

Descriptive Histology

9 Sept. 2019

Objectives

- ▶ Understand what is descriptive histology
- ▶ Review the cell and its structure
- ▶ Learn the epithelial tissue and its location
- ▶ Explain the different type of epithelial tissue
- ▶ Introduce to the connective tissue



JUNQUEIRA'S **Basic Histology** **Text & Atlas**

Fifteenth Edition



Anthony L. Mescher

Mc
Graw
Hill
Education

LANGHE

**Describe
what you see**



**Describe
what you see**



Definitions

- ▶ Descriptive: to describe
- ▶ Histology: The study of the microscopic structure of tissues.
- ▶ Tissue: An aggregate of cells in an organism that have similar structure and function.
- ▶ Cell: A membrane bound structure containing biomolecules, such as nucleic acids, proteins, and polysaccharides.



Cell

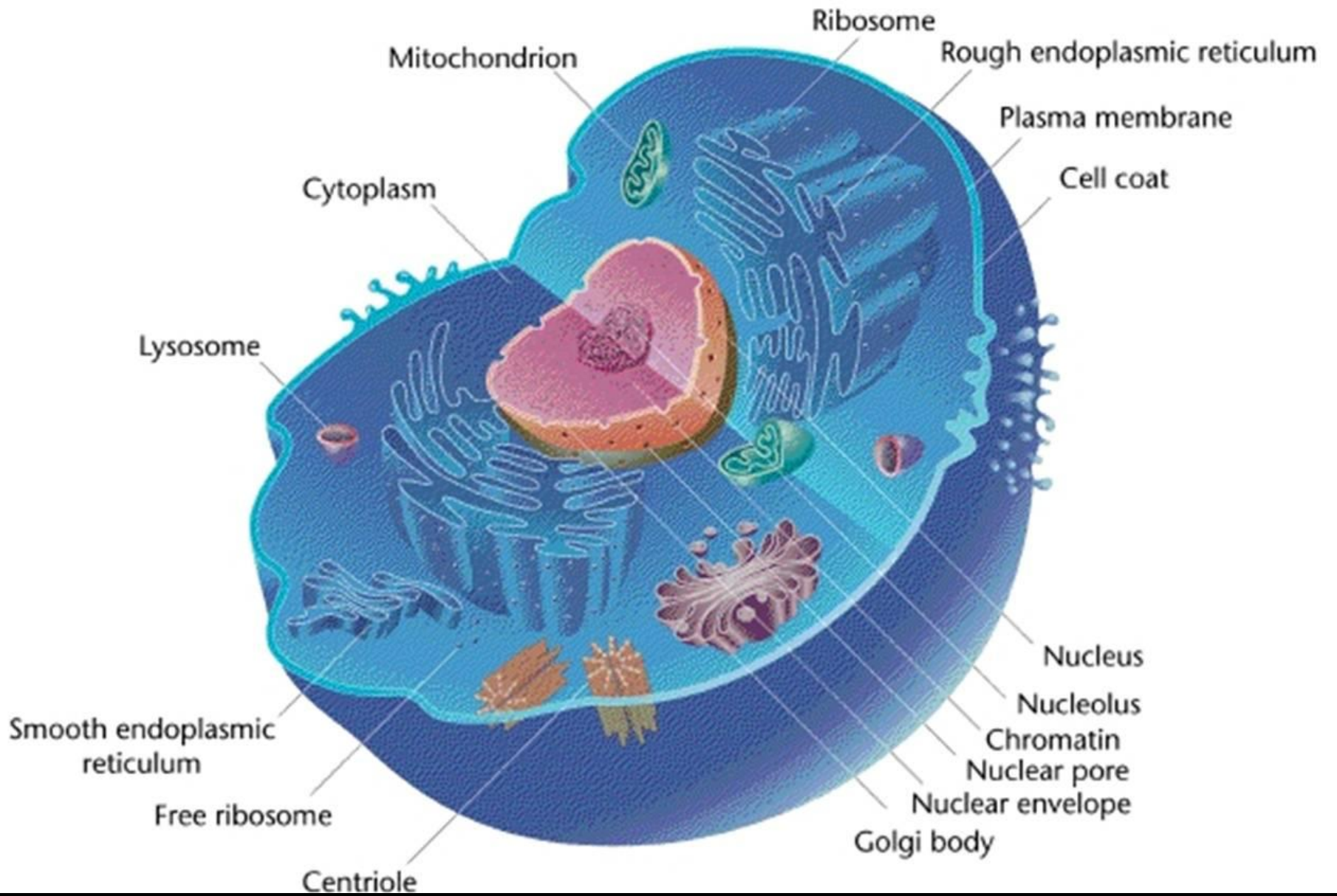
Cells are the basic structural and functional units of organisms

Animal cells are **eukaryotic**

Prokaryote is bacterial cells

The human organism consists of hundreds of different cell types





<https://www.youtube.com/watch?v=IZ9pqST72is>



Type of tissue

- ▶ Epithelial : cover and protect the body
- ▶ Connective : provide support
- ▶ Muscular : movement
- ▶ Nervous : control and communication



Main characteristics of the four basic types of tissues.

Tissue	Cells	Extracellular Matrix	Main Functions
Epithelial	Aggregated polyhedral cells	Small amount	Lining of surface or body cavities, glandular secretion
Connective	Several types of fixed and wandering cells	Abundant amount	Support and protection of tissues/ organs
Muscle	Elongated contractile cells	Moderate amount	Strong contraction; body movement
Nervous	Intertwining elongated processes	Very small amount	Transmission of nervous impulses



Epithelial Tissue

What do you know about Epithelial Tissue?



**Epithelial cells line all external
and internal surfaces of the body**



Functions of Epithelial

The principal functions of epithelial tissues are:

- ▶ Covering, lining, and protecting surfaces (e. g, skin)
- ▶ Absorption (e. g, the intestines)
- ▶ Secretion (e. g, the epithelial cells of glands)
- ▶ Contractility (e. g, myoepithelial cells found in glandular epithelium).



Type of epithelium

- ▶ Proper Epithelium

Covers and lines our outer and inner body

- ▶ Glandular Epithelium

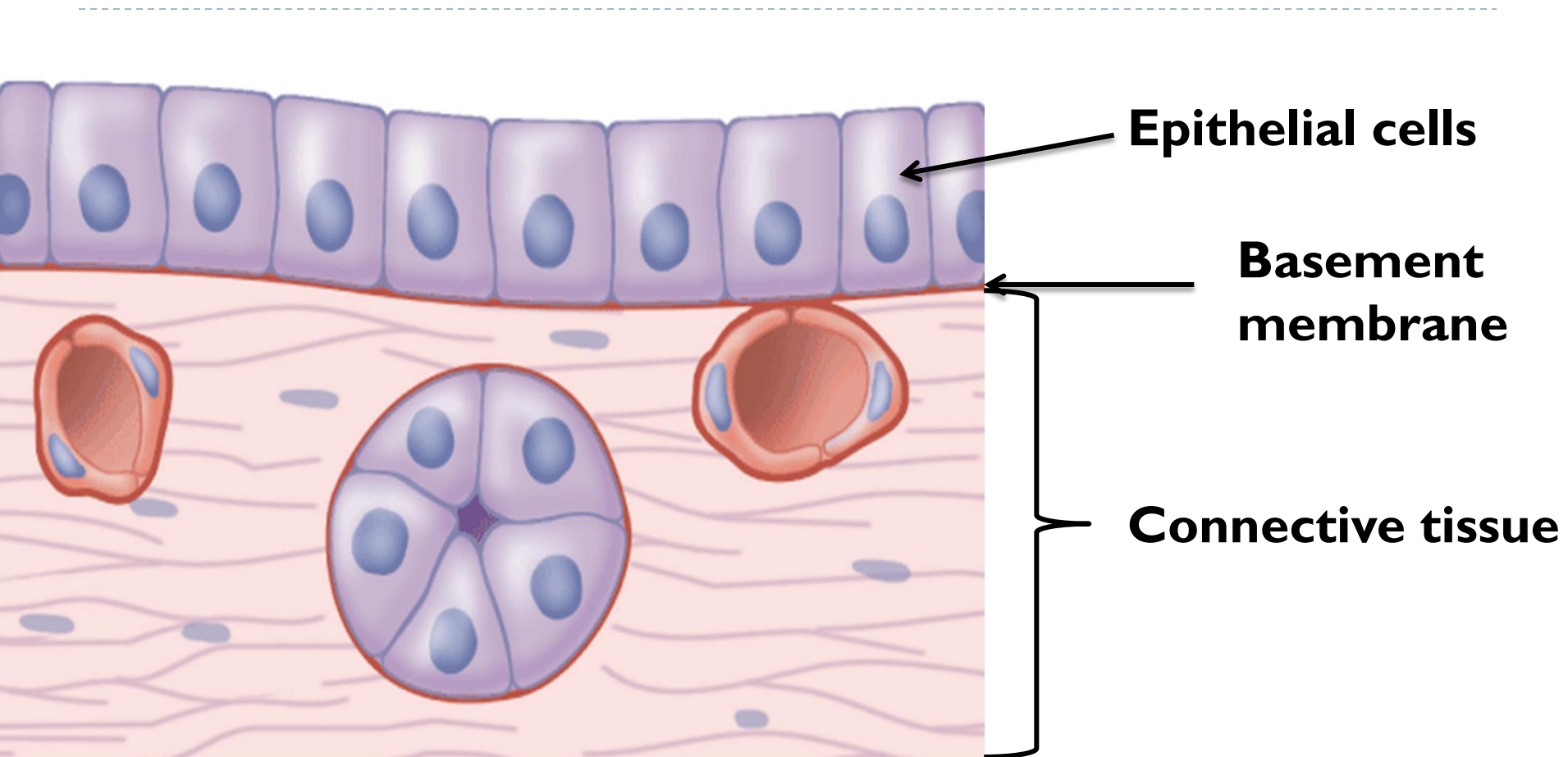
Forms our glands and secretes hormones and other substances



Basement Membranes

- ▶ All epithelial cells in contact with subjacent connective tissue have at their basal surfaces a specialized, felt-like sheet of extracellular material referred to as the **basement membrane**
- ▶ a thin, delicate membrane of protein fibres and mucopolysaccharides separating an epithelium from underlying tissue.



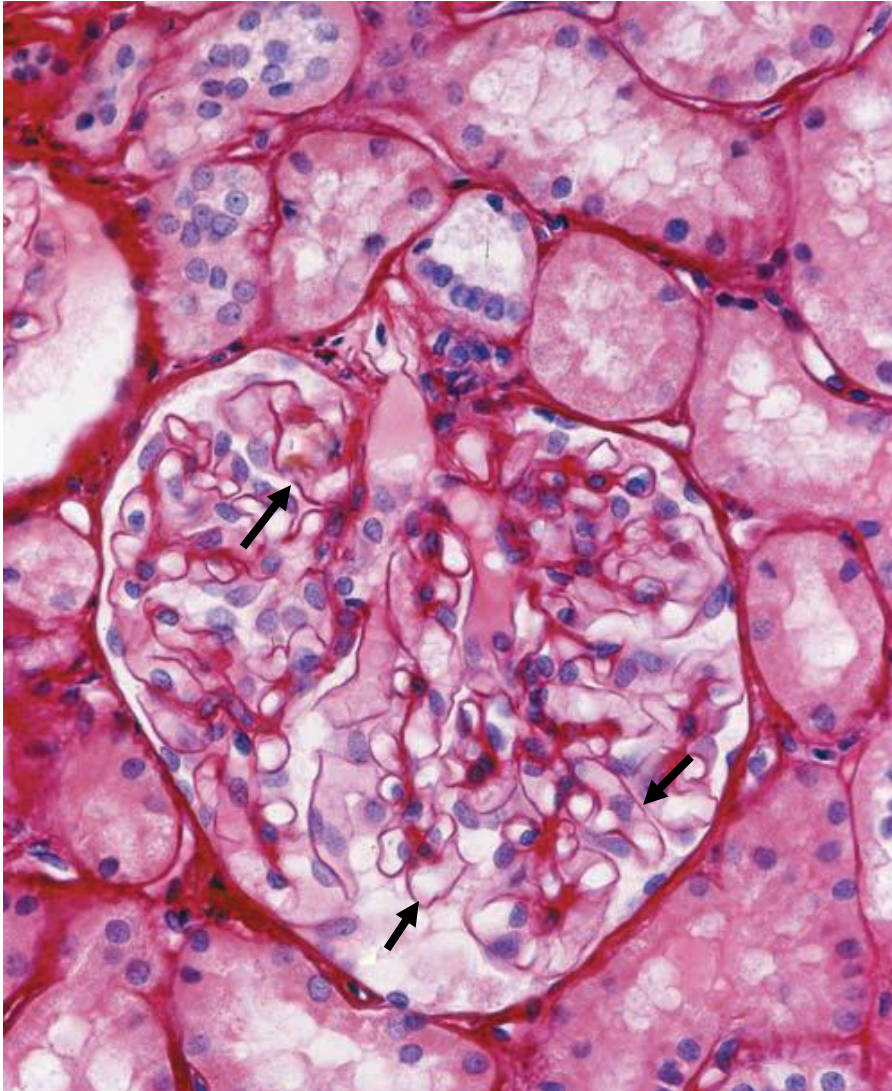


Epithelial cells

**Basement
membrane**

Connective tissue

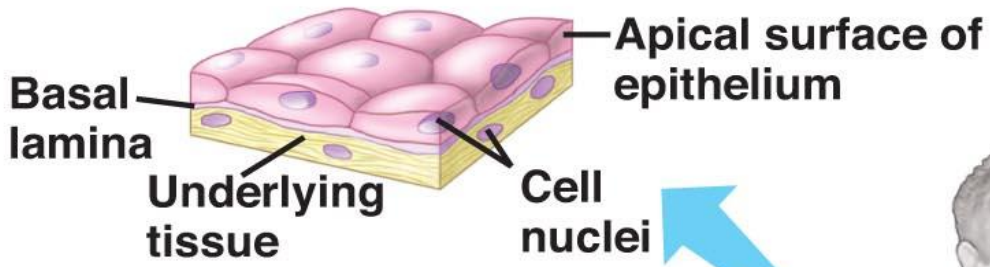




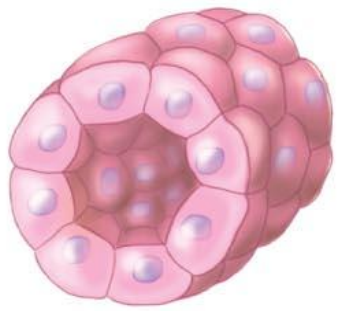
This section of kidney shows the well-stained basement membranes (arrows) of epithelia forming structures within the large, round renal glomerulus and its surrounding tubules. In kidney glomeruli the basement membrane, besides having a supporting function, has a highly developed role as a filter that is key to renal function.

Layers	Cell Shape	Location
Simple (One layer)	Squamous (flat)	Capillary and air sac linings
	Cuboidal (cube)	Kidney tubules and thyroid gland
	Columnar (column)	Intestinal lining
Stratified (More than one layer)	Squamous (flat)	Skin
	Cuboidal (cube)	Sweat glands and Mammary glands
	Columnar (column)	Pharynx and anus
Pseudostratified (one layer but looks like more)	Columnar	Upper respiratory tract

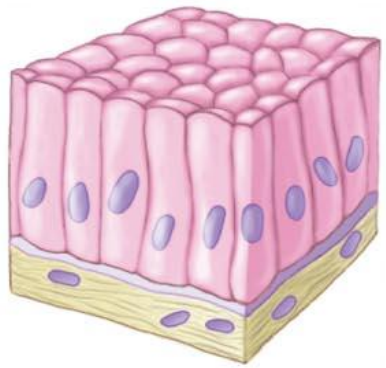




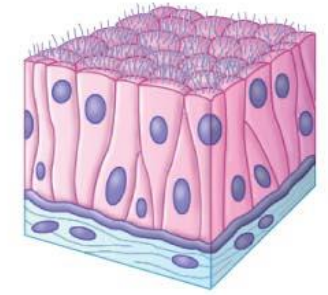
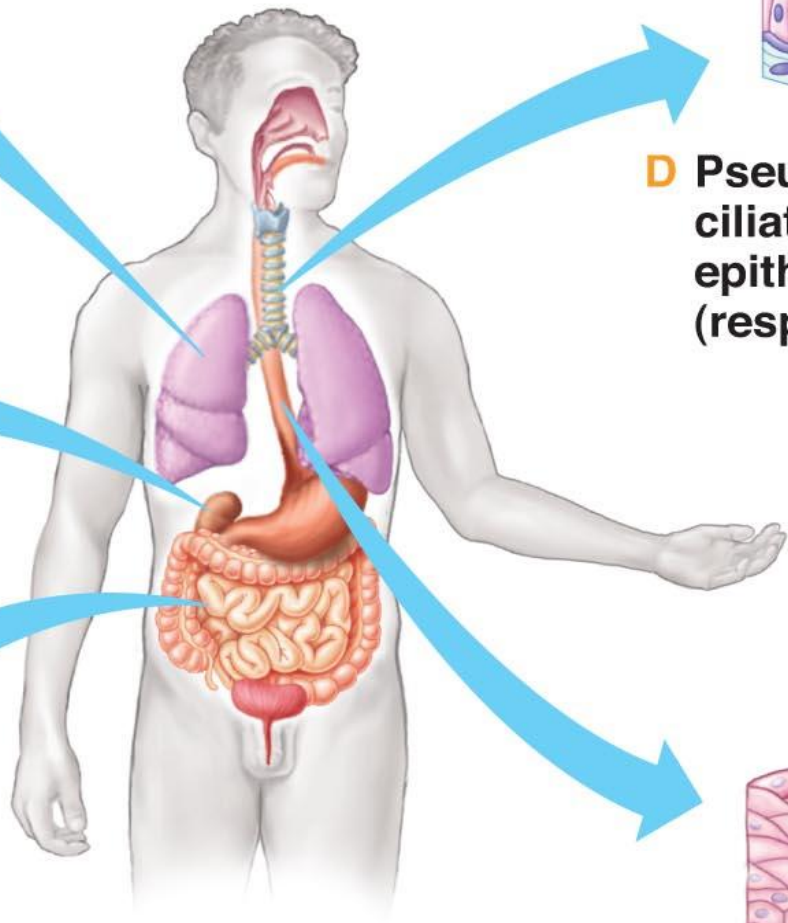
A Simple squamous epithelium (air sacs of the lung)



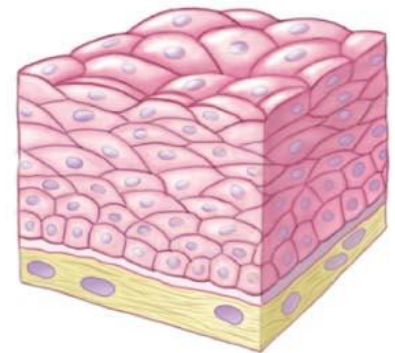
B Simple cuboidal epithelium (kidney)



C Simple columnar epithelium (intestine)



D Pseudostratified ciliated columnar epithelium (respiratory tract)

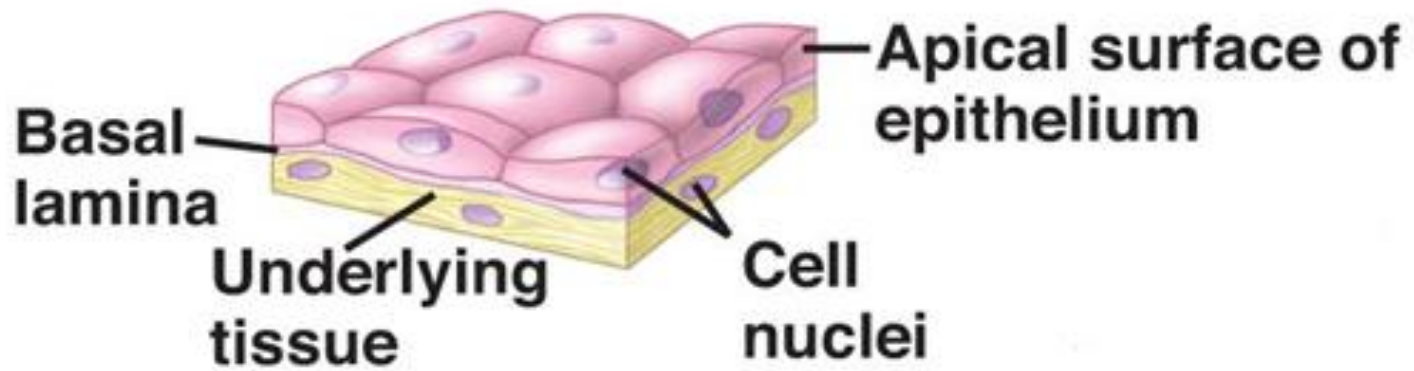


E Stratified squamous epithelium (esophagus)

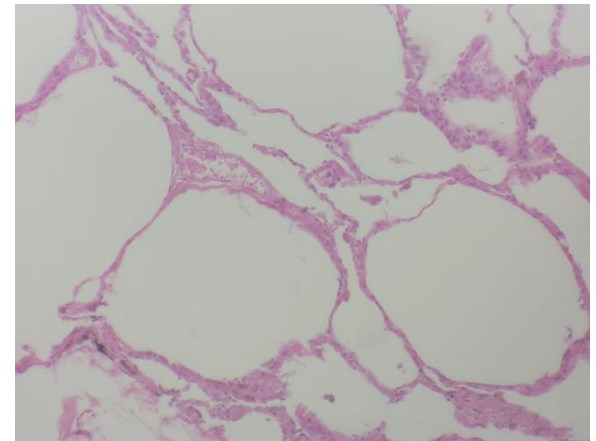
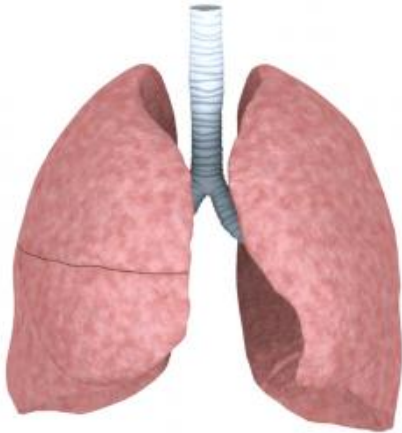
Activity

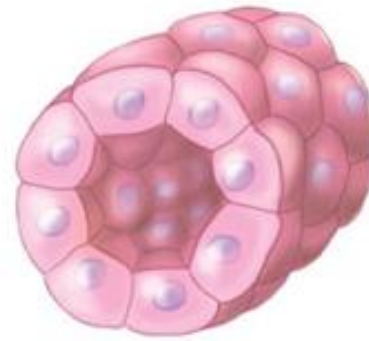
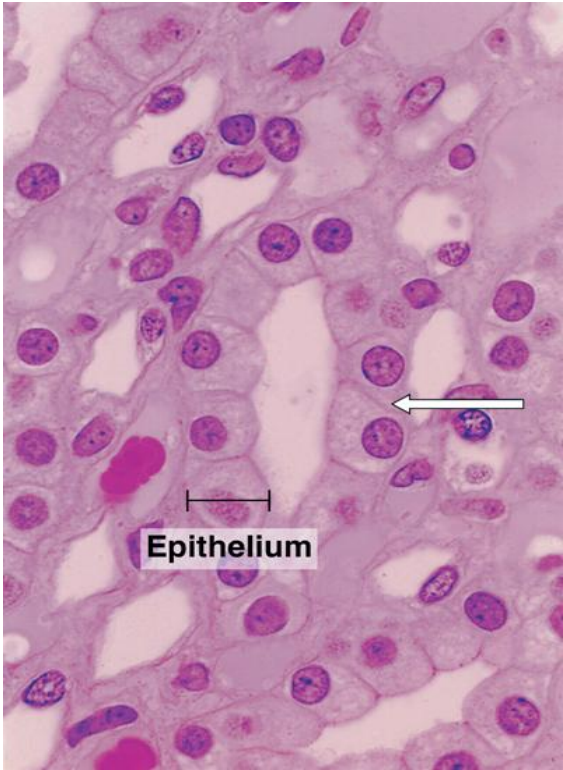
Name some of the other organs and tissue in your body



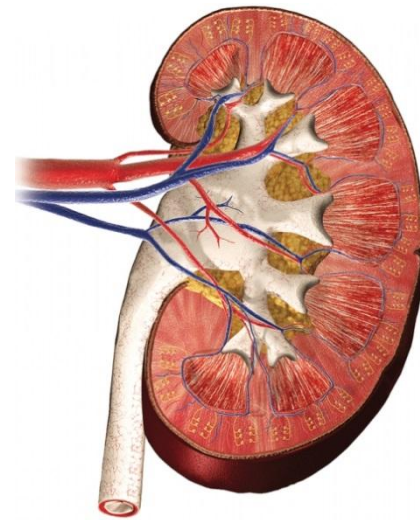


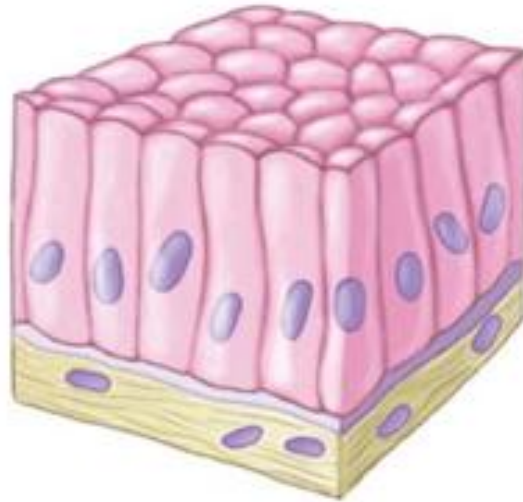
**Simple squamous epithelium
(air sacs of the lung)**



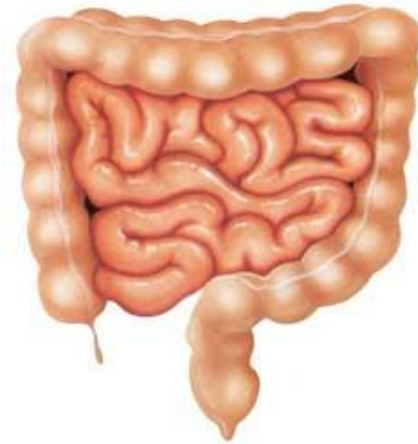
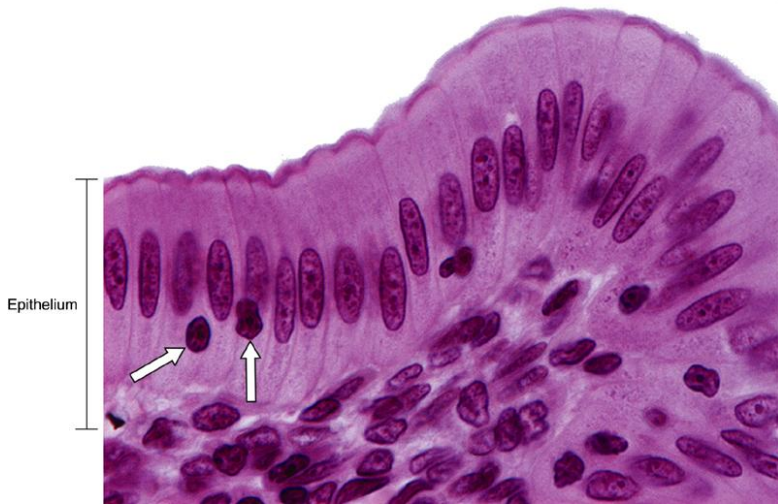


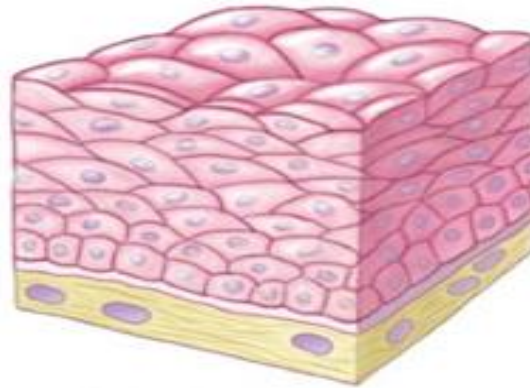
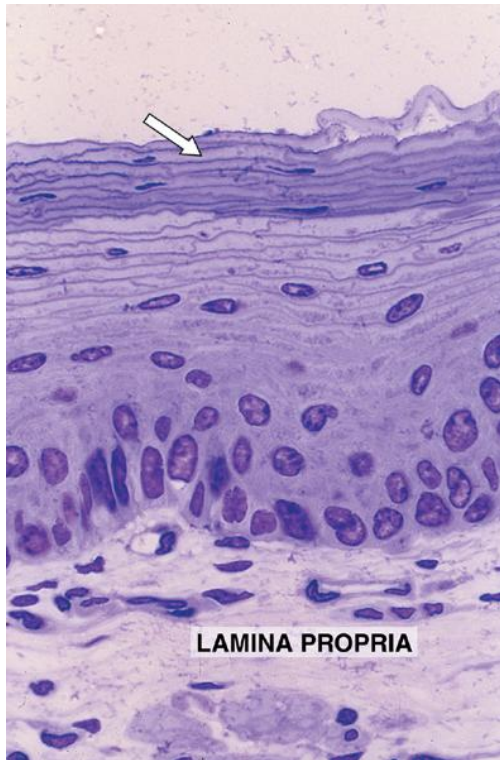
**Simple cuboidal epithelium
(kidney)**





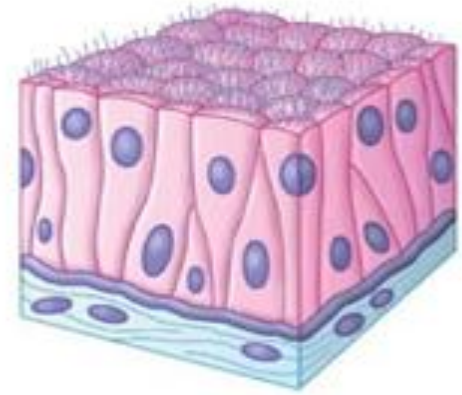
**Simple columnar epithelium
(intestine)**



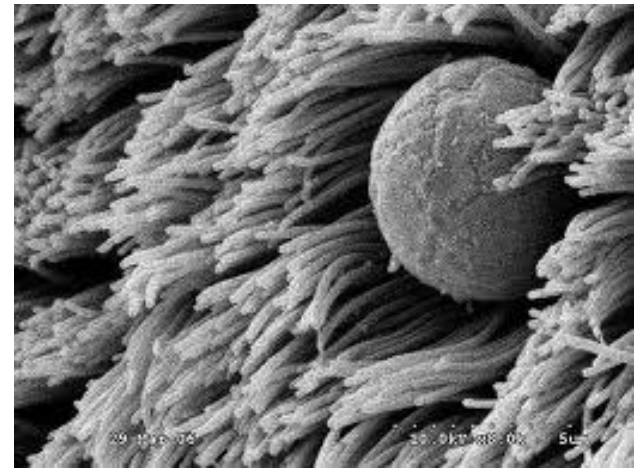


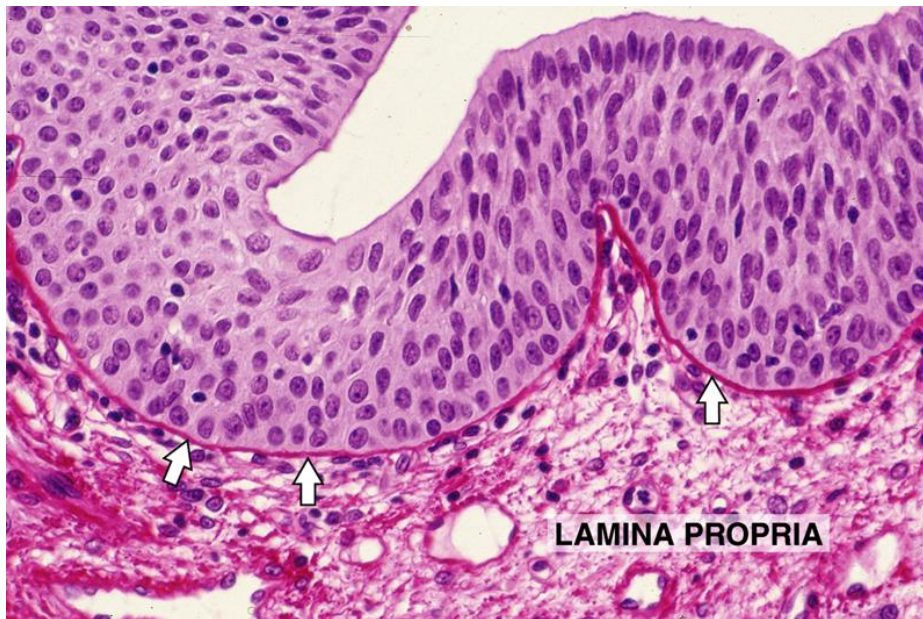
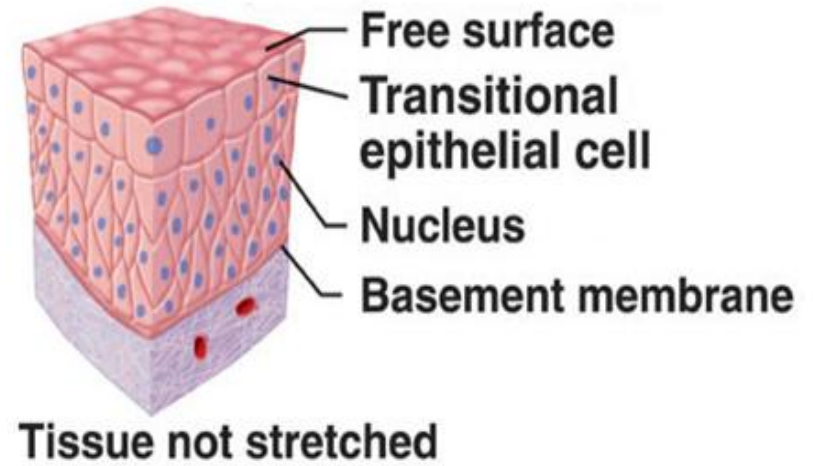
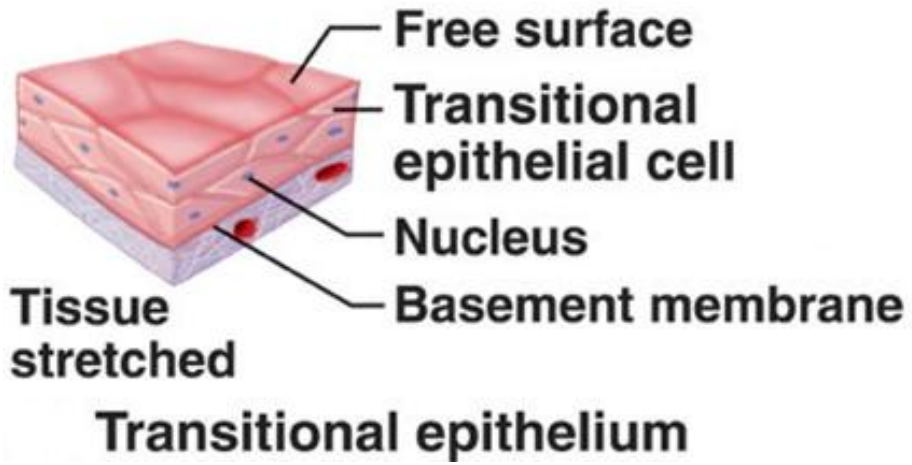
**Stratified squamous
epithelium
(esophagus)**





Pseudostratified ciliated columnar epithelium (respiratory tract)





Transitional Epithelial

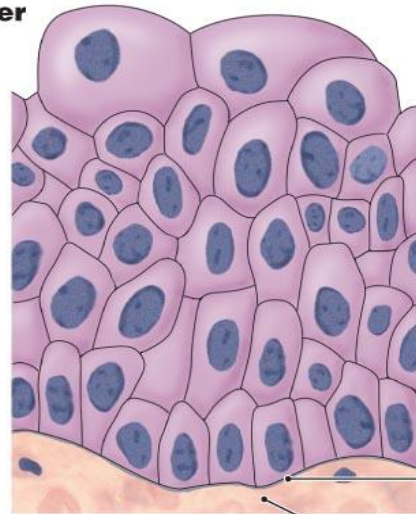
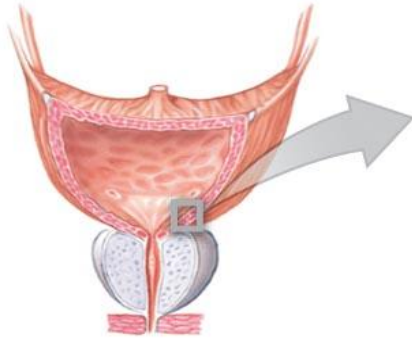
Transitional: Multiple layers of cells, but surface cells change from rounded to flat to permit expansion when needed. Transitional epithelium is found in the urinary bladder, renal pelvis and ureters.



The transitional epithelium in an empty and a full urinary bladder

Epithelium in a Relaxed Bladder

In an empty urinary bladder, the superficial cells are cuboidal with a dome-shaped surface.

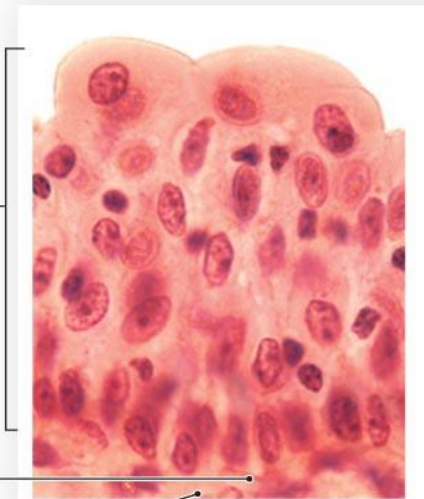


Epithelium (relaxed)

Basal lamina

Relaxed bladder

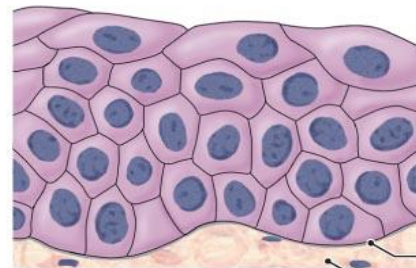
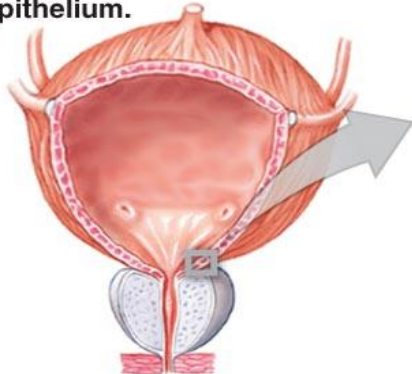
Connective tissue and smooth muscle layers



LM × 400

Epithelium in a Stretched Bladder

When the urinary bladder is full, the volume of urine has stretched the lining to such a degree that the epithelium appears flattened, and more like a stratified squamous epithelium.



Epithelium (stretched)

Basal lamina

Stretched bladder

Connective tissue and smooth muscle layers



LM × 400

TABLE 4-3

Common types of covering epithelia.

Major Feature	Cell Form	Examples of Distribution	Main Function
Simple (one layer of cells)	Squamous	Lining of vessels (endothelium); Serous lining of cavities: pericardium, pleura, peritoneum (mesothelium)	Facilitates the movement of the viscera (mesothelium), active transport by pinocytosis (mesothelium and endothelium), secretion of biologically active molecules (mesothelium)
	Cuboidal	Covering the ovary, thyroid	Covering, secretion
	Columnar	Lining of intestine, gallbladder	Protection, lubrication, absorption, secretion
Pseudostratified (layers of cells with nuclei at different levels; not all cells reach surface but all adhere to basal lamina)		Lining of trachea, bronchi, nasal cavity	Protection, secretion; cilia-mediated transport of particles trapped in mucus out of the air passages
Stratified (two or more layers of cells)	Squamous keratinized (dry)	Epidermis	Protection; prevents water loss
	Squamous nonkeratinized (moist)	Mouth, esophagus, larynx, vagina, anal canal	Protection, secretion; prevents water loss
	Cuboidal	Sweat glands, developing ovarian follicles	Protection, secretion
	Transitional	Bladder, ureters, renal calyces	Protection, distensibility
	Columnar	Conjunctiva	Protection



Glandular Epithelial



Reference

<http://www.histology.leeds.ac.uk/index.php>

