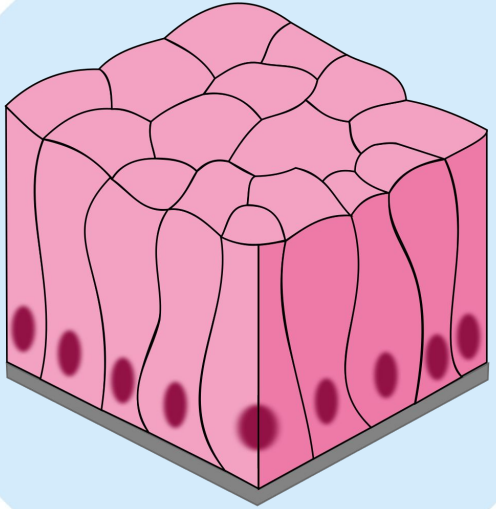
Histology
Foundation Block

2 Epithelial Tissues



Editing File

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Objectives:

- 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 functions of epithelial tissue.
- Understand the following clinical applications:

– Immotile cilia syndrome (Kartagener's syndrome).

– Metaplasia.

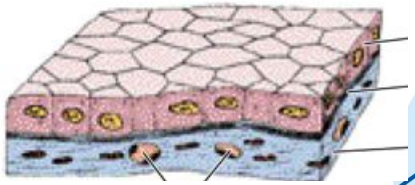
Epithelial Tissues

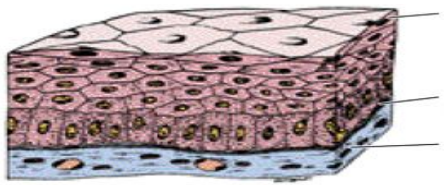
General characteristics:

- Cells are tightly joined with little intercellular space.
  REMEMBER: The difference between intercellular and intracellular is that intercellular is located between cells. while intracellular is inside or within a cell.
- Rest on a basement membrane.
- Avascular. (no blood vessels)
  - Gets nutrient & O2 from near blood vessels
  - Get rid of CO2 through Connective Tissue
- High power of regeneration.
  - Epithelium Tissue derived from (Ectoderm Endoderm or Mesoderm), While Connective Tissue only from Mesoderm.
  - Epithelial Tissue gets the blood supply from the surrounded Connective Tissue.
  - 441: Epithelial membranes covers structures like skin and line cavities like Stomach, Uterus buccal cavity and nasal cavity.

Classification

- **Epithelial membranes**
  - **Simple Epithelium** "One layer"
  - **Stratified Epithelium** "More than one layer"
- **Glands** (Glandular Epithelium)

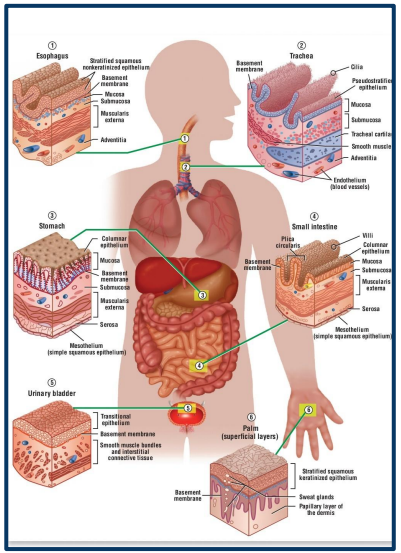




Function of epithelium:

439: Hey! I'm just a **"PASSER"** and my name is 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.



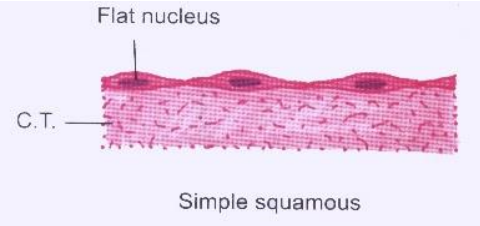
A) Simple Epithelium

1) Simple Squamous Epithelium

- One layer
- Flat cells
- Flat Nuclei
- Provides smooth thin surface.

Examples of sites:

- Endothelium (lining the cardio vascular system, CVS)
- Lung alveoli (tiny air sacs)

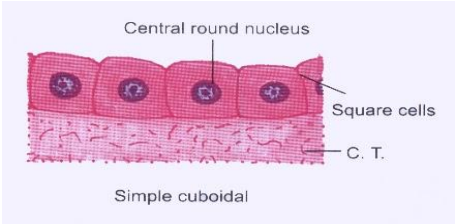


2) Simple Cuboidal Epithelium

- One layer
- Cuboidal Cells
- Central Rounded Nuclei

Examples of sites:

- Thyroid follicles
- Collecting tubules of the kidney.



You will hear “Ciliated” or “with Goblet Cells” only in Columnar Epitheliums

A) Simple Epithelium

3) Simple Columnar Epithelium

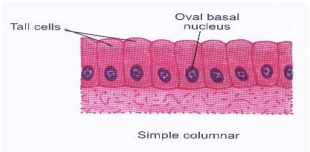
- One layer
- Columnar cells
- Basal oval nuclei.

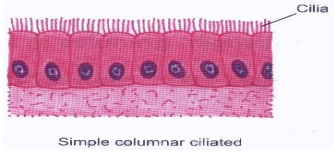
Types:

- Ciliated (with cilia on free surface)
- Non-ciliated

Examples of sites:

- Ciliated: Fallopian tubes.
- Non-ciliated:1-Lining of stomach 2-Gall bladder 3-Intestines (with goblet cells)





4) Pseudo-Stratified Columnar:

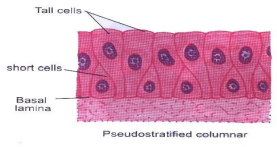
- One layer
- Columnar cells.
- Tall and short cells
- Short don’t reach the surface.
- All cells rest on the basement membrane.
- Nuclei appear at different levels

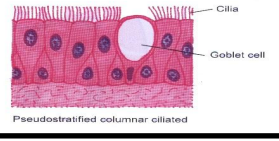
Types:

- Ciliated with Goblet Cells
- Non-ciliated

Examples of sites:

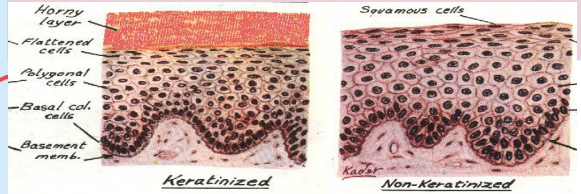
- Ciliated:(Respiratory Epithelium): trachea & bronchi.
- Non-ciliated: male urethra (parts). Vas Deferens (MED441)

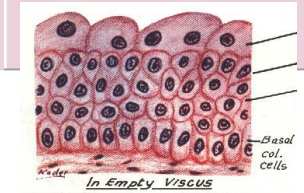


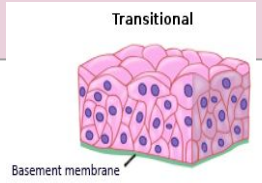


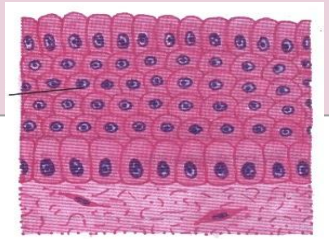
B) Stratified Epithelium

1) Stratified Squamous Epithelium	2) Transitional Epithelium	3) Stratified Columnar Epithelium
• Multiple layers of cells. • Basal columnar cells with Basal oval nuclei. • Intermediate polygonal cells with central rounded nuclei. • Surface cells are flat with flattened nuclei.	• Multiple layers of cells. • Basal cells are columnar. Intermediate cells are polygonal. • Surface cells large cuboidal with convex free surface and may be binucleated	• Multiple layers of cells. • Basal cells are columnar. • Intermediate cells are polygonal. • Surface cells are columnar.
Types: (keratin will be only found here) 1-Keratinized:with a layer of keratin on the surface. **Example of sites**: Epidermis of skin. 2-Non-keratinized: without a layer of keratin on the surface. **Example of sites**: Esophagus.	**Example of sites**: Ureter and Urinary bladder (It has the ability to stretch until it becomes one layer)	**Example of sites**: large ducts of Glands.









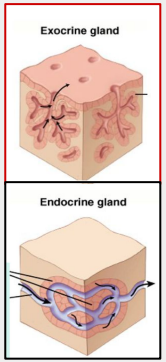
Glands (glandular epithelium) classification according to :

Presence or absence of ducts

Exocrine:
e.g. salivary.

Endocrine:
e.g. thyroid gland.

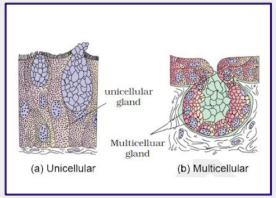
Mixed:
e.g. pancreas.



Number of cells

Unicellular:
e.g. goblet cells.

Multicellular:
e.g. salivary glands.

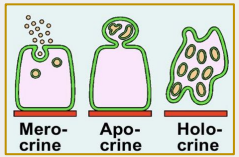


Mode of secretion

Merocrine:
No part of the cell is lost with secretion.
eg.salivary glands

Apocrine:
The top of the cell is lost with secretion.
e.g.mammary gland

Holocrine:
The whole cell detaches with the secretion.
e.g.sebaceous glands

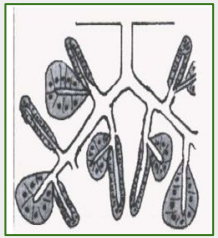


Shape of secretory part

Tubular:
eg.intestinal gland.

Alveolar(acinar):
e.g.mammary gland.

Tubule-alveolar:
e.g.pancreas.



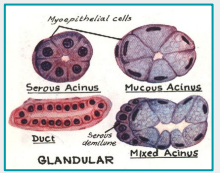
Nature of secretion

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 :

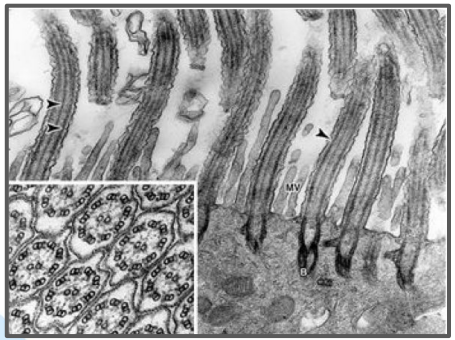
Immotile cilia syndrome (Kartagener's syndrome):

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.

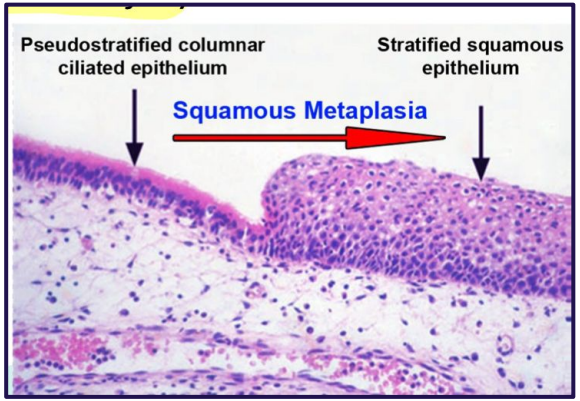
Dynein protein is responsible for movements of cilia and flagella.



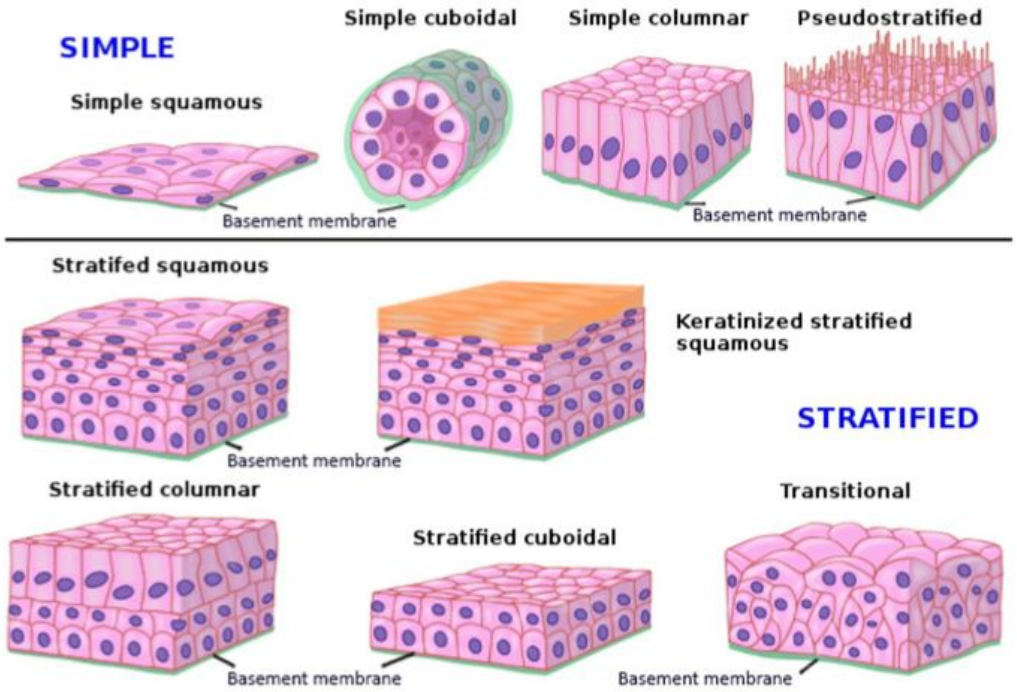
Clinical Applications :

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


SIMPLE
Simple squamous
Simple cuboidal
Simple columnar
Pseudostratified
Basement membrane
Basement membrane
Stratifed squamous
Keratinized stratified squamous
STRATIFIED
Basement membrane
Stratified columnar
Stratified cuboidal
Transitional
Basement membrane
Basement membrane

MCQs:

1- Which of the following is not right about the Epithelial Tissue?

A) It has a high power of generation.	B) It is vascular.	C) Rests on a basement membrane.	D) Cells are tightly joined.

2- Which of the following is related to Simple Columnar Epithelium?

A) Has blood capillaries.	B) Has a wide intercellular space.	C) May have goblet cells.	D) Contains more than one layer.

3- Which of the following types of epithelial cells can be keratinized?

A) Stratified Squamous Epithelium.	B) Stratified Columnar Epithelium.	C) Simple Squamous Epithelium.	D) Simple Columnar Epithelium.

4- The Ureter is an example of:

A) Simple Columnar Epithelium.	B) Stratified Squamous Epithelium.	C) Pseudo-stratified Columnar	D) Transitional Epithelium

5- The mode of secretion in Sebaceous glands is:

A) Holocrine	B) Merocrine	C) Apocrine	D) Endocrine

6- Kartagener's Syndrome causes chronic respiratory tract infection in?

A) Male	B) Female	C) Both sexes	D) None of them

Answers:

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

Meet The Team

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