

HISTOLOGY
EPITHELIAL
TISSUE



Epithelial Tissue

Objectives:

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

EPITHELIAL TISSUE

General characteristics:

- Cells are **tightly joined** with little **intercellular space**.
- **The little might be replace with scarce or scanty .**
- Rest on a **basement membrane**.
- visible in both **Light microscopic (L/M) & Electron microscopic (E/M) .**
- **Avascular**. (**A** means: not)
- High power of **regeneration**.

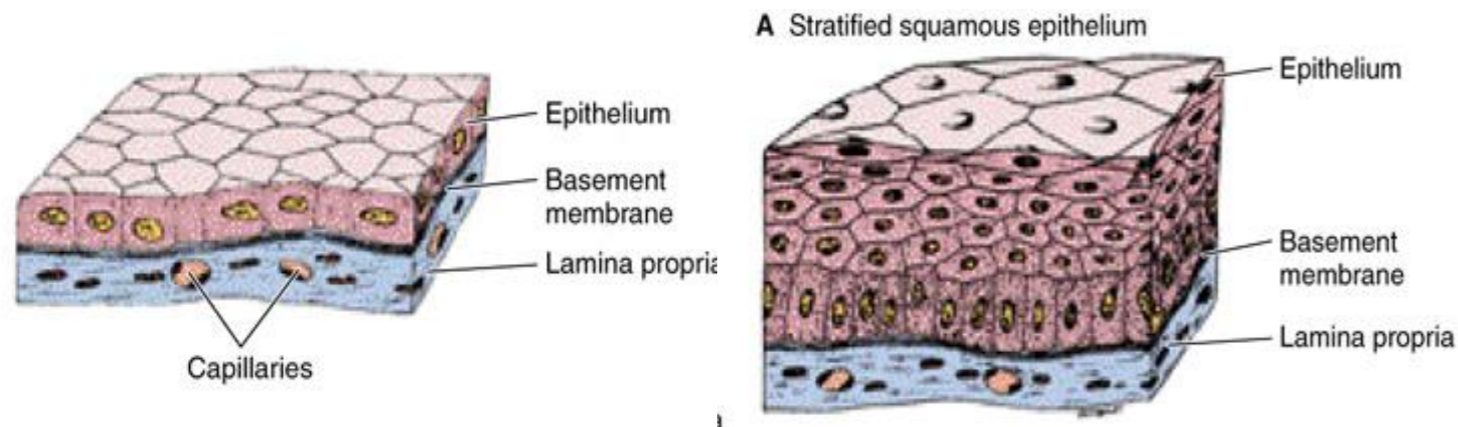


Classification:

➔ a. Epithelial membranes:

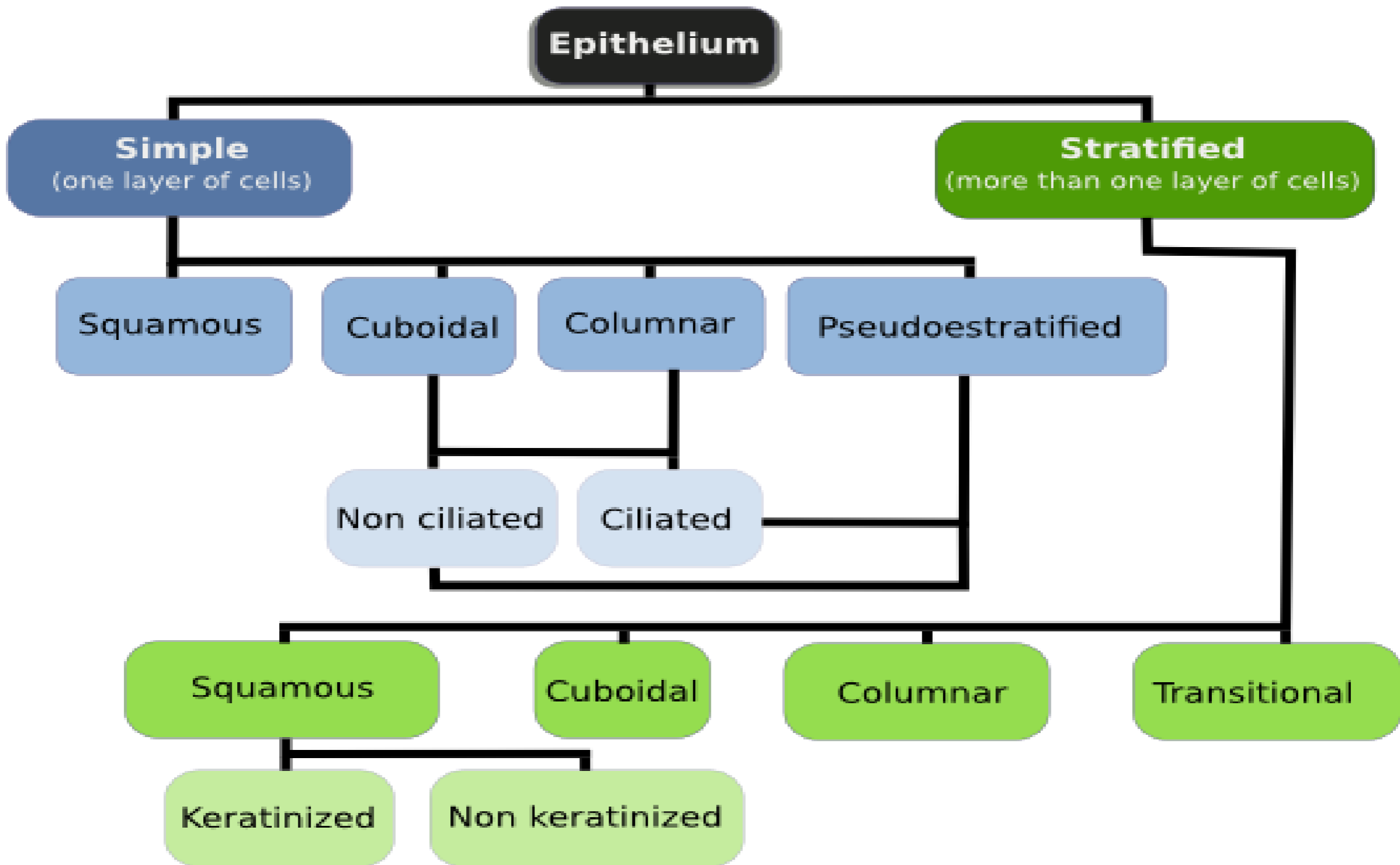
- 1- Simple epithelium: one layer.
- 2- Stratified epithelium: more than one layer.

➔ b. Glands (Glandular Epithelium).

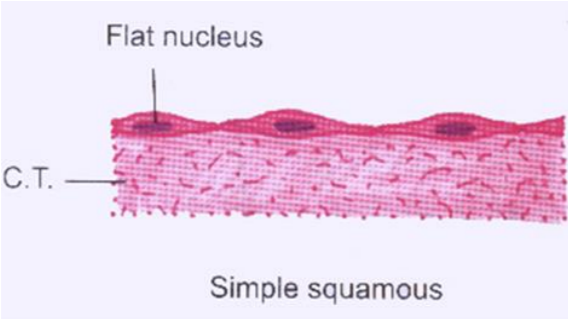
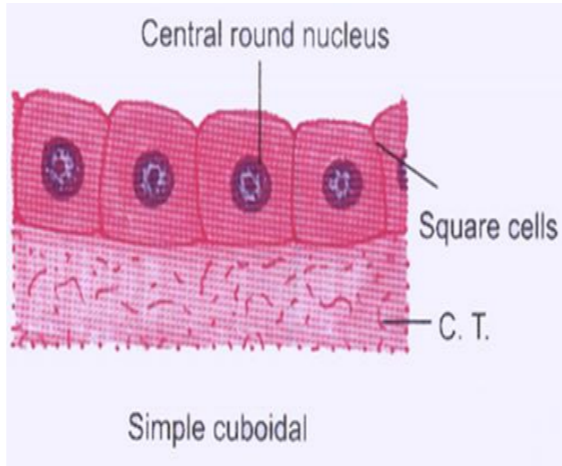
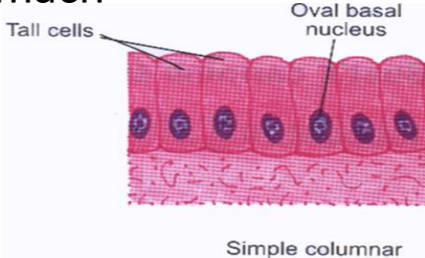

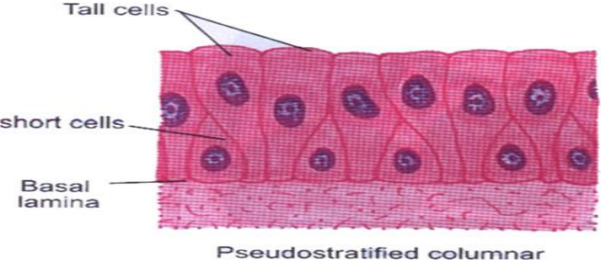
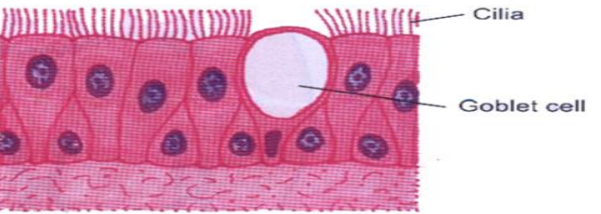


FUNCTIONS OF EPITHELIUM :

- Protection as in epidermis of skin.
- Secretion as in glands.
- Absorption as in small intestine.
- Excretion as in kidney.
- Reproduction as in gonads.
- Smooth lining as in blood vessels.

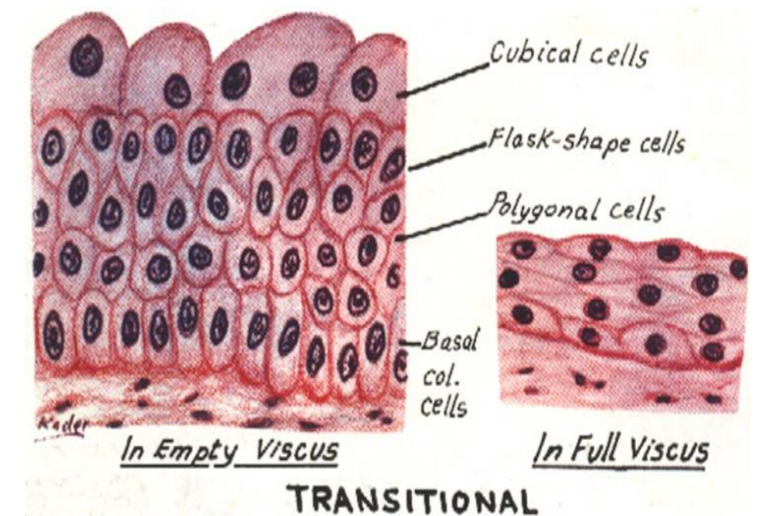
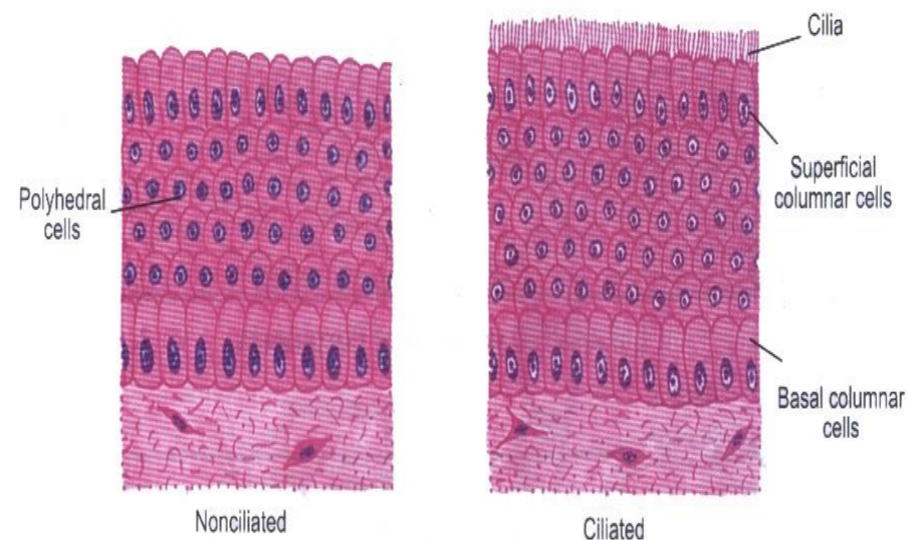
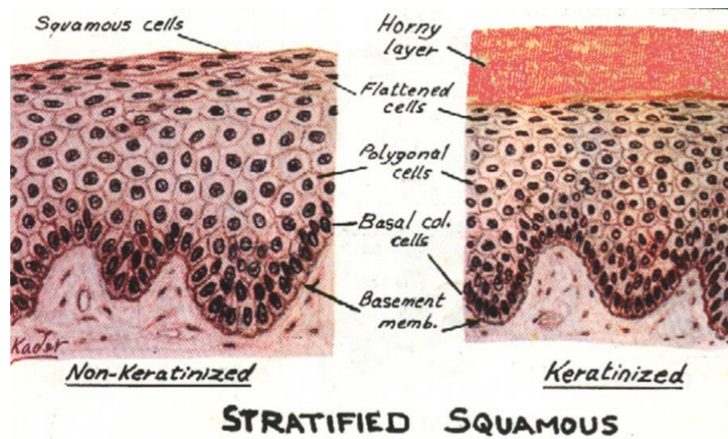


Simple Epithelium

	1- Simple squamous / flat	2- Simple cuboidal	3- Simple columnar	4- Pseudo-Stratified Columnar
Cell layers:	One layer			One layer of cells, they can be tall or short that don't reach the surface. They rest on a basement membrane.
Nuclei Characteristics:	Flat, provides smooth thin surface.	Central, round	Basal, oval.	appears at different levels
Sites/ Distribution:	1- Endothelium (lining the CVS) 2- Alveoli of lung.  <p>Flat nucleus C.T. Simple squamous</p>	1- Thyroid follicles.  <p>Central round nucleus Square cells C.T. Simple cuboidal</p>	Non-ciliated: 1- In lining of stomach 2- intestines (with goblet cells) 3- in gall bladder.  <p>Tall cells Oval basal nucleus Simple columnar</p> Ciliated with cilia on free surface: 1- Fallopian tubes.  <p>Cilia Simple columnar ciliated</p>	Non-ciliated: 1- vas deferens  <p>Tall cells short cells Basal lamina Pseudostratified columnar</p> Ciliated with Goblet Cells: 1- trachea 2-bronchi 3- resp.system  <p>Cilia Goblet cell Pseudostratified columnar ciliated</p>

Stratified Epithelium

	1-Stratified Squamous:	2- Stratified Columnar Epithelium:	3-Transitional:
Cell layers and Nuclei Characteristics:	<p>Basal cells: columnar with basal oval nuclei.</p> <p>Intermediate cells: polygonal with central rounded nuclei.</p> <p>Surface cells: flat with flat nuclei.</p>	<p>Basal cells: columnar.</p> <p>Intermediate cells: polygonal.</p> <p>Surface cells: columnar.</p>	<p>Basal cells: columnar.</p> <p>Intermediate cells: polygonal.</p> <p>Surface cells: large cuboidal with convex free surface, may be bi-nucleated.</p>
Sites/ Distribution:	<p>Keratinized (keratin layer on the surface):</p> <p>1- epidermis of skin.</p> <p>Non-keratinized:</p> <p>1- esophagus.</p>	<p>1- large ducts of glands.</p>	<p>1- Urinary bladder.</p>



GLANDS (Glandular Epithelium) Classifications:

50% of Epithelial Tissues are Glands




Presence or absence of ducts

- 1- Endocrine:**
Thyroid gland
- 2- Exocrine:**
Salivary gland
- 3- Mixed:**
Pancreas

Number of cells:

- 1-Uni cellular:**
Goblet cells
- 2- multicellular:**
Salivary glands


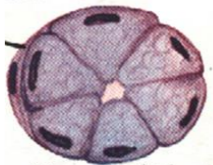

Mode of Secretion:

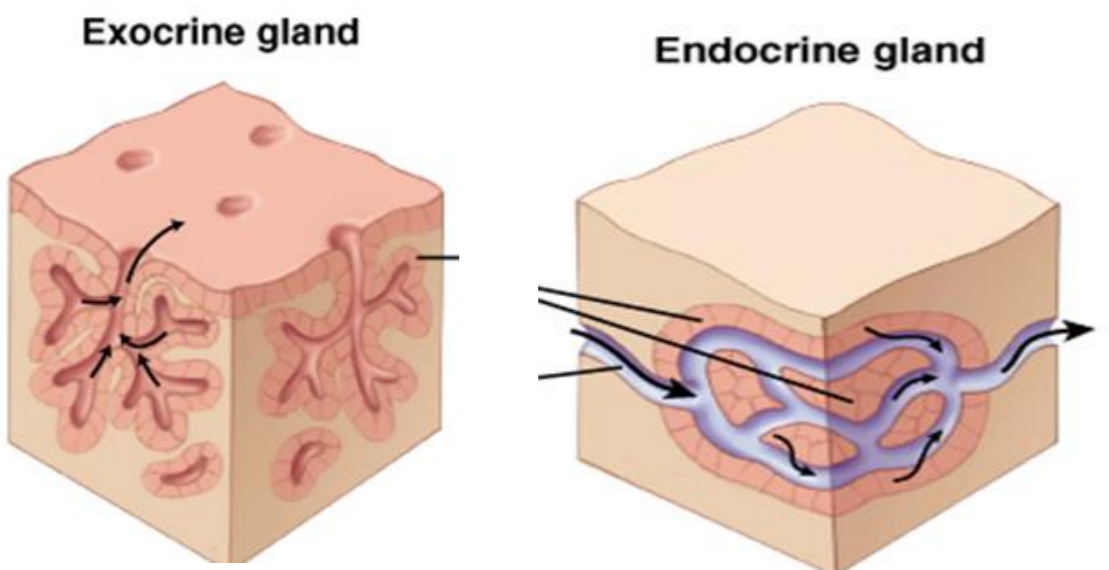
- 1- Merocrine:**
No part of the cell is lost with the secretion.
salivary glands 
- 2- Apocrine:**
The **top of the** cell is lost with the secretion.
mammary gland 
- 3- Holocrine:**
The whole cell detaches with the secretion.
sebaceous glands. 

Shape of secretory part:

- Tubular:**
Intestinal gland. 
- Alveolar (acinar):**
Mammary gland 
- Tubulo-Alveolar:**
Pancreas 

Nature of secretion:

- Serous:**
parotid gland. 
Serous Acinus
- Mucous:**
goblet cells. 
Mucous Acinus
- Muco-serous:**
sublingual gland. 
Mixed Acinus
- Watery:**
sweat gland.



Clinical Applications



Immotile cilia syndrome (Kartegener's syndrome):

Disorder that causes infertility in male and 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.

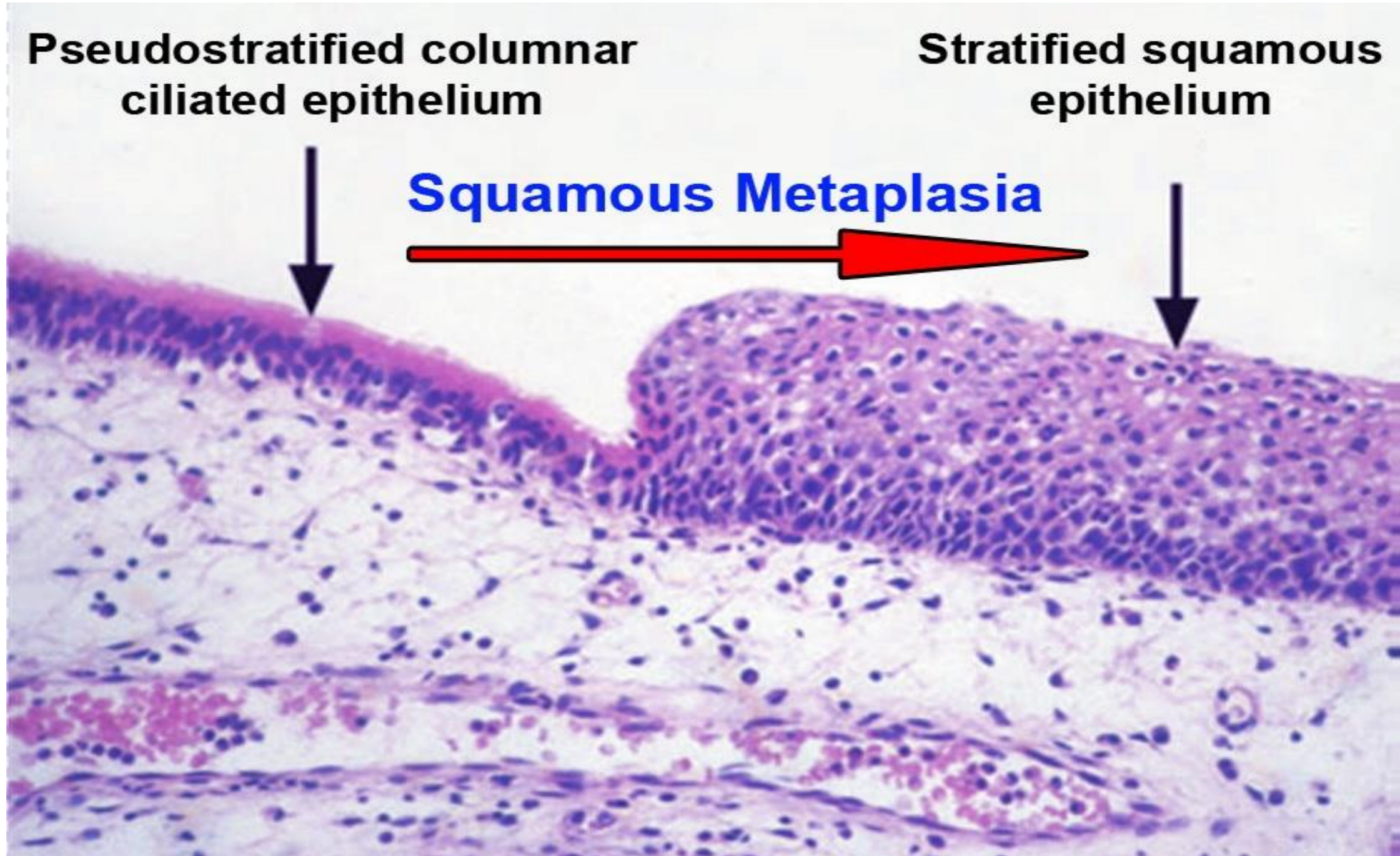
Example: pseudostratified ciliated columnar epithelium of the respiratory passages, e.g. trachea, of heavy smokers may undergo squamous metaplasia, transforming into stratified squamous epithelium.

Squamous Metaplasia

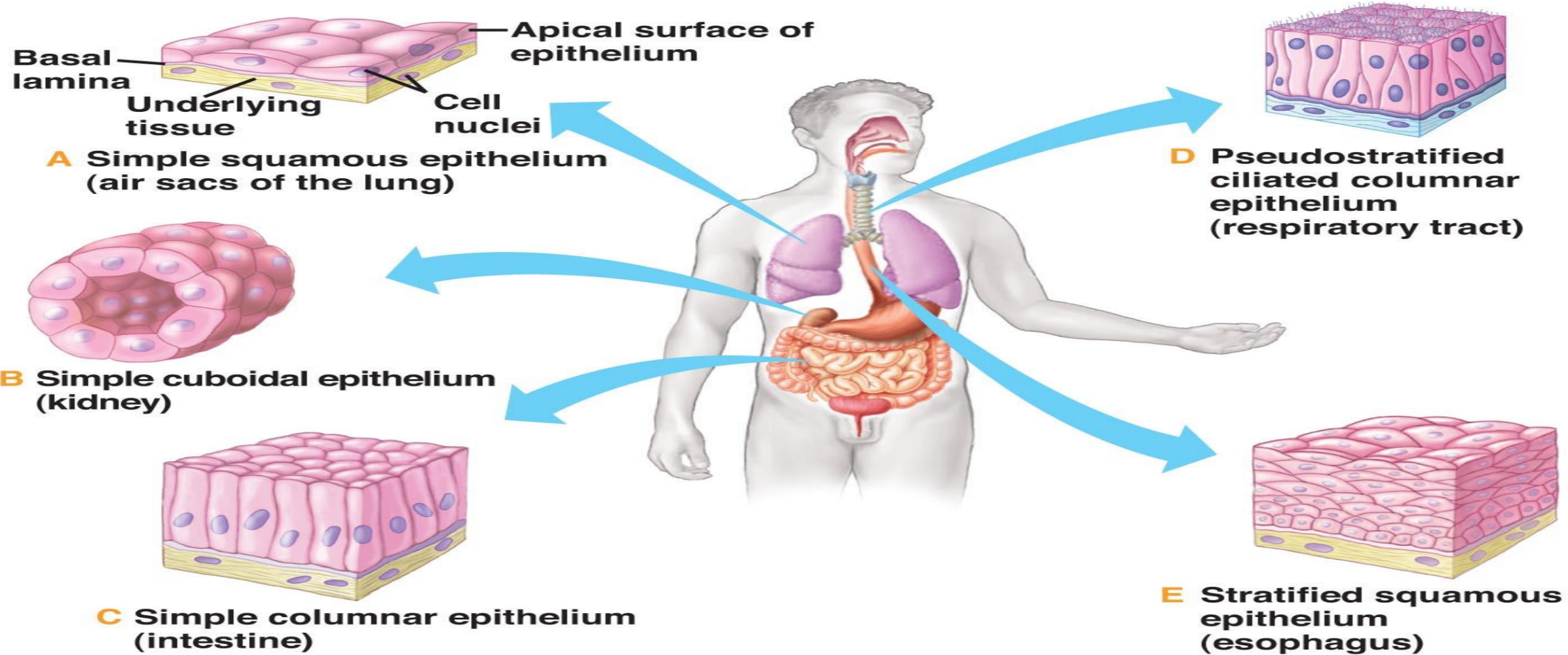
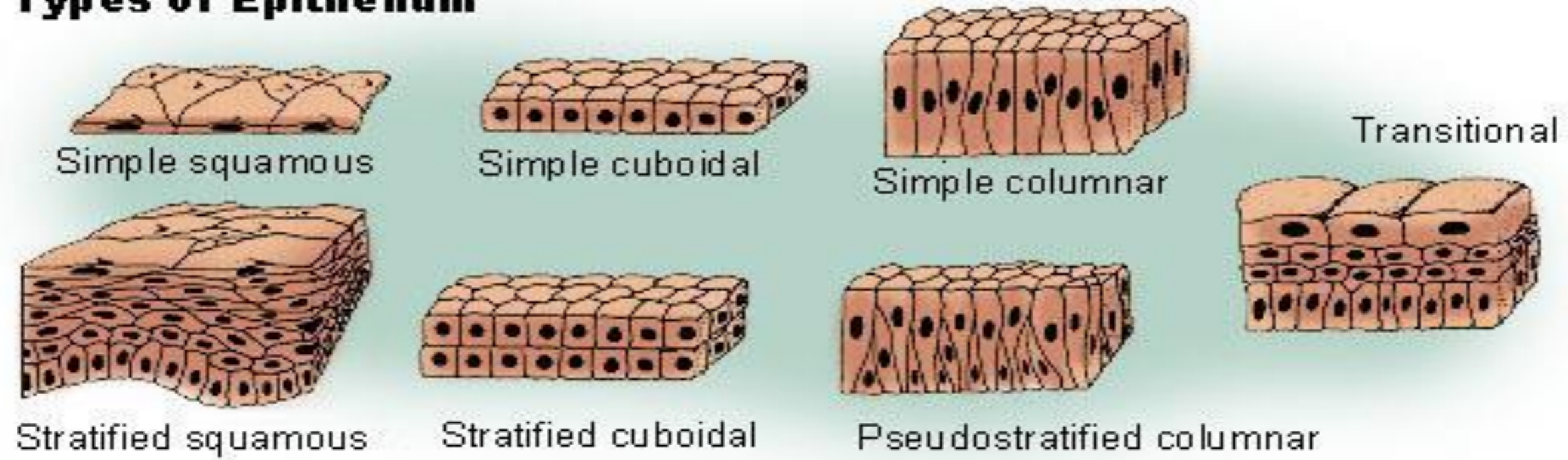
Pseudostratified columnar ciliated epithelium

Stratified squamous epithelium

Squamous Metaplasia



Types of Epithelium



Videos for you to watch:

Epithelium

<https://www.youtube.com/watch?v=L1YQaAfAKfs>

<https://www.youtube.com/watch?v=rSqzvU6vmmg>

<https://www.youtube.com/watch?v=3LceGFcMtqM>

THANK YOU !

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