



لجان الترغبات

ANATOMY

MORPHINE ACADEMY

MORPHINE
ACADEMY

Glandular Epithelium

* نوع من الأنسجة الظلائية
المتخصص بالإفراز

- Is an epithelium specialized for secretion.

يُقسم بناء على (4) طرق :

Classification of glandular epithelium:

عدد الخلايا المكونة لها

① According to number of cells:

خلية وحدة

❑ **Unicellular** glands: formed of a single cell, like Goblet cells of digestive and respiratory tracts.

❑ **Multicellular** glands: formed of clusters of cells, like: salivary and sweat glands.

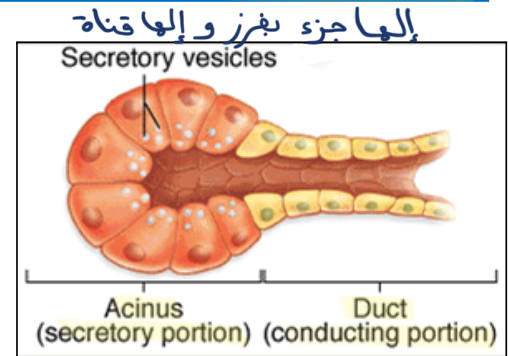
عدة خلايا

② According to presence of ducts:

- ❑ **Exocrine** glands: possess ducts that transfer the secretion to the outside of the body, like: salivary glands. بكون إلهاقنة →
- ❑ **Endocrine** glands: they lack ducts. Their secretions are transferred to the target organs, usually, by blood. Example: Pancreatic Islets, Pituitary gland. ما إلهاقنة ← بتفرز بالدم →

③ Exocrine glands classified according to morphology of duct and secretory portion:

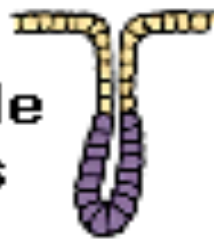
- ❑ Each exocrine gland has a secretory portion that produces the secretion and a duct that carries this secretion.
- ❑ The duct and the secretory portion could be branched or unbranched.
- ❑ The secretory portion could **acinar** (ball-shaped), **tubular**, or **coiled**.



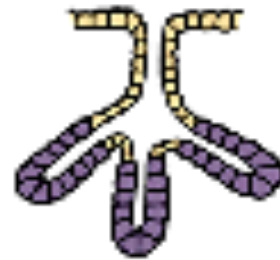
أشكال Part Acinus

Exocrine Gland Types

simple
types



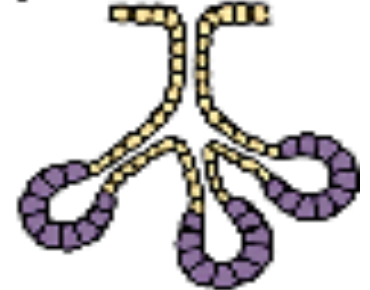
tubular



branched
tubular

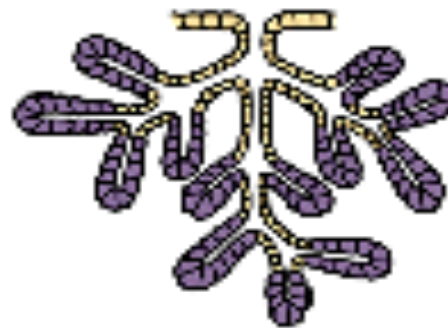


coiled
tubular

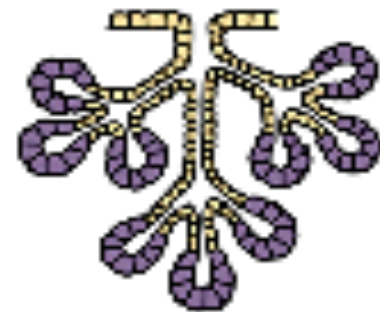


branched
alveolar

compound
types



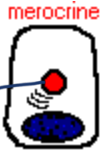
tubular



alveolar

4) Exocrine glands classified according to method of secretion:

- ❑ **Merocrine**: only the product is secreted by exocytosis. As in salivary glands.



بتطلع على سطح الخلية جدين
بتفتحه وبتطلع كل مكوناتها ← بعمل exocytosis

- ❖ Merocrine glands are either serous (excrete a watery solution) or mucous (excrete a thick solution).

- ❑ **Apocrine**: the product and the apical part of the cell is shed. As in mammary gland.



بتطلع بس بقطع جزء من الخلية
جدين بتفجر هو والجزء

- ❑ **Holocrine**: the whole cell disintegrates and is shed with the secretion. As in sebaceous glands of the skin.



الغدر الدهنية

كل الخلية بكل مكوناتها
بتفجر

Epithelial Cell Polarity

تعني كل جزء من الخلية في الـ structures مختلف التالي إلى الـ functions مختلفة

- ❖ Polarity means that various regions of a cell have specialized structural features because they perform different functions.
- ❖ Epithelial cells can be generally divided into 3 regions: أجزاء الخلية
 1. **Apical (Luminal) region:** close to the lumen of the organ. الجزء العلوي
 2. **Lateral regions:** adjacent to other cells. الجزء إلى يمينها مع الخلايا الثانية
 3. **Basal region:** lying on the basal lamina.

بالزقها على basal lamina
يحيى مكن يلقها على الخلية إلى تحتها
أو الطبقة إلى تحتها

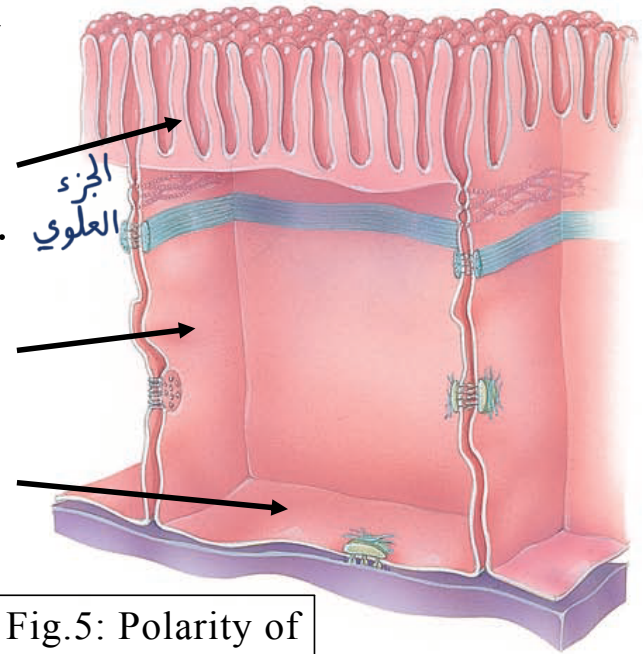


Fig.5: Polarity of epithelial cells.

Cellular Junctions

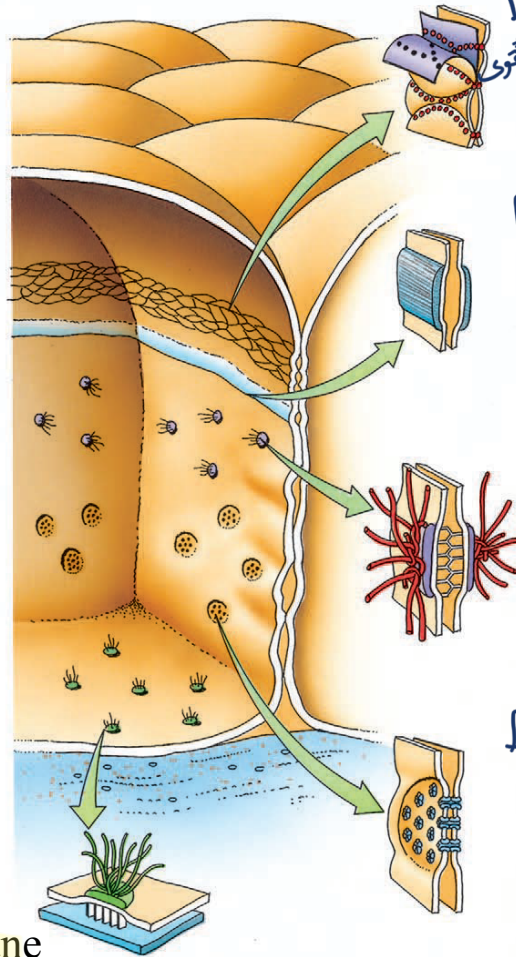
بَلَزَقُ الخَلَايا ببعض

- ❖ Cell-membrane structures.
- ❖ Located on the lateral and basal surfaces.

بَلَزَقُ الخَلِيَةِ بِالـ Basal lamina

Hemidesmosomes:

area of adhesion between cell membrane and basal lamina.



نرتبهم من الأقوى للأضعف

1

Tight Junction: area of fusion of cell membrane. Seals the space between two cells.

الحام

3

Adherent Junction: area of adhesion between two cell membrane. جعل التصاق

2

Desmosomes: area of stronger adhesion between two cell membrane.

التصاق قوي وليس الحام

4

Gap Junction: porous area in the cell membrane of two cells that allow passage of substances between them.

يكون عنًا فراغات (Pores) يسمح مرور المواد من خلية لثانية

Features of the apical surface of the cell

الموجودين
عاجزء الحلوي

- **① Microvilli (single = microvillus):**
- Finger-like cytoplasmic projections that are present in absorptive epithelium, most prominently in the small intestine. They increase the surface area.

العم
نقش
Structure

Fig.6a: Microvilli of small intestinal cells



- **② Stereocilia**
- They're similar in structure to microvilli; however, they're longer and less motile. They may act as mechanoreceptors as in the inner ear hair cells.

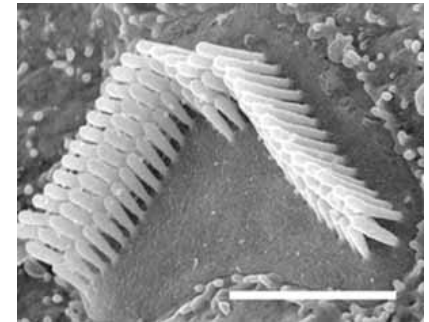


Fig.6b: Stereocilia of a hair cell

• **3) Cilia** شعيرات [موجود بأكثر من مكان و الخلية الوحيدة يكون عليها عدد كبير من Cilia]

- Thick, elongated, motile structures on the surface of some epithelial cells, like those of the trachea. There are, usually, many cilia on the surface of a single cell. They move in rhythmic fashion backwards and forwards removing fluids and debris in a certain direction.

إلى
نفس
الهيكل

• **4) Flagella** [الخلية يكون عليها flagella وحيدة] أطول من Cilia

- They're similar to cilia in structure but are much longer and, usually, only one flagellum is present on a cell. The movement of the flagellum is rotational. In humans, only sperms possess a flagellum.

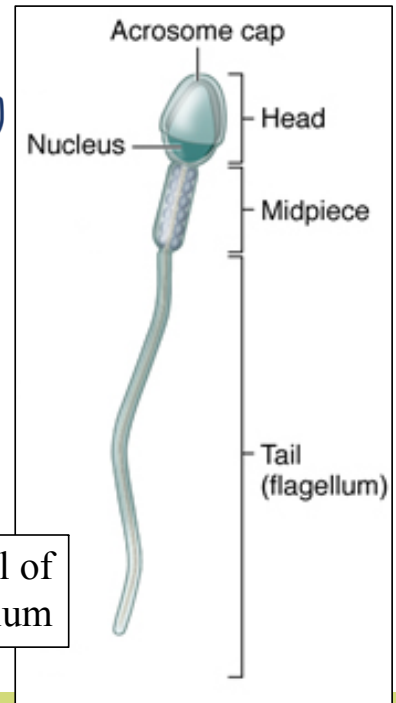
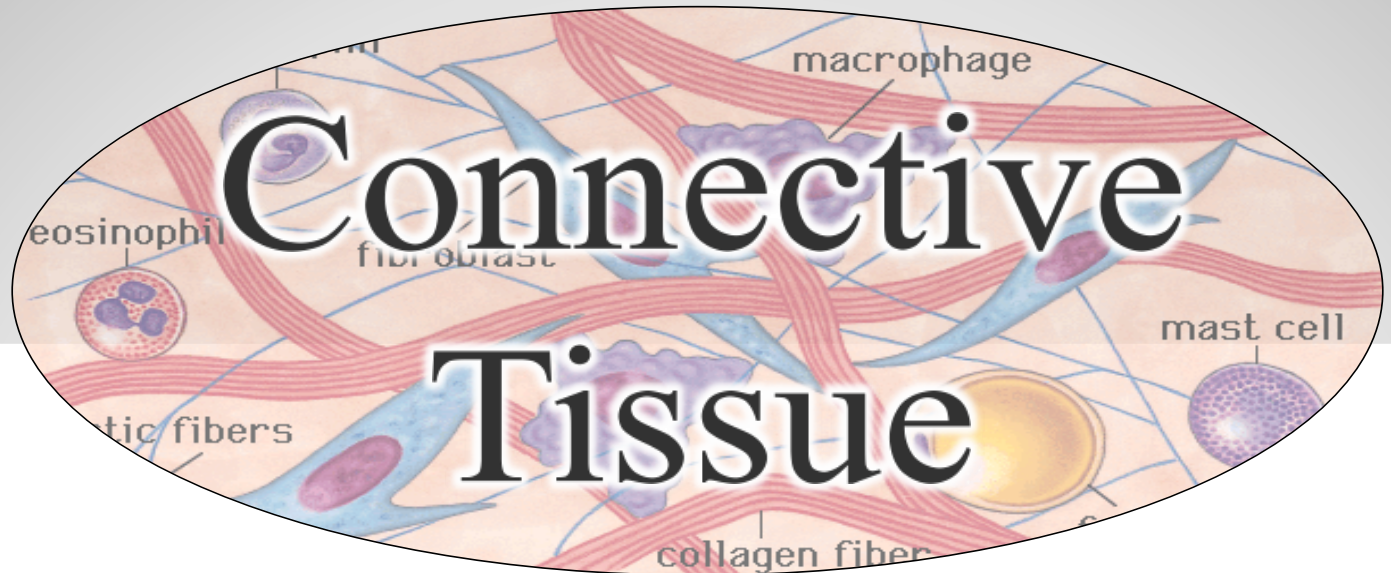


Fig.6c: Sperm. The tail of the sperm is a flagellum



Connective tissue (CT) is a type of body tissue characterized by the presence of an abundant extracellular matrix within which are dispersed different types of cells and fibers.

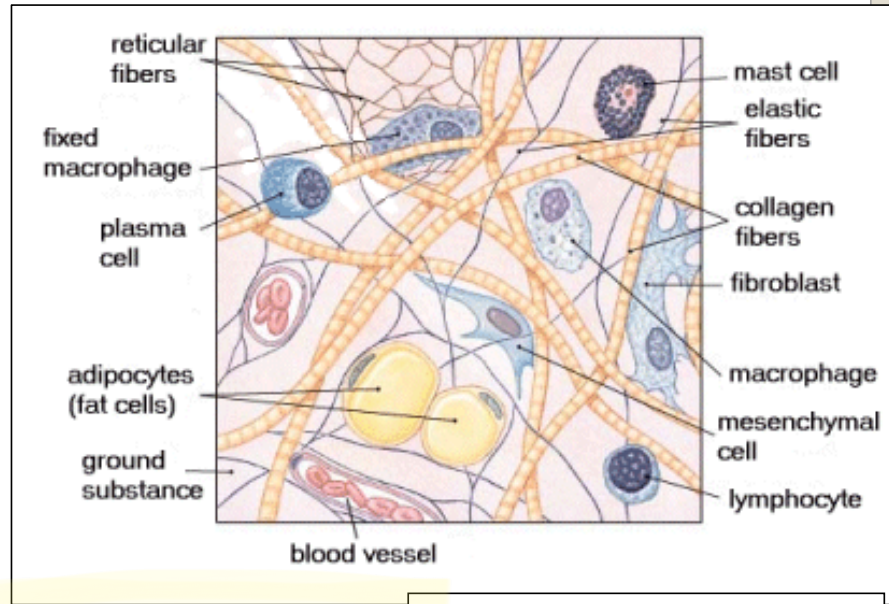


Fig.7: Components of CT.

Functions:

1. Provide form of organs. بعضى شكل الـ organ
2. Support of different organs → fatty tissue. electrical impulse / movement / secretion / covering / lining
3. Connect and bind different structures → cartilage, bone. * أي إشي مش مسؤول عن
4. Provide a medium for diffusion of nutrients and waste products → connective tissue proper, blood. Connective تكون
مثلا : bone , blood

وسط الانتشار

The Cells Of The Connective Tissue

الخلايا المكونة لإهـج

Fibroblasts – *most common type of cell in the CT*

أكثر أنواع خلايا موجود

- **Function:** *Synthesizes fibers and produces components of extracellular matrix.*

- **Main Features:**

- ✓ Abundant irregularly branched cytoplasm.
- ✓ Large, pale-staining nucleus with a prominent nucleolus and a well developed rough endoplasmic reticulum and Golgi apparatus (*features of protein producing cells*).

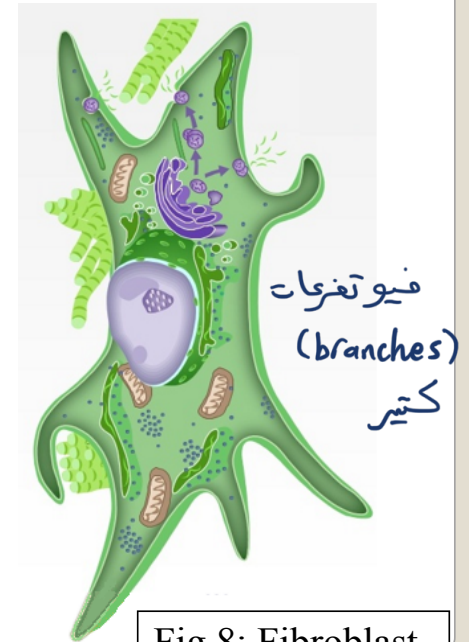
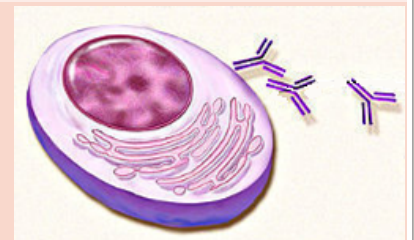
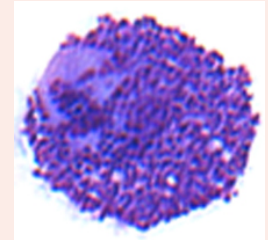
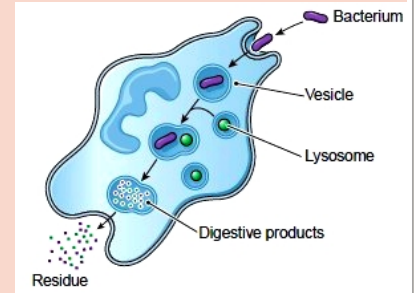


Fig.8: Fibroblast.

Cell	Important feature	Function
Macrophages مسؤولة عن البلعة	Cell surface has indentations and protrusions طبقات	Phagocytosis
Mast cells	Cytoplasm filled with dark staining secretory granules عبارة عن حبيبات	Secretion of histamine (allergy), heparin, and others افراز حساسية
Plasma cells	Nucleus has alternating dark and light regions (clock-face appearance)	Production of antibodies



Extracellular Matrix

Formed of:

A. Fibers: these are elongated protein structures and they include: *Types :*

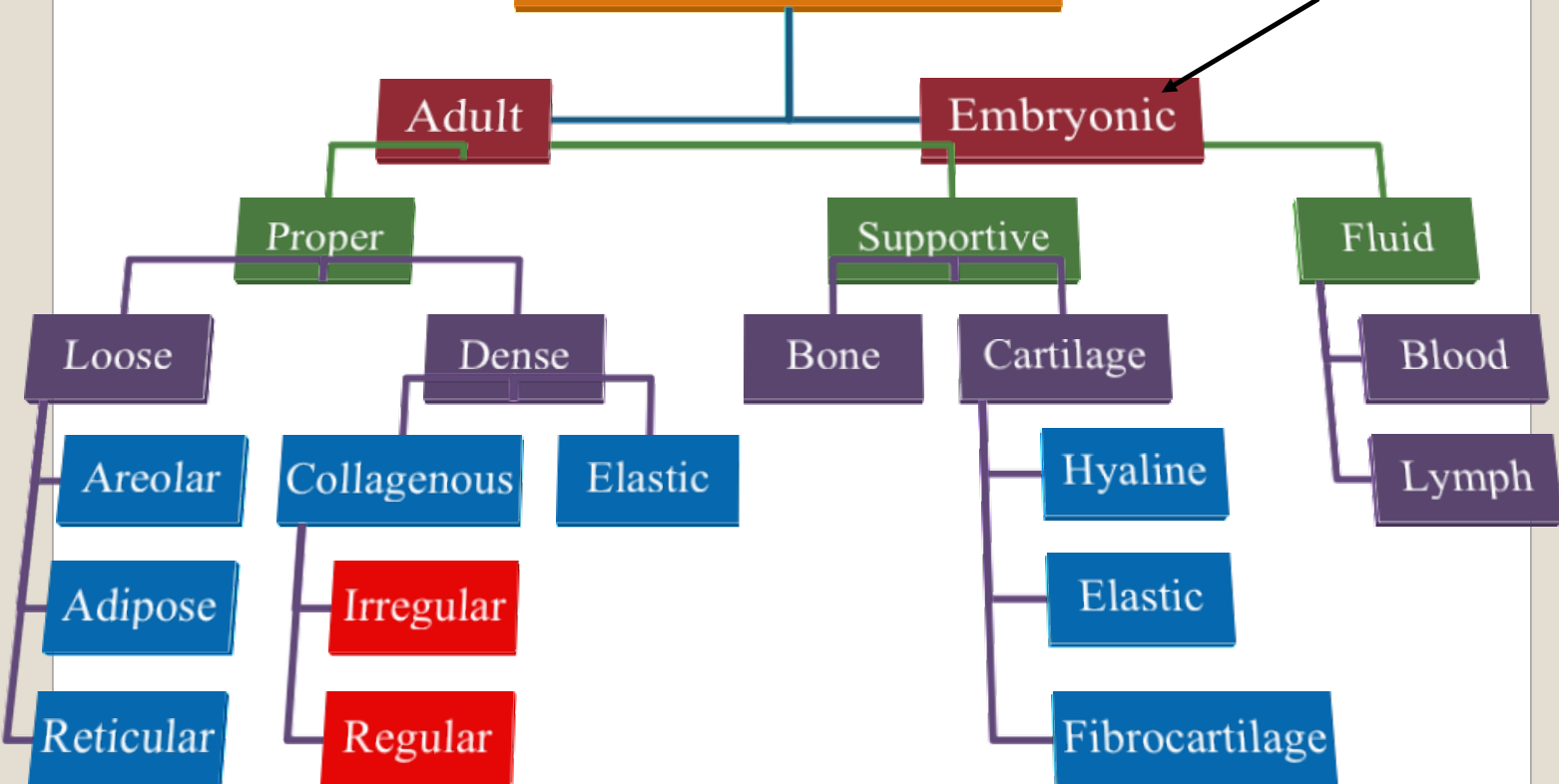
- ① *Collagen fibers*: give strength to the tissue. بتعطى قوّة
- ② *Elastic fibers*: give elasticity to the tissue. بتعطى مرونة
- ③ *Reticular fibers*: form a net that surrounds the different parts of the tissue holding them together. عشان يربط

B. Ground substance: formed of various large molecules with water.

Classification

Connective Tissue

Mainly in embryos



حتوي على fibers مرتبة بطريقة loose dense [يتمدد على عدد الـ fibers وترتيبهم]

- ❑ **Proper connective tissue** is the connective tissue in which the cells that form the ECM is the fibroblast or cells derived from fibroblasts.
- ❑ **Loose connective tissue**: the fibers are loosely arranged forming a network.
- ❑ **Dense connective tissue**: the fibers are numerous and densely packed.

Loose Areolar Connective Tissue:

- ❑ A very common type of connective tissue. It gives some support to organs and tissues.

أكثر نوع من أنواع Connective tissue موجود بالجسم

- ❑ Features:

- Contain all three types of fibers arranged loosely. *يحتوي على كل أنواع fibers*
- All types of connective tissue cells (especially fibroblasts and macrophages) are present here. *أكثر نوعين*
- All these components are embedded in an abundant semi-fluid ground substance. *thick not watery*
- It's highly vascular.

مكونات
خلايا
Connective tissue

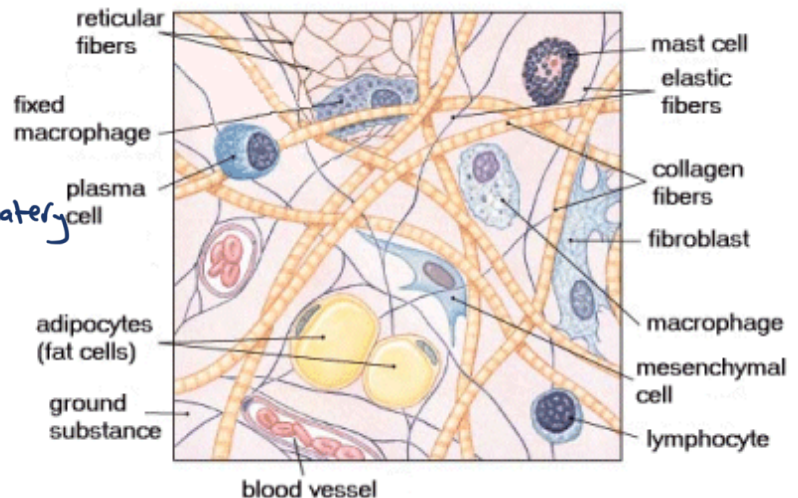


Fig.9: Areolar connective tissue.

❑ Found:

1. Under epithelia.
2. Around glands.
3. In the spaces between muscle and nerve fibers.
4. Around blood and lymphatic vessels.
5. It fills many small spaces making it the '*packing material*' of our body.

حشوة

is the Areolar loose proper Adult connective tissue

❑ Functions:

1. It gives organs their shape.
2. It is a medium for the diffusion of gases, nutrients, and waste product.
3. It is usually the first tissue where microorganisms and foreign particles enter the body; therefore, it's an important site for immune and inflammatory responses.

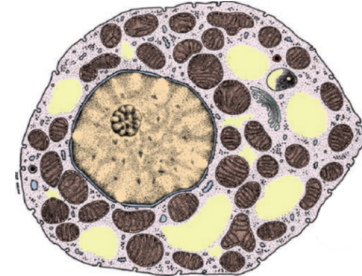
Adipose Tissue

يحتوي على كمية كبيرة من adipocytes

- [?] Is a type of loose connective tissue characterized by the abundance of a specific type of cells called adipocytes.
- [?] It is of two types:

	<i>White Adipose Tissue</i>	<i>Brown Adipose Tissue</i>
Type of adipocyte	White	Brown
Gross color	White to yellow (due to presence of <u>fat</u>) ليس؟	Brown due to abundance of blood vessels
Main function	Storage of energy	Production of heat
Location	- Present throughout life - All over the body	- Abundant in infants - Decrease with age - In adults found in few areas كل ما الشخص كبير عندها يقل

	White Adipocyte	Brown Adipocyte
Shape	Spherical دائري	Polygonal مضلع
Size	Larger	Smaller
Fat droplet	Single (unilocular)	Multiple (multilocular)
Nucleus	Peripheral عالرف	Central
Mitochondria	Numerous	Numerous



بفرز Liptin ح

- White adipocytes secrete the hormone Leptin, which is a satiety factor.

الإشباع

Other types of connective tissue proper:

Type	Loose		Dense		Elastic
	Reticular	Collagenous	Irregular	Regular	
Fibers	Reticular	Collagen, passing in all directions	Collagen, passing in one direction	Elastic	
Function	Holds parts of organs together	Resists forces from all directions	Resists traction forces	Provides elasticity	
Location	Lymph node, spleen	Dermis of skin	Tendons, ligaments	Aorta, vocal cords	

يكون فيها عدد كبير من Fibers

لا يتحمل ضغط

بناء على ترتيب fibers

موجودين باتجاه واحد

لا يتحملوا قوة الشد

الاربطه بين اوتار او بين Bones muscles

شريان او رطبي الاصل المصوبه

