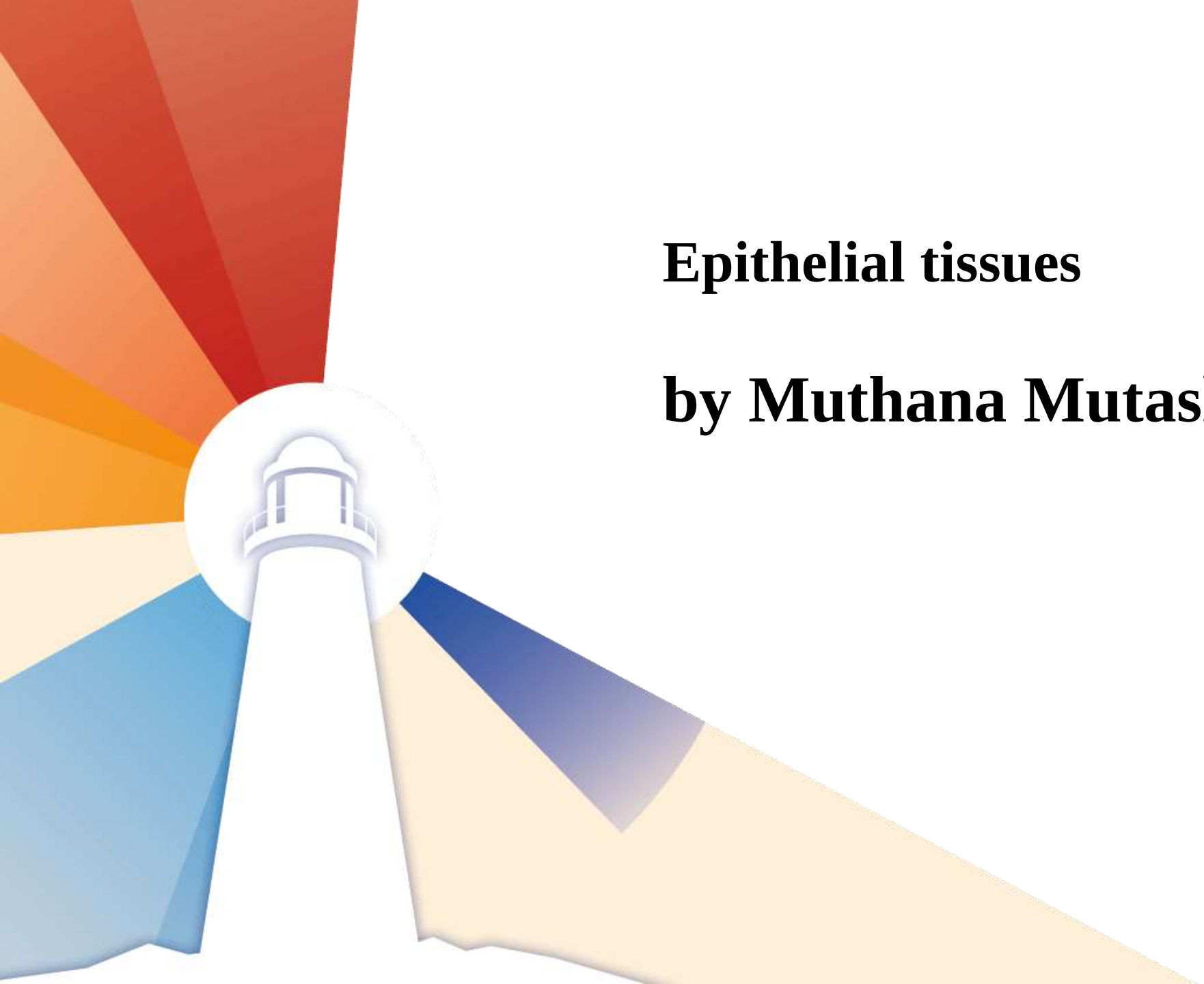


Epithelial tissues

by Muthana Mutasher

Epithelial tissues

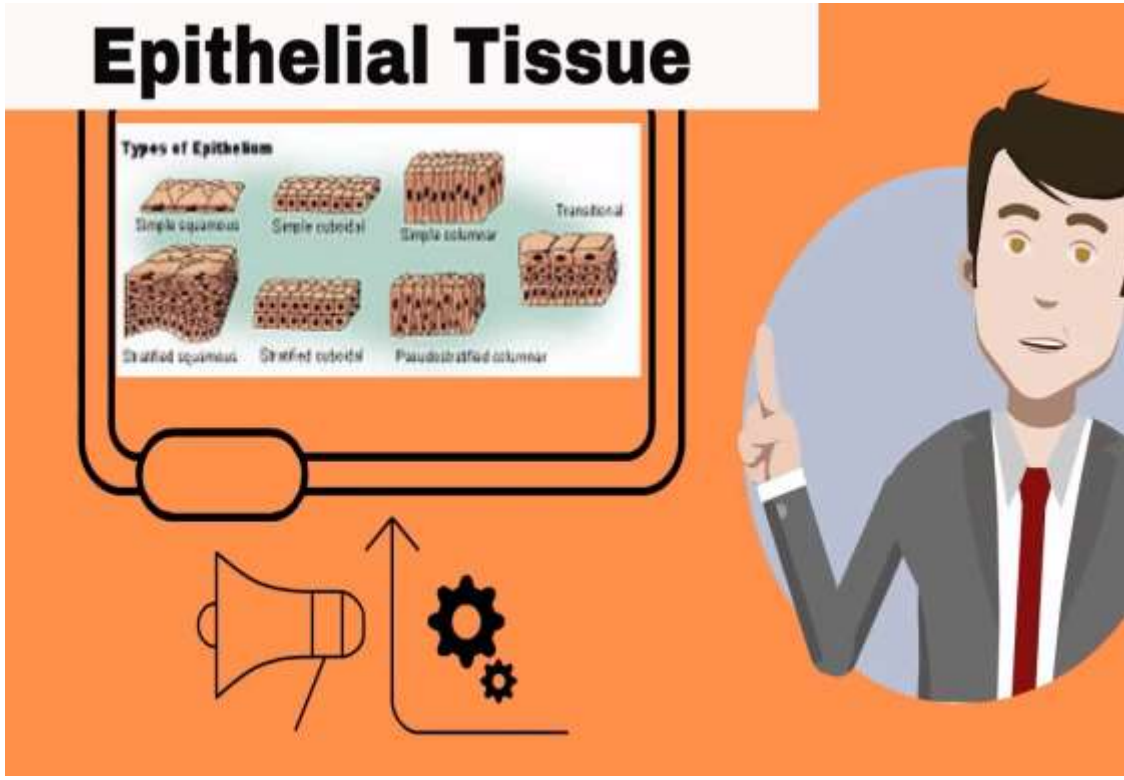
Epithelial tissue or "Epithelium": Composed of closely aggregated cells adhering strongly to one another, and to a thin layer of extracellular matrix- the basement membrane- forming cellular sheets that line the cavities of organs and cover the body surfaces.

Classification of Epithelial Tissue:

Epithelia are divided into two main groups according to their structure and function:

1.Covering & lining epithelia

2.Glandular epithelia.



Covering & lining Epithelia:

➢ In which the cells are organized in layers that cover the external surfaces or line the cavities of the body.

➢ They can be classified according to the number of cellular layers into:

1- **Simple epithelium**

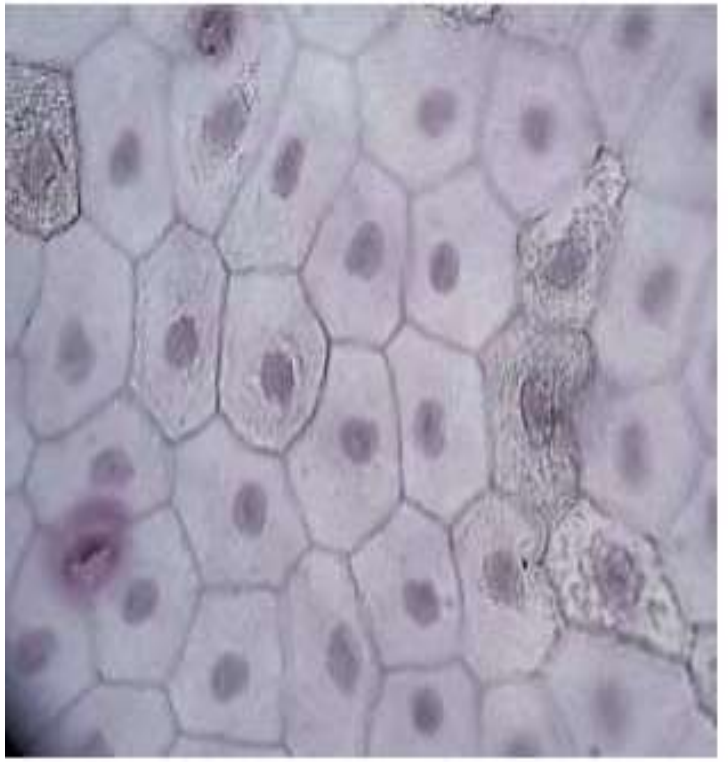
2- **Stratified epithelium**

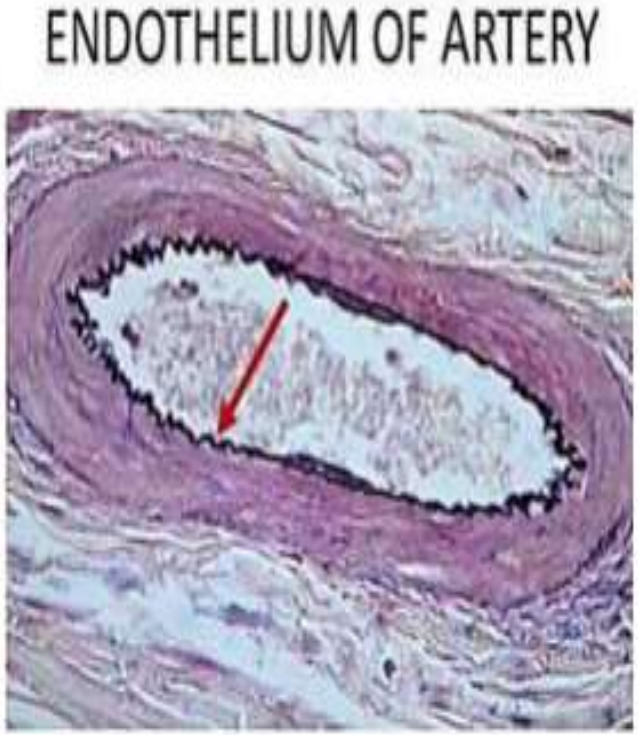
Simple Epithelial Tissues

Contain one layer of cells, all of them based on the basement membrane. It can be classified according to the shape of cells into:

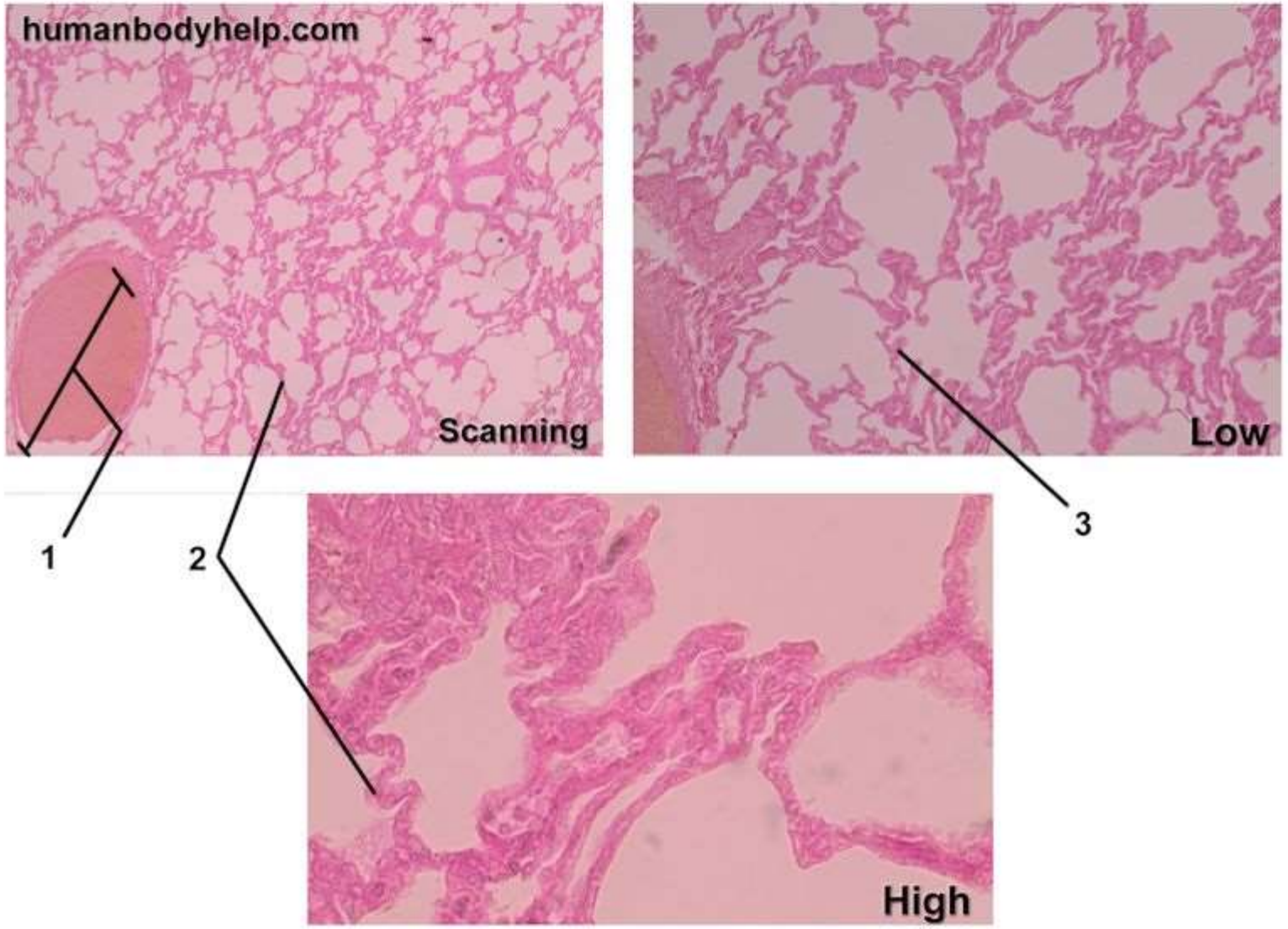
1- Simple Squamous Epithelium:

•The cells are flat in shape (look like scales) and arranged in a single layer.





•Each cell is irregular in shape, and has a disk-shaped flattened nucleus. Ex: Endothelium, and Mesothelium.



Simple Squamous Epithelium:

Simple Epithelial Tissues

Simple Columnar Epithelial Tissue:

•A single layer of tall, closely packed cells, aligned in a row.

•Each cell has an oval nucleus that located close to the basal region of the cell.

•This epithelium is adapted for secretion and/or absorption, and can also be protective.

•This tissue lines the digestive tract from the stomach to the anus as well as uterus and other organs.

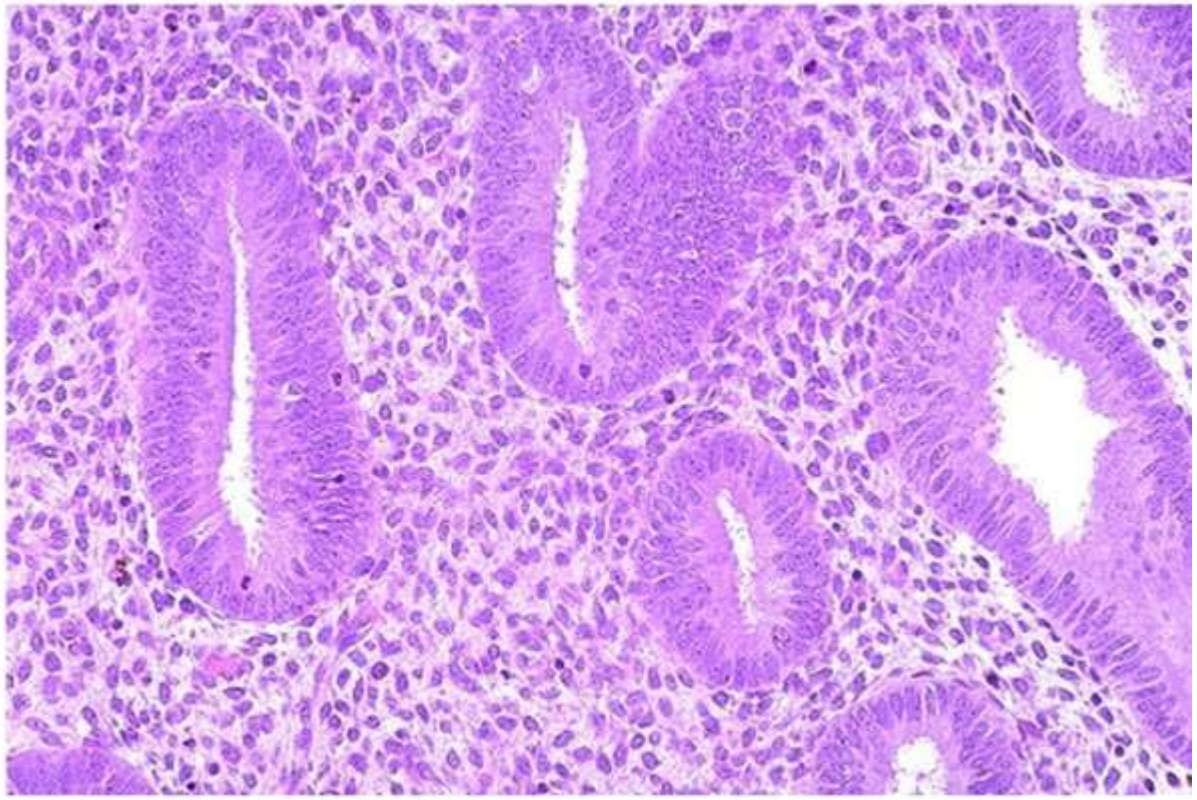
Simple Columnar Epithelial Tissue is further divided into two categories: ciliated and non-ciliated.

•Non ciliated columnar epithelium often contains cellular extensions (microvilli) and scattering unicellular glands (goblet cells) as in the small intestine.

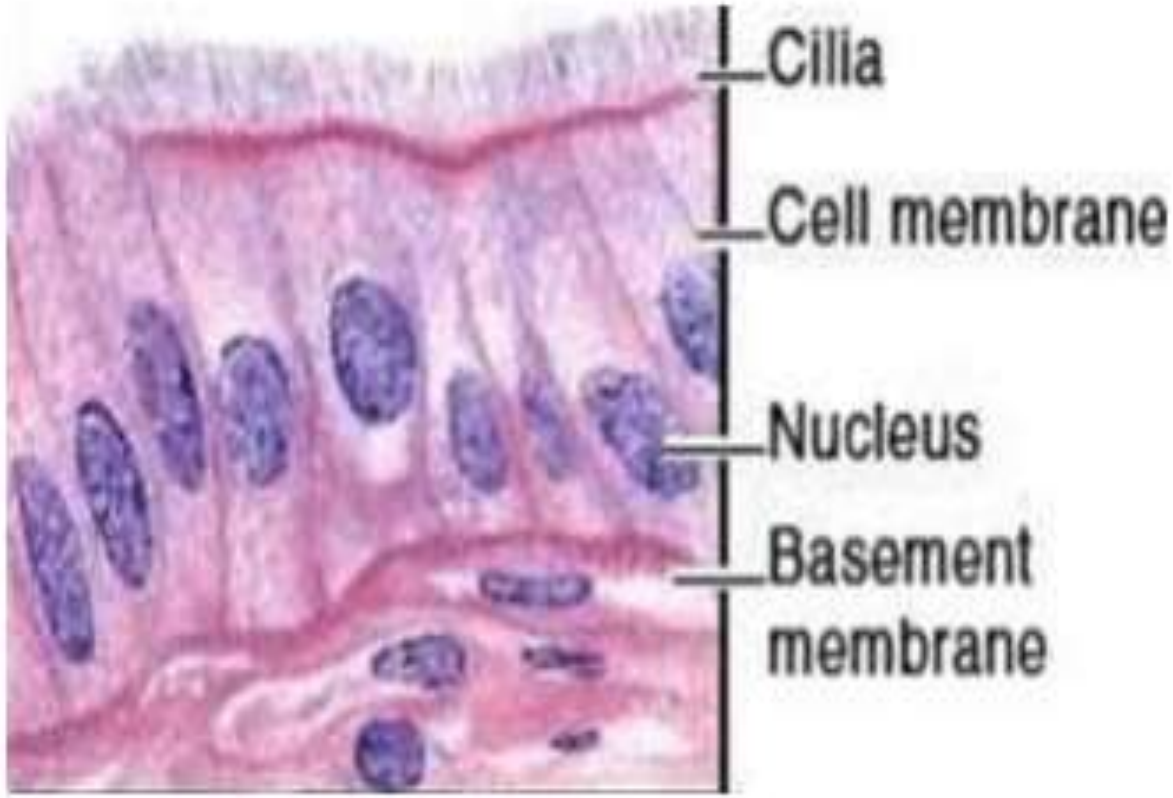
Non ciliated columnar epithelium

Simple Epithelial Tissues

•Ciliated columnar epithelium contains cilia and found within bronchioles of the respiratory tract and in the oviduct of the female reproductive tract.



female reproductive tract



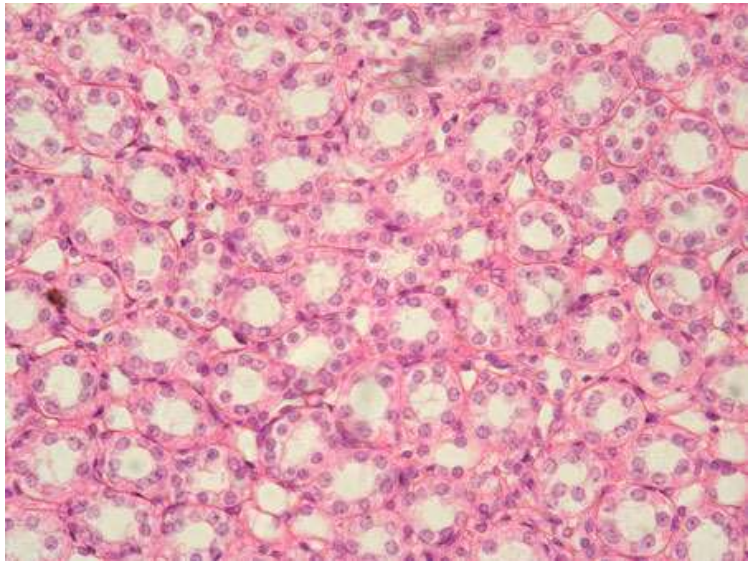
Simple Epithelial Tissues

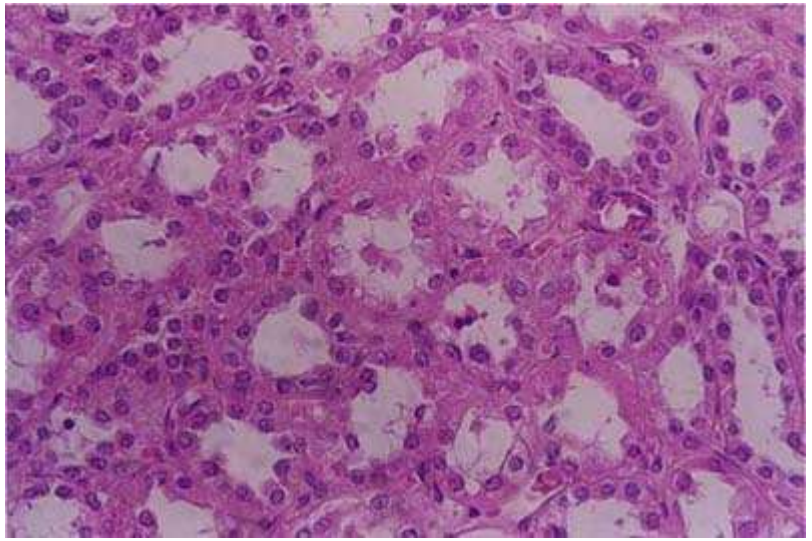
Simple Cuboidal Epithelial Tissue:

•It is a single layer of cells that are as tall as they are wide (appear to be square-shaped in cross section).

•Each cell has a large, rounded, centrally located nucleus.
•The important functions of this epithelium are covering and secretion.

•It’s found in kidney tubules and in ducts of many glands, and secretory portion of salivary glands.

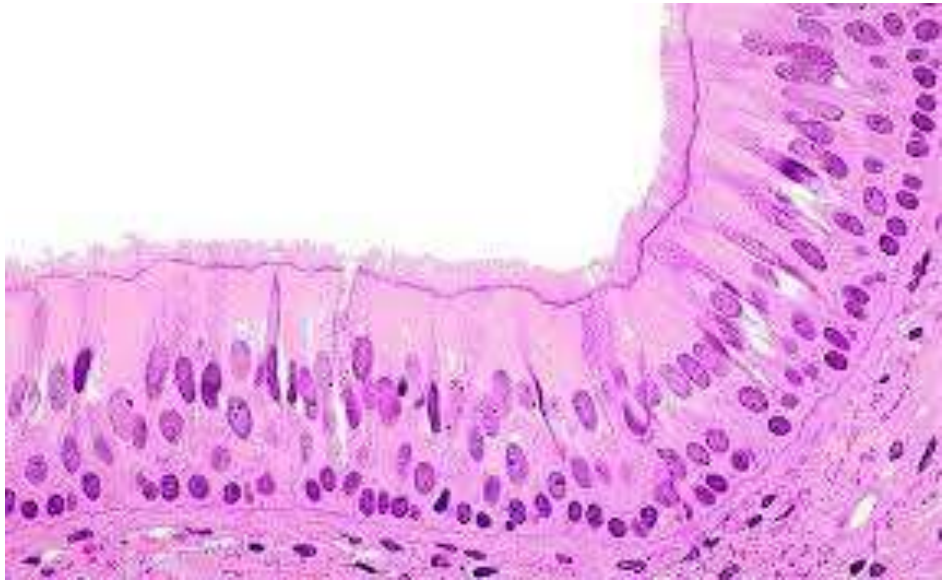




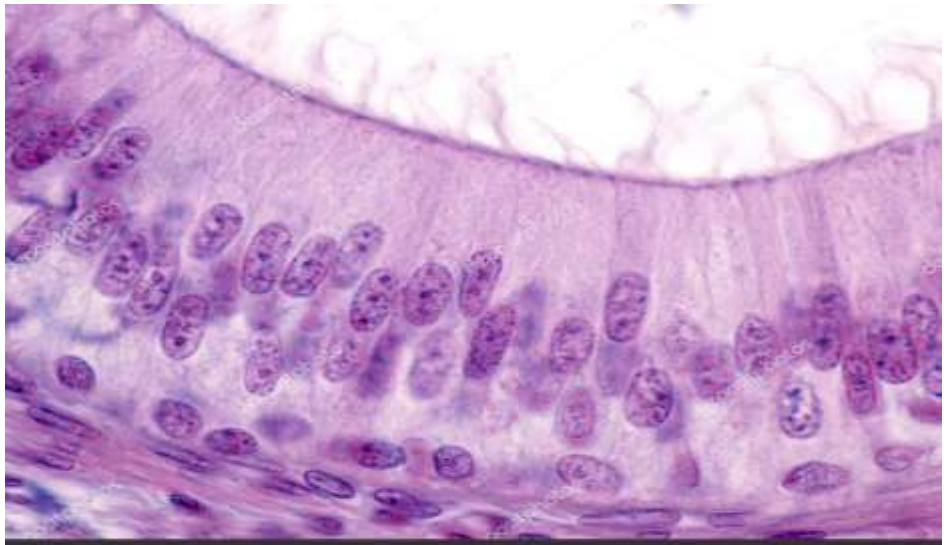
Simple Epithelial Tissues

Pseudostratified Columnar Epithelial Tissue:

• It looks layered (stratified) because the nuclei of the cells are distributed at different levels between the apical and basal surfaces. Although all of these epithelial cells are attached to the basement membrane, though some of them do not reach its apical surface. Therefore, this tissue has been classified as a type of simple epithelium.



•It includes two subtypes: a) **Ciliated pseudostratified columnar epithelium**: founds in the lining of the trachea and upper respiratory tract



b) **Non-ciliated pseudostratified columnar epithelium**: lacks cilia and goblet cells, occurs primarily in part of the male urethra and epididymis.

Stratified Epithelial Tissues

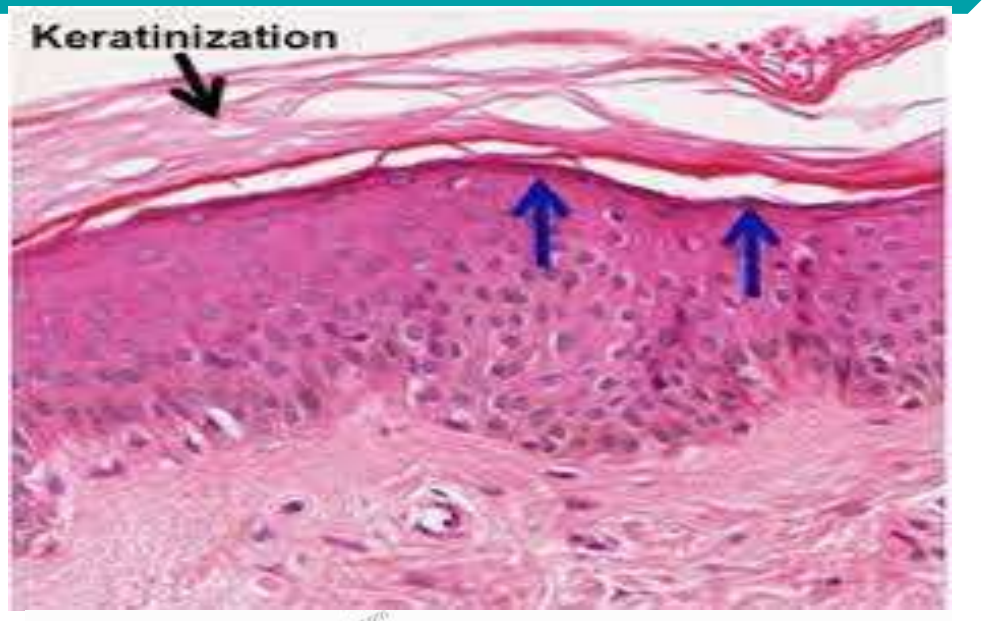
Contain more than one layer of cells placed on top of each other, only the inner most layer based on the basement membrane. It can be classified according to the shape of cells of its superficial layer into:

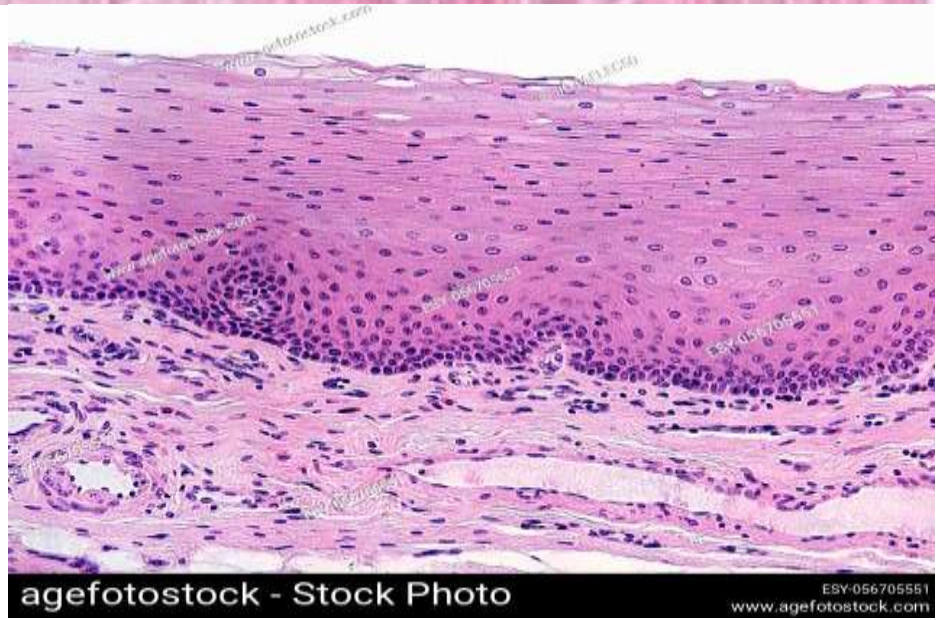
1- Stratified Squamous Epithelial Tissue:

•Found primarily in places subjected to attrition (skin, mouth, esophagus, vagina).

•This tissue has multiple cell layers, and only the deepest layer of cells is in direct contact with the basement membrane

As they move progressively closer to the surface, the cells become irregular in shape and flatten, becoming very thin and squamous.





Stratified Epithelial Tissues

Stratified Columnar Epithelial Tissue:

•It consists of two or more layers of cells, but only the cells at the apical surface are columnar in shape.

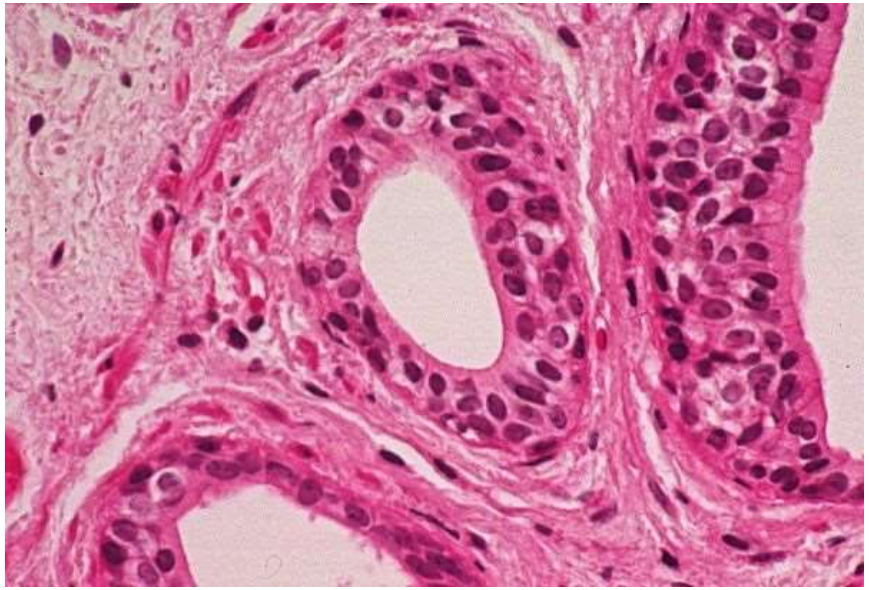
•It is a rare tissue, presents in human body in small areas, such as the ocular conjunctive, membranous segment of the male urethra, and large duct of salivary glands.

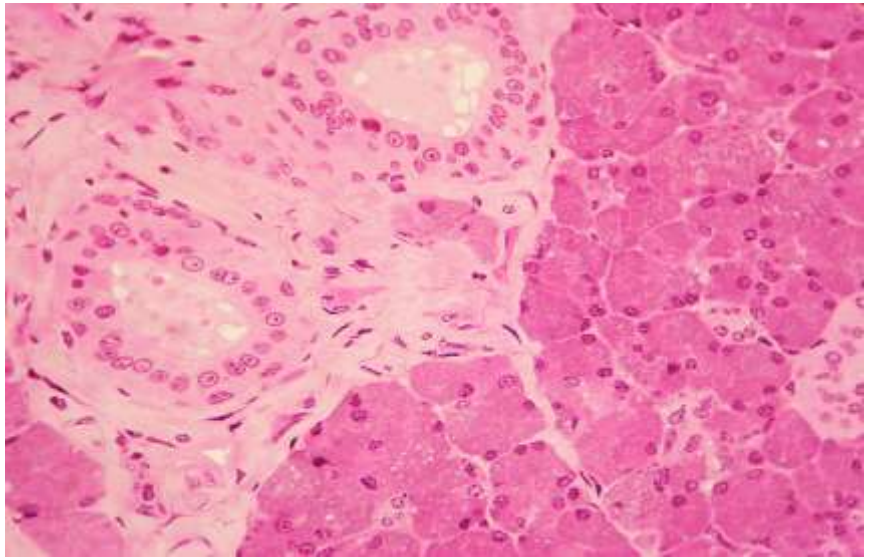
Stratified Epithelial Tissues

Stratified Cuboidal Epithelial Tissue:

•This epithelium contains two or more layers of cells, and the superficial cells tend to be cuboidal in shape.

• It forms the walls of the large ducts of most exocrine glands, such as the ducts of the sweat glands in the skin





Stratified Epithelial Tissues

Transitional Epithelial Tissue:

•This epithelium is limited to the urinary tract (urinary bladder, ureters, and part of the urethra).

•It varies in appearance, depending upon whether it is in a relaxed state or a stretched state.

•In a relaxed state, the basal cells appear cuboidal or polyhedral, and the apical cells are large and rounded (dome-like cells).

•When transitional epithelium stretches, it thins and the apical cells flatten and become almost squamous in shape.