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HISTOLOGY SHEET

Doctor 2021 -mercy- | medicine | MU

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Tissues of adult organism

A tissue is defined as a group of cells with their extracellular products, specialized in common direction and set apart for the performance of a common function

Cells work together in functionally related groups called tissues

How is this done?

- Attachments
- communication

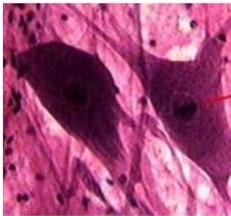
About 200 types of specialized cells in adult human body are arranged into

4 main tissues:

- Epithelium
- connective tissues
- Muscular tissues
- Nervous tissues

The closer the cells are to each other, the lower the quantity Extracellular matrix

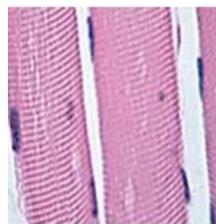
4 Basic Types of Tissues



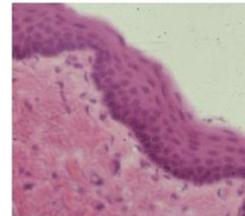
Nervous tissue



Connective tissue



Muscular tissue



Epithelial tissue

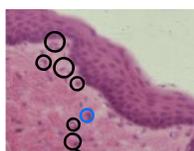
The general function of epithelial and connective tissue is protection :covering—>like skin ,Lining—> hollow structure

Epithelial Tissue

Epithelium creates a selective barrier between the external environment and the underlying connective tissue

The cells predominate (in terms of number) ,they are closely apposed(side by side) and adhere to one another by means of special junctions. Highly cellular

Their basal surface is attached to an underlying basement membrane (resting on basement membrane)



Nuclei

...There is two type of ECM:

1-basement membrane

2- interstitial fluid

...The beginning of the formation of the Embryo

Ovum+ sperm -> zygote -> morula -> 3 embryonic layers : ectoderm, endoderm, mesoderm

...Epithelium is derived from all 3 embryonic layers

General morphological signs of epithelial tissues (structural~ related to structure)

(The blood vessel don't enter epithelium, so how does the epithelium feed?
From the underlying connective tissue via diffusion)

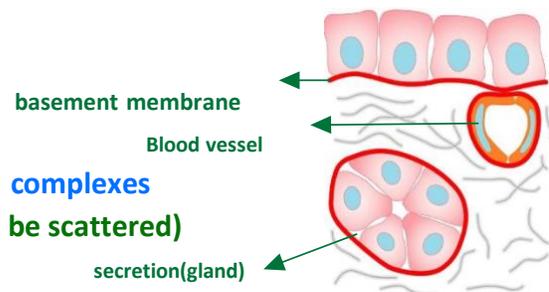
Epithelial tissues are widespread throughout the body. They form the covering of all body surfaces, line body cavities (ex: esophagus, digestive tract) and hollow organs, and are the major tissue in glands. (If it excret secretion we called it **glandular epithelium**)

- 1) Cells are closely packed together. (Cells numerous in number)
- 2) Intercellular substance is reduced to a minimum. (minimal intercellular space)
- 3) Cells rest on the basal lamina (part of basement membrane). {All rest on basement membrane}
- 4) Polarity of epitheliocytes (in the epitheliocytes there are apical and basal poles).
- 5) All epithelia don't have blood vessels(called avascular . They derive their nutrition)
from the blood vessels of underlying connective tissue.
- 6) Availability of intercellular junctions.[Junction complex]
- 7) High ability to regeneration.{ ex: trauma, injury, ulcer }
- 8) Derived from **three** embryonic layers

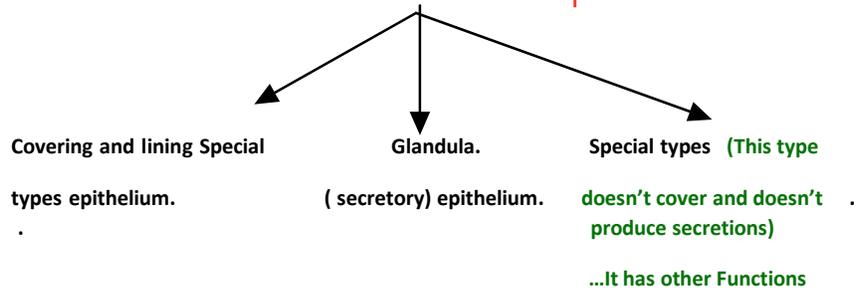
↳ Mesoderm , ectoderm , endoderm

General features of epithelium

- Derived from **3** embryonic layers .
- Closely aggregated cells
- Very little intercellular substances.
- Regular shaped cells bind together by **junctional complexes**
- (If it doesn't do junction complexes, the cells will be scattered)
- Basal lamina (**basement membrane**).
- Avascular(not vascular)
- Rich in nerve supply. (highly nerveted)
- High renewal rate (regeneration)



Classification of epithelium



Function ---> type

-cover---> covering epithelium

-secretion---> glandular

-other ---> special types

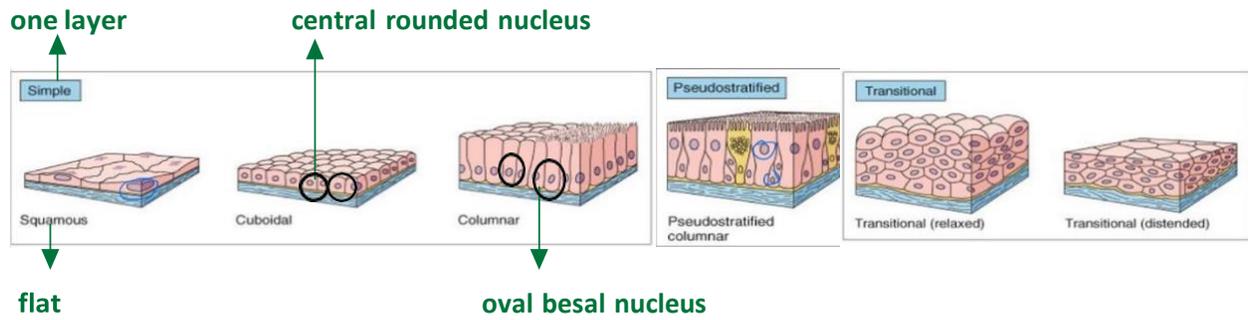
Epithelium covers body surfaces, lines body cavities, and constistutes glands, therefore it is subdivided into lining , glandular and special types

Classification of covering = lining epithelium

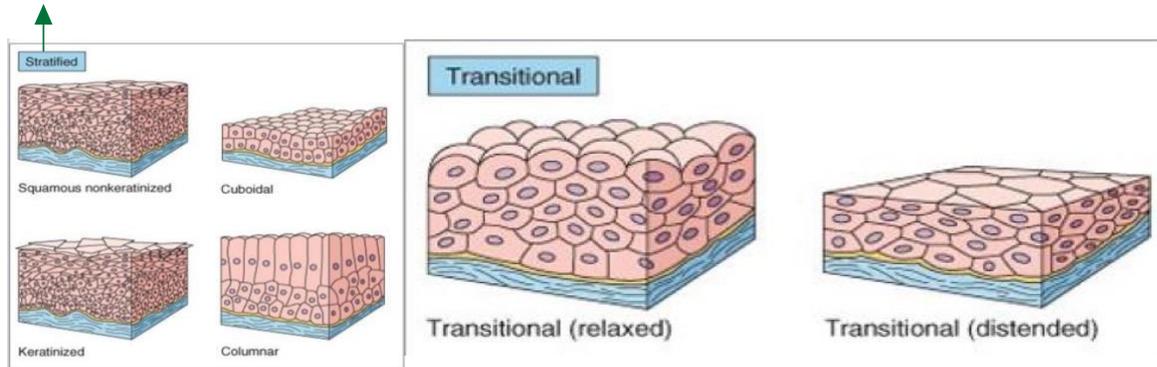


...We can determine the shape of the cell on the microscope by the shape of the nucleus

Classification of lining epithelia



More than one layer

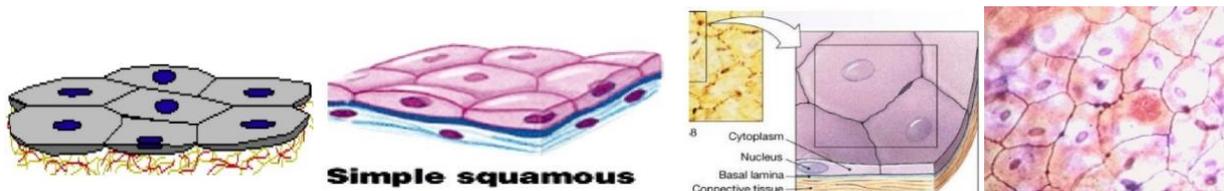


Identified according to the most superficial layer (first layer)

1- Simple Squamous Epithelium

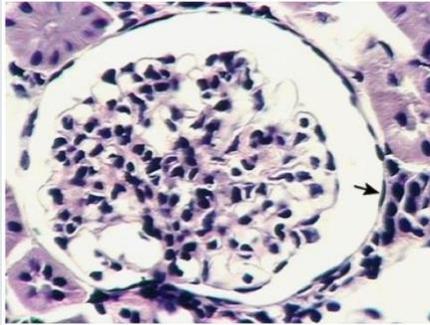
LM:

Very thin and smooth surface



Simple Squamous Epithelium is found in :

(Bowman's capsule- kidney).(**Glomerulus**)



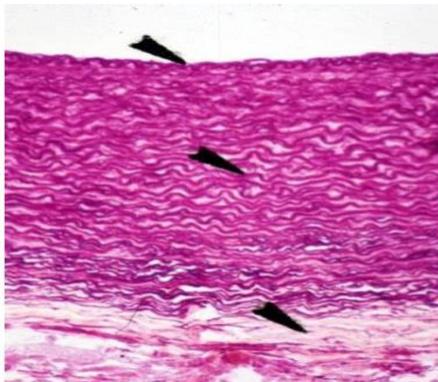
Function: Filtration of blood

Simple Squamous Epithelium

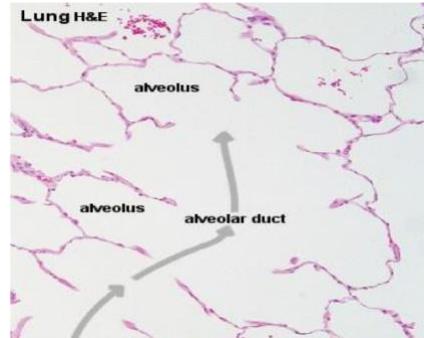
Endothelium.

of the blood vessels.

lining the lumen of blood vessel



(Lung alveoli)

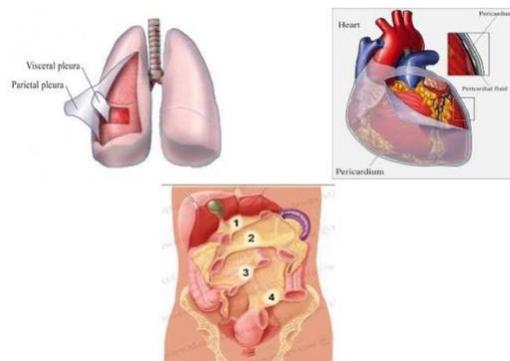


Function: gas exchange

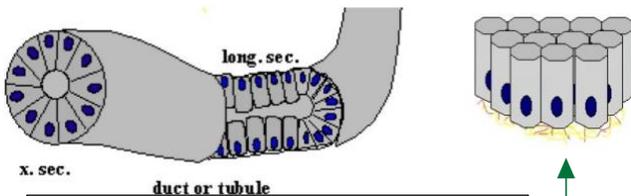
Mesothelium :

Pericardium, pleura, peritoneum(intestine)

Function : smooth surface



3- Simple Columnar Epithelium.

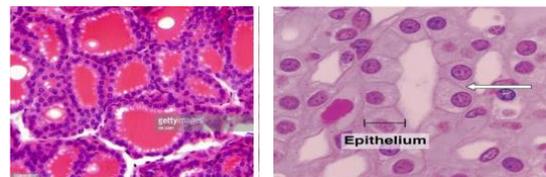


Types:

Non ciliated without cilia

a. Ciliated with cilia-

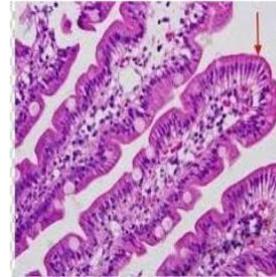
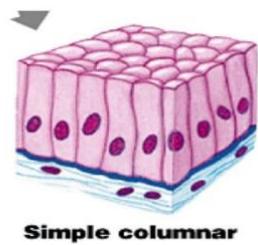
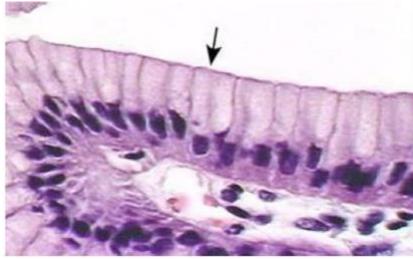
2- Simple cuboidal Epithelium



Site: Thyroid gland (there's thyroid follicle inside it which secrete thyroid hormone so it's (covering and glandular) : secretion

kidney tubules: ion exchange

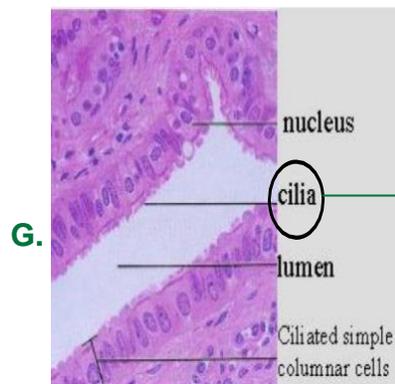
Simple columnar epithelium (non ciliated) LM



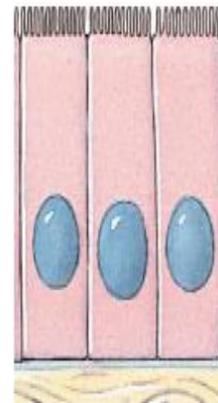
Sites: ducts of glands: secretion

digestive tract (gastrointestinal tract): absorption it has apical microvilli (not cilia). to do absorption

Simple columnar epithelium ciliated



Function: cleaning and movement of Luminal content



The most place have ciliated epithelium is respiratory tract specifically bronchiole because RS have most of dust particles (alot of bacteria) so it must washed by cilia on epithelium

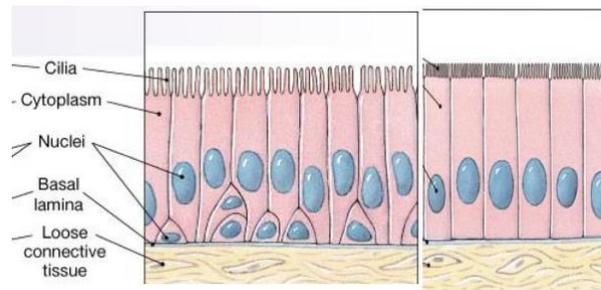
Sites: **uterus, oviduct** (fallopian tube {ovary in pelvis release ovum, if ovum doesn't enter rapidly from ovary to fallopian tube it will get lost in peritoneum of abdominal cavity so this doesn't happen & the end of fallopian tube has things like fingers so it surrounds ovary and takes the ova before it went to peritoneum, when this ova entered fallopian tube it will meet sperm and the fertilization will happen, then fertilized egg will enter uterus because it has muscle and the rupture will not happen })

) & **bronchiole** (inside lung not outside) of the lung
(movement of luminal contents)

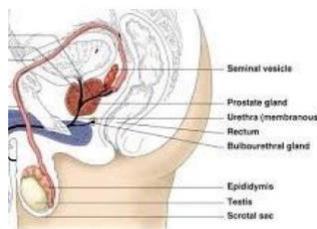
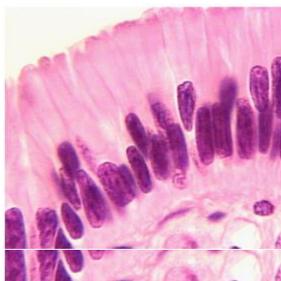
Nose (nasal cavity) + nose pharynx + trachea + parts of larynx + two main bronchi outside the lung = **pseudostratified columnar epithelium** (We can replace this long name : respiratory epithelium)

4- Pseudostratified columnar epithelium

False



Pseudostratified columnar epithelium non ciliated



Sites: Male genital tract – large ducts of glands:

(secretion) of sperm

Pseudostratified columnar epithelium non ciliated cover male genital tract, there is a stereocilia above it which function of it is slow the sperm to be maturation

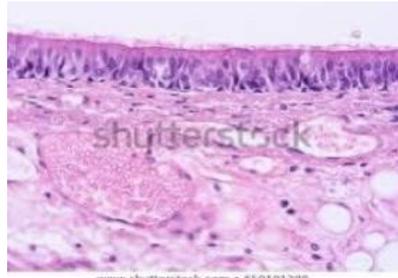
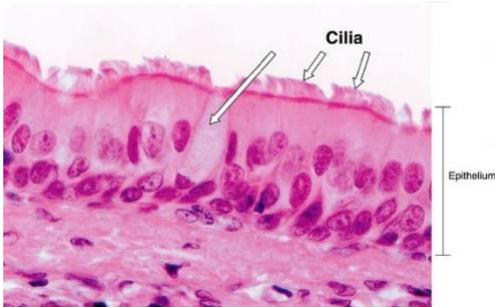
If it is none-ciliated how the sperm will move ?

Microvilli here is short and non motile cilia —> long and motile

{ stereocilia —> long & non motile }

Pseudostratified columnar epithelium ciliated

Sites: Nose- Trachea



Type	Site	Function
Simple Squamous	<ul style="list-style-type: none"> • Bowman's capsule- kidney • Lung alveoli 	Filteration
Simple cuboidal	<ul style="list-style-type: none"> ❖ Thyroid follicles ❖ Kidney tubules 	<ul style="list-style-type: none"> ❖ Secretion ❖ Ions exchange
Simple Columnar non ciliated	<ul style="list-style-type: none"> ➢ Digestive tube ➢ Ducts of the glands 	<ul style="list-style-type: none"> ➢ Absorption ➢ Secretion
Simple Columnar ciliated	<ul style="list-style-type: none"> ▪ uterus, oviduct ▪ bronchiole of the lung 	<ul style="list-style-type: none"> ▪ Movement of luminal contents
Pseudostratified columnar ciliated	<ul style="list-style-type: none"> ✓ Nose- Trachea 	Movement of luminal contents
Pseudostratified columnar non ciliated	<ul style="list-style-type: none"> ☐ Male genital tract ☐ large ducts of glands 	Secretion