



لجان الترغفات

ANATOMY

MORPHINE ACADEMY

MORPHINE
ACADEMY

Tissues

1

Dr. Mustafa Saad
(2021)

A tissue is a collection of cells with a common embryologic origin that work together to perform specialized activity. In addition to the cells, a tissue contains the extracellular matrix (ECM) which's found between the cells.

- Body tissues can be generally divided into 4 main types according to the *type of cells* and the *amount and content of the ECM* they possess.
- The main types of body tissues are:
 - 1. Epithelial tissue طلائئ
 - 2. Connective tissue الضام
 - 3. Muscular tissue عضلي
 - 4. Nervous tissue عصبي

⇒ يختلفوا حسب نوع الخلايا المكون لهم

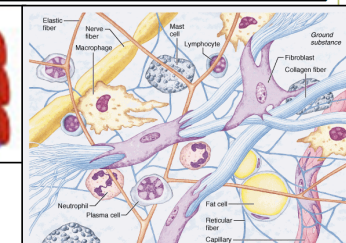
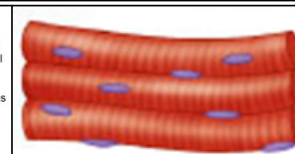
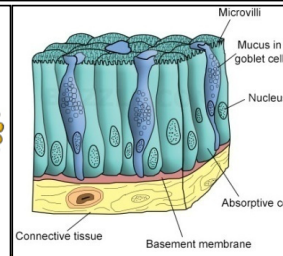
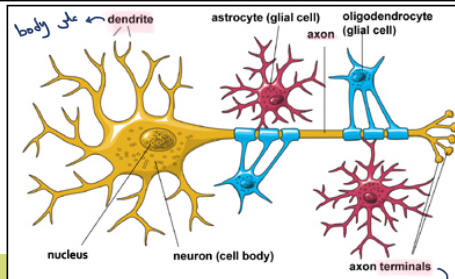
وكمية ECM

و Content تبعيم (محتوياتهم)

Table 1: Types of tissues and their characteristics

* الجدول يقارن بين أنواع
الأنسجة tissues

<i>Tissue</i>	<i>Nervous</i>	<i>Epithelial</i>	<i>Muscular</i>	<i>Connective</i>
<i>Cells</i>	نصبغية (nerve cells) → Have intertwining elongated processes	لا يتم يكت مع Connective يدعمه ما ينجي حاله → Aggregated polyhedral cells → خلايا متعددة الأشكال	خلايا مطولة، ممدودة → Elongated contractile cells	خلايا ثابتة (1) و خلايا متجولة (2) → Several types of <u>fixed</u> and <u>wandering</u> cells → خلايا متحركة
<i>Amount of ECM</i>	* أقل أنواع tissues بال ECM → Very small	قليلة لكن أكثر من nervous → Small	كمية معتدلة → Moderate	الغالب على ECM → Abundant very much
<i>Main Function</i>	نقل السيالات العصبية → Transmission of nerve impulse	الخطاف → Lining, or covering الامتصاص → Secretion	Movement	Support, protection



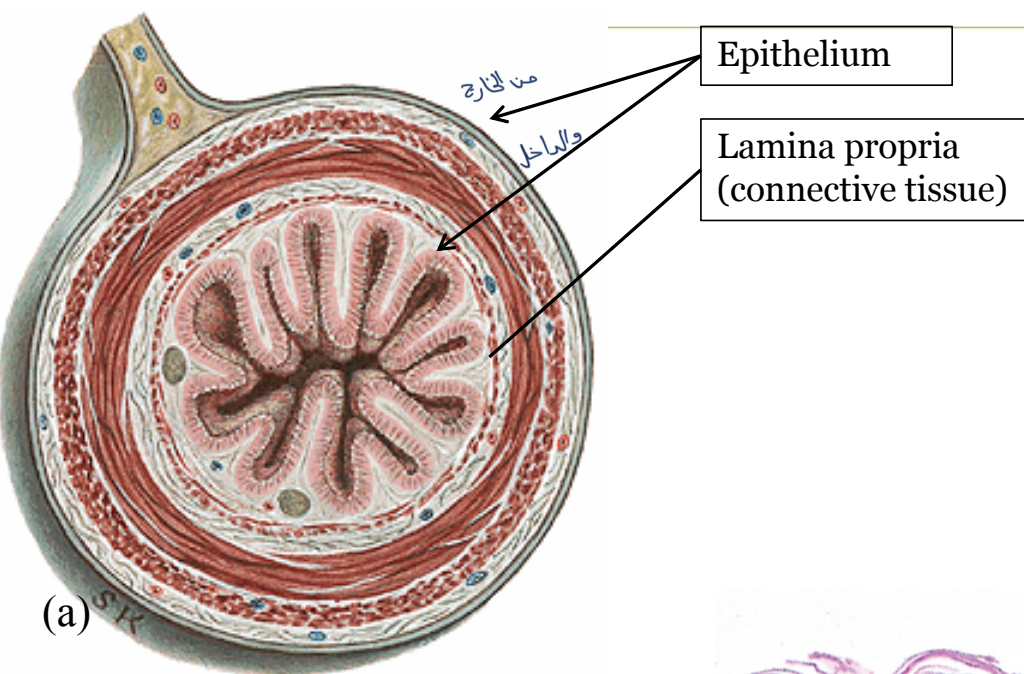
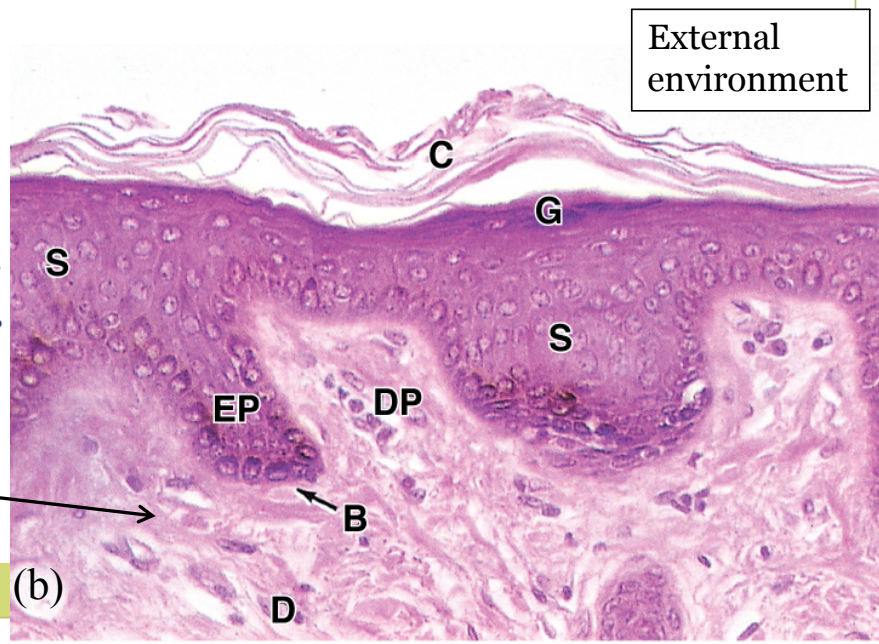
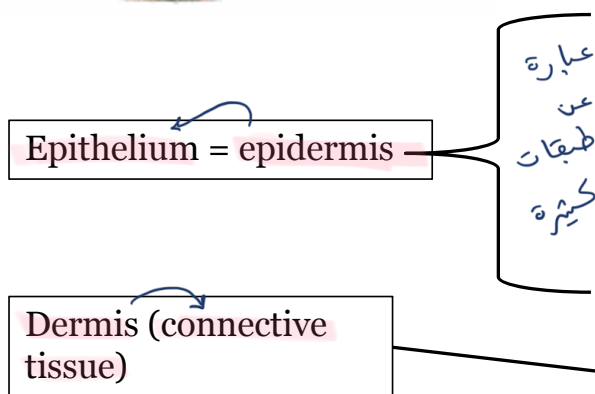


Fig.1: Characteristics of Epithelial tissue. (a) Cross section of small intestine. (b) Section through the skin.



Epithelial Tissue

- Epithelial tissues have the following characteristics:

- 1) **Cover surfaces or line cavities.** من الخارج Covering من الداخل lining بتغطي من الخارج والداخل
- 2) Rapid turn-over (time from the birth of a cell till its death), because it's exposed to the **external environment**. لا أنفا كثير يتعرض لـ environment
- 3) **Formed of sheets of closely packed cells.** مجموعة خلايا مترابطة لبعض
- 4) The cells are polar. كل جهة من جهات الخلية اله هكلية بالتالي functions هكلية structures
- 5) The **epithelium** rests upon a sheet of extracellular matrix called the **Basal Lamina**. The epithelium, also, have a **connective tissue layer** under it.
- 6) **Epithelial tissues lack blood vessels**. They receive their nutrients from the underlying vascular connective tissue.

Basement Membrane

- Basement membrane is formed of the *basal lamina* and the *reticular lamina*. The reticular lamina is the upper part of the connective tissue that's usually located under the **epithelium** which is rich in **reticular fibers**.
- It supports the epithelium.

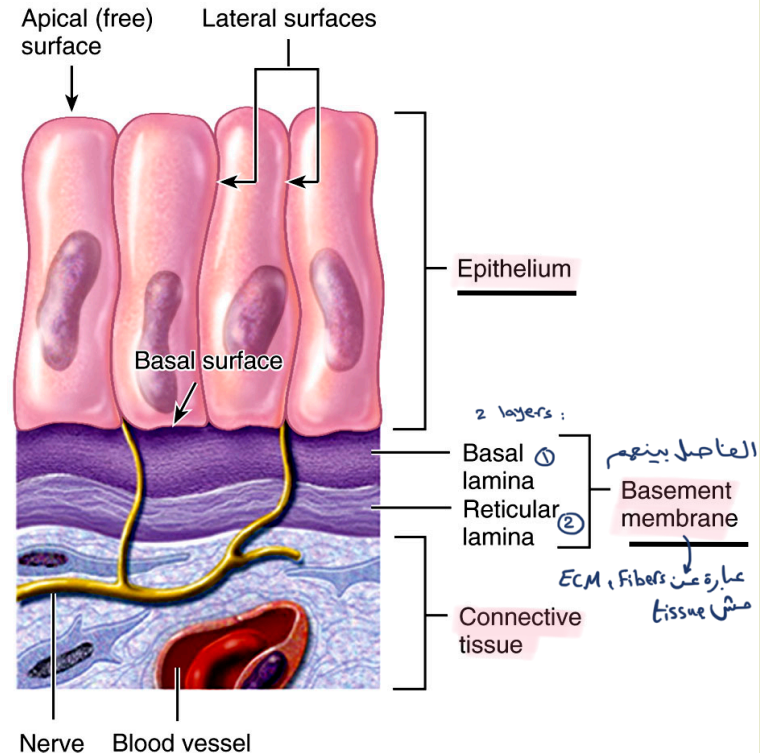


Fig.2: Difference between basal lamina and basement membrane.

Types of Epithelium

- Epithelium can be divided into two general groups:
 - 1) Lining or covering epithelium
 - 2) Glandular epithelium → Main function is secretion
- However, some lining epithelial cells secrete (like those in the stomach) and some glandular cells are present between lining cells (like goblet cells of small intestine)

يمكن خلايا مسؤولة عن lining يعملوا secretion

وحلايا مسؤولة عن secretion ويعملوا lining

رج اعتمد على

عدد الطبقات
ومشكل الخلية

Lining or covering epithelium

According to number of layers

Simple
(1 layer)

طبقتين أو أكثر

Stratified
(≥ 2 layers)

Pseudostratified
epithelium كاذب

According to shape of cell

Squamous

مسطحة
flat

Cuboidal

مكعب

Columnar

عمودي
بالطول

According to shape of cell in upper layer

مشوكة آخر طبقة من فوق

Squamous

Cuboidal

Columnar

Transitional

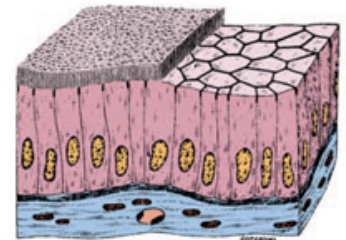
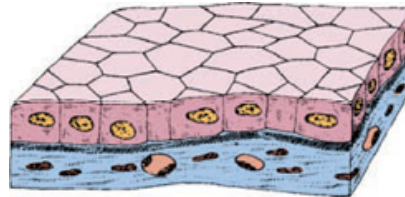
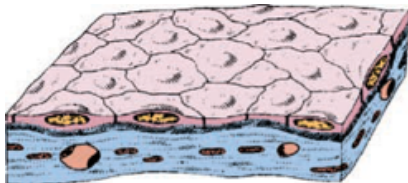
Keratinized

Non-
keratinized

شكلها من فوق مثل مسطحة
مع زلا وحيدة

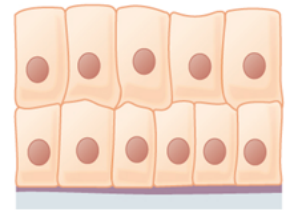
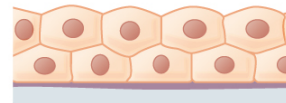
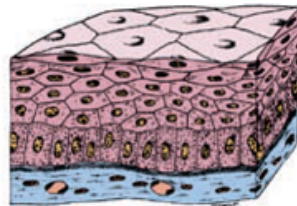
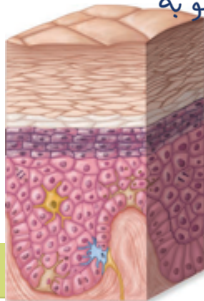
Simple Epithelium

	Simple Squamous	Simple Cuboidal	Simple Columnar
Number of Layers	Single الأكثر انتشاراً	Single	Single
Cells	Flattened squamous	Cuboidal	Tall columnar
Location	- Line blood vessel - Line body cavities	- Line renal tubules الأنابيب الكلوية - Cover ovaries المبايض	<u>Ciliated</u>: عليهم شعيرات → Uterine tube <u>Non-ciliated</u>: ماعليهم شعيرات → Stomach
Function	- Easy passage of substances - Secretion	- Active transport - Cover organs	- Secretion - Absorption



Stratified Epithelium

	Stratified Squamous		Stratified Cuboidal	Stratified Columnar
	Keratinized	Non-keratinized		
Number of layers	Multiple	Multiple	Multiple	Multiple
Top-most layer	Squamous cells covered by keratin layer	Squamous cells not covered by keratin layer	Cuboidal	Columnar
Location	Skin	Esophagus ^{بالمرء}	Large ducts of salivary glands ^{بالعقد اللعابية}	Conjunctiva ^{تجويف العين}
Function	- Protection - Prevent water loss ^{حافظ على الرطوبة}	Protection	- Protection - Secretion	- Protection - Secretion



Transitional epithelium (Urothelium):

2 or more layers

- ❖ The topmost cells of this stratified epithelium are dome-like (called *Umbrella Cells*).

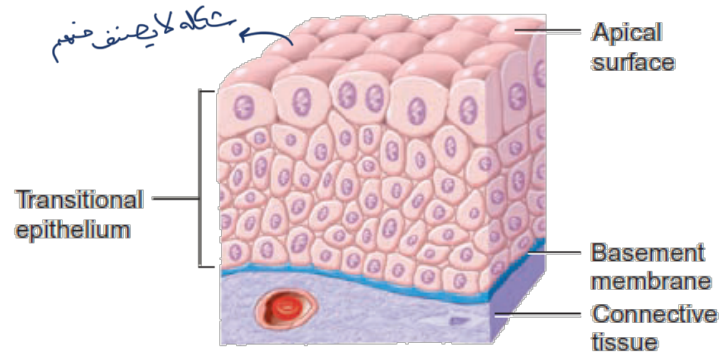


Fig.3: Relaxed transitional epithelium.

- ❖ Location:
 - Urinary bladder and ureters. That's why it's also called *Urothelium*.
- ❖ The umbrella cells are dome-shaped when the bladder is empty. Once it's full, these cells will become flattened (hence the name transitional). بالوضع الطبيعي يكون مناسي شكله umbrella لما يمتلئ رة يشد ويصير flat.
- ❖ Functions: Protection against the adverse effects of urine. Allows the bladder to change size.

Pseudostratified columnar ciliated epithelium: → It's one layer

أطوالهم مختلفة فبذلك ينعطونهم بمسويات مختلفة ليس هي فعلياً طبقة واحدة

- In this epithelium, the cells have different heights. All cells rest on the same basal lamina, but not all of them reach the surface. This makes the nuclei occupy different levels giving the epithelium a false stratified appearance, but this epithelium is, actually, simple.

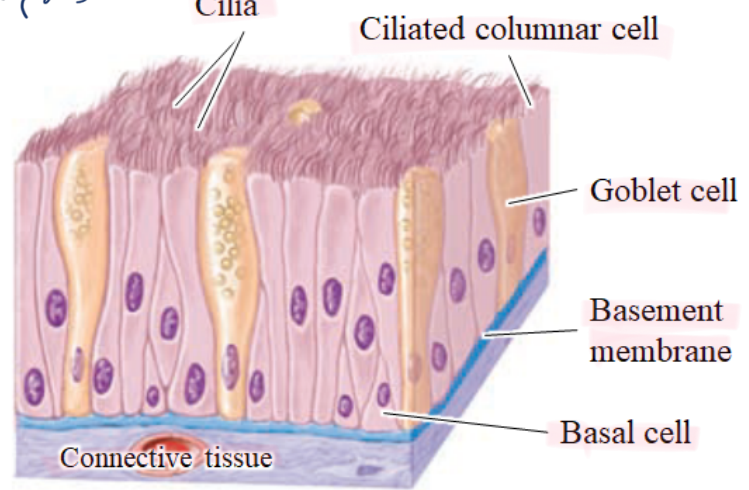


Fig.4: Pseudostratified columnar ciliated epithelium.

- Location:
 - Trachea, bronchi, and nasal cavity (that's why it's also called *Respiratory Epithelium*).
- Functions: Protection, secretion. Ciliary movement removes particles from the airway passages.