جامعة الملك سعود
King Saud University

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MED439
KING SAUD UNIVERSITY

Lecture 2:
Integrated Epithelium

Histology Team
MED 439

- Colour index :
Red : important
Grey : doctors notes

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.

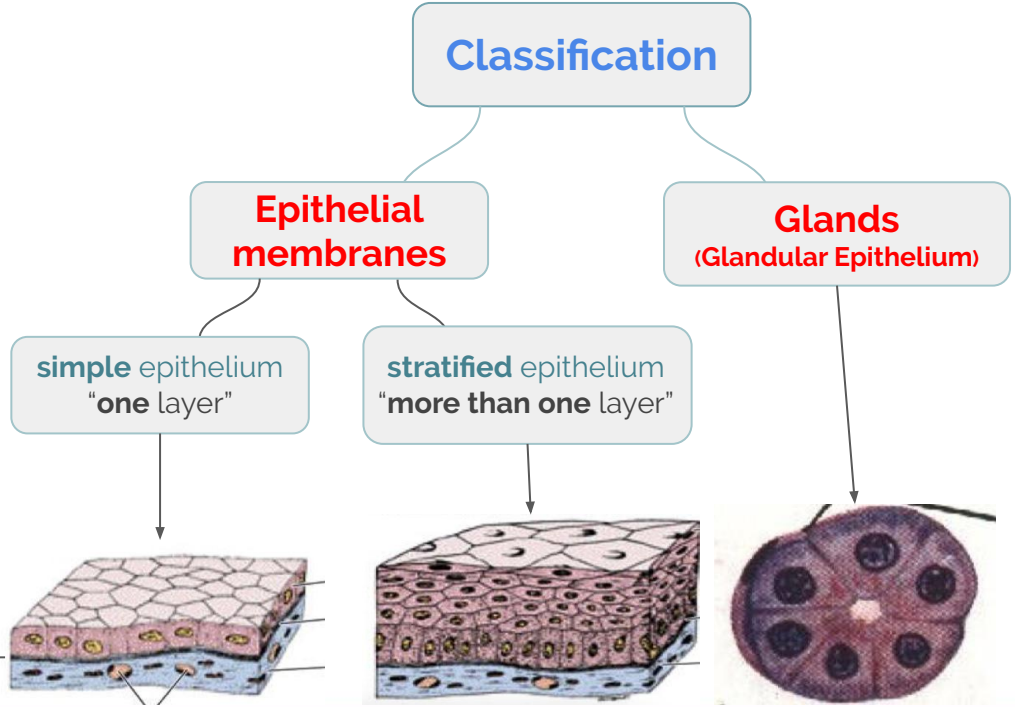
Any future correction will be in the editing file

Epithelial Tissue :

General characteristics :

- Cells are tightly joined with little intercellular space.
  "intercellular = between cells "
- Rest on a basement membrane.
- Avascular. "lack of blood vessels"
- High power of regeneration.

epithelial tissue gets the blood supply from the surrounded connective tissue .

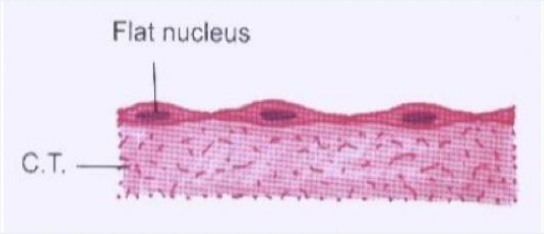
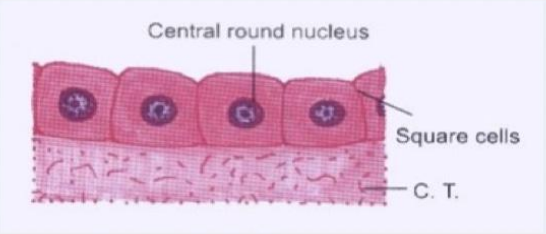


Hey! I'm just a "PASSER" and my name is epithelium.

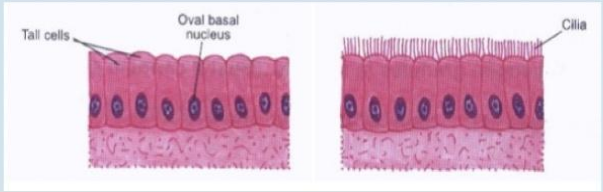
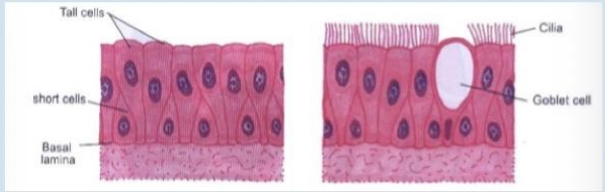
Functions of Epithelium tissue:

01	**P**rotection	As in the epidermis of the skin
02	**S**ecretion	As in glands
03	**A**bsorption	As in small intestines
04	**E**xcretion	As in kidneys
05	**R**eproduction	As in gonads
06	**S**mooth lining	As in blood vessels

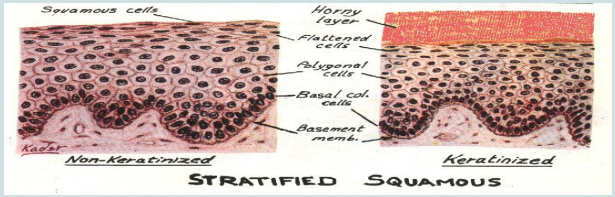
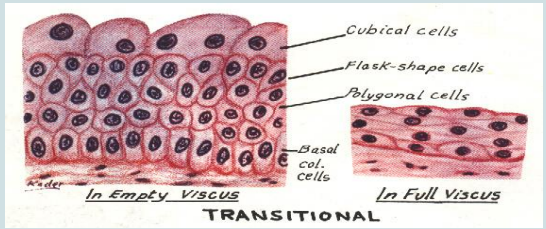
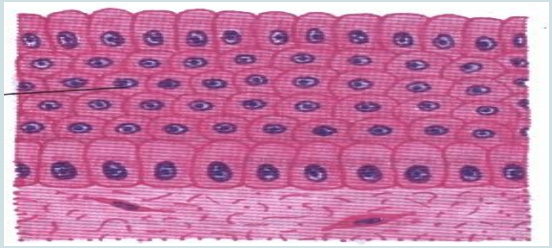
A) Simple Epithelium

1) Simple Squamous Epithelium	2) Simple Cuboidal Epithelium
▪ One layer of flat cells . ▪ flat nuclei . ▪ provides smooth thin surface.	• One layer of cuboidal cells. • Central rounded nuclei .
Examples: • Endothelium (lining the CVS "cardiovascular system"). • Alveoli "air sacs" of lung .	**Example:** • Thyroid follicles
	

A) Simple Epithelium

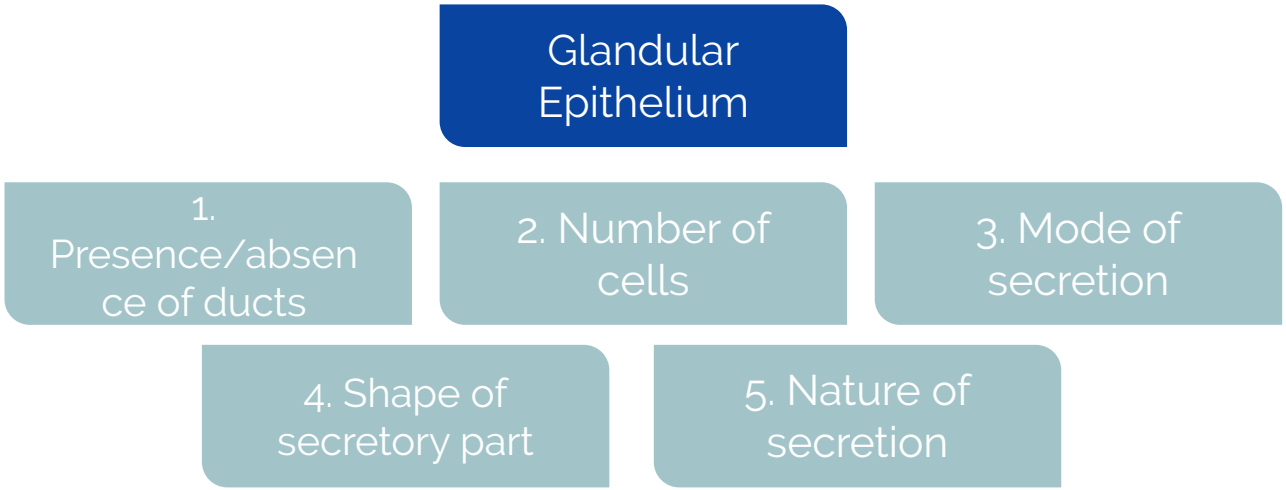
3) Simple Columnar Epithelium	4) Pseudo-Stratified Columnar "Pseudo = false"
• One layer of columnar cells • Basal oval nuclei	• One layer of columnar cells. • Nuclei appear at different levels . • Some cells are tall, others are short and don't reach the surface . • All cells rest on the basement membrane.
Types: 1. ciliated "with cilia on free surface". 2. Non-ciliated . "no cilia"	**Types:** 1. ciliated "with Goblet cells" . "goblet cell secretes the main component of mucus". 2. Non-ciliated .
Examples: Ciliated: Fallopian tubes "uterine tube". Non-ciliated: lining of stomach, gall bladder, and intestines (with goblet cells).	**Examples:** Ciliated: (respiratory epithelium) trachea & bronchi Non-ciliated: vas deferens
	

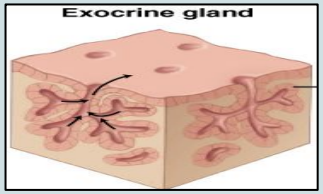
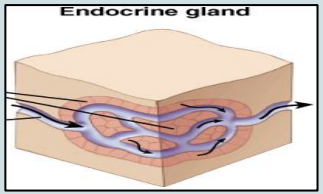
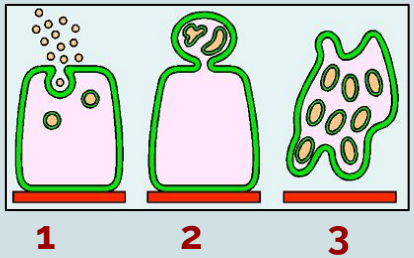
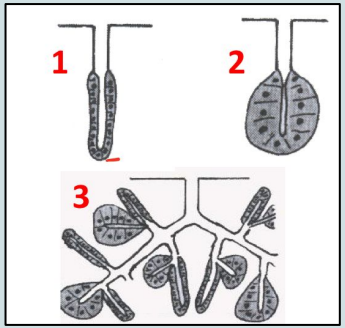
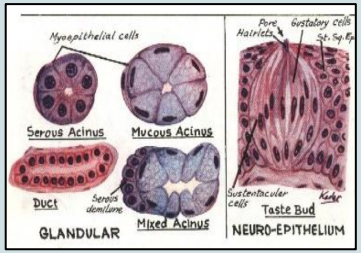
B) Stratified Epithelium

Stratified Squamous Epithelium	Transitional Epithelium	Stratified Columnar Epithelium
-Multiple layers of cells. -Basal cells are columnar with basal oval nuclei. -Intermediate cells are polygonal 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: Keratinized:with a layer of keratin on the surface. **Example of sites**: epidermis of skin. Non-keratinized: without a layer of keratin on the surface. **Example of sites**: esophagus. 	**Example of sites**: Urinary bladder. 	**Example of sites**: large ducts of glands. 

Glands (Glandular Epithelium)

- It is a type of epithelial tissue that covers the glands of our body. They're classified based upon 5 different characteristics:



1)Presence/Absence of ducts	2)Number of cells	3)Mode of secretion	4)Shape of secretory part	4)Nature of secretion
1. Exocrine: ex. salivary gland.  **2. Endocrine:** ex. thyroid gland  **3. Mixed:** ex. pancrea.	**1. Unicellular:** ex. goblet cells **2. Multicellular**: ex. salivary glands	**1. Merocrine:** No part of the cell is lost with the secretion. ex. salivary glands **2. Apocrine:** The top of the cell is lost with the secretion. ex. mammary gland **3. Holocrine:** The whole cell detaches with the secretion ex. sebaceous glands  	**1.Tubular:** ex.Intestinal gland **2.Alveolar(Acinar):** ex.Mammary gland **3.Tubulo-alveolar:** ex.Pancreas  	**1.Serous:** ex.Parotid gland **2.Mucous:** ex. Goblet cells **3.Muco-serous:** ex.Sublingual gland **4.Watery:** ex.Sweat gland 

Clinical Applications:

1) Immotile cilia syndrome (Kartegener's syndrome)

➔ Disorder caused by immobility of cilia and flagella induced by deficiency of dynein

Dynein: protein responsible for movement of cilia and flagella

Result:

➔ Infertility in male

➔ Chronic respiratory tract infection (both sexes)

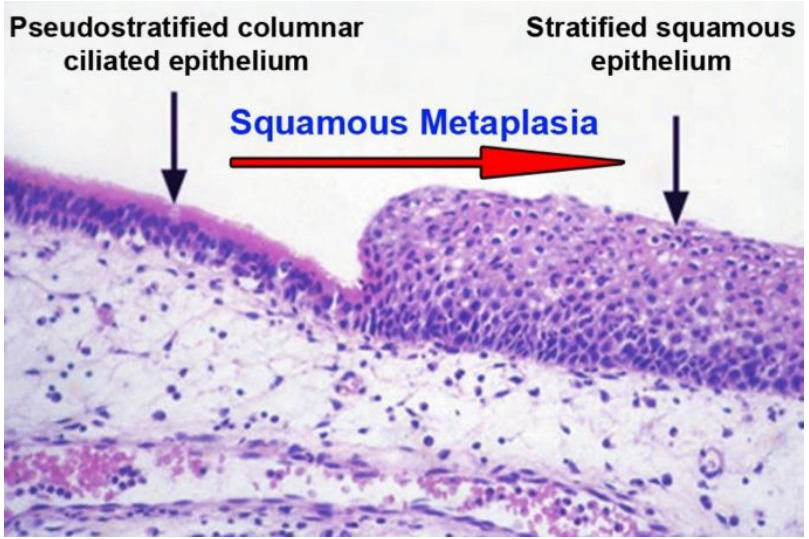
Clinical Applications:

2) Metaplasia: abnormal change in nature of tissue

- ➔ It's the transformation of one type of tissue to another in response to injury.
- ➔ Condition is usually reversible if injured tissue is removed.

Example;

- ➔ Trachea, pseudostratified ciliated columnar epithelium of respiratory passages, of heavy smokers may undergo squamous metaplasia, transforming into **stratified squamous epithelium.**



MCQs:

1)The simple columnar epithelium is a layer of columnar cells with :

A) central rounded nuclei .
B) basal oval nuclei .
C) nuclei appear at different levels .
D) flat nuclei .

2)gall bladder is an example of :

A) ciliated Pseudo-Stratified Columnar
B) transitional epithelium
C) non-ciliated simple columnar epithelium
D) simple cuboidal epithelium .

3) Fallopian tubes is example of ?

A) ciliated Pseudo-Stratified Columnar
B) ciliated Simple Columnar Epithelium
C) transitional epithelium
D) stratified columnar epithelium

4) All epithelial tissue rest on?

A) lamina
B) nuclei
C) basement membrane
D) basal cell

***5)What function of Dynein protein?**

A) protection the cilia & flagella
B) growth of cilia.
C) movements of cilia and flagella
D) movement of cilia only

***6)Kartegener's syndrome causes chronic respiratory tract infection in?**

A) children B) males
C) females D) both sexes

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

MCQs:

***7)If the injury is removed, metaplasia is usually?**
A) reversible
B) irreversible
C) chronic
D) Acute

***8)What differences between nuclei of simple squamous epithelium & simple cuboidal epithelium?**
A) Simple squamous epithelium: flat nuclei Simple cuboidal epithelium: basal oval nuclei
B) Simple squamous epithelium: central rounded nuclei. Simple cuboidal epithelium: flat nuclei
C) Simple squamous epithelium: basal oval nuclei Simple cuboidal epithelium: central rounded nuclei
D) Simple squamous epithelium: flat nuclei Simple cuboidal epithelium: central rounded nuclei

9) Urinary bladder is example of?
A) pseudo-stratified columnar
B) transitional epithelium
C) simple cuboidal epithelium
D) stratified columnar epithelium

10) Which of the following is not a classification of glandular epithelium tissues?
A) Presence or absence of ducts in tissue
B) Presence or absence of Keratin in tissue
C) According to the mode of secretion of the tissue
D) According to the number of cells in tissue

11) which of the following is a shape of secretory cells?
A) Simple squamous B) Pseudo-stratified columnar
C) Tubulo-alveolar D) Triangular

7) A
8) D
9) B
10) B
11) C

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