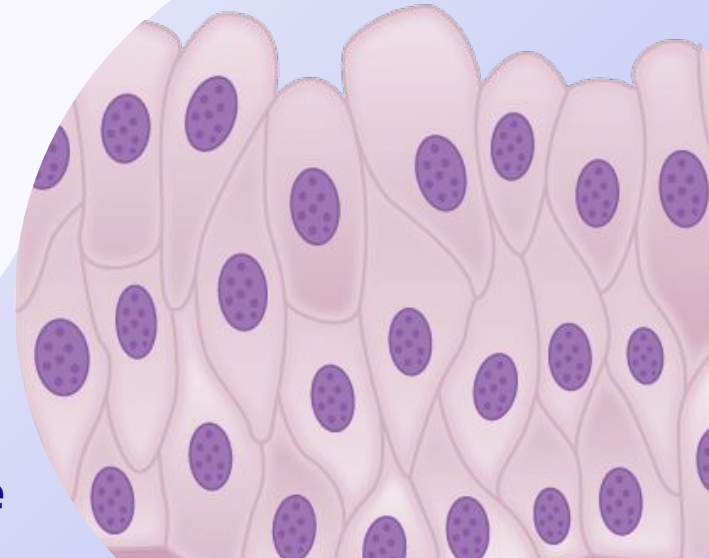


Epithelial Tissue

Color Index:

- Main Text -Important -Notes
- Boy Slides -Girl Slides -Extra

Editing File



Objectives:

01

Describe general characteristics of epithelial tissue

03

Classify glandular epithelium according to different parameters

02

Discuss microscopic structure and distribution of different types of epithelium membranes

04

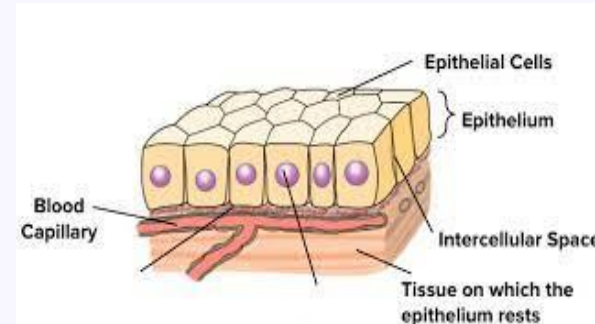
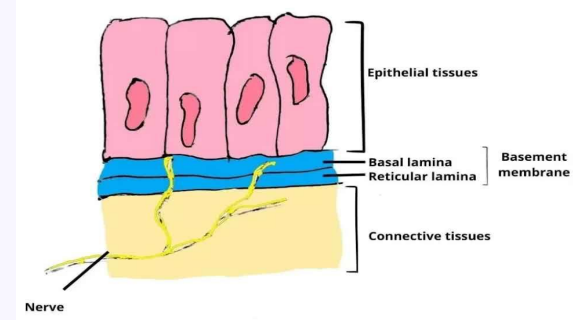
Enumerate the functions of epithelial tissue

General Characteristics

- Cells are **tightly joined** with **little intercellular space**.

(The difference between the size of the intercellular space varies for each type of epithelial cell which helps us distinguish them from each other, however in general they are all little.)

- Rest on **basement membrane** (Located deep compared to the epithelial cells)
- High power of **regeneration**.
- **Avascular** (No blood vessels, it gets nourishment via diffusion)
- **Highly sensitive** (rich in nerve endings that send messages to your brain when you feel sensations such as heat, cold, and pain)



Classification:

There are more but only need to know these two.

Epithelial membranes:

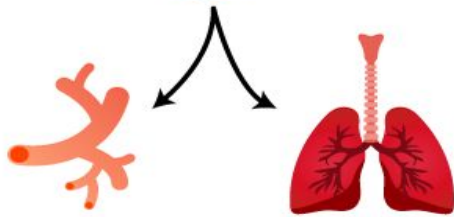
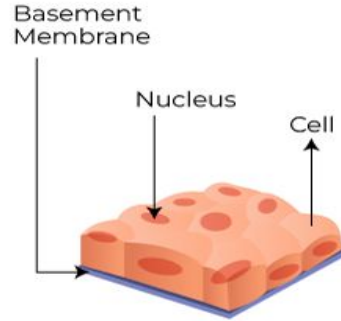
- Simple epithelium: One layer
- Stratified Epithelium: More than one layer

Glands (Glandular epithelium)

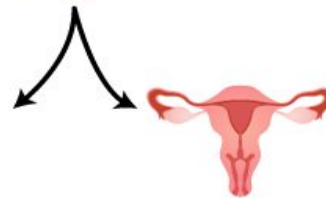
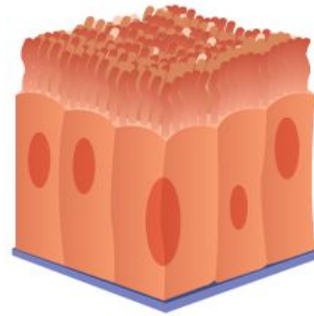
Common Features:
All are **one layer**

I. Simple Epithelium

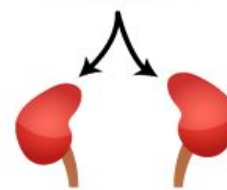
Single Squamous Epithelium



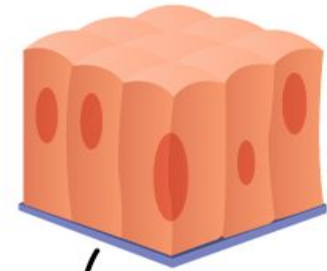
Ciliated Columnar Epithelium



Simple Cuboidal Epithelium



Simple (smooth) Columnar Epithelium



1) Simple Squamous

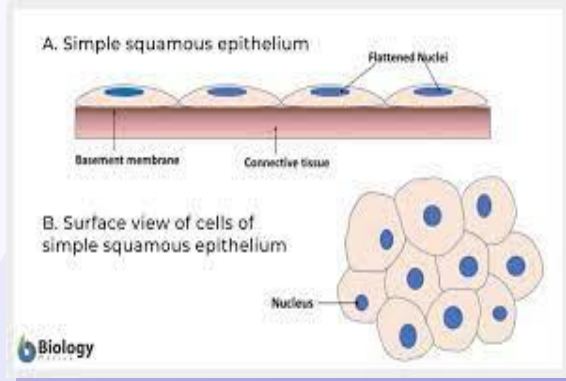
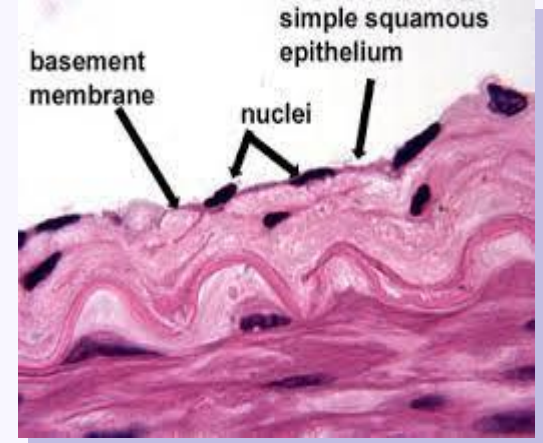
Features:

- **One Layer**
- They are **flat cells**
- They have **flat nuclei**
- Provides **smooth thin surface**

Examples of sites:

- **Endothelium** (lining of the Cardiovascular System, CVS (Heart and blood vessels))
- **Alveoli** of lung (pulmonary) (They are tiny air sacs that function as basic respiratory unit)

Q1) Where is the (simple squamous, simple columnar, stratified columnar, etc) distributed?
Q2) What is the localization of (simple squamous, simple columnar, stratified columnar, etc)?
Ans: the examples given for each type.



2) Simple Cuboidal

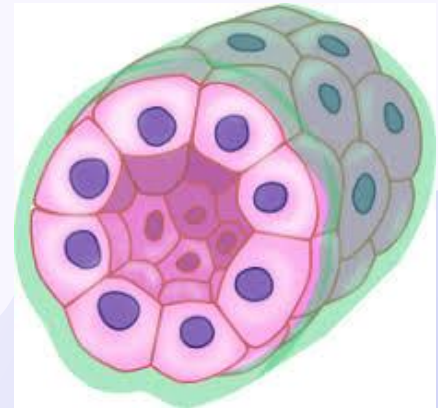
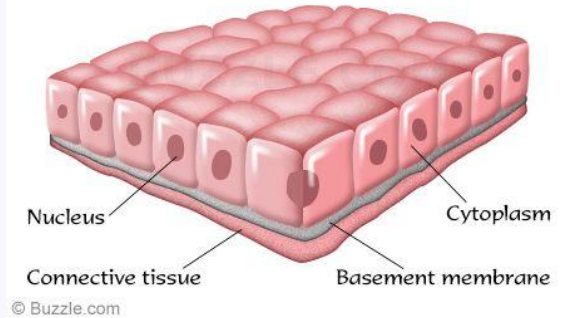
Features:

- **One Layer**
- **Cuboidal cells** (shaped like a cube)
- **Central rounded nuclei**

Examples of sites:

- **Thyroid follicles** (follicle means small secretory cavity, sac or gland)

Simple Cuboidal Epithelium



3) Simple Columnar

Features:

- **One Layer**
- **Columnar cells** (tall cells)
- **Basal oval nuclei** (basal means located at the bottom)

Types: (Columnar is the only one with 2 types)

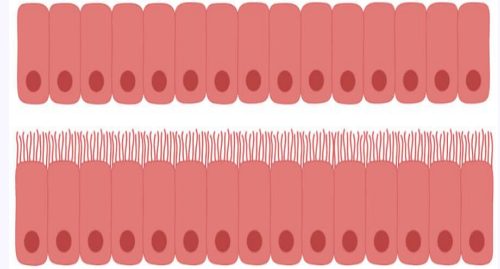
- **Non-Ciliated:**
 - Example of sites: **Stomach** and **Intestines (with goblet cells)**

(goblet cells look like a goblet cup and they secrete mucus)

- **Ciliated:**
 - Example of sites: **Fallopian (uterine) tubes**

In the examples given goblet cell is only present in intestine.

Simple Columnar Epithelium



wide from the top

Narrow from the bottom

This is called a goblet

4) Pseudostratified Columnar

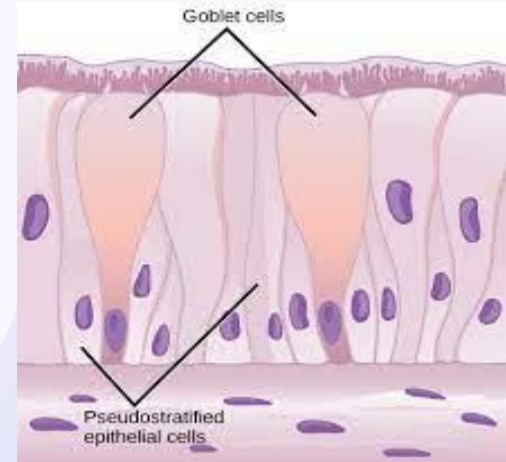
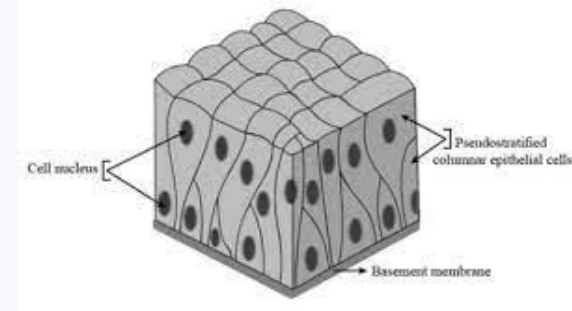
pseudo means almost, impression that there is more than one layer of cells (stratified), when in fact this is a true simple epithelium (all the cells rest on the basement membrane).

Features:

- **One Layer**
- **Columnar cells**
- Some **tall** and some **short** (Some reach the surface and others don't)
- **Nuclei** appears at **different** levels
- **All rest on basement membrane**

Types:

- **Non-Ciliated:**
 - Example of sites: **parts of male urethra**
- **Ciliated with Goblet cells:** (Has cilia and has goblet cells)
 - Example of sites: (Respiratory epithelium) **trachea** and **Bronchi**

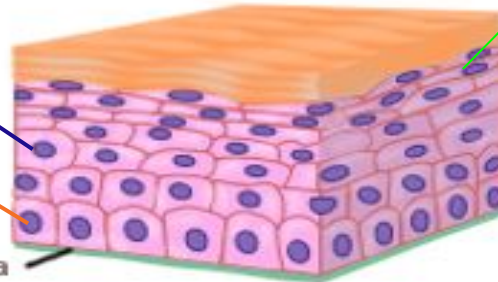
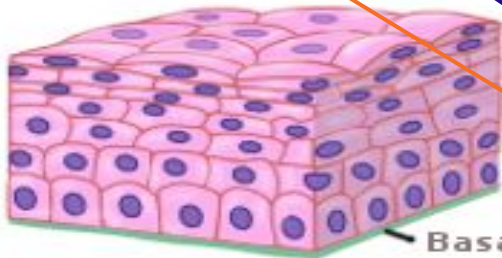


Common Features:

- **Multiple** Layers of cells
- **Intermediate cells are polygonal** with central rounded nuclei
- **Basal cells are columnar** with basal oval nuclei

II. Stratified Epithelium

Stratified squamous

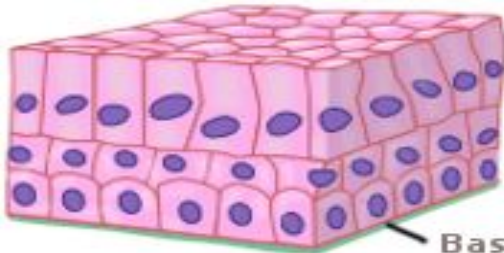


Type of tissue is based on the cells on the apical (surface)

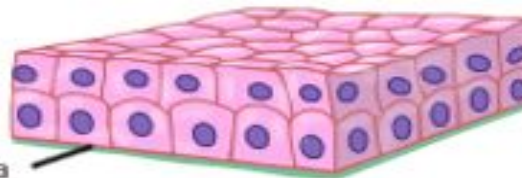
Keratinized stratified squamous

STRATIFIED

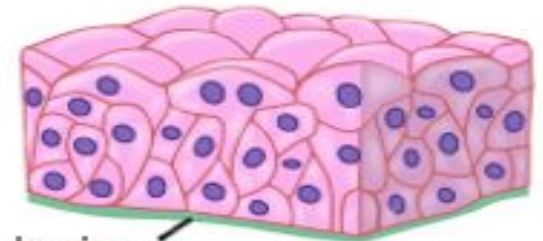
Stratified columnar



Stratified cuboidal



Transitional



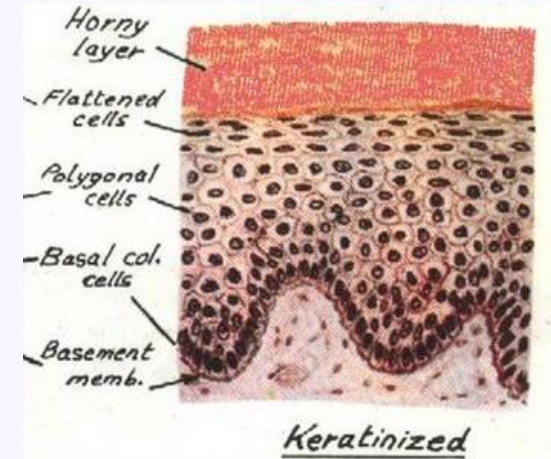
1) Stratified Squamous

Features:

- **Surface cells** are **flat**
- **Flat nuclei**

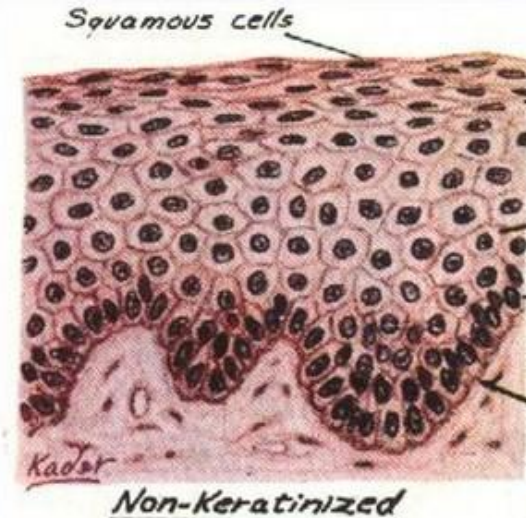
Common Features:

- **Multiple** Layers of cells
- **Intermediate cells are polygonal** with central rounded nuclei
- **Basal cells are columnar** with basal oval nuclei



Types: (In the stratified epithelial, squamous is the only one that has more than one type)

- **Keratinized:** Has layer of **keratin** (Also called horny layer) on the surface
 - example of sites: **Epidermis of skin**
- **Non-Keratinized:** Without layer of **keratin** on the surface
 - example of sites: **Esophagus**



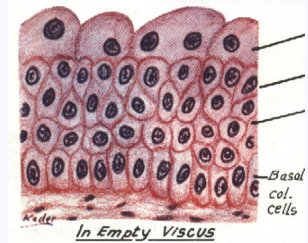
2) Transitional Epithelium

Features:

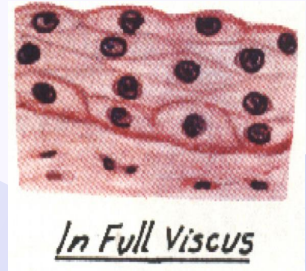
- Surface cells are **large cuboidal**
- **Convex free surface** (The membrane is dome-shaped)
- May be **binucleated** (contain two nuclei)

Common Features:

- **Multiple** Layers of cells
- **Intermediate cells are polygonal** with central rounded nuclei
- **Basal cells are columnar** with basal oval nuclei



In empty bladder (relaxed) the transitional epithelium appears cuboidal and thick.



In full bladder (stretched) it appears squamous and thin.

Examples of sites:

- **Urinary bladder** (It's because transitional epithelium helps the urinary bladder to contract and expand.)
- **Ureter**

3) Stratified Columnar Epithelium

Features:

- **Surface** cells are **columnar**

Common Features:

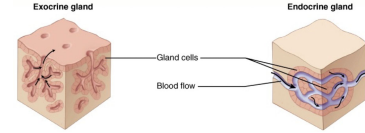
- **Multiple** Layers of cells
- **Intermediate cells are polygonal** with central rounded nuclei
- **Basal cells are columnar** with basal oval nuclei

Examples of sites:

- **Parts of male urethra**



Classification of Glands (Glandular Epithelium)



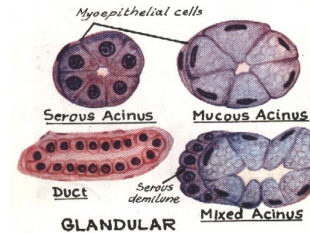
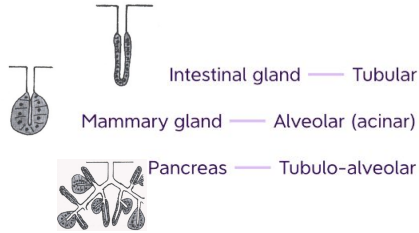
Based on the presence or absence of ducts

- Exocrine — Salivary
- Endocrine — Thyroid gland
- Mixed — Pancreas
- Liver

Based on the Nature of secretion

- Serous — Parotid gland
- Muco-serous — Sublingual gland
- Mucous — Goblet cells
- Watery — Sweat glands

Based on the Shape of secretory part



Serous secretions differ from watery secretions because serous includes enzymes

Functions of epithelium

439: hey i am just a
"PASSER" and my name
is epithelium



Protection as in epidermis of skin

Absorption as in small intestine.

Secretion as in gonads.

Smooth lining as in blood vessels.

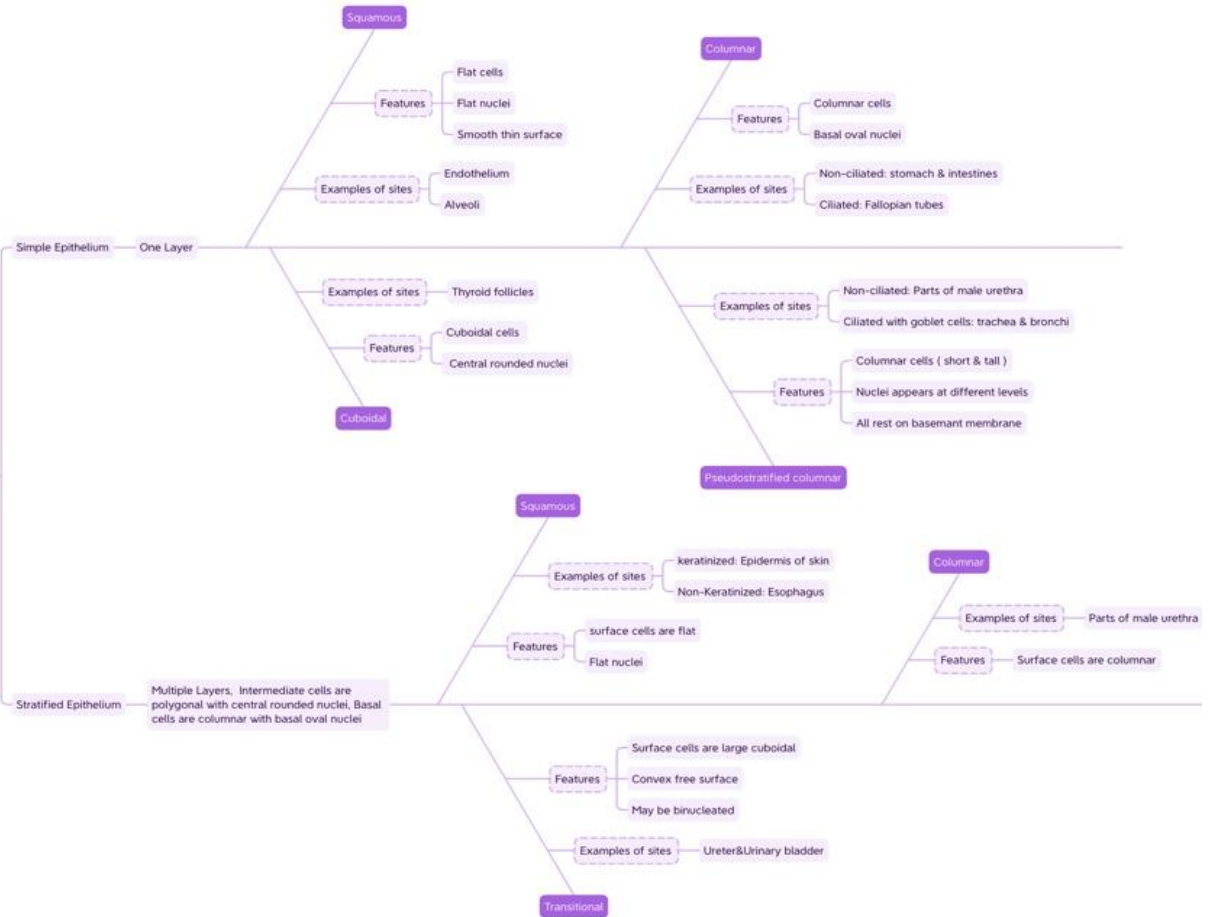
Excretion as in kidney.

Reproduction as in gonads.

Summary

Epithelial Tissue

Epithelial membranes



MCQs

1- What is the localization of ciliated simple columnar epithelial?

A- Intestine

B- Thyroid follicle

C- Heart

D- Fallopian tubes

2- What is the shape of the basal cells in stratified squamous epithelium?

A- Columnar

B- Circular

C- Polygonal

D- Flat

3- Which of these features is not true about pseudostratified columnar epithelium?

A-Multiple layers

B- Tall and short cells

C- Located in Trachea

D- Nuclei appears in different levels

MCQs

4- What is the nature of secretion in the parotid gland?

A) Serous

B- Muco-serous

C- Mucous

D- Watery

5- Example of transitional epithelium:

A) Urinary bladder

B) Epidermis

C) Ureter

D) A and C

The Team

Team Leaders:

- Ahmad Addas
- Hessah Alghanim

Team Members:

- Saud Alsaeed
- Fahad Alqahtani 
- Abdulaziz Alobathani
- Ibrahim Albabtain
- Fahad Albalawi
- Faisal Alessa
- Yazan Alkheder
- Ziyad Bukhari
- Joud Alahmari
- Lulwah Alwabel 
- Hessah Alyousef
- Haneen Baatiah
- Norah Alnoshan
- Lina Albaqiyh
- Layan Alsubaie
- Ghaida Alotaibi

