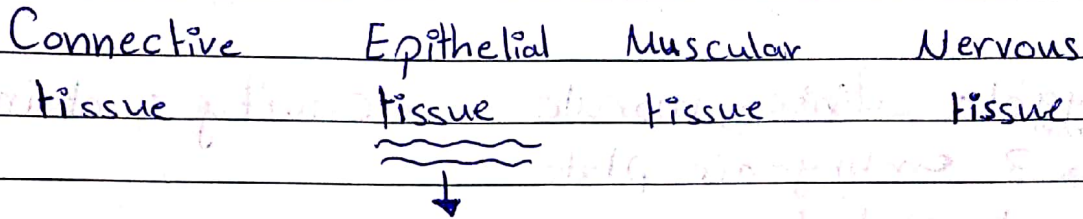


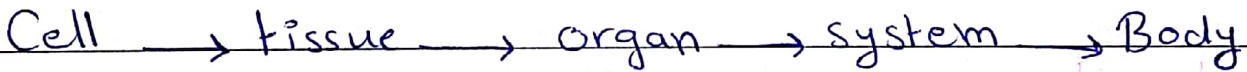
◦ Histology ◦

Tissues → 4 Basic Type of Tissues →



Epithelial Tissue ◦ « Epithelium »

Cell ◦ The unit and basic structure and function of the body. (cells form the 4 Basic tissue)



Any type of tissues have the general features. This is the base of classification of the tissues for 4 types.

every tissues (4 types) have general characteristic features

\* Definition ◦ « Epithelial tissue »

1- Group of <sup>1</sup> Cell in contact with each other with minimal ~~or~~ <sup>2</sup> no intercellular space,

↓  
« Few or non existent »

3- more or less of the shape and function and resting on the basement membrane.



This cells are avascular (No blood vessel), highly innervated (take nutrition from the tissues below it) (blood supply from diffusion) <sup>Connective</sup> (Connective) (epithelium).  
When damage ↑ happened the cells can make repair.

This cells originally "from" 3 embryonic layers.

Zygote division → morula → Cavity containing fluid  
→ 3 embryonic plate  
1. endoderm.  
2. ectoderm.  
3. mesoderm.

ex: Skin from ectoderm.  
Intestine from mesoderm.

epithelium  
الخلايا الظهارية

Classification of epithelium.  
what the cells covering external surface  
1. Covering for  
    ↳ internal cavity  
    " covering epithelium.

2. Secretion → Glandular epithelium.

3. Epithelial in nature (Not make covering or secretion)  
(special types).

## Classification of Covering epithelium

Number of layers

1. Simple: one layer.

2. Stratified: more than one layer.

Shape of cells

1. Squamous: Flat nucleus

1. Simple squamous epithelium (flat cells)

2. Cuboidal: rounded center nuclei.

3. Columnar: ovum basal nucleus.

4. Pseudostratified.

Note: we can't see the shape of cell via light microscope if there are no cell membrane.

\* ~~see~~ we can see the nucleus.

But we can use stain which deposit on the cell to see it.



Note: Focus in three items:

نوع، موقع، وظيفة

1- Type of epithelium.

2- Site

3- Function.



**Number of layers**

**Shape of cells**

• **Simple**

• **Stratified**

• **Squamous**

• **Cuboidal**

• **Columnar**

• **Pseudostratified**

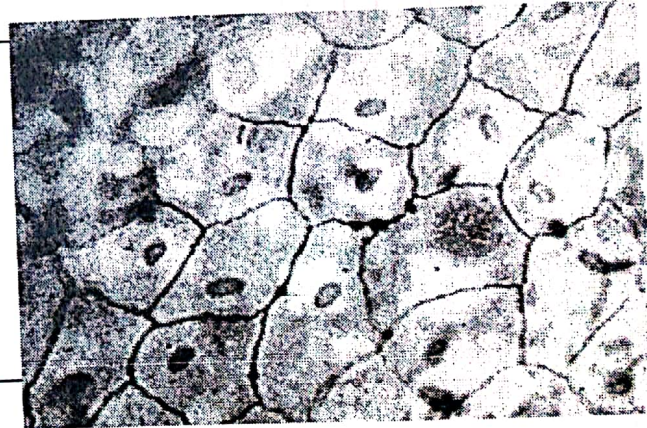
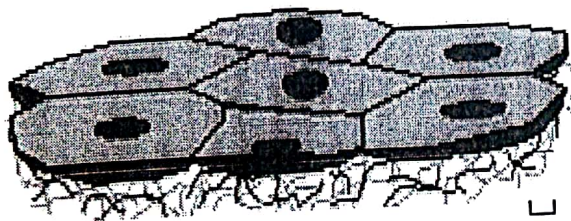
# 1- Simple Squamous Epithelium

**LM:**

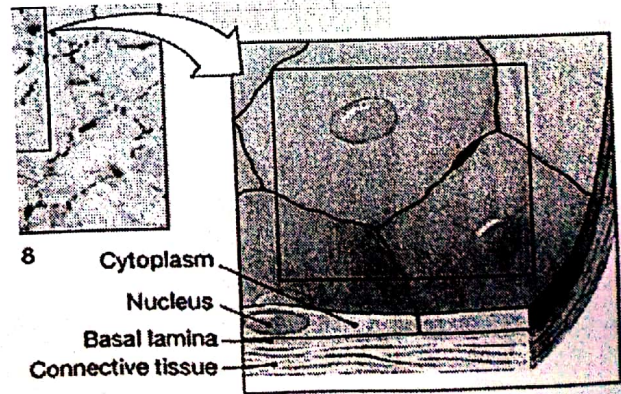
*From above*

*\* Flat cell*

*السطح*



**Simple squamous**  
*fusiform flat cell with flatent nucleus.*



*(( thin cell , smooth surface ))*

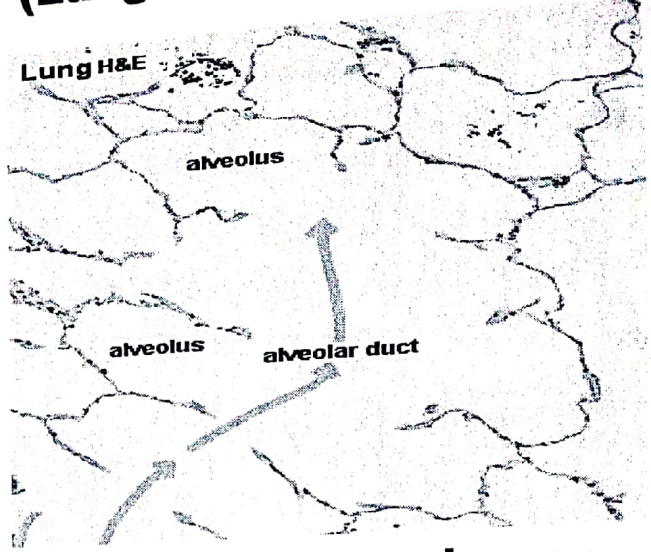
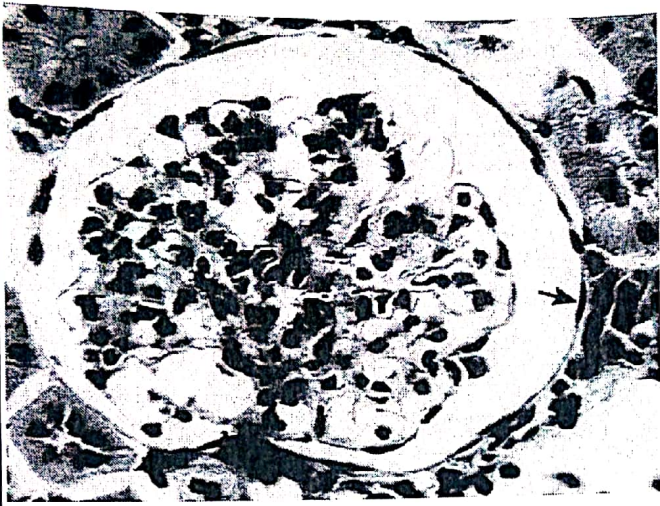


*Page side wall*

# 1- Simple Squamous Epithelium

(Bowman's capsule- kidney) \* (Kidney glomeruli) \*

(Lung alveoli)



Function: Filtration of blood

Function: gas exchange

# Simple Squamous Epithelium

*in (aorta) \**

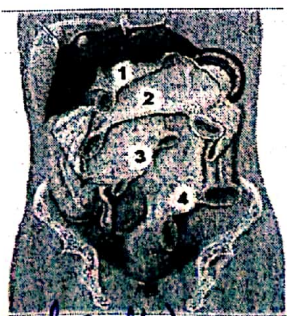
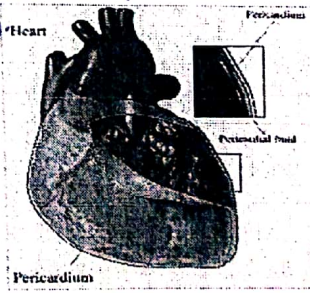
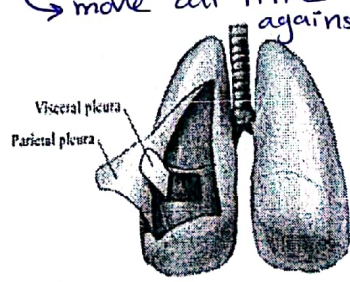
Endothelium:  
of the blood vessel

**Methothelium** : *covering lung*

*covering heart*

Pericardium, pleura, peritoneum → *covering intestine.*  
Function : smooth surface

→ *move all time so epithelium protect them against friction*

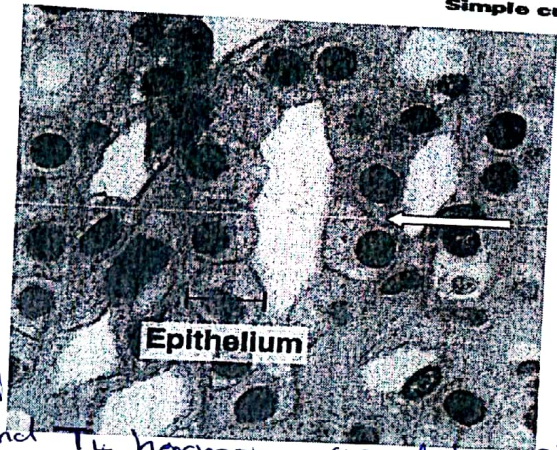
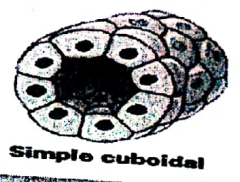
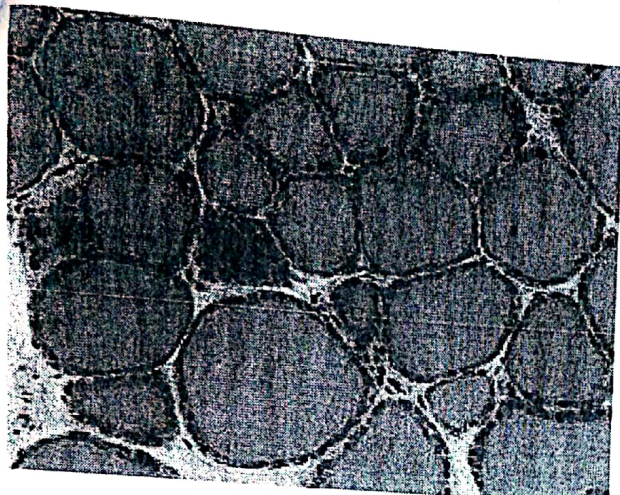


*(simple squamous epithelium in blood cell)*



circubical of shape with central rounded nucleus.

## 2- Simple cuboidal Epithelium

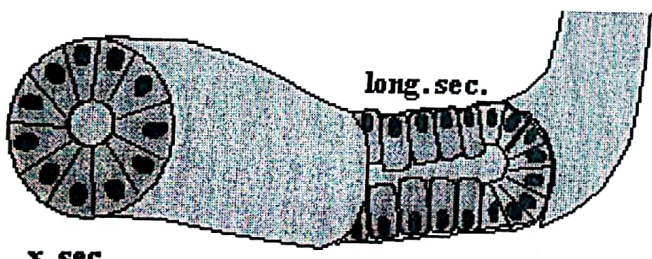


have thyroid follicles which make the T3 and T4 hormone. (lined by epithelium).

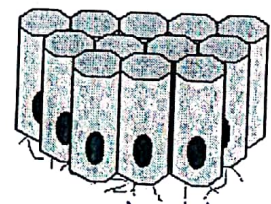
Site: Thyroid gland : secretion  
 \* kidney tubules : ion exchange

oval basel nuclei

## 3- Simple Columnar Epithelium



duct or tubule



Modification at the apical surface :-  
 1- cilia      2- microvilli  
 3- stereo cilia

Cilia & microvilli are apical modification occur in cell in apical part.

### Types:

- \* fold of cell membrane.
- \* increase surface area.

a. Non ciliated

Cilia & long, motile  
 microvilli & short, non motile  
 stereo cilia & long, non motile

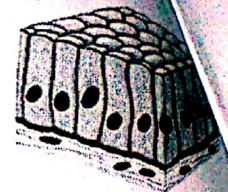
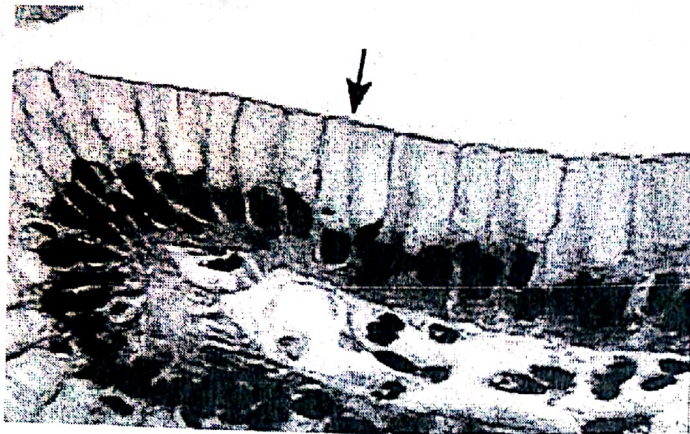
b. Ciliated

in respiratory system. (moving all time)

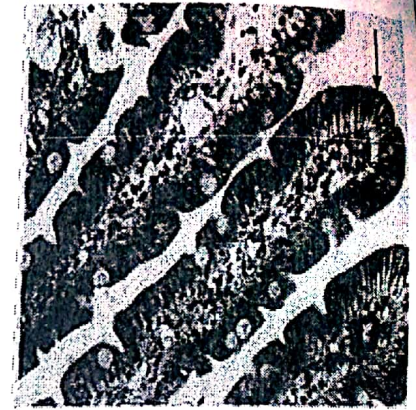


## a. Simple columnar epithelium (non ciliated)

LM



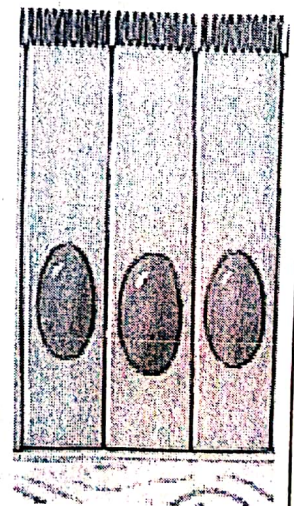
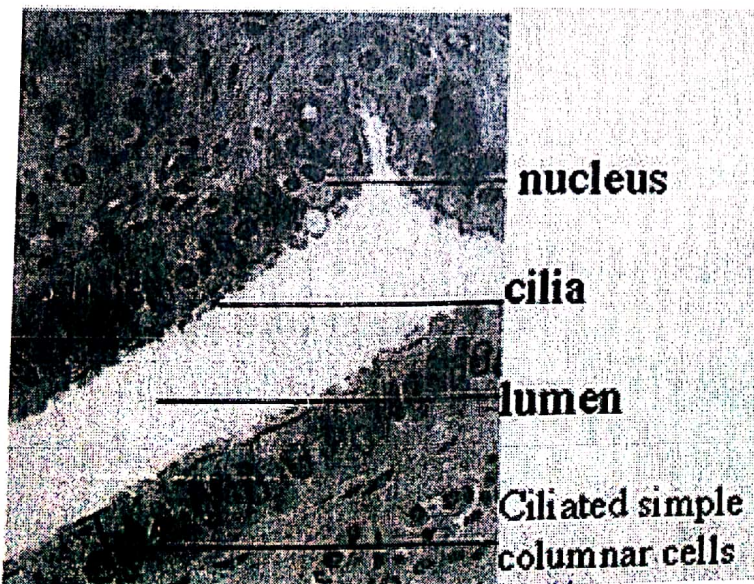
Simple columnar



Sites: ducts of glands: secretion  
digestive tract : absorption

small intestine, large intestine  
stomach. (microvilli) (

## b. Simple columnar epithelium ciliated

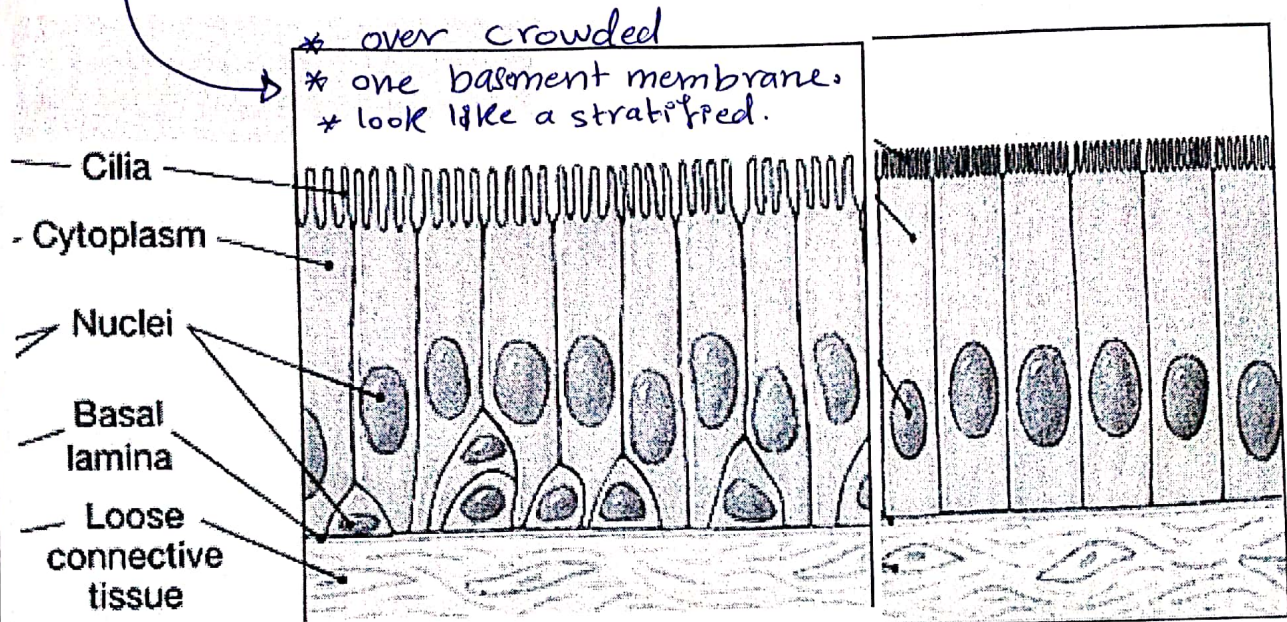


Sites: uterus, oviduct & bronchiole of the lung

Flobian (movement of luminal contents)  
tube in female

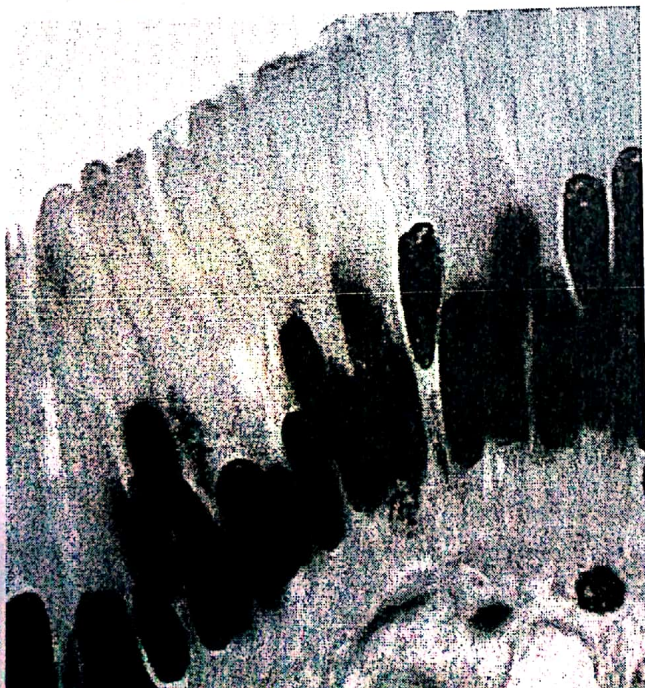


why?!  
**4- Pseudostratified columnar**  
**False epithelium**

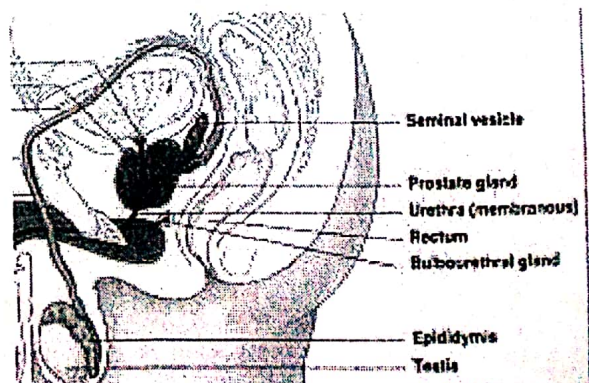


**a- Pseudostratified columnar epithelium**  
**non ciliated**

stereocilia go for slow movement.



- Sites: Male genital tract – large ducts of glands: (secretion)

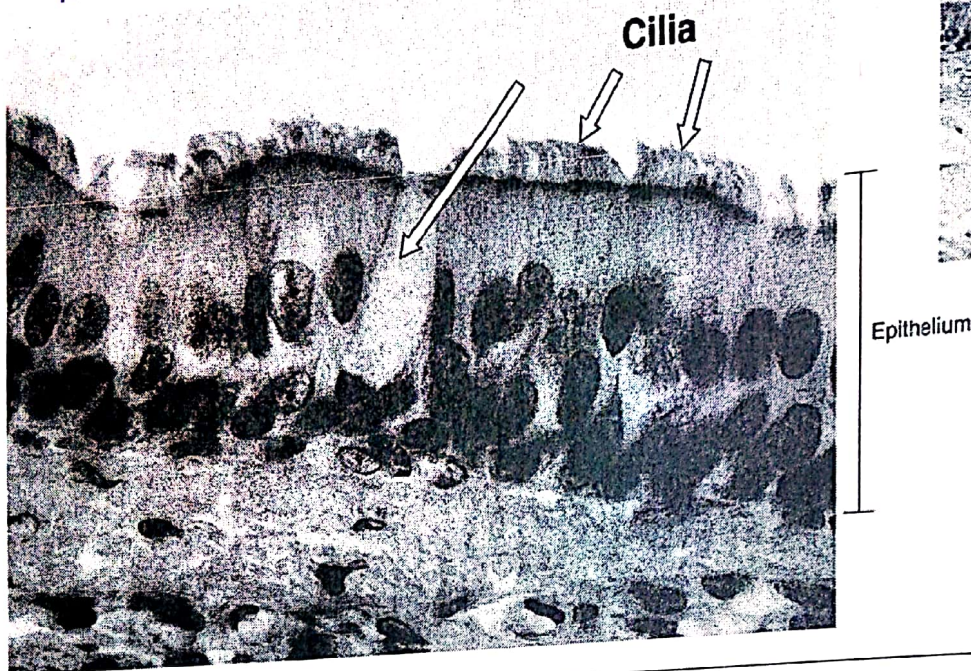




## b. Pseudostratified columnar ciliated

Nasal cavity - a parts of  
larynx - Trachea - two  
main bronchi

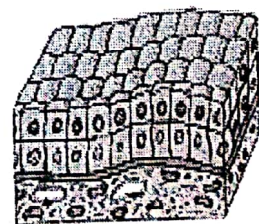
Sites: Nose- Trachea



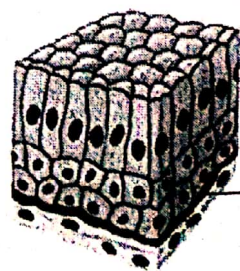
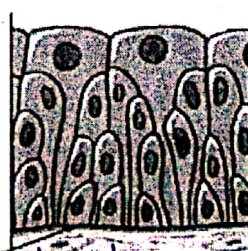
## 2- Stratified Epithelium

What cell is on the top layer?

- Classification according to shape of most <sup>\*</sup> superficial layer
- Stratified sqamous epithelium
- Stratified cuboidal epithelium
- Stratified columnar epithelium

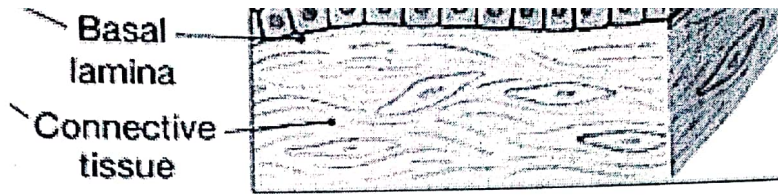


\* Transitional epithelium



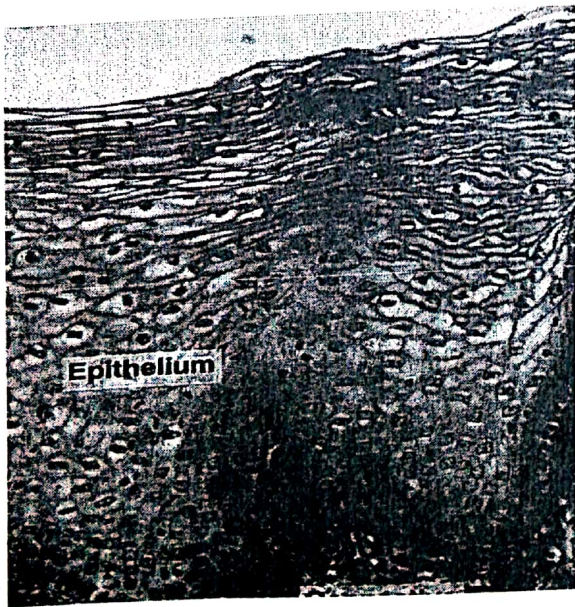
The main function is protection, because they have more than one layers.



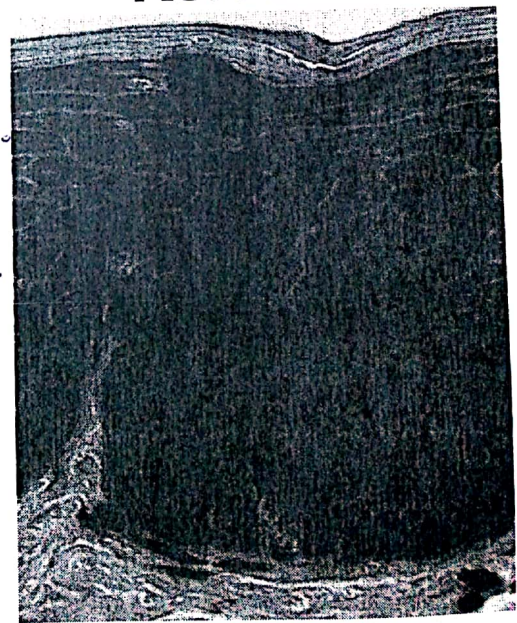


# Stratified squamous epithelium

\* Non Keratinized ← → \* Keratinized



Collagen  
not  
spaces.



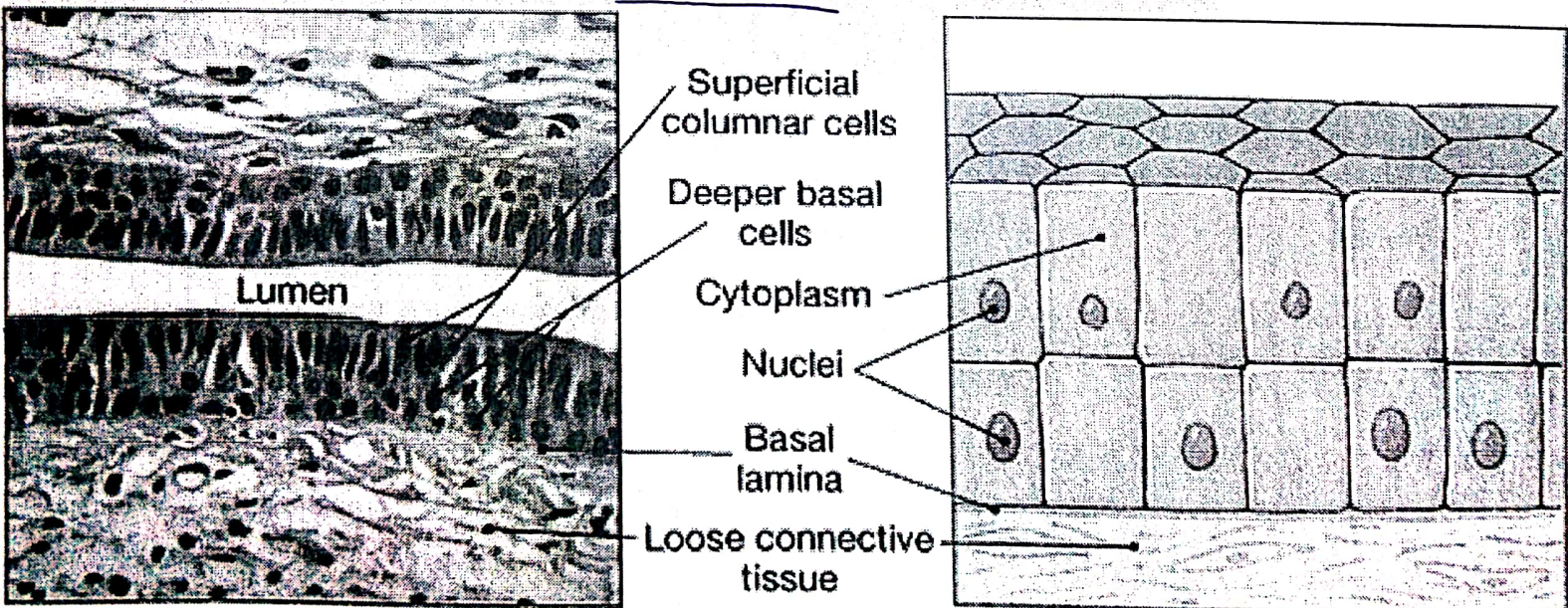
\* Oesophagus- vagina }  
(Physical protection)

\* skin <sup>وأي شيء فاتح عام</sup>  
الجلد مثل فتحة الأنف والعين؟!

\* Cornea , oral cavity }  
inal canal



# Stratified Columnar Epithelium (Rare)



- ciliated: penile urethra

- Non ciliated: conjunctival fornix (in eye)  
↓  
(protection)



stratified

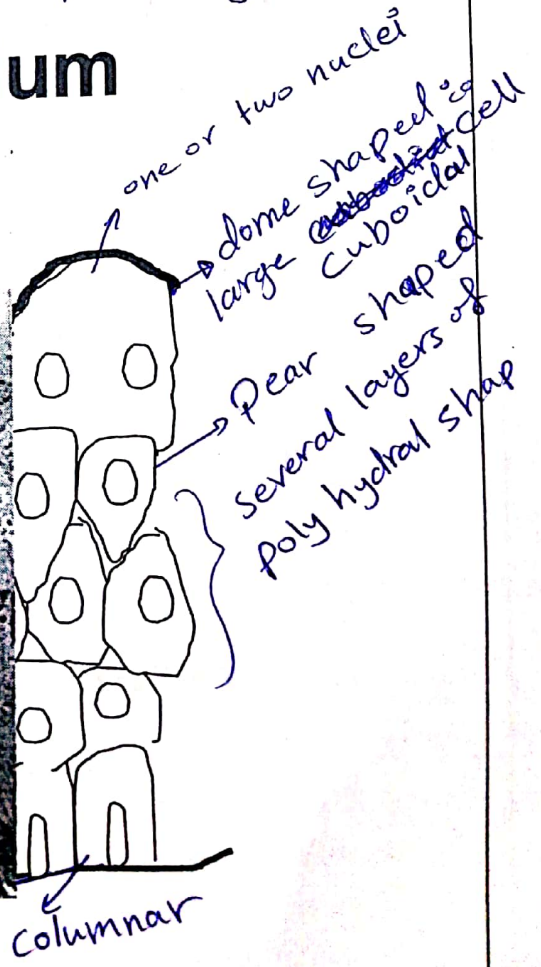
# Transitional epithelium



(urinary bladder - empty)

basement membrane is very thin / corrugated.

# Transitional Epithelium



containing ~~the~~ spaces between cells. / adaptation to reserve of urin function.

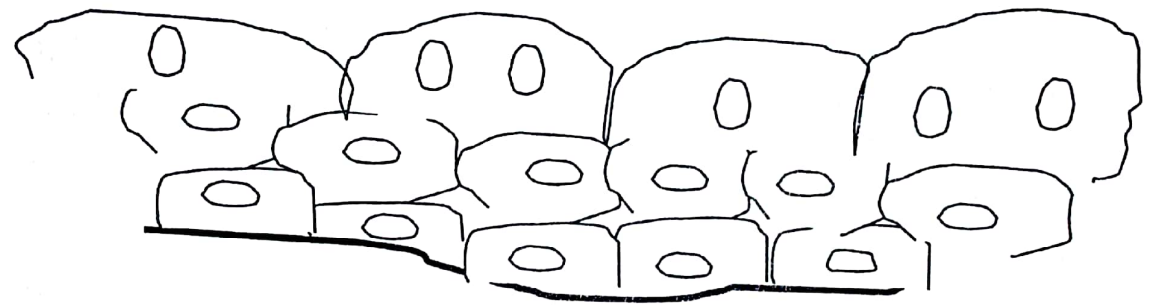


when the urinary bladder empty ⇒ 10 layers  
↳ ↳ ↳ ↳ ↳ full ⇒ 2-3 layers.

# Transitional Epithelium

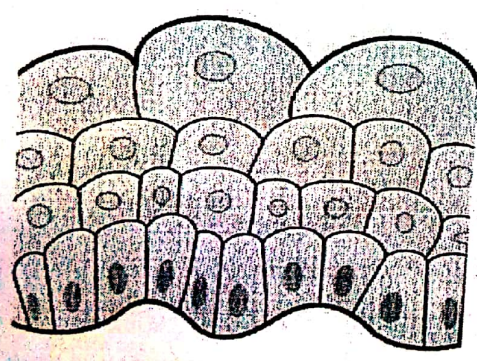
ابنوی نزل

## Full urinary bladder

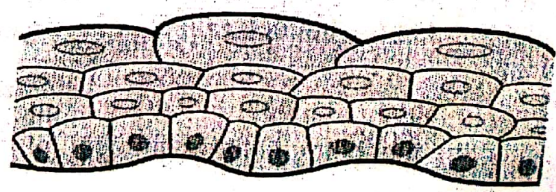


Just in urinary bladder ⇒ (urothelium) \*

## Transitional epithelium



A Relaxed



B Stretched

Transitional epithelium: A. Relaxed. B. Stretched.