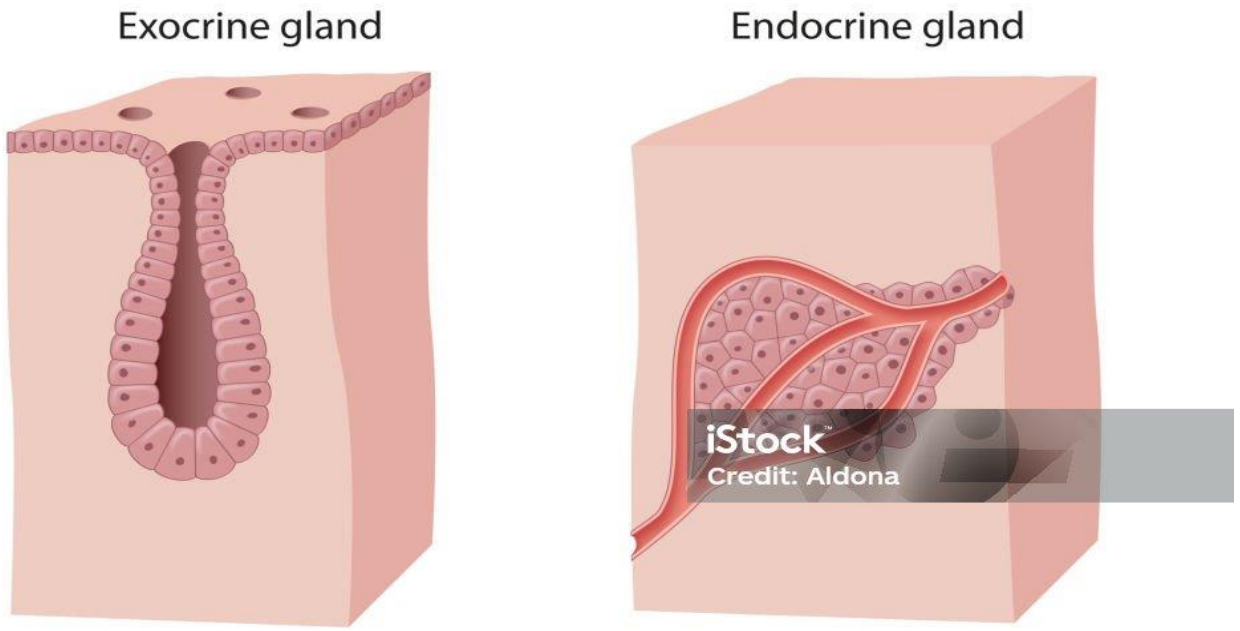


**Glandular tissue** : cells of the glands developed from epithelial tissue , according to the methods of secreted products of gland the glandular epithelial tissues classified to :

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

B- Endocrine glands(secret their products direct into circulatory system)like thyroid

C- Mixed glands (like pancreas)



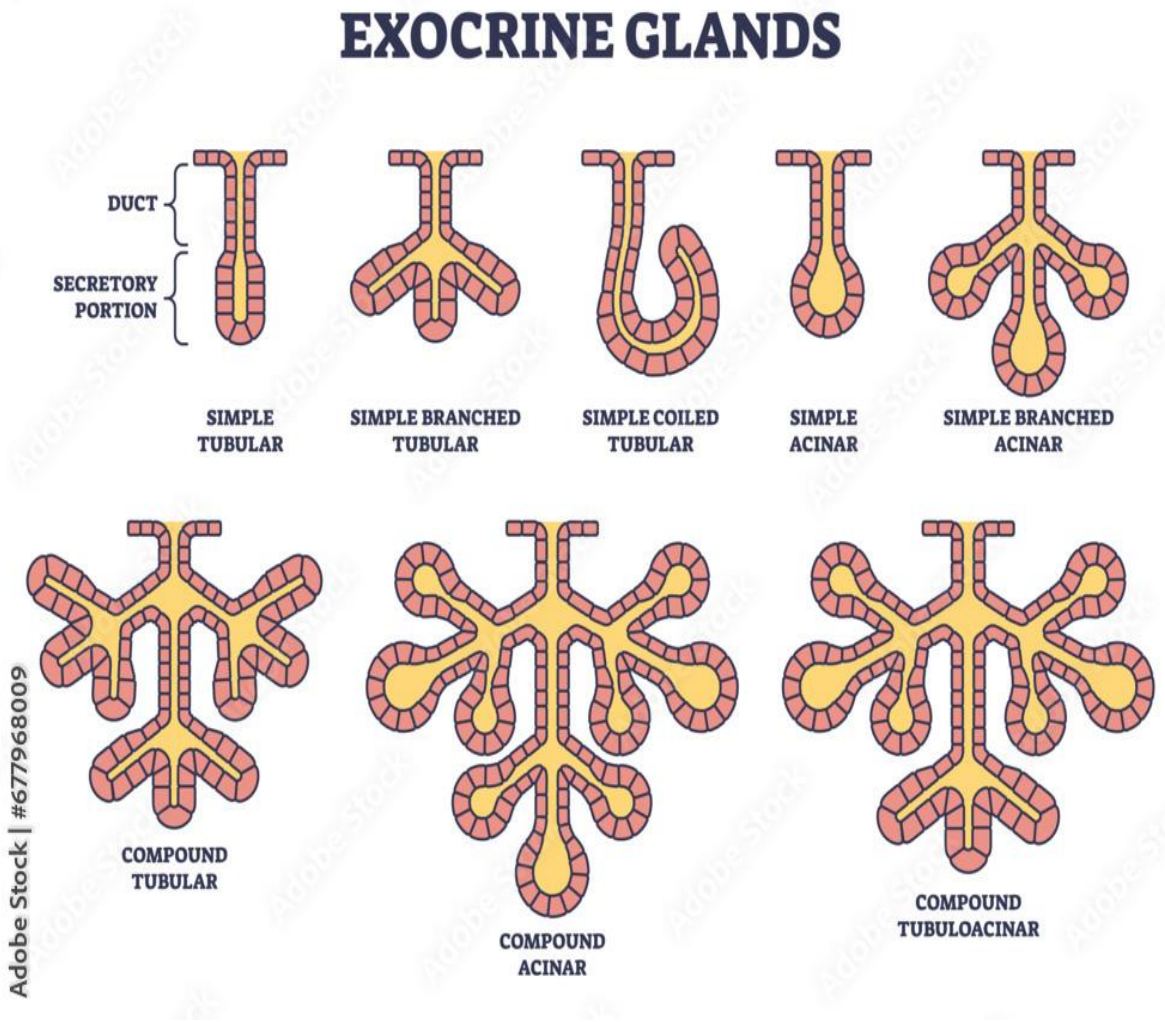
**A- Exocrine gland** :have a secretory portion which contains the cells specialized for secretion and ducts which transport the secretion out of the gland

**According to the structure of the ducts**:

- Simple(un branched ).
- Compound (two or more branched ).

**According to the structure of secretory portion**

- Tubular (either short or long and coiled )
- Acinar (round or globular ).

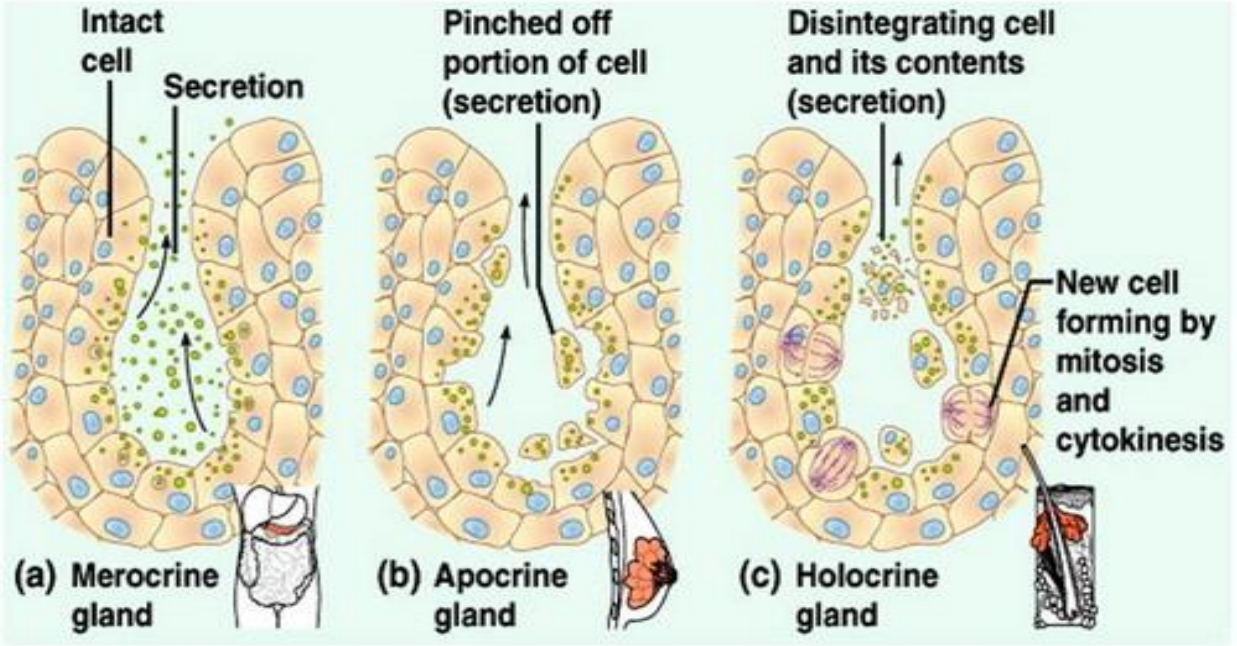


## According to the way the secretory products leave the cell

- Apocrine:-The secretory products is typically a large lipid droplet. The secretory cells lose part of their cytoplasm in the process of secretion. Example; Mammary glands

Merocrine ( Eccrine): secrete product usually containing proteins and no part of the gland is lost or - damaged like salivary gland

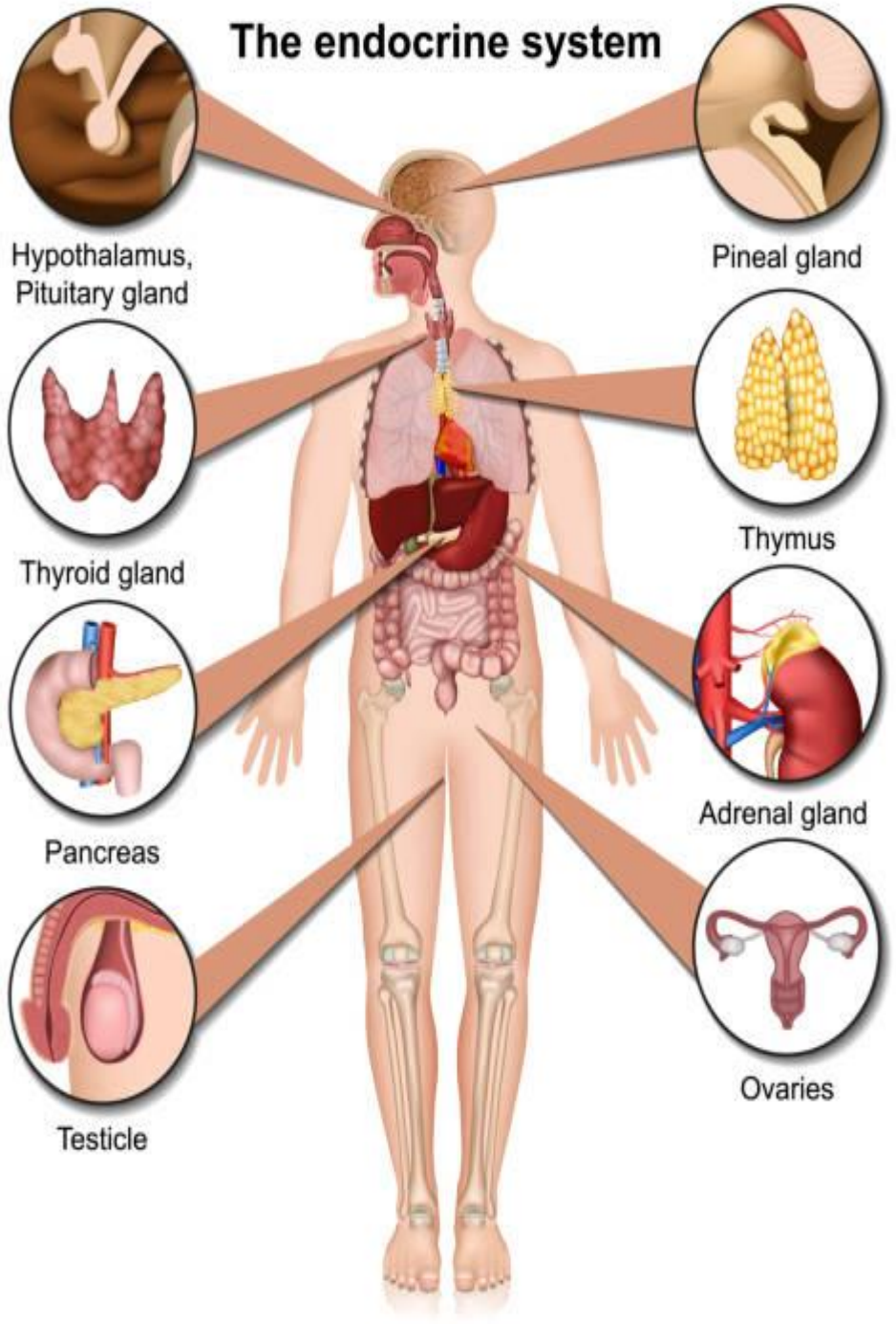
_-Holocrine : the cell filling with secretory product and then the whole cell being disrupted and shed .Example: Sebaceous glands of skin.



● **Endocrine glands :-** have not any ducts ; their specific products – hormones are released directly into the blood stream.

● The major endocrine glands include:

A- Pituitary, thyroid, Parathyroid, Adrenal, Pancreas, Ovary (females), Testis (males)



2- Connective tissue:- Are group of tissues in the body that maintain the form of the body , provide cohesion and internal support. The connective tissues include several types of fibrous tissue that vary in their density and cellularity, such as—bone, ligament- cartilage, and adipose (fat) tissue.

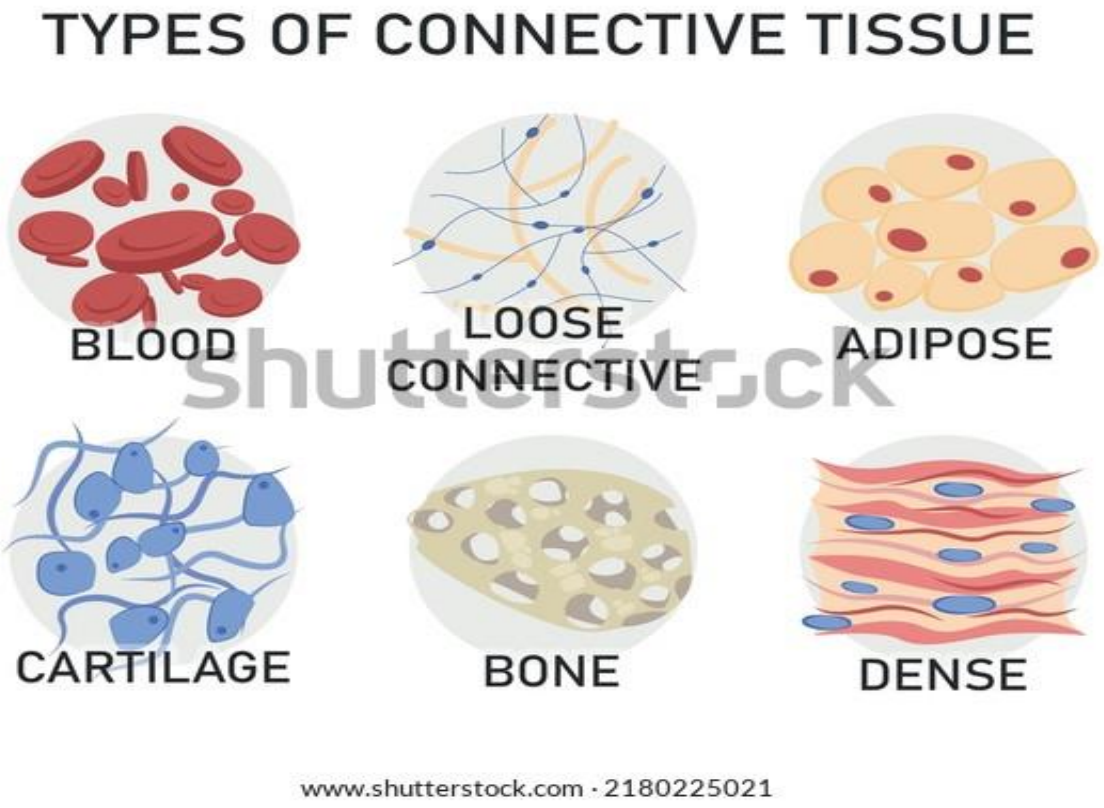
**Function:-**

- Wound repair / inflammatory response

- mechanical support for other tissue

Transport, immunological defense, -

energy reseverve,and inflammation -



**3- Muscular tissue** is composed of cells that have the special ability to shorten or contract in order to produce movement of the body parts . Muscle occurs in three distinct types: skeletal, smooth, and Cardiac muscle .

**4- Nervous tissue** is found in the brain, spinal cord, and nerves. It is responsible for coordinating and controlling many body