Foundation Block | Histology

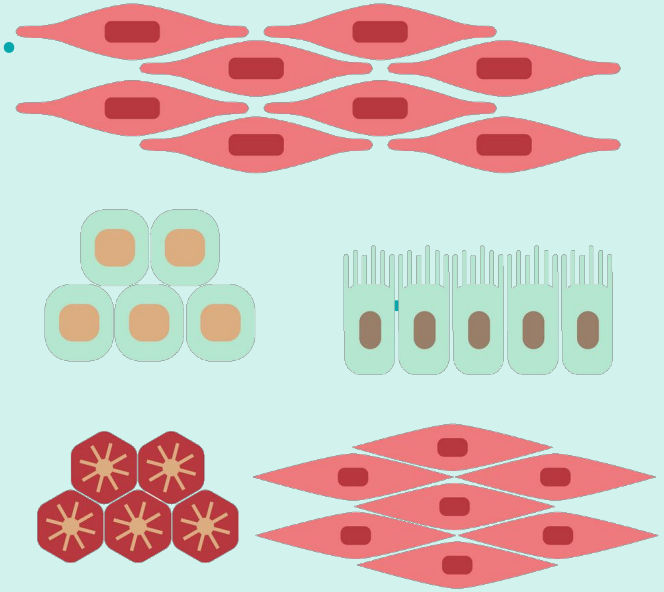
Epithelial Tissues

- Color index :
Main text
Important
Female slide
Male slide
DR.Notes
extra

Revised & Reviewed by: Abdulaziz & Bahammam
Faye Wael Sendi

2

Editing File



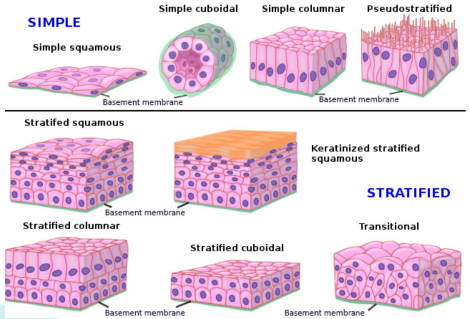
Objectives :

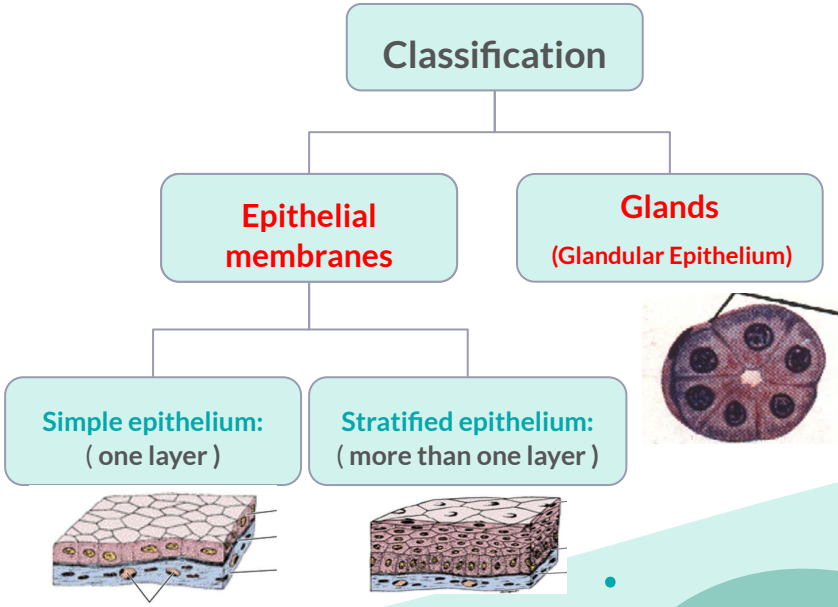
In this lecture you are expected to learn :

- Describe general characteristics of epithelial tissue.
- Discuss microscopic structure and distribution of different types of epithelial membranes.
- Classify glandular epithelium according to different parameters.
- Enumerate the function of epithelial tissue.
- Understand the following clinical applications :
  - **Immotile cilia syndrome** (Kartagener's syndrome)
  - **Metaplasia.**

Epithelial Tissues

- **Cells** are **tightly joined** with **little intercellular space**. (Compacted)
- **Rest** on a **basement membrane**.
- **Avascular.** (**No Blood** Capillaries\Venules\Arterioles **Between** Epithelial Cells)
  - (**Gets Nutrients** And O_2 From **Neighbour** Blood Vessels)
  - (**Get (Rid** of **Waste** Products + CO_2 By **Diffusion**)
- **High** power of **Regeneration**. → (**Epithelial** Tissue **>** Other Tissues)
  - Epithelium Tissue could be derived from Ectoderm, endoderm and mesoderm .
  - Connective tissue only derived from mesoderm (remember the trilaminar embryonic disc , Embryology)
  - **Epithelial membranes Cover** Structures like skin and line cavities like stomach, uterus Buccal cavity and nasal cavity





MED441
Histology team

Functions of epithelium:-

1. Protection as in epidermis of skin
2. Secretion as in glands.
3. Absorption as in small intestine.
4. Excretion as in kidney.
5. Reproduction as in gonads.
6. Smooth lining as in blood vessels

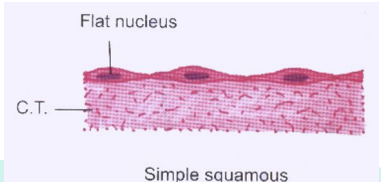
Simple Epithelium

1 Simple Squamous Epithelium

- One Layer
- Flat Cells
- Flat Nuclei
- Provides Smooth Thin Surface

Sites

- Endothelium lining Of CVS
- Lung alveoli



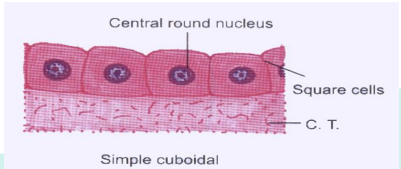
Simple squamous

Simple Cuboidal Epithelium 2

- One Layer
- Cuboidal Cells
- Central Round Nuclei

Sites

- Thyroid follicles
- Collecting Tubules of Kidney

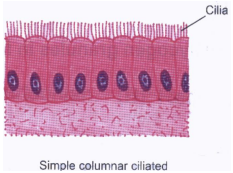


Simple cuboidal

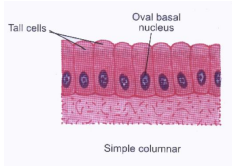
MED441
Histology team

Simple Epithelium

3 Simple Columnar Epithelium



- One Layer
- Columnar Cells
- Basal Oval Nuclei



Ciliated
With cilia on free surface

Sites: Fallopian Tubes & Uterus

Non-Ciliated

Sites:
-Lining of Stomach
-Gall Bladder
-Intestine (with goblet cells)

Pseudo-Stratified Columnar 4

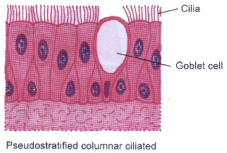
Ciliated
With Goblet cells

Sites: Respiratory epithelium : Trachea Bronchi

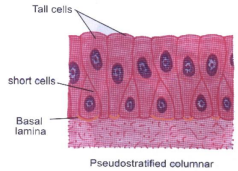
Non-Ciliated

Sites: Male Urethra, Vas Deferens

- One Layer



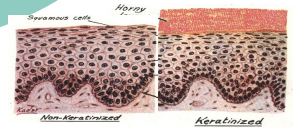
- Columnar Cells
- Tall\Short Cell
  Short Don't Reach Surface



- All Cells Rest on Basement
- Nuclei Appear At different Levels

MED441
Histology team

Stratified Epithelium



1 Stratified Squamous Epithelium

- Multiple Layers of cells
- Basal Columnar Cells
  Basal Oval Nuclei
- Intermediate Polygonal cells
  Central Rounded Nuclei
- Surface is Flat Cells
  Flattened Nuclei

Keratinized

Keratin Layer on Surface

Sites

Epidermis Of Skin

Non-Keratinized

No Keratin Layer On Surface

Sites

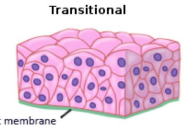
Esophagus & oral cavity

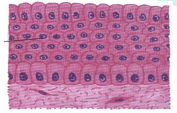
2 Transitional Epithelium

- Multiple Layers Of cells
- Basal Columnar Cells
- Intermediate Polygonal cells
- Surface large Cuboidal Cells
  Convex free surface and may be binucleated

Sites

Ureter & Urinary bladder (can extend)





Stratified Columnar Epithelium 3

Sites

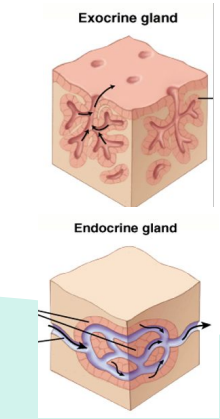
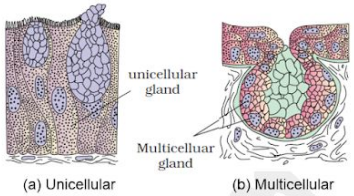
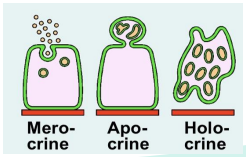
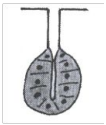
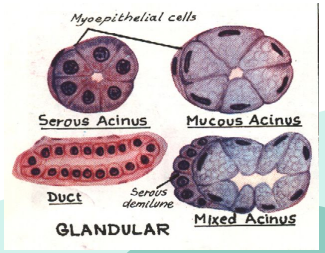
Large Ducts of Glands

- Multiple Layers Of cells
- Basal Columnar Cells
  Basal Oval Nuclei
- Intermediate Polygonal cells
  Central Rounded Nuclei
- Surface Columnar Cells
  Basal Oval Nuclei

MED441

Histology team

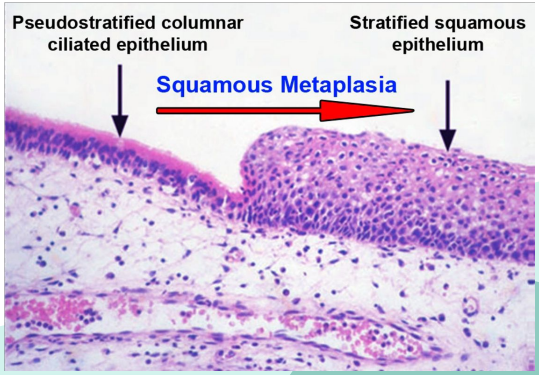
Glands (glandular epithelium) classification according to :

Presence or absence of ducts	Number of cells	Mode of secretion	Shape of secretory part	Nature of secretion
• **Exocrine:** e.g. salivary glands • **Endocrine:** e.g. thyroid gland and adrenal gland • **Mixed:** e.g. pancreas 	• **Unicellular:** e.g. goblet cells • **Multicellular** e.g. salivary glands 	• **Merocrine:** no part of the cell is lost with the secretion e.g. salivary glands • **Apocrine:** the top of the cell is lost with the secretion e.g. mammary gland • **Holocrine:** the whole cell detaches with the secretion e.g. sebaceous glands 	• **Tubular:** e.g. intestinal gland  • **Alveolar(acinar):** e.g. mammary gland  • **Tubulo-alveolar:** e.g. pancreas 	• **Serous:** e.g. parotid gland (with enzymes) • **Mucous:** e.g. goblet cells • **Muco-serous:** e.g. Sublingual gland • **Watery:** e.g. sweat gland 

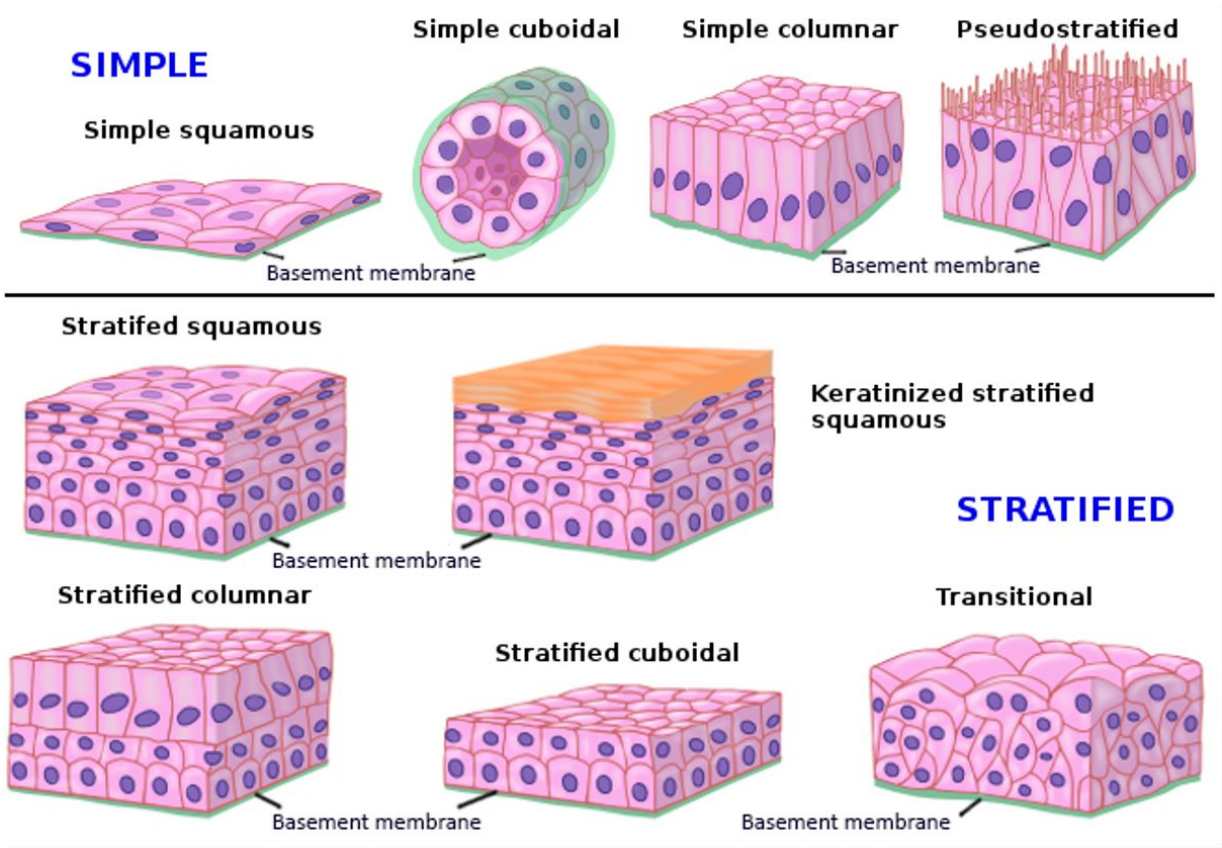
Clinical Applications :

- **Immotile cilia syndrome (Kartagener's syndrome):**
  - Disorder that causes:
    - infertility in male.
    - chronic respiratory tract infection in both sexes.
  - It is caused by immobility of cilia and flagella induced by deficiency of dynein.
  - Dynein protein is responsible for movements of cilia and flagella.

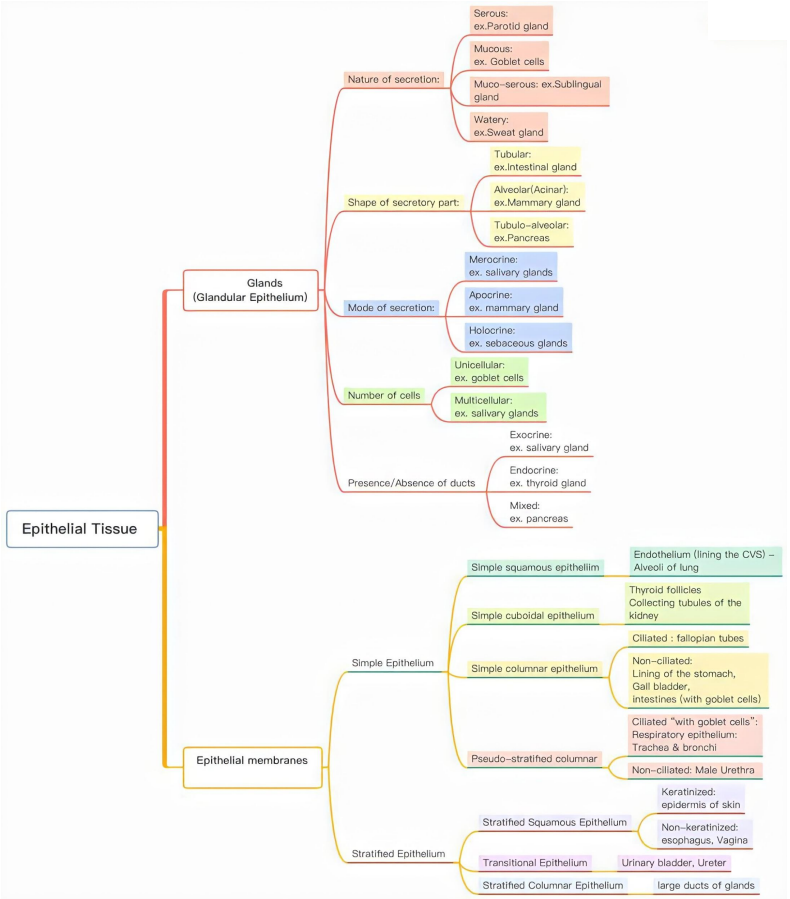
- **Metaplasia:**
  - It is the transformation of one type of tissue to another in response to injury.
  - This condition is usually reversible if the injury is removed.
  - Example: Pseudostratified ciliated columnar epithelium of the respiratory passages, e.g. trachea, of heavy smokers may undergo squamous metaplasia, transforming into stratified squamous epithelium.



Summary



Summary



Credits to :

Razan alobaid

MED441

Histology team

Quiz!

Q(1): Bronchi is an example of ?

A Transitional Epithelium	B Stratified Squamous Epithelium	C Pseudostratified Columnar	D Simple Cuboidal Epithelium

Q(2): The simple Cuboidal epithelium is a layer of Cuboidal cells with :

A Central rounded nuclei	B Flat nuclei	C Nuclei appear at different levels	D Basal oval nuclei

Q(3): Small intestine is an example of:

A Secretion	B Reproduction	C Excretion	D Absorption

Q(4): Example of muco-serous secretion:

A Sweat gland	B Goblet cells	C Parotid gland	D Sublingual gland

Q(5): Example of transitional epithelium:

A Urinary bladder	B Epidermis	C Ureter	D A and C

Q(6): The top of the cell is lost with the secretion

A Holocrine	B Apocrine	C Merocrine	D All correct

Answers

1	C
2	A
3	D
4	D
5	D
6	B

Histologyteam441@gmail.com

The Creative Crew!

Foundation Block | Histology Team (441)

Boys Captain

Alwaleed Alnasser

Girls Captain

Norah Alawlah

The Crew

- Abdullah Alqarni
- Abdulrahman Mukhtar
- Abdulmajeed Alharbi
- Mansor Aldoajy
- Mohammed Alhaqbani
- Ziyad Al-Abduljabbar

- Iyah Alhasan
- Hussah Alshareef
- Lobna Altimimy
- Zahraa Alsultan
- Fay Alluhaidan
- Sarah Al-homaydy
- Sara Al-Majed