

Tissue Level of Organization (Epithelial Tissues)

Dr. Rajesh Choudhary
M. Pharm. (Pharmacology), Ph. D.



www.youtube.com/pharmacologyconceptsbyrajeshchoudhary



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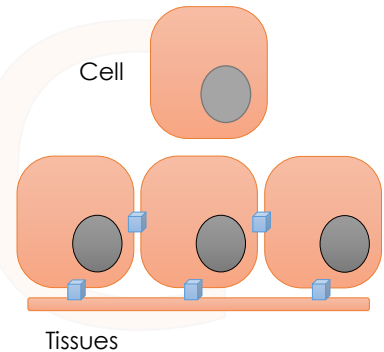
Contents of the Lecture:

- Introduction to Tissue of Organization
- Types of Tissues
- Classification of Tissues
- Details of Epithelial Tissues

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Tissue Level of Organization

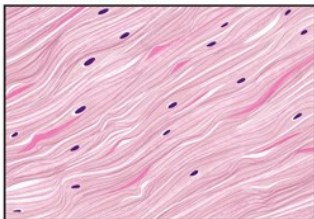
- **Histology:** Study of the Tissues.
- **Tissues** are made up of large numbers of the same type of cells
- They are classified according to the size, shape and functions of their constituent cells.
- There are four main types of tissue each with subtypes.
- They are:
 - **Epithelial tissue or epithelium (Protective, Secretion, Absorption)**
 - Connective tissue (Support and communication)
 - Muscle tissue (Movement and Locomotion)
 - Nervous tissue (Control and Co-ordination)



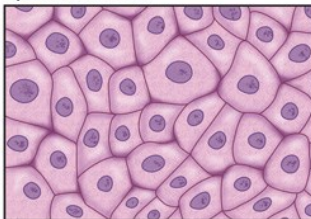
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Tissue Level of Organization

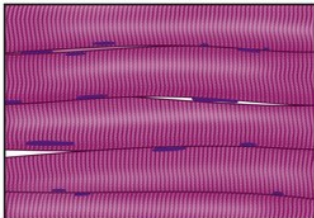
Connective tissue



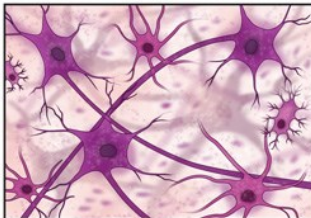
Epithelial tissue



Muscle tissue

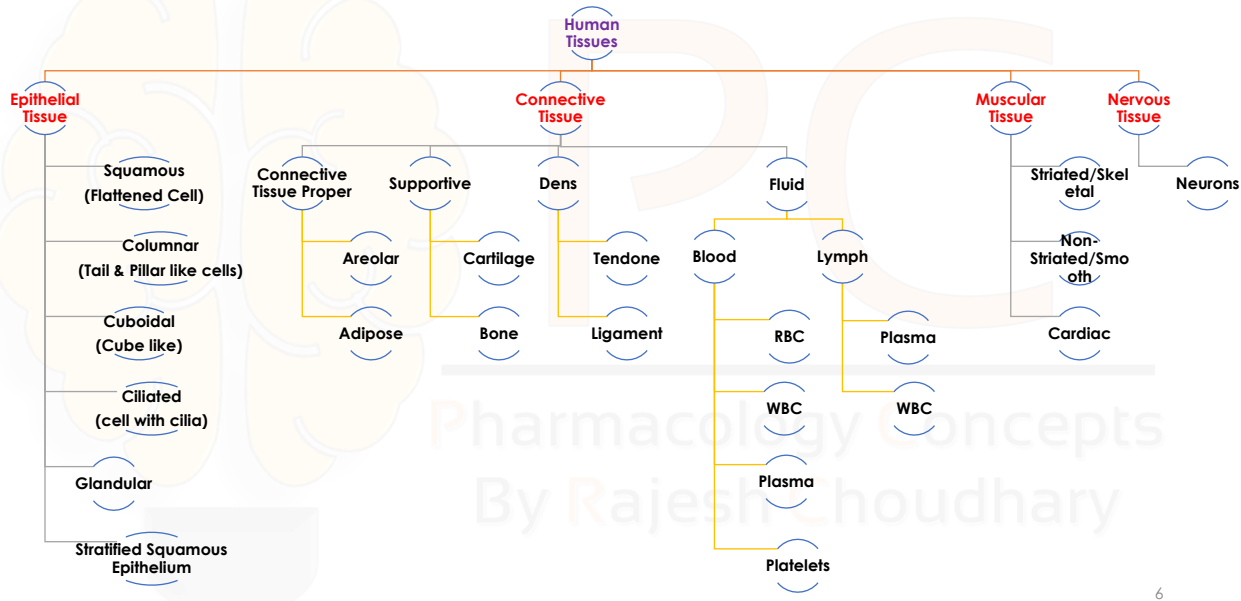


Nervous tissue

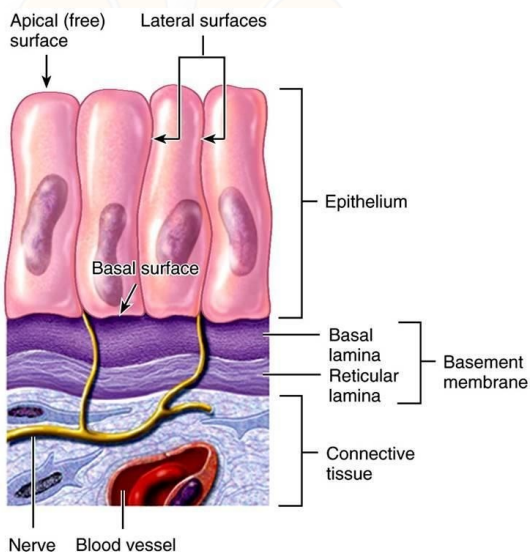


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Classification of Human Tissues



Epithelial Tissues



- **Epithelium** : An avascular layer of cells that forms a barrier that covers internal or external surfaces
- This type of tissues covers the body and lines cavities, hollow organs and tubes.
- It is also found in glands.

Figure 04.02 Tortora - PAP 12/e
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Epithelial Tissues

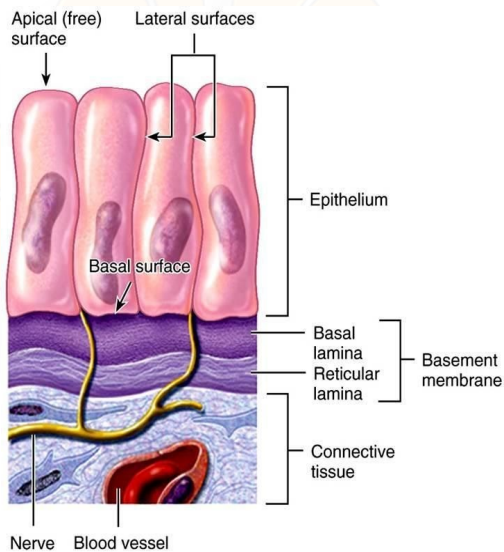


Figure 04.02 Tortora - PAP 12/e
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- Characteristic Feature :**
- Closely packed cells forming continuous sheets
- Cells sit on basement membrane
- Apical (upper) free surface
- Avascular---without blood vessels
 - nutrients diffuse in from underlying connective tissue
- Rapid cell division
- A. Covering / lining and B. Glandular types**

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Epithelial Tissues Types

Types: A. Lining Epithelia

	Simple	Stratified	Pseudostratified
Squamous	 Simple squamous epithelium	 Stratified squamous epithelium	
Cuboidal	 Simple cuboidal epithelium	 Stratified cuboidal epithelium	
Columnar	 Simple columnar epithelium	 Stratified columnar epithelium	 Pseudostratified columnar epithelium

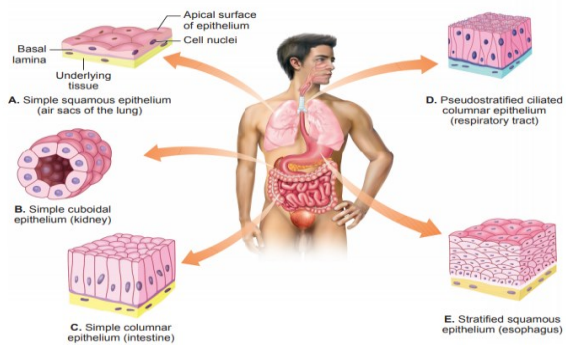


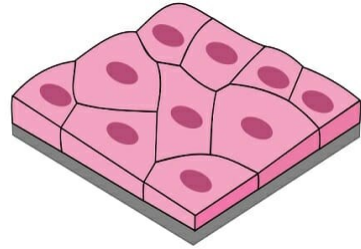
Figure 3.2 Types of Epithelial tissues

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Simple Epithelial Tissues

Simple Squamous Epithelial

- Single layer of flat cells
 - lines blood vessels (endothelium), body cavities (mesothelium)
 - very thin --- controls diffusion, osmosis and filtration
- nuclei centrally located
- Cells in direct contact with each other



Found in

- heart – where it is known as endocardium
- blood vessels, lymph vessels
- alveoli of the lungs
- lining the collecting ducts of nephrons in the kidneys

Functions: Filtration, diffusion, osmosis, and secretion in serous membranes.

Simple Epithelial Tissues

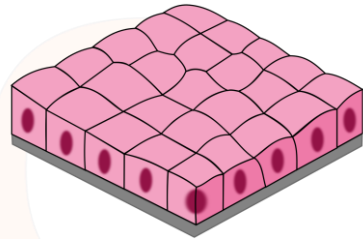
2. Simple Cuboidal Epithelial

- Single layer of cube-shaped cells
- nuclei centrally located

Found in

- Covers surface of ovary,
- Lines of Kidney tubules
- Glands such as the thyroid gland and the ducts of some glands such as the pancreas.

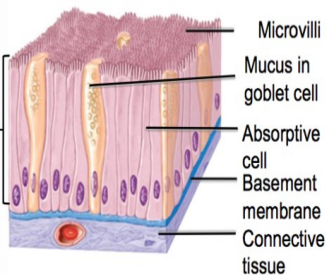
Functions: secretion, absorption and/or excretion.



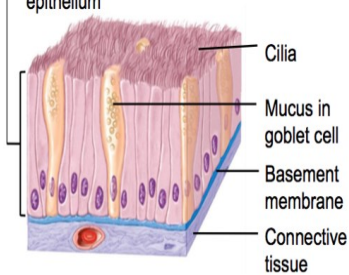
Simple Epithelial Tissues

Nonciliated
simple columnar
epithelium

microvilli- give appearance of a brush



Ciliated simple columnar
epithelium



3. Simple Columnar Epithelial

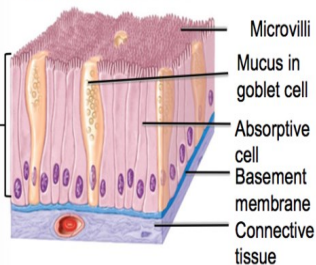
- single layer, Columnar/ rectangular in shape, on a basement membrane
- It contains goblet cells and cells with microvilli in some locations
- It Located at Lines the gastrointestinal tract (from the stomach to the anus), ducts of many glands, and gallbladder

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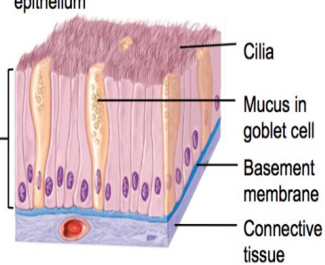
Simple Epithelial Tissues

Nonciliated
simple columnar
epithelium

microvilli- give appearance of a brush



Ciliated simple columnar
epithelium



3. Simple Columnar Epithelial

- **Intestine** contains **microvilli** to provide a very large surface area for absorption of nutrients from the **small intestine**.
- In the **trachea**, columnar epithelium is **ciliated** and also contains **goblet cells** that secrete **mucus**
- **Function: Absorption & Secretion**

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Pseudostratified Epithelial Tissues

Pseudostratified columnar epithelium

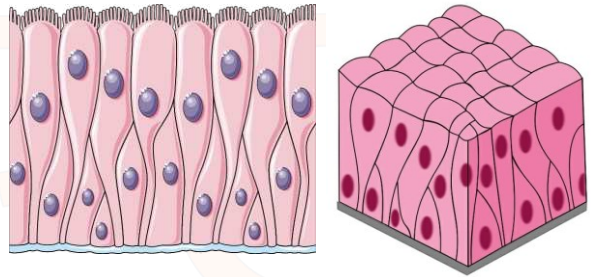
- Not a true stratified tissue; nuclei of cells are at different levels;
- All cells are attached to basement membrane, but not all reach the apical surface

Location

- Pseudostratified Ciliated** are found in lines the airways of most of upper respiratory tract
- Pseudostratified non-ciliated** are found in lines larger ducts of many glands, epididymis, and part of male urethra.

Function

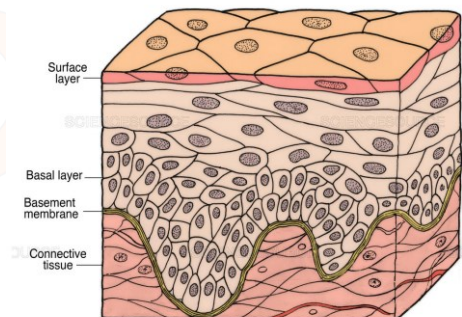
- Secretion and movement of mucus by ciliary action



Stratified Epithelial Tissues

1. Stratified Squamous epithelium

- Multilayered of cells, cuboidal to columnar shape in deep layers; squamous cells form the apical layer and several layers deep to it; cells from the basal layer replace surface cells as they are lost
- Keratinized variety** forms superficial layer of skin;
- Nonkeratinized variety** lines wet surfaces, such as lining of the mouth, esophagus, part of larynx, part of pharynx, and vagina, and covers the tongue
- Functions: Protection**



Stratified Epithelial Tissues

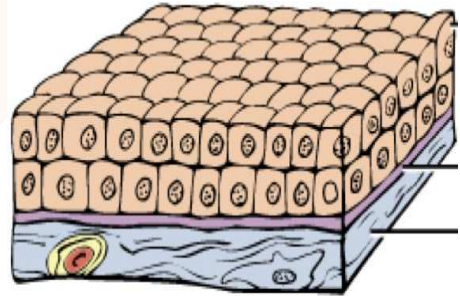
2. Stratified Cuboidal epithelium

• Multilayer of cells in which the cells in the apical layer are cube-shaped

Location

- Sweat gland ducts
- esophageal glands
- male urethra

• **Functions:** Protection, Absorption and Secretion



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Stratified Epithelial Tissues

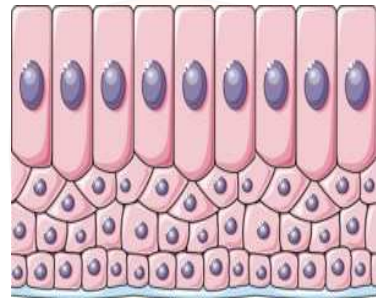
3. Stratified Columnar epithelium

• Multilayer of cells in which the cells in the apical layer are Columnar in shape

Location

- Lines part of urethra,
- large excretory ducts of esophageal glands,
- small areas in anal mucous membrane,
- and part of the conjunctiva of the eye

• **Functions:** Protection and Secretion



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Stratified Epithelial Tissues

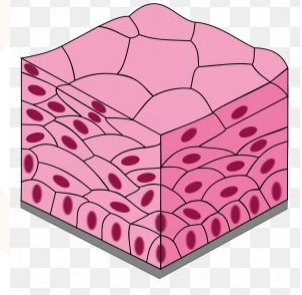
3. Stratified Transitional epithelium

📌 Multilayered; Transitional in shape in stretched squamous in shape (apical layer) and cuboidal in relaxed

Location

📌 Lines part of urinary bladder, ureter and urethra

Functions: Permits distension



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Glandular Epithelium Tissues

Glandular Epithelium

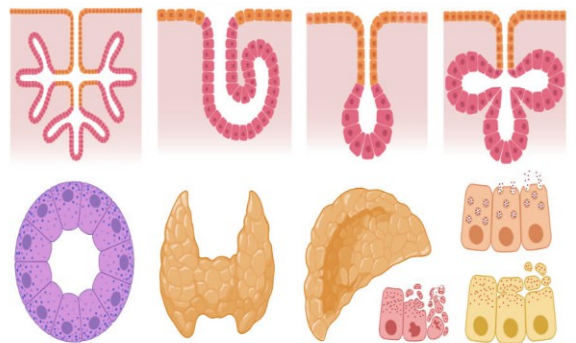
📌 The function of glandular epithelium is secretion, which is accomplished by glandular cells that often lie in clusters deep to the covering and lining epithelium.

📌 A gland may consist of a single cell or a group of cells that secrete substances into ducts (tubes), onto a surface, or into the blood.

📌 All glands are classified into

📌 Endocrine glands: Thyroid, adrenal, etc

📌 Exocrine glands: Sweet gland



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