جامعة المستقبل
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Zoology
Frist stage

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Lecture: 5

Animal tissues

Tissue: are collection of cells and their products (extracellular material) that had same origin that together carry out a specific function. The science that deal with study tissue is known as **histology.** Four basic tissue types:

Epithelial tissue connective tissue muscle tissue nervous tissue

Type	Origin	Function
1. Epithelial tissue	Ectoderm, endoderm, mesoderm	Protection, secretion, absorption etc.
2. Connective tissue	Mesoderm	Support, binding, storage, protection, circulation.
3. Muscular tissue	Mesoderm	Contraction and movement
4. Nervous tissue	Ectoderm.	Conduction and control

- All animals are composed of ONLY these four tissue types
- Tissue types are organized to form organs, which form the functional systems of the body.

Embryonic Tissues

Embryo begins as a single cell divides into many cells that form layers (strata).Three primary germ layers:

A. Ectoderm (outer) gives rise to: epidermis + nervous system

B. Endoderm (inner): mucous membranes: GI tract and respiratory linings; digestive glands.

C. Mesoderm (middle) give rise to muscle, bone, and blood.

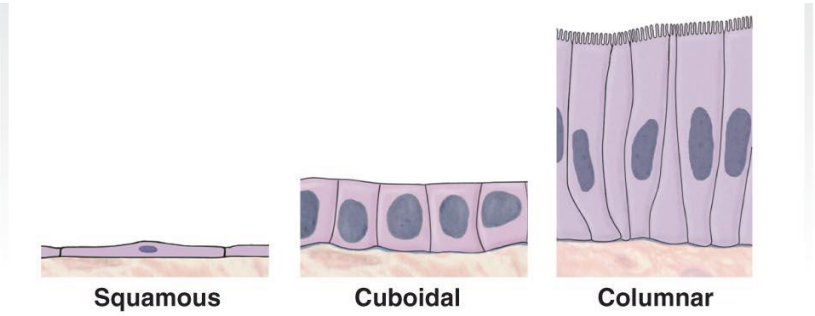
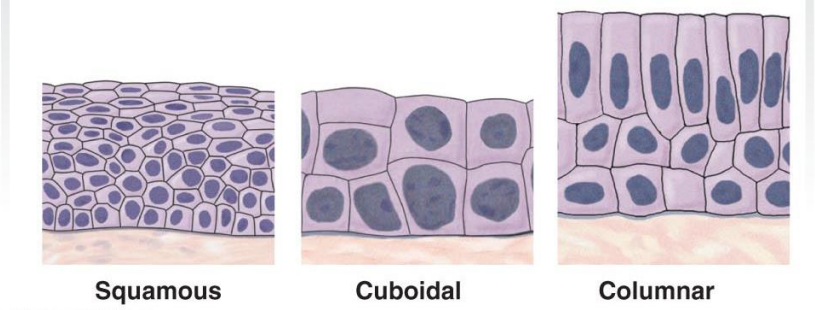
Epithelium tissue

Epithelium tissue is sheets of cells , closed one of each other that cover or line the body surface . The main function is **protective** in addition to other function (**Secretion, Selective absorption, , Trans -cellular transport, and Sensing.)**

The epithelium cell are resting on non-cellular layer known (**basement membrane or basal lamina**) , in Stratified epithelium only base layer are resting on basement layer.

Classification of epithelium

Tissues can be divided based on the shape of their constituent cells and the number of cell layers into:

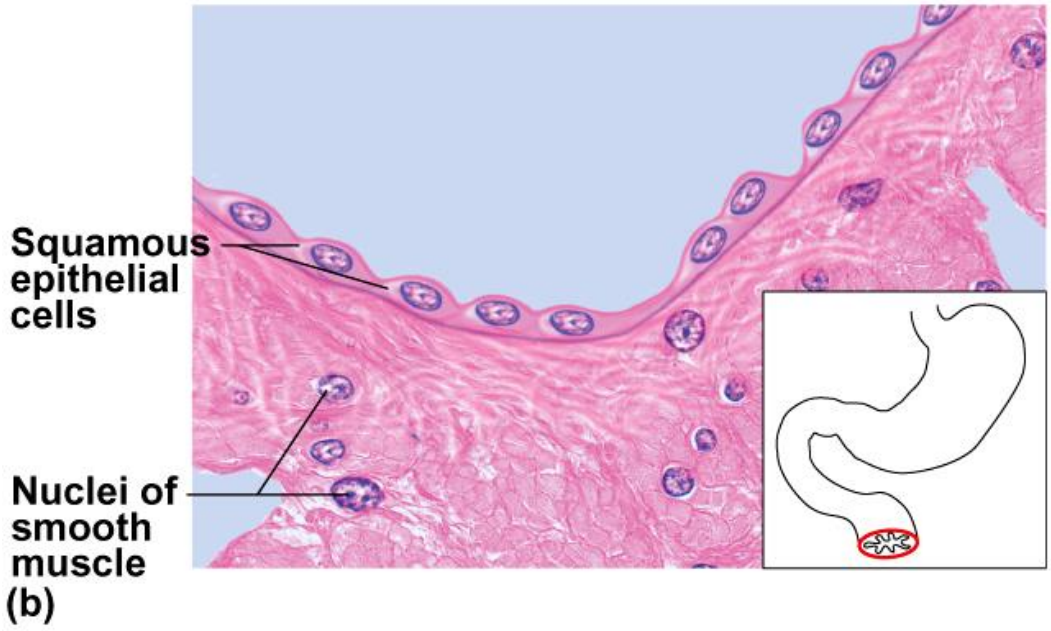
1. **Simple epithelium**	– contains one layer of cells – named by shape of cells
	
2. **Stratified epithelium**	– contains more than one layer – named by shape of ***apical cells***
	

Simple epithelium

Simple epithelium is a single layer of cells with every cell contact with the basement membrane that separates it from the underlying connective tissue. In general, it is found where absorption and filtration occur. The thinness of the epithelial barrier facilitates these processes.

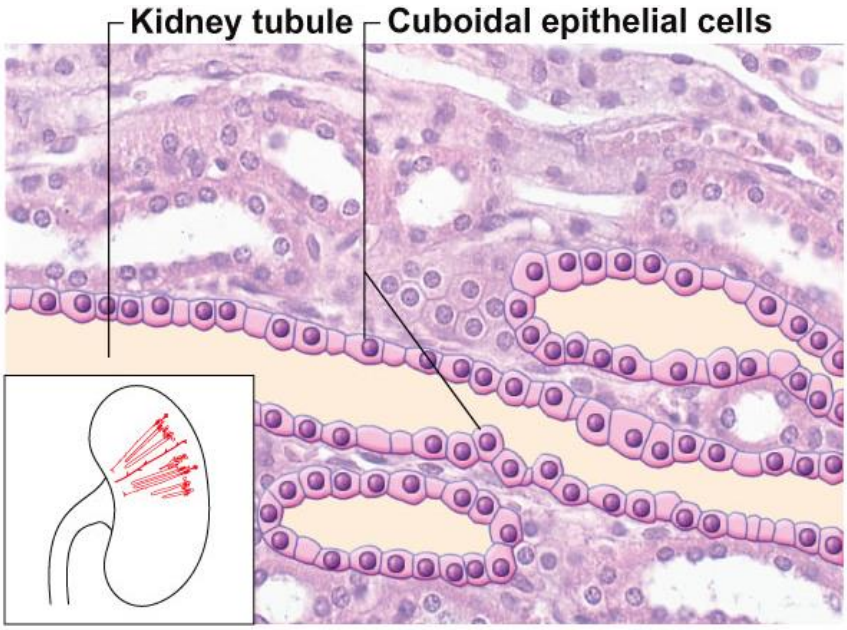
In general, simple epithelial tissues are classified by the shape of their cells. The four major classes of simple epithelium are: (1) simple squamous; (2) simple cuboidal; (3) simple columnar; (4) pseudostratified.

(1) simple squamous; Squamous epithelial cells linings of the pericardial, pleural, as well as the linings of the alveoli of the lungs.



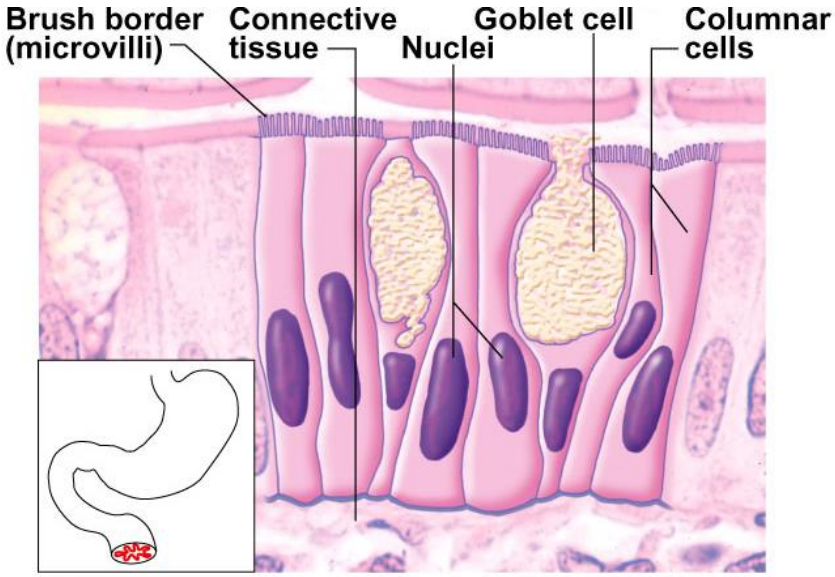
Simple Squamous Epithelium tissue	
Structure	Single row of flat cells (scaly)
Functions	Allows rapid diffusion of substances; secretes serous fluid
Locations	in alveoli, **glomerular capsule**, endothelium (blood vessels and heart), and serosa (external surface) such as stomach & intestines

(2) Simple Cuboidal: these cells may have secretory, absorptive, or excretory functions. examples include small collecting ducts of kidney, and salivary gland.



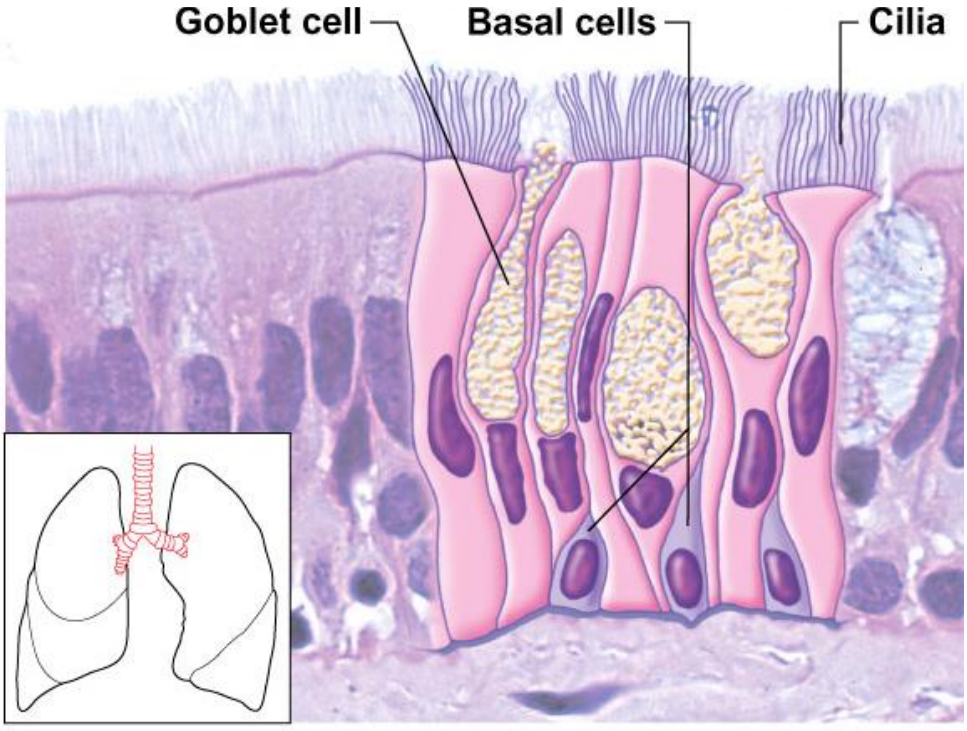
Simple Cuboidal Epithelium tissue	
Structure	Single row of **cube-shaped** cells, often with microvilli
Functions	Absorption & secretion; produces mucus
Locations	Liver, thyroid, mammary, salivary and other glands, bronchioles, and most kidney tubules

(3) Simple Columnar; Simple columnar epithelium can be ciliated or non-ciliated; ciliated columnar is found in the female reproductive tract and uterus. Non-ciliated epithelium can also possess microvilli. Some tissues contain goblet cells and are referred to as simple glandular columnar epithelium. these secrete mucus and are found in stomach, colon and rectum.



Simple Columnar Epithelium tissue	
Structure	Single row of **tall, narrow** cells ,vertically oriented, oval nuclei in basal half of cell
Functions	Absorption & secretion; produces mucus
Locations	Inner lining of GI tract from stomach to the anus; ducts of gallbladder; uterus, and uterine tubes; some kidney tubes; a few portions of upper respiratory tract bronchioles, and most kidney tubules

(3) Pseudostratified Columnar Epithelium; can be ciliated or non-ciliated. The ciliated type is also called respiratory epithelium as it is almost exclusively confined to the larger respiratory airways of the nasal cavity, trachea and bronchi. The term **pseudostratified** is derived from the appearance of this epithelium in section that there is more than one layer of cells, when in fact this is a true simple epithelium since all the cells rest on the basal lamina. The nucleus of these cells, however, are disposed at different levels, thus creating the illusion of cellular stratification.



Pseudostratified Epithelium tissue	
Structure	Single row of cells not all of which reach the free surface; nuclei at different levels
Functions	secretes propels mucus
Locations	most of the upper respiratory system from nasal cavity to bronchi; part of male urethra