



لجان الترقيات

PHYSIOLOGY

MORPHINE ACADEMY

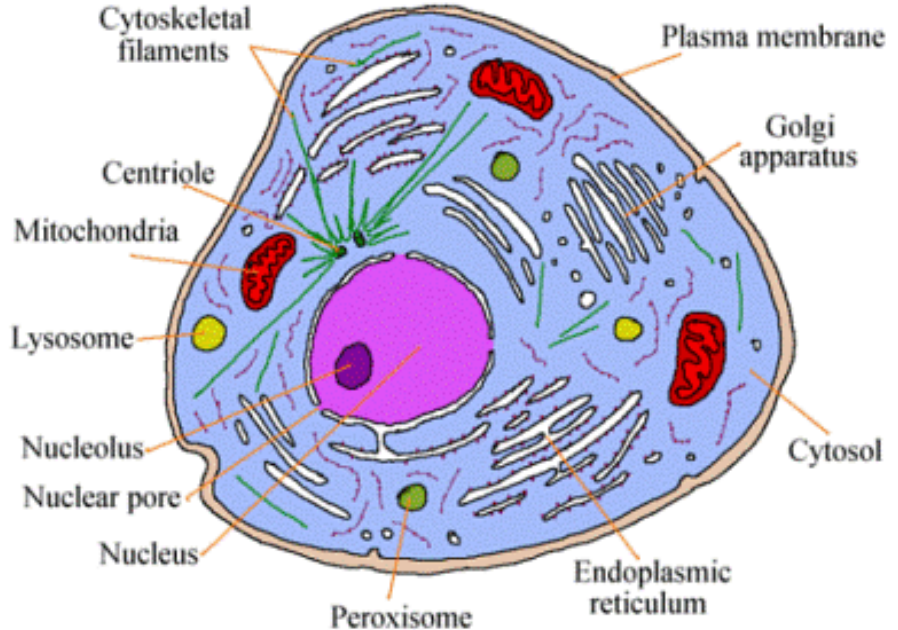
MORPHINE
ACADEMY

THE ORGANELLES

Organelles are **specialized structures** within the cell that have characteristic shapes, and they perform specific functions in cellular growth, maintenance, and reproduction. They often cooperate to **maintain homeostasis**.

* رح خذني عن الأعضاء و شكلهم و وظائفهم

Organelles of the Cell



THE ORGANELLES

هذه الأعضاء التي رحبتي عنهم

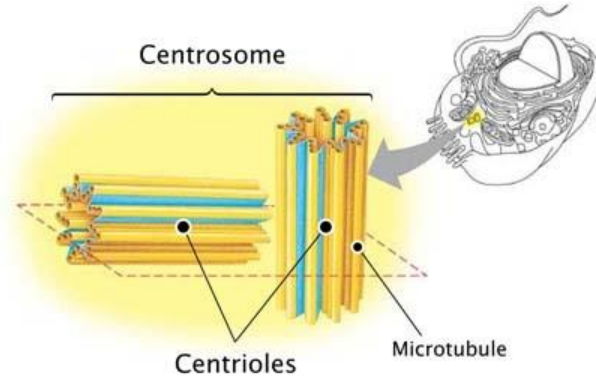


1. Centrosome.
2. Cilia and Flagella.
3. Ribosomes.
4. Endoplasmic Reticulum.
5. Golgi Complex.
6. Lysosomes.
7. Peroxisomes.
8. Proteasomes.
9. Mitochondria.
10. Nucleus.

Skeleton الخلية
بشكل شكل الخلية وبدعم cell membrane بالخلية

Centrosome

- Is located near the nucleus and it consists of two components: **a pair of centrioles and pericentriolar material**.
- The **centrioles** are cylindrical structures (microtubules). Surrounding the centrioles is pericentriolar material which contains the **tubulin complexes**.
- These complexes **organize centers** for growth of the mitotic spindle (cell division).



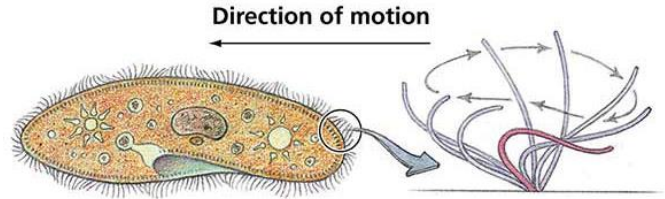
Centrosomes أهم دور كبير في حالات cell division ← الخلية بتتقسم للتجديد والنمو

Cilia

الأهداب (الشعيرات)

- **Microtubules are the dominant components of cilia and flagella.** Both are motile projections. However, cilia is present throughout the surface of a cell, but flagella is present at both the ends or all over the surface.
- Hair-like structure.
- **The main function of motile cilia is to keep the airways clear of mucus and dust.**

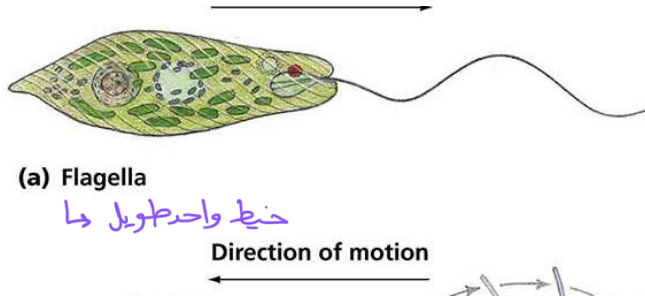
وظيفتها الحركة (بتساعد على حركة الخلية
أو الـ organelles جوا الخلية)



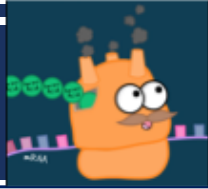
(b) Cilia

→ خيوط قصيرة
ورفاعة

Flagella



- Flagella are similar in structure to cilia but are typically much longer.
- Flagella usually move an entire cell (i.e. sperm). مثلاً موجود في
- The motion of cilia is rotational, very fast moving. The motion of flagella is rotary movement in prokaryotes whereas it is bending movement in eukaryotes. Cilia beat in coordination or one after the other. Flagella beat independent of each other.



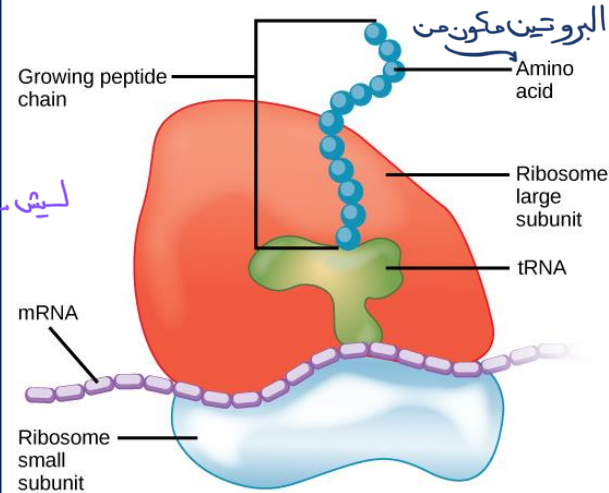
Ribosomes مصنع البروتين

Are the sites of protein synthesis.

- The name of these tiny structures reflects their high [content of one type of ribonucleic acid] (ribosomal RNA, or rRNA).

ليس ميمانه Ribosome؟
موجودين بعد د كبير بالخلية منتشرة في cytoplasm

- “Scattered throughout cytoplasm”: Some ribosomes are attached to the outer surface of the nuclear membrane and to an endoplasmic reticulum. Ribosomes are also located within mitochondria. Other ribosomes are “free” or unattached to other cytoplasmic structures.

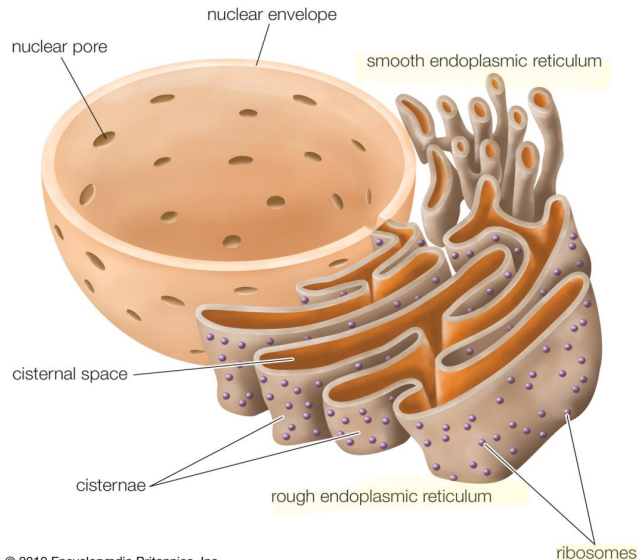


Endoplasmic Reticulum

smooth
rough

- **The endoplasmic reticulum (ER)** is a network of membranes in the form of flattened sacs or tubules.
- The ER extends from the nuclear envelope (membrane around the nucleus), to which it is connected and projects throughout the cytoplasm.
- Cells contain two distinct forms of ER (**rough ER and smooth ER**), which differ in structure and function.

Endoplasmic reticulum



Endoplasmic Reticulum



يكون على سطحه Ribosomes

- The outer surface of **rough ER** is studded with ribosomes (membrane-bound ribosomes). Proteins synthesized by ribosomes enter spaces within the ER for processing and sorting. Thus, rough ER produces secretory proteins, membrane proteins, and many organellar proteins.

البروتينات التي ينتجها رح تدخلوا ER حتى تعمل معالجة وإعارة ترتيب

- Unlike rough ER, **smooth ER** does not have ribosomes on its membrane. However, smooth ER contributes to lipids and carbohydrates synthesis, making phospholipids bilayer for cell membranes as well as it stores and releases calcium ions that trigger contraction in muscle cells.

مسؤول عن تكوين بعض lipids و carbs يحتاجها الخلية

عشان يصير active

ER (Processing and sorting)



لا تحول البروتين
من linear الى folded



folding

بطريقة يقدر يرتبط على
receptors

[mainly
rough ER]



Protien (linear chain)

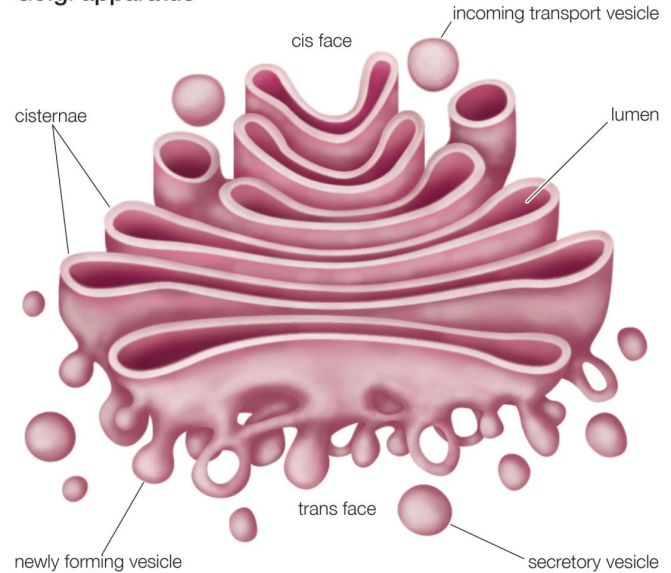
بكون inactive
في حال

Golgi Complex

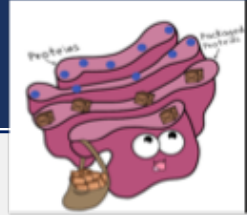
عبارة عن مكان لتخزين البروتين

- Most of the proteins synthesized by ribosomes attached to rough ER are ultimately transported to other regions of the cell (i.e. **Golgi complex**).

Golgi apparatus



Golgi Complex



■ Functions of Golgi Complex:

1. **Modifies, sorts, packages,** and transports proteins received from the rough ER (through face or cis entry). Enzymes in the middle site of the Golgi complex modify the proteins to form glycoproteins, glycolipids, and lipoproteins.
2. **Forms secretory vesicles** that discharge processed proteins via exocytosis (through exist or trans face) into extracellular fluid and forms transport vesicles that carry molecules to other organelles, such as lysosomes.

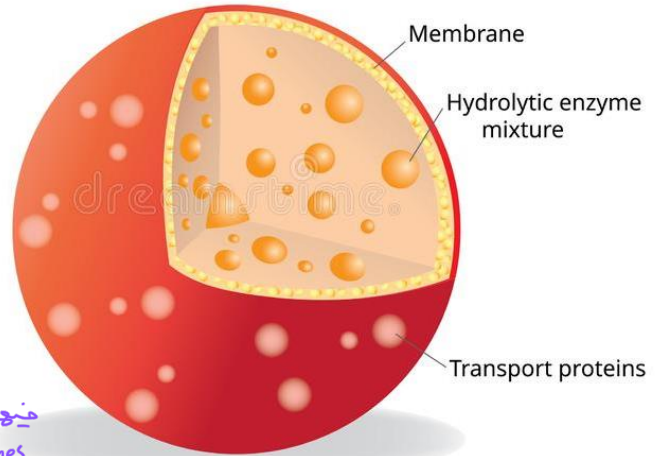
الموصلية إلى يكون مخزن فيها البروتين ال Golgi complex يكون مخزنها

وسيلة حماية للخلية Lysosomes

- **Lysosomes** are membrane-enclosed vesicles that form from the Golgi complex.
- They can contain as many as 60 kinds of **powerful digestive and hydrolytic enzymes** that can break down a wide variety of molecules.

مضغ كيميائى كبيرة من
hydrolytic and digestive enzymes

LYSOSOME





Lysosomes

■ Functions of lysosomes:

مثلا بكتيريا أو بروتين يدخل lysosomes الي فيها enzymes قادرة على تحطيم هاد البروتين

1. Digest substances (within the cell) that enter a cell via endocytosis and transport final products of digestion into cytosol.

يعني مثلا الخلية قتلت من organelle إلى هو جزء منها

2. Carry out **autophagy**, the digestion of worn-out organelles.

3. Implement **autolysis**, the digestion of an entire cell. لأنه الخلية ممكن تقتل نفسها
عن طريق lysosomes

4. Accomplish **extracellular digestion**. ممكن احي من برا الخلية
يدخل ما الخلية وتعمله digestion

Peroxisomes

يحتوي على مجموعة من enzymes

→ oxidases enzymes

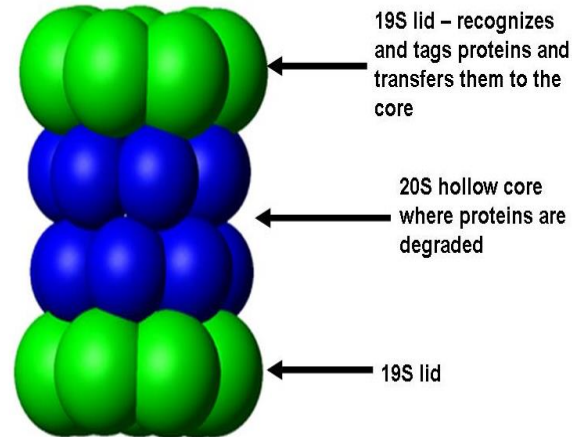
- **Peroxisomes** contain several oxidases, enzymes that can oxidize (remove hydrogen atoms from) various organic substances.
بشيل H من المركب (أكسدة)
- They protect the cells from oxidative damage.
- They protect other parts of the cell from the toxic effects of potentially toxic compounds.
- Peroxisomes are very abundant in the liver, where detoxification of alcohol and other damaging substances occurs.
مهم في حالات
- Peroxisomes also contain the enzyme catalase, which decomposes by-product of the oxidation reactions which is hydrogen peroxide (H_2O_2); thus, it decomposes hydrogen peroxide to water and oxygen.
يسرعوا التفاعل



Proteasomes

- Cytosolic proteins require disposal at certain times in the life of a cell. **Continuous destruction of unneeded, damaged, or faulty proteins** is the function of tiny barrel-shaped structures consisting of four stacked rings of proteins around a central core called **proteasomes**.
- Proteasomes were so named because they contain **proteases, enzymes that cut proteins into small peptides**. Once the enzymes of a proteasome have chopped up a protein into smaller chunks, **other enzymes then break down the peptides into amino acids, which can be recycled into new proteins.**

26S proteasome



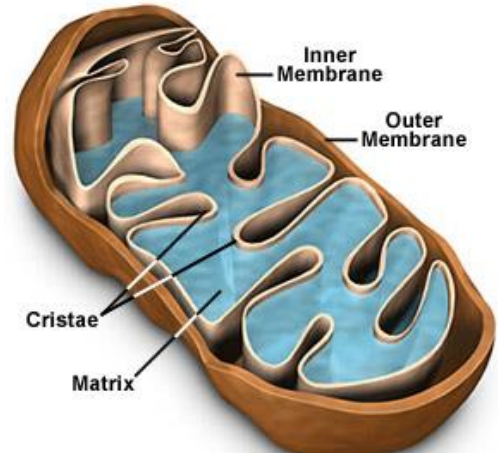


میتوکاندريا ATP إنتاج

انتاج الطاقة بوجود الأكسجين

- **Mitochondria** generate most of the ATP through aerobic (oxygen requiring) respiration, (“**powerhouses**” of the cell). The enzymes that catalyze the chemical reactions which are part of the aerobic phase of cellular respiration are located in the mitochondria.
- Active cells that use ATP at a high rate—such as those found in the muscles, liver, and kidneys—have a large number of mitochondria.
- A mitochondrion consists of an **outer mitochondrial membrane** and an **inner mitochondrial membrane** with a small fluid-filled space between them (**mitochondrial matrix**).

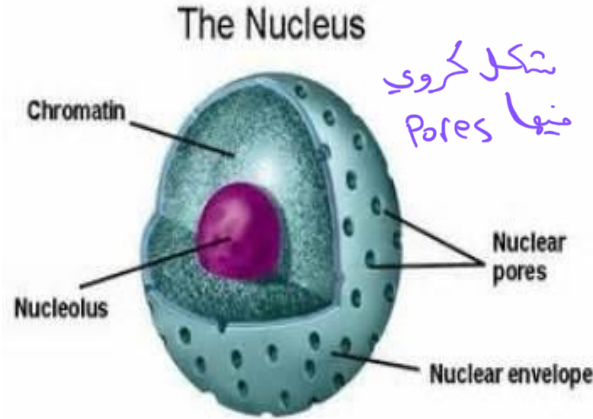
Mitochondria Structural Features



Nucleus

بجھتوي على DNA

- **The nucleus** is a spherical or oval-shaped structure that usually is the most prominent feature of a cell.
- Most cells have a single nucleus, although some, such as mature red blood cells, have none. Other types of cells have multiple nuclei.
- A double membrane called the **nuclear envelope** separates the nucleus from the cytoplasm. Many openings called **nuclear pores** extend through the nuclear envelope.
بجھتوي له دخول مواد
[مثلا دخول انزيمات بجھتوي انتاج بروتين معين]
او خروجها
- The complex of DNA, proteins, and some RNA is called **chromatin**. The total genetic information carried in a cell, or an organism is its **genome**.



Nucleus

الهادور يكلش الجسم



■ Functions of nucleus:

1. Controls cellular structure.
2. Directs cellular activities.
3. Produces ribosomes in nucleoli.
4. Nuclear pores control the movement of substances between the nucleus and cytoplasm.