جامعة المستقبل
AL MUSTAQBAL UNIVERSITY

كلية العلـــوم
قـســـــم الادلة الجنائية

Lecture (4)

عنوان المحاضرة

Epithelial tissue: Simple Ep. T. , Compound Ep. T.

المادة : علم الانسجة

المرحلة : الثانية

اسم الاستاذ: م.م هويدا نزال حسين

Histology

The study of animal **tissues** is called **histology.**

Tissue Definition

A **tissue** is a group of cells and their extracellular matrix that share the same embryonic origin and perform a similar function.

The human body is composed of four main types of tissues :

1. **Epithelial tissues**
2. **Connective tissues**
3. **Muscular tissues**
4. **Nervous tissues**

Epithelial Tissues

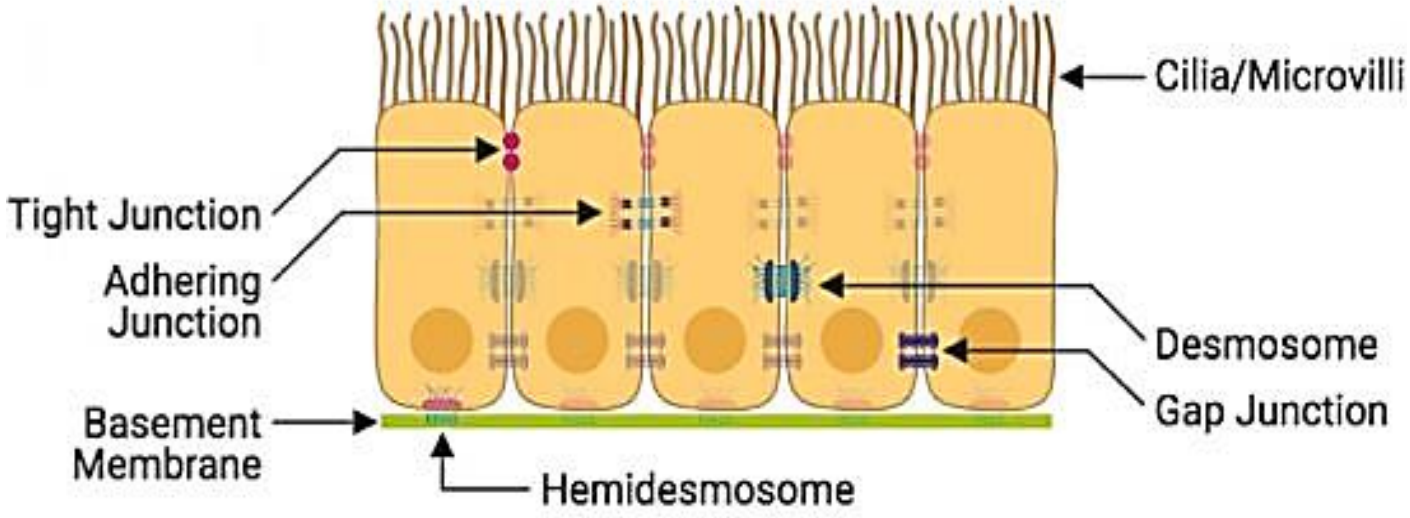
Epithelial tissues are essentially large sheets of cells covering the internal and external surfaces of the body.

Epithelia arise from all of the 3 primary germ layers: **ectoderm** (outer layer; e.g. skin & surface of sense organs), **mesoderm** (middle layer; e.g. lining of body cavities), and **endoderm** (inner layer; e.g. internal linings of gastrointestinal & respiratory tracts).

General characteristics of epithelial cells and tissues:

- **Polar:** Epithelial cells have structurally- and functionally-distinct apical and basal surfaces. The apical surface faces the external environment or lumen while the basal surface faces the basement membrane.

- **Closely-connected continuous sheets:** Epithelial cells typically fit closely together, forming continuous sheets of tissue. The lateral surfaces of these cells interact through junctional complexes (adhering junctions, tight junctions, and desmosomes) and gap junctions



General characteristics of epithelial cells and tissues:

- **Avascular:** Epithelial tissue does not contain blood vessels, with few exceptions (e.g. stria vascularis of inner ear).

- **Supported by connective tissue:** Epithelia rely on support from underlying connective tissue, facilitated by a layer of extracellular matrix called a basement membrane.

Types of epithelial tissues

Two main types of epithelial tissues:

A- Covering or lining epithelium

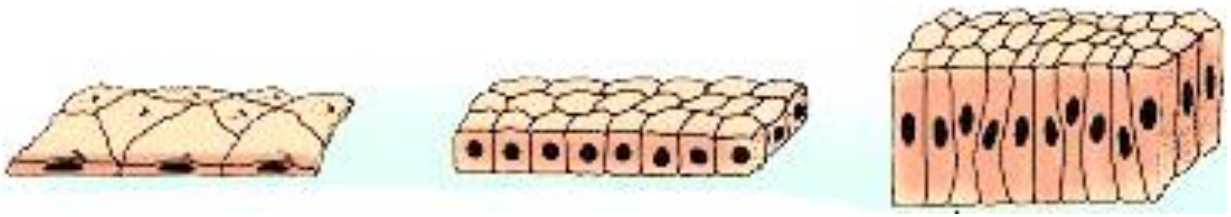
B- Glandular epithelium

A. Covering or lining epithelium

They are classified according to the number of structural layers into :

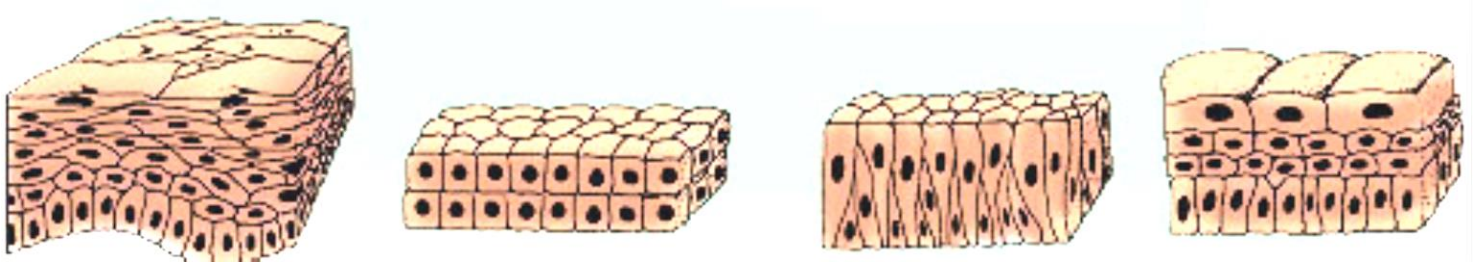
Simple epithelium

Is an **epithelial** tissue made up of only one layer of **epithelial** cells. These cells are in direct contact with the basement membrane



Stratified epithelium

This type of **epithelial** is composed of more than one layer of **epithelial** cells. The basal layer is the only one that is in contact with the basal lamina



1. Simple epithelium includes:

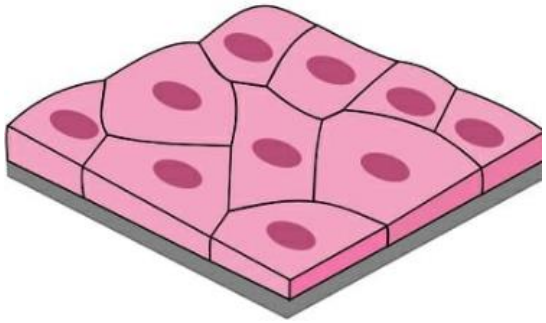
a. Simple squamous epithelium:

This type of tissues is found in the following parts in the body:

➢ lining the inside of the blood vessels [called: endothelium]

➢ lining the inside of the lung cavities [mesothelium]

➢ lining the inside of the mouth and esophagus

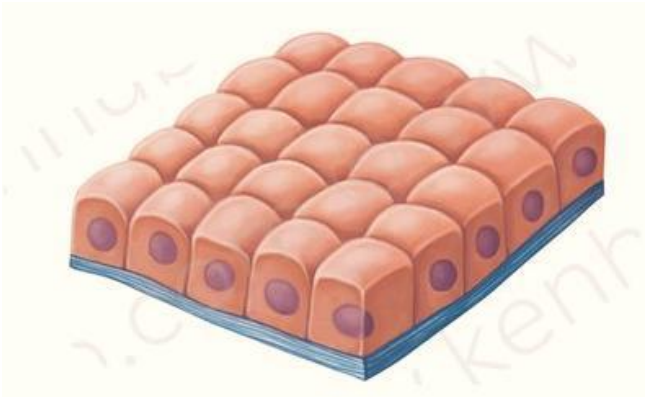


b. Simple cuboidal epithelium:

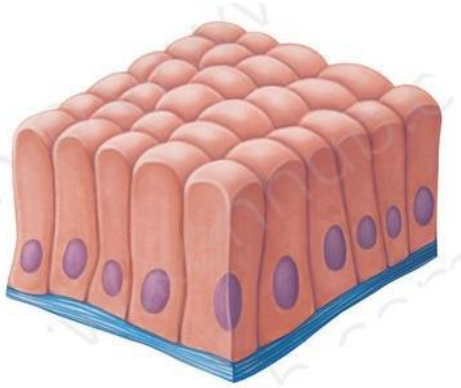
This type of tissues is found in the following parts in the body:

➢ lining the tubules within the kidney

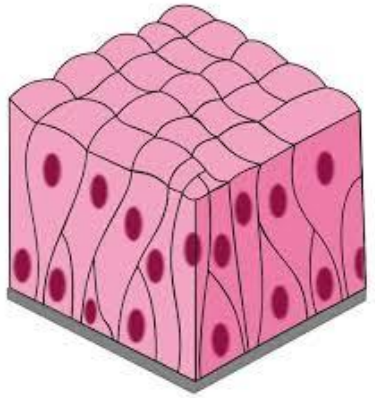
➢ lining the ducts of many glands



1- Simple epithelium includes:

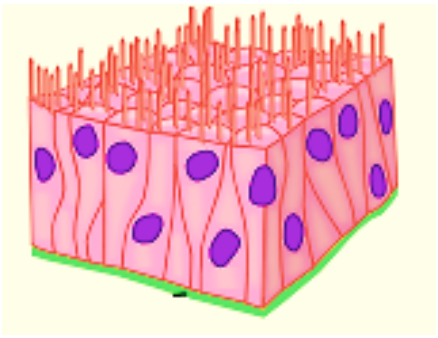


c. Simple columnar epithelium:
This type of tissues is lining the stomach and the intestines



d. Pseudostratified epithelium:
It consists of many types of cells arranged in different levels and therefore it gives this tissue a pseudostratified shape.

Non-ciliated pseudostratified columnar epithelia are located in the membranous part of male vas deferens, while **ciliated type** of this tissue is found in the trachea.



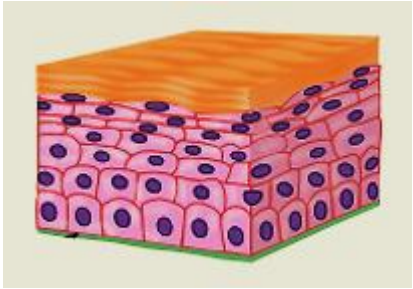
2- Stratified epithelium:

This type of epithelium consists of many cell layers.

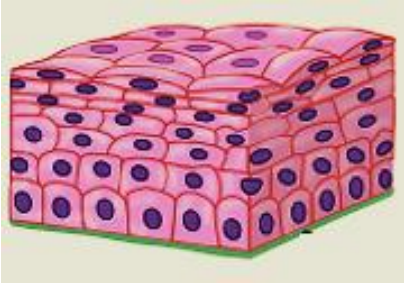
a. Stratified squamous epithelium:

There are two types of this tissue:

1- Keratinized which is found in the skin (epidermis).

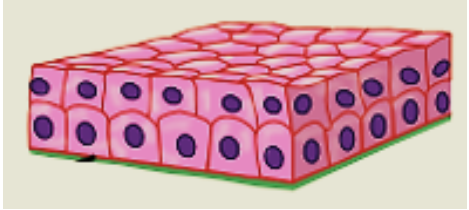


2- Non-keratinized which found in the mouth and vagina.



b. Stratified cuboidal epithelium:

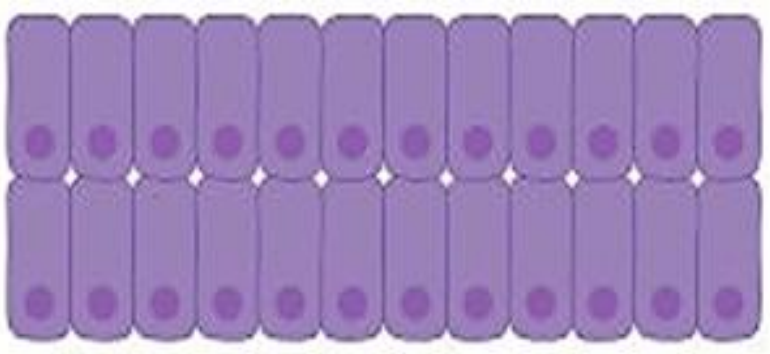
This type is found in the ducts of the glands.



2- Stratified epithelium:

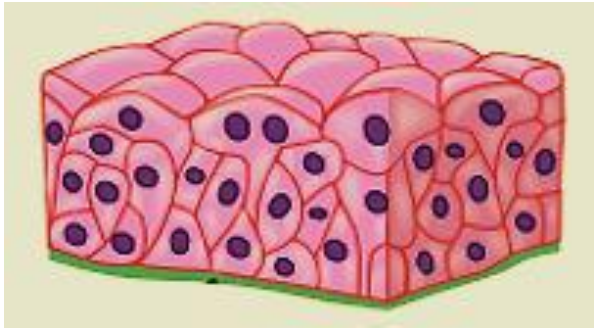
c. Stratified columnar epithelium:

This type is found in the in conjunctiva



d. Transitional epithelium:

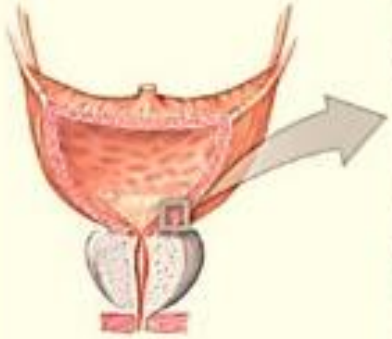
This type is found only in the urinary system.

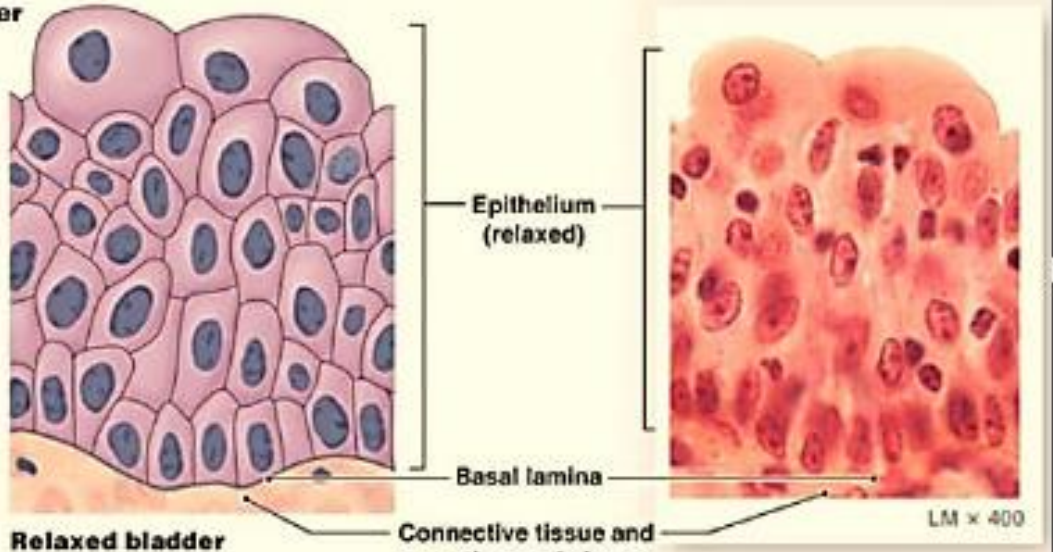


The transitional epithelium in an empty and a full urinary bladder

Epithelium in a Relaxed Bladder

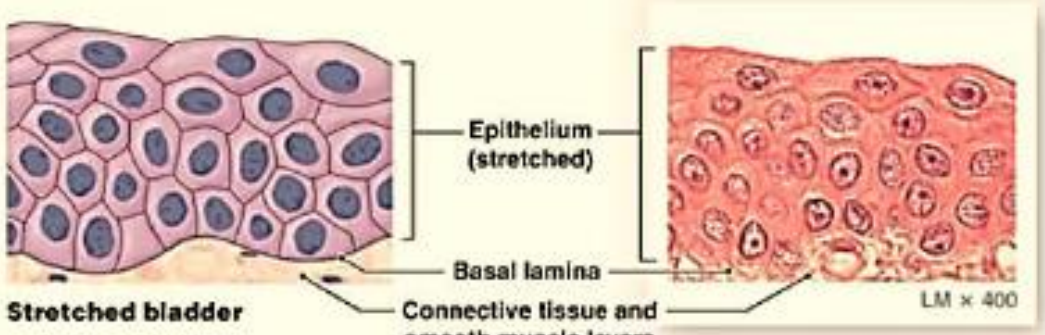
In an empty urinary bladder, the superficial cells are cuboidal with a dome-shaped surface.





Epithelium in a Stretched Bladder

When the urinary bladder is full, the volume of urine has stretched the lining to such a degree that the epithelium appears flattened, and more like a stratified squamous epithelium.



B-Glandular epithelium (the glands):

Some epithelial cells may be specialized to perform a secretory function.

Comprised of organized collections of secretory epithelial cells, **glands** (also called ***glandular epithelia***) are broadly divided into two categories: **endocrine** (without ducts) & **exocrine** (with ducts).

Endocrine Glands release their secretions—called *hormones*—directly into the bloodstream for distribution to target tissues with specialized receptors.

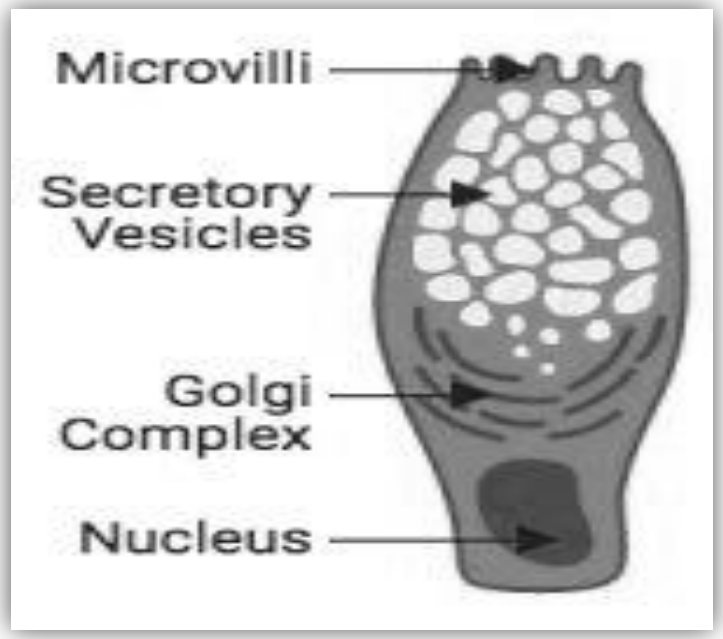
Examples include the **pituitary gland**, the **ovaries** & **testes**, and the **pancreas**

Exocrine Glands release their secretions into a lumen through an epithelial-lined tube called a **duct**

Examples include **salivary glands & sweat glands**

~~~ Exocrine Glands

While most exocrine glands are **multicellular**, **goblet cells** are the only example of **unicellular exocrine glands** in mammals. They can be found in the epithelium lining of the intestines.
These specialized epithelial cells secrete mucus are typically found in simple and pseudostratified columnar membranes



Goblet cell

Function of epithelial tissues

➢ Protection

Epithelia provide a layer of protection for all underlying tissues from toxins, pathogens, etc.

e.g. stratified squamous keratinized epithelium of the skin

➢ Absorption and/or Secretion

Depending on the location, some epithelia are involved in absorption or secretion

e.g. simple cuboidal epithelium of the choroid plexus

➢ Motility

Some epithelia have motile cilia on their apical surface that move in coordinated waves to move particles (e.g. mucus)

e.g. ciliated pseudostratified columnar epithelium of the trachea

➢ Sensation

e.g. stratified squamous non-keratinized epithelium of the cornea

Thank you for your attention