

# Biology



**Histology: is the study of the tissues of the body.**

**Tissue: group of similar cells combined to perform a common function.**

**The human body is composed of only 4**

**basic types of tissue:**

- 1. epithelial tissues.**
- 2. connective tissues.**
- 3. muscular tissues.**
- 4. nervous tissues.**

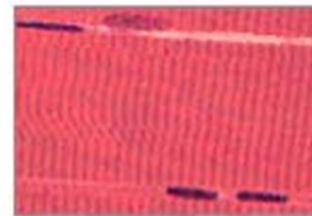
Four types of tissue



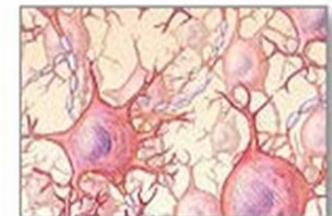
Connective tissue



Epithelial tissue



Muscle tissue



Nervous tissue

# **Epithelial Tissues:**

## **Features of epithelium:**

- 1. Covering & lining**
- 2. Homeostasis**
- 3. Intercellular space**
- 4. No bl. Vessels**
- 5. 3 germ layers**



# Functions of epithelium:

1. Protection:
2. Sensation
3. Secretion
4. Absorption:
5. Cellular transport:

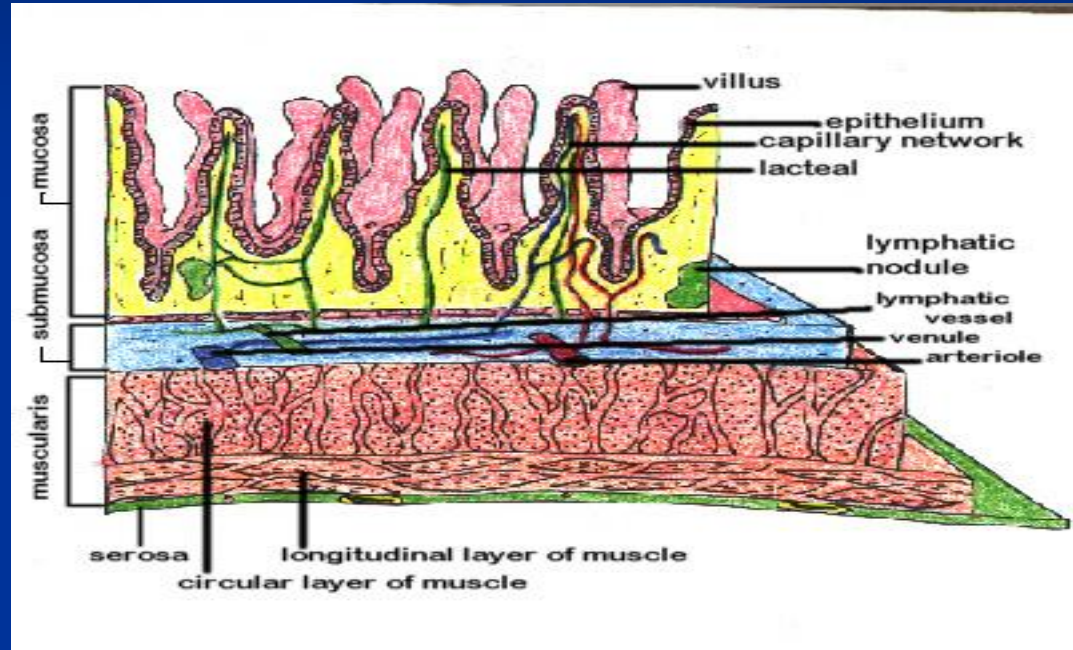


# polarity



# Apical modification of plasma membrane

micrvilli:



Stereocilia:



# Cell membrane specialization

The lateral parts of the cell membrane can show several specialization that form "intercellular junctions".

## functions of these junctions:

1. they are the sites of adhesion between adjacent cell.
2. they prevent the flow of materials through the intercellular compartment.
3. they help in the intercellular communication.



There are **three** types of junctions:  
**adhesion junctions (desmosomes):**

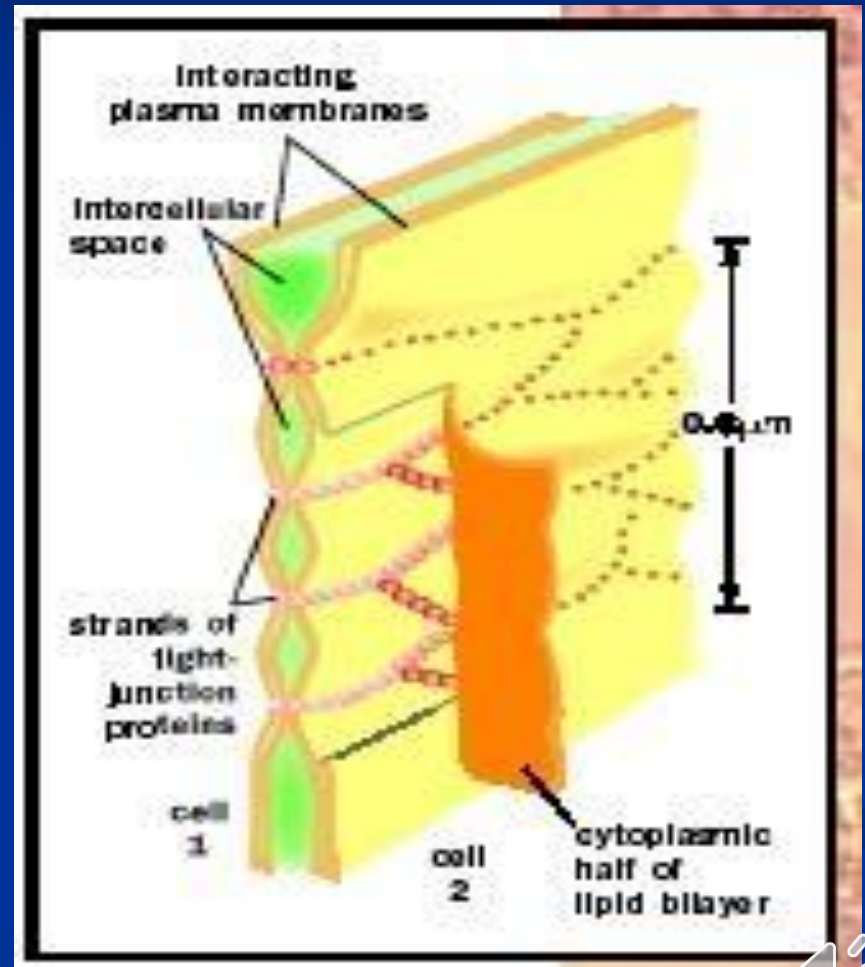
in this type, the internal cytoplasmic plaques firmly attached to the cytoskeleton within each cell, are joined by intercellular filaments.





- **tight junctions:**

adjacent cells are even more closely joined by tight junctions in which plasma membrane proteins actually attach to each other producing a zipper like fastening.

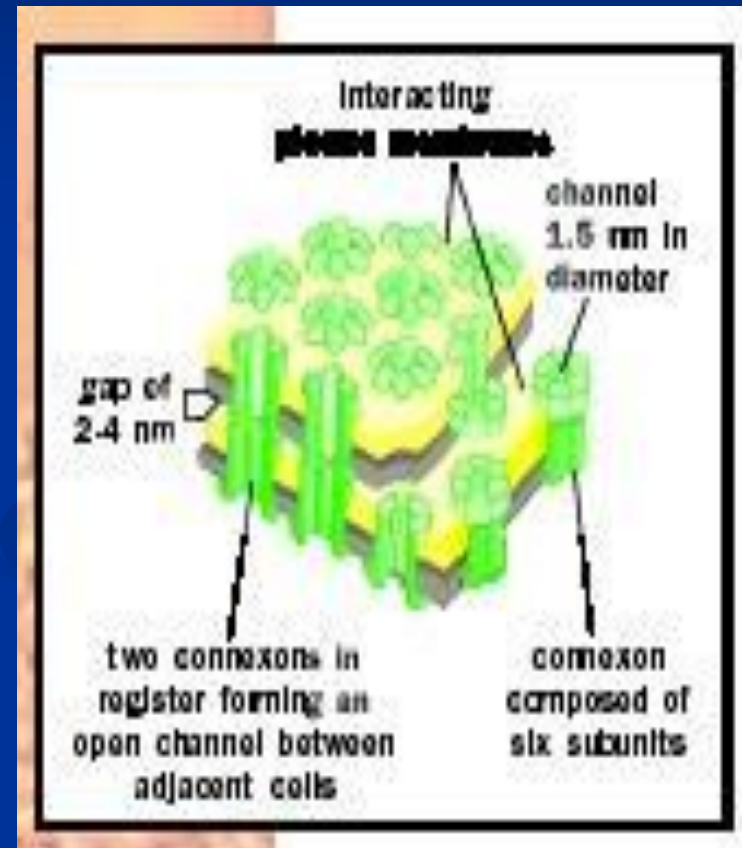


# •gap junctions:

it allows cells to communicate, and is formed when two identical plasma membrane channels join.

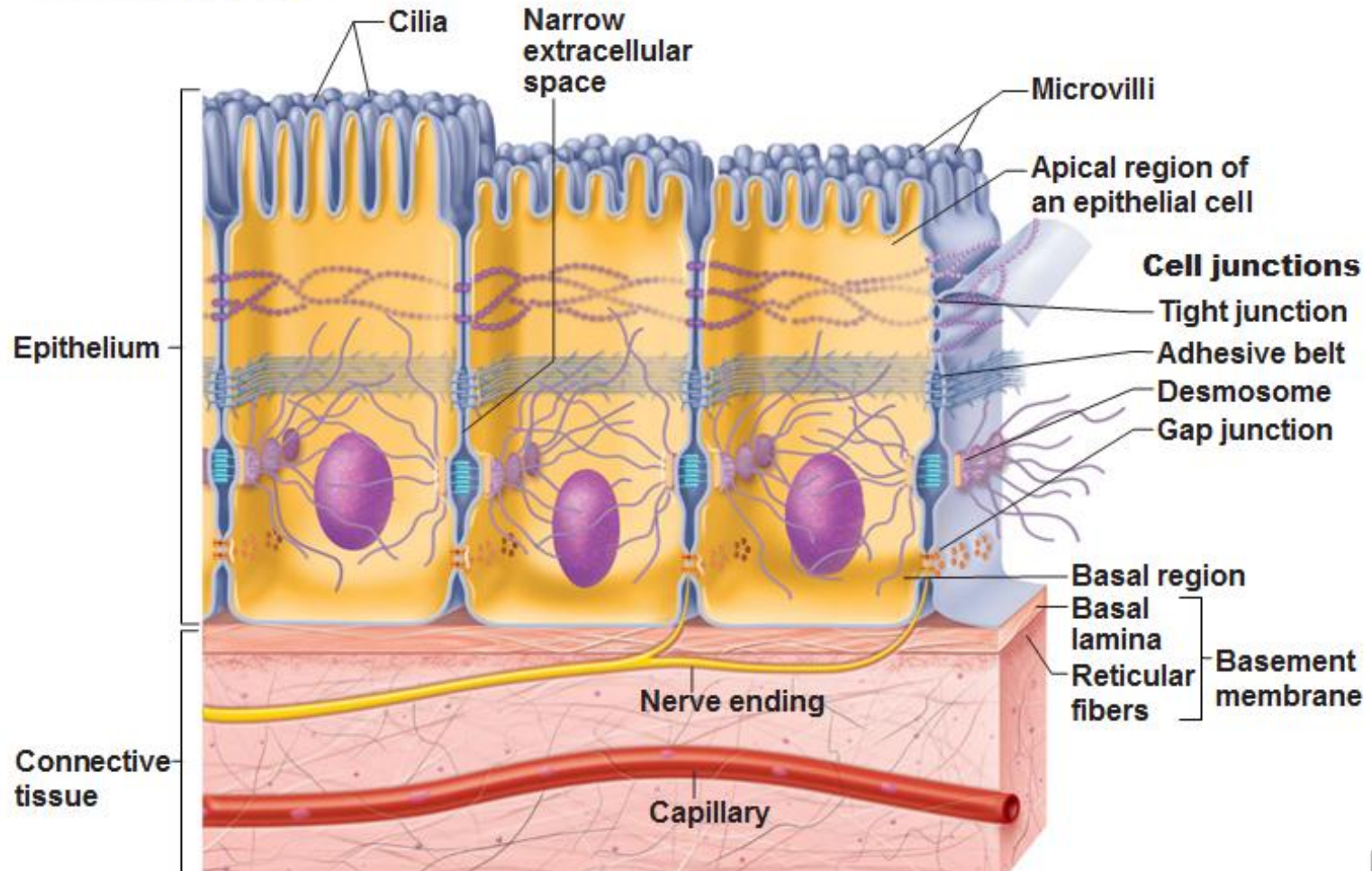
**Functions** of gap junctions are:

1. it lends strength to the cells.
2. it allows small molecules and ions to pass between them.



# Polarity:

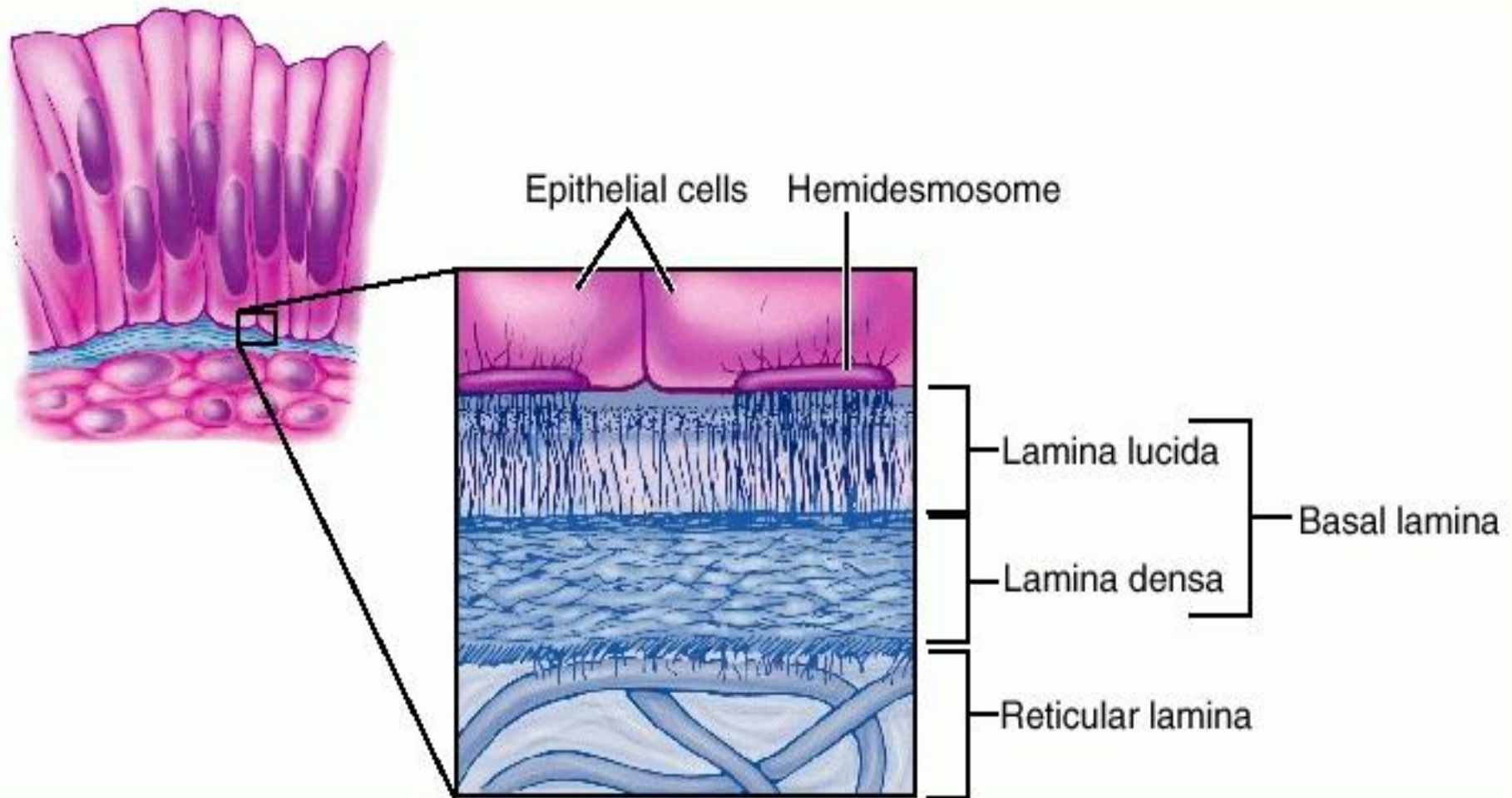
## Special Characteristics of Epithelia-Cell Junctions



# Basal lamina:

- 1. lamina densa: a delicate network of fine fibrils.**
- 2. lamina lucidae: which appear to be transparent.**





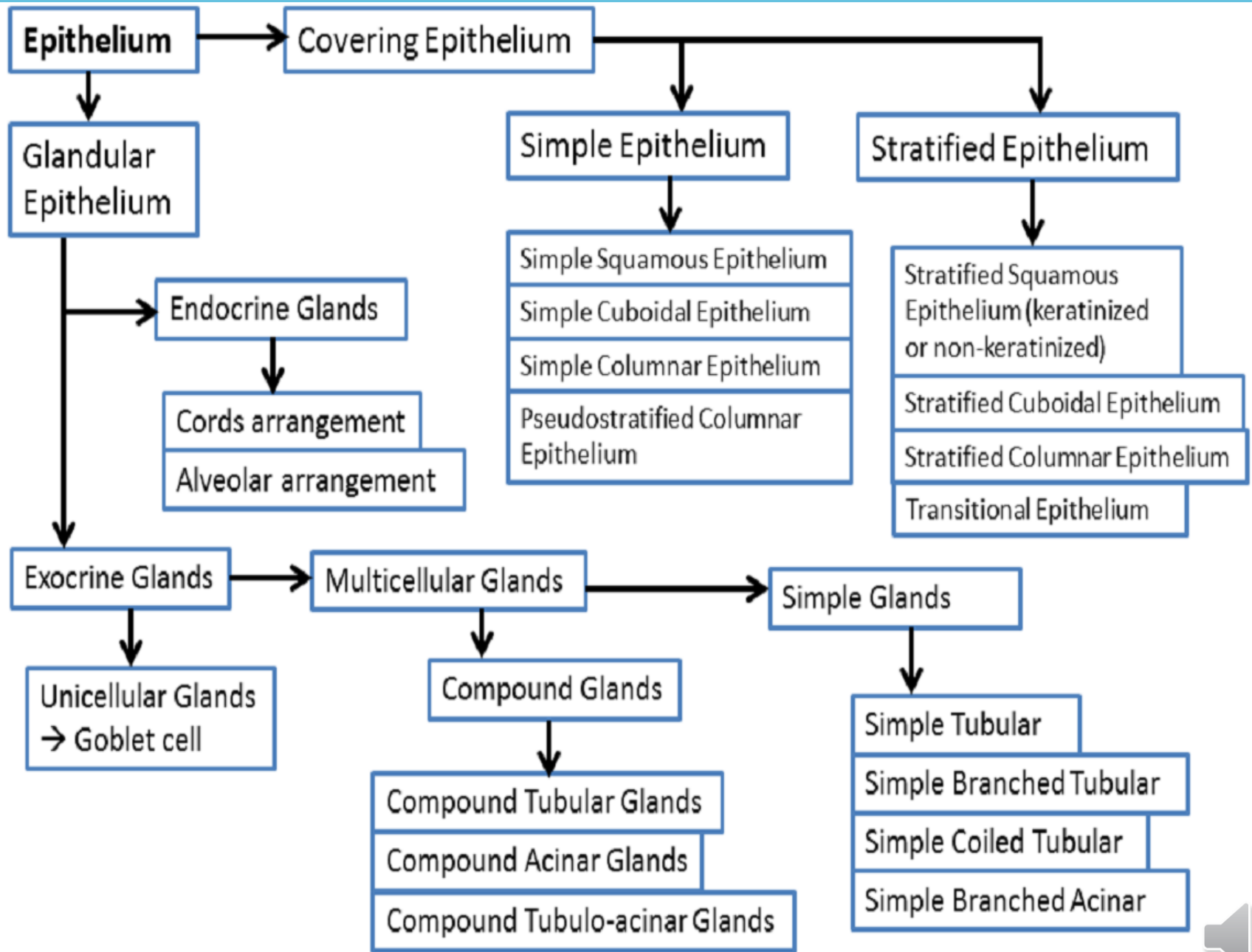
## ➤ Basement membrane:



## **Functions of basal lamina:**

- 1. it is considered as a molecular filter and as a flexible, firm support for the overlying epithelium.**
- 2. provide a selective barrier between connective tissue and other cells.**
- 3. the presence of the basal lamina around a muscle cell is necessary for the establishment of new neuromuscular junctions.**
- 4. the ability to influence cell polarity.**
- 5. regulate cell proliferation and differentiation by binding with growth factors.**
- 6. influence cell metabolism.**





# **Classification of epithelia:**

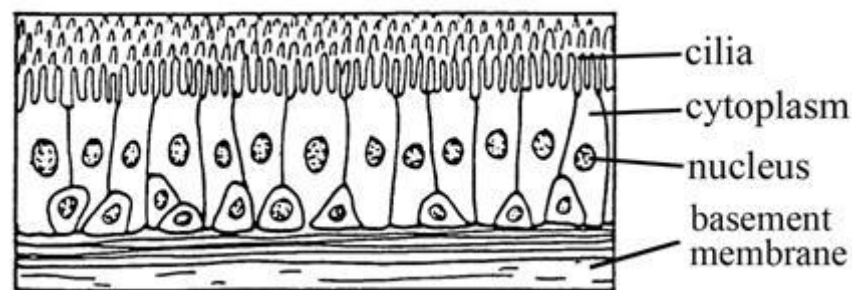
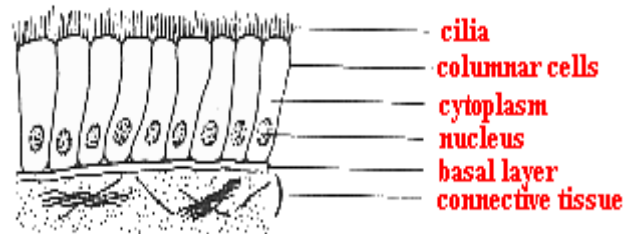
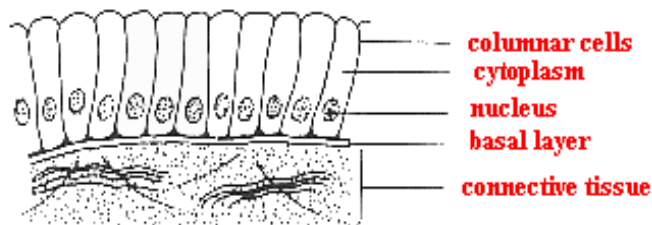
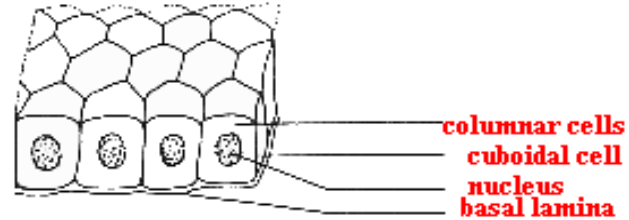
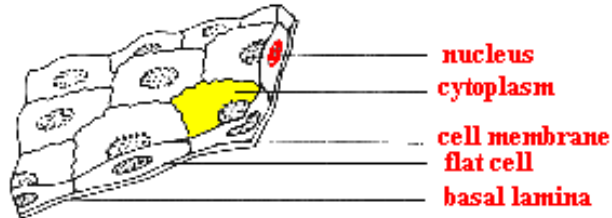
**covering epithelium.  
glandular epithelium.**





# Covering epithelium:

## Simple epithelia:



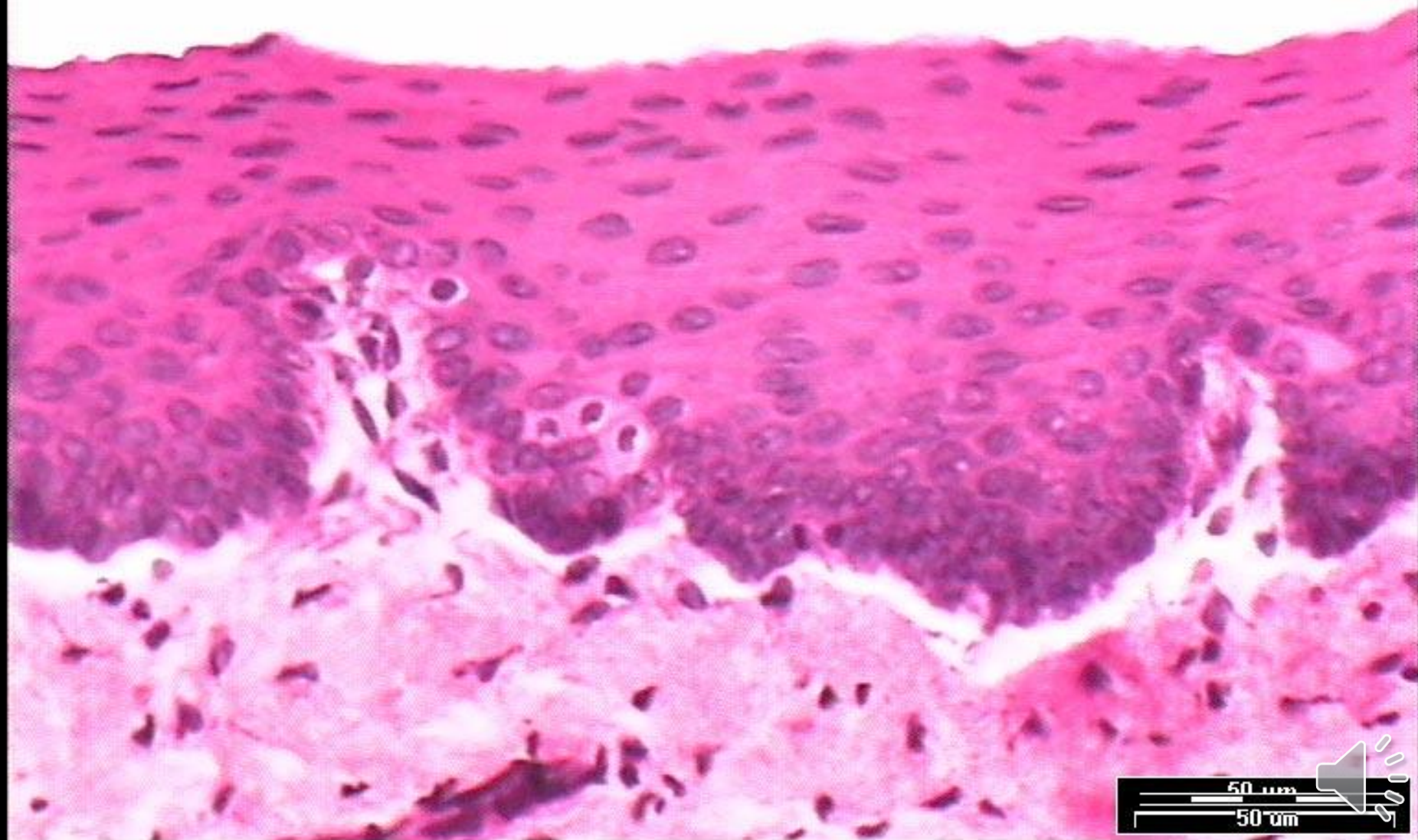
# Stratified epithelium:

Stratified Squamous Epithelium  
with Keratin  
Thick skin. Osmium staining



# Stratified Squamous Epithelium

## Tongue



# Stratified epithelium:

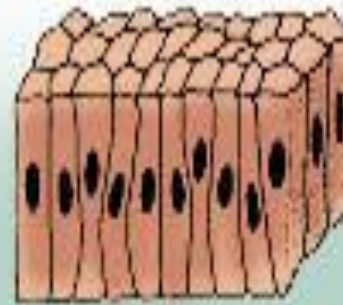
## Types of Epithelium



Simple squamous

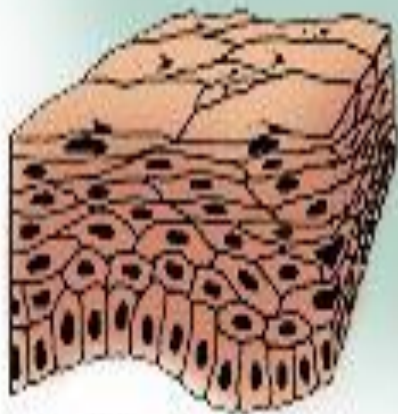
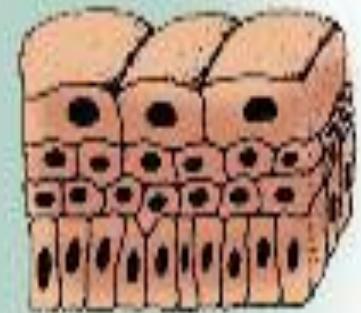


Simple cuboidal

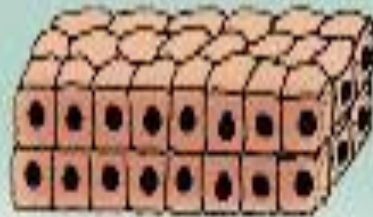


Simple columnar

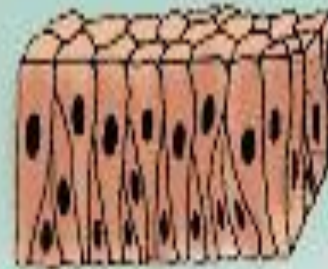
Transitional



Stratified squamous



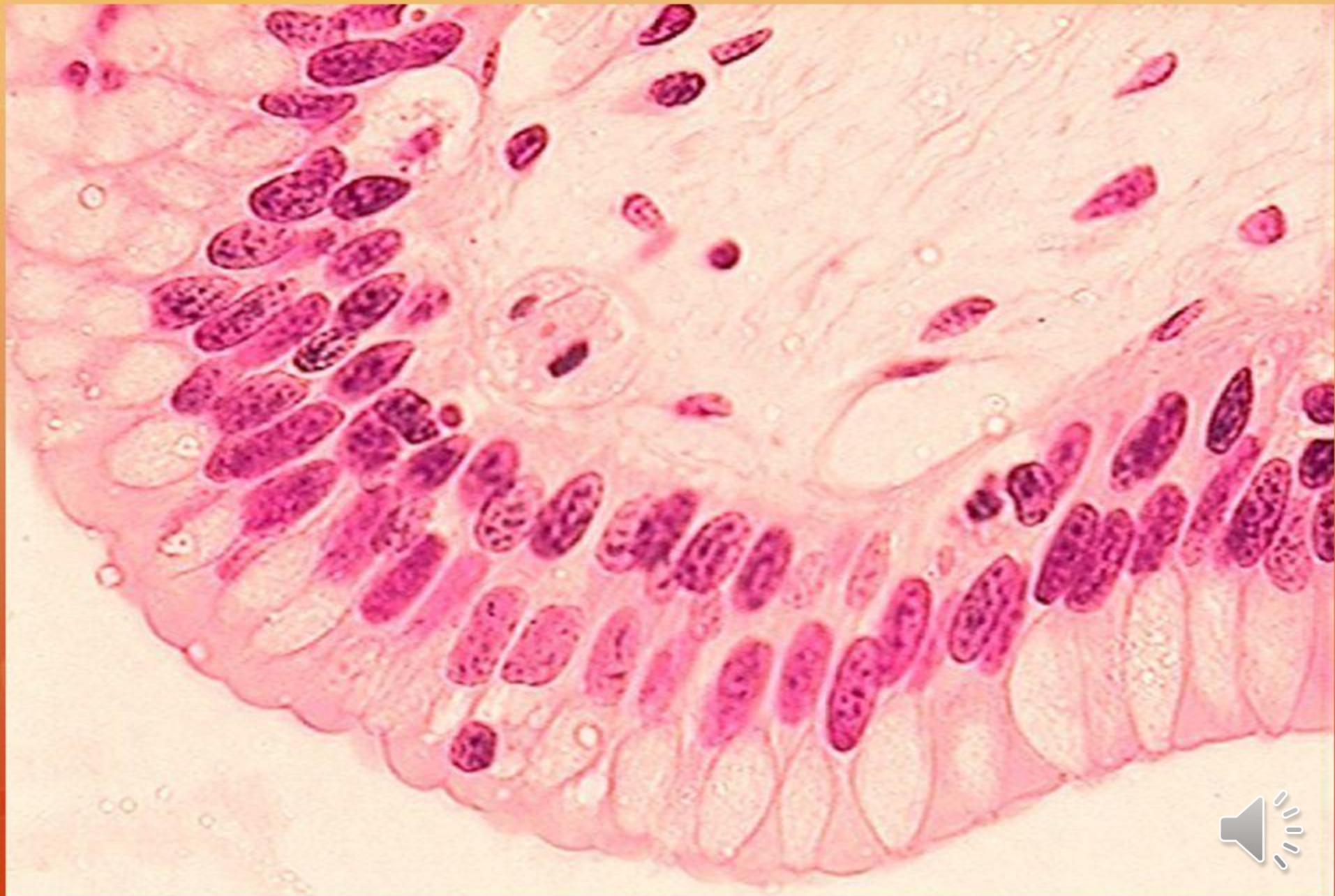
Stratified cuboidal



Pseudostratified columnar



# Stratified Columnar Epithelium



# Stratified epithelium:

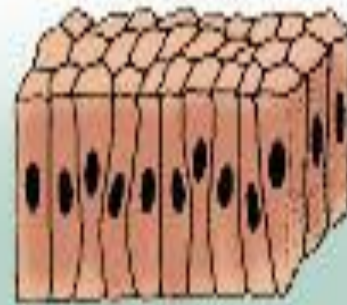
## Types of Epithelium



Simple squamous

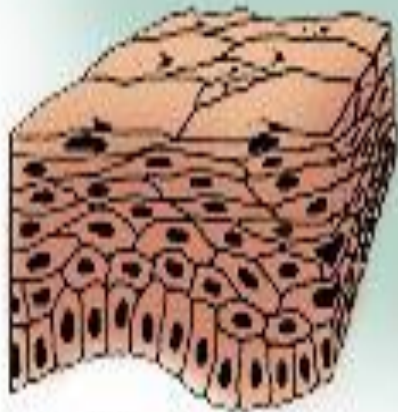
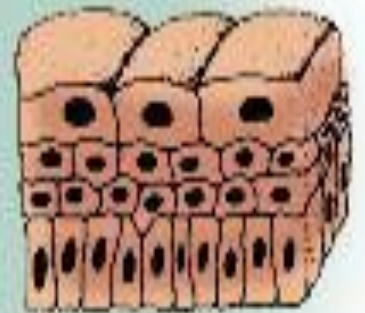


Simple cuboidal

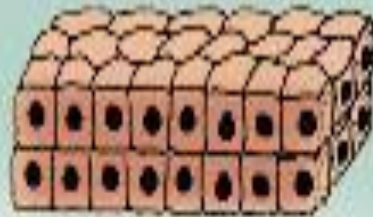


Simple columnar

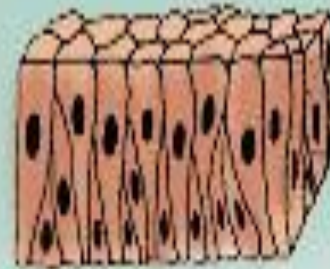
Transitional



Stratified squamous



Stratified cuboidal

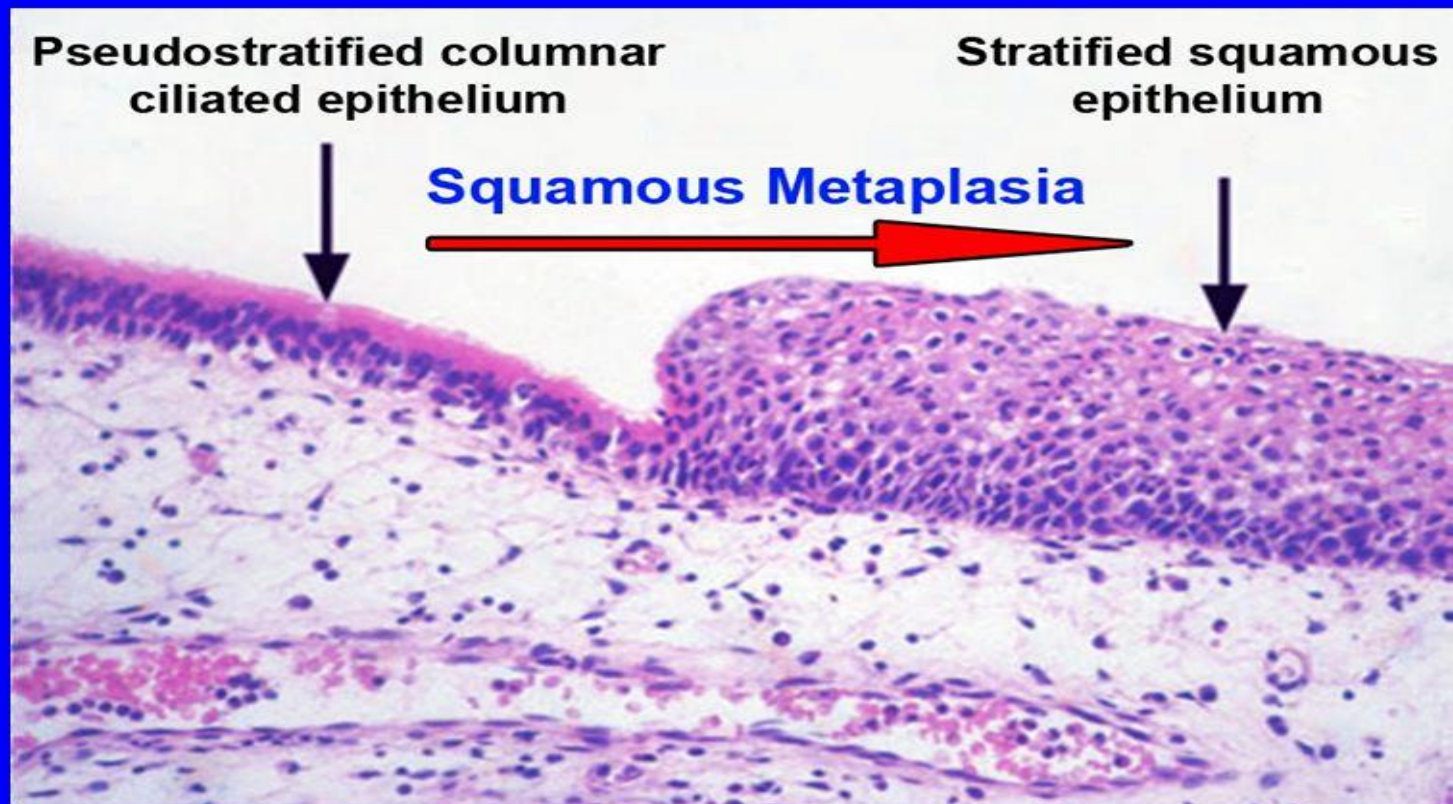


Pseudostratified columnar



# Clinical Correlation: Epithelial Metaplasia

## Squamous Metaplasia

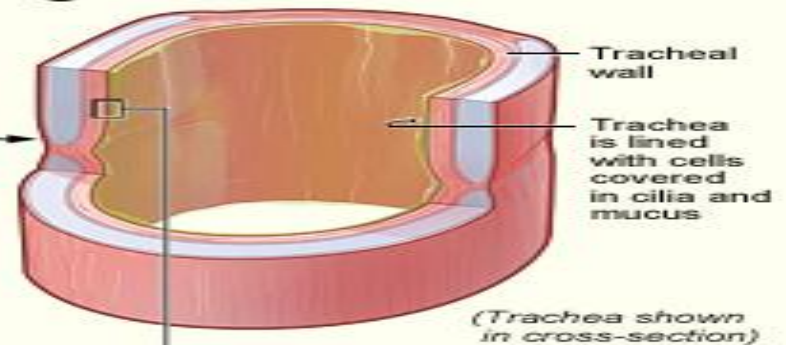


# Primary Ciliary Dyskinesia (Immotile Cilia Syndrome)

## A Organs affected by primary ciliary dyskinesia

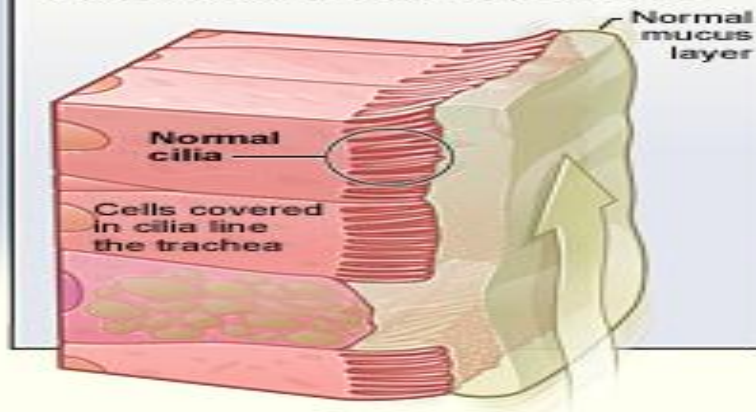


## B Trachea



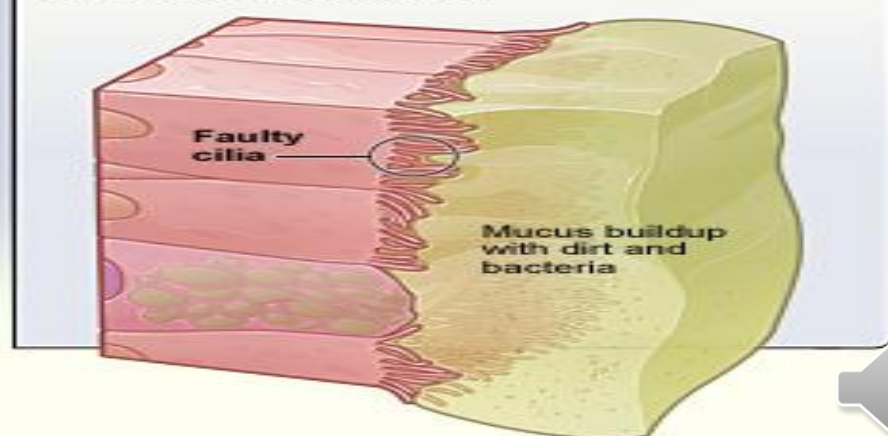
## C Normal cilia lining trachea

Cilia move together in wave-like motions to transport mucus toward the mouth. The mucus contains dirt and bacteria.



## D Faulty cilia lining trachea

Cilia are deformed and do not move together, causing a buildup of mucus. The mucus contains dirt and bacteria.





**Thank you**