

University of Basrah
Veterinary College



Biology Practical

Dr. Haider Rasheed Alrafas

Eukaryotic Cells

College of Veterinary Medicine

University Of Basrah

First Grade

Biology Practical

What is a Eukaryotic Cell?

Eukaryotic cells have a nucleus enclosed within the nuclear membrane and form large and complex organisms. Protozoa, fungi, plants, and animals all have eukaryotic cells. They are classified under the kingdom Eukaryota.

They can maintain different environments in a single cell that allows them to carry out various metabolic reactions. This helps them grow many times larger than the prokaryotic cells.

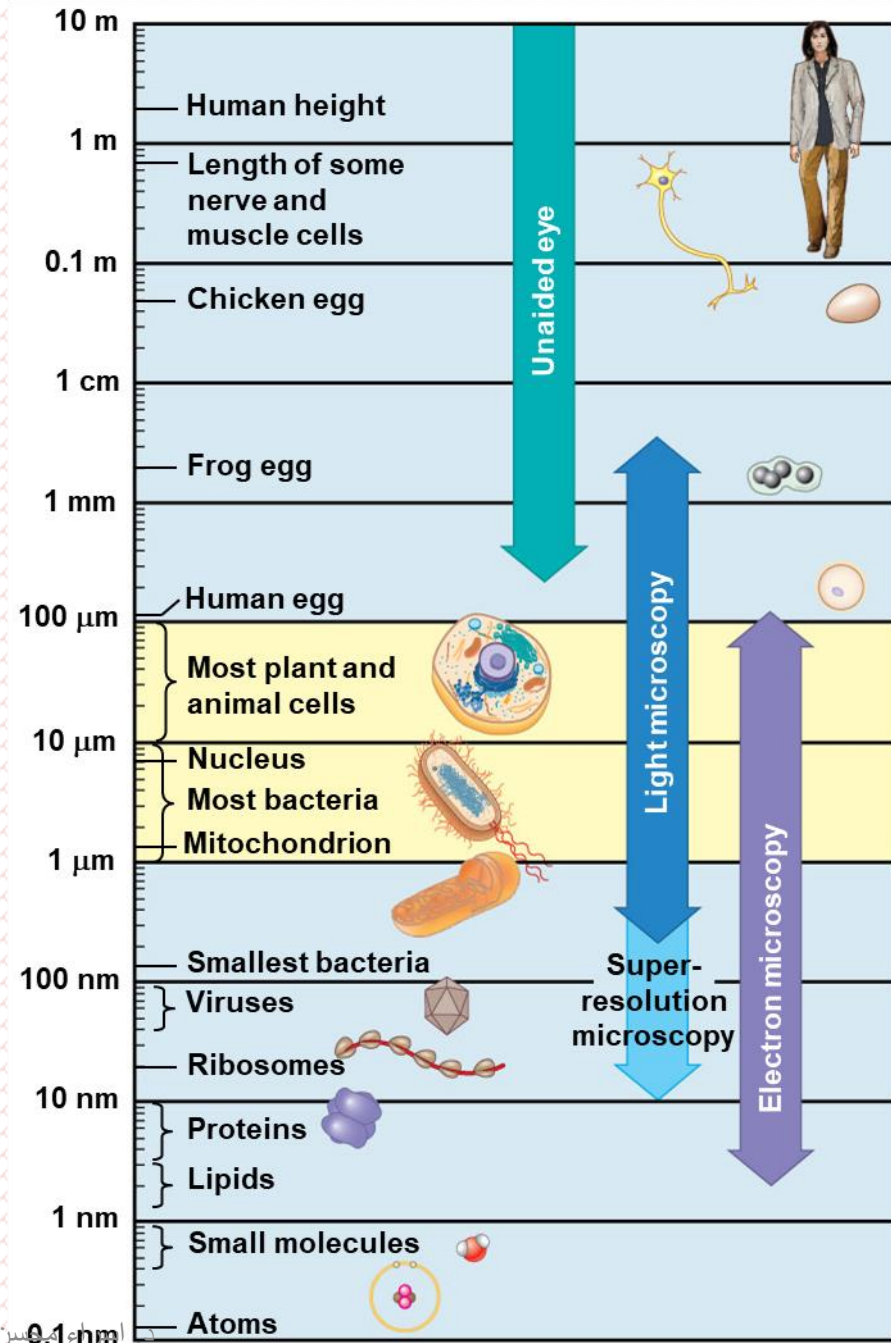


Figure 6.3

Light Microscopy (LM)

Characteristics of Eukaryotic Cells

The features of eukaryotic cells are as follows:

1-Eukaryotic cells have the nucleus enclosed within the nuclear membrane.

2-The cell has mitochondria.

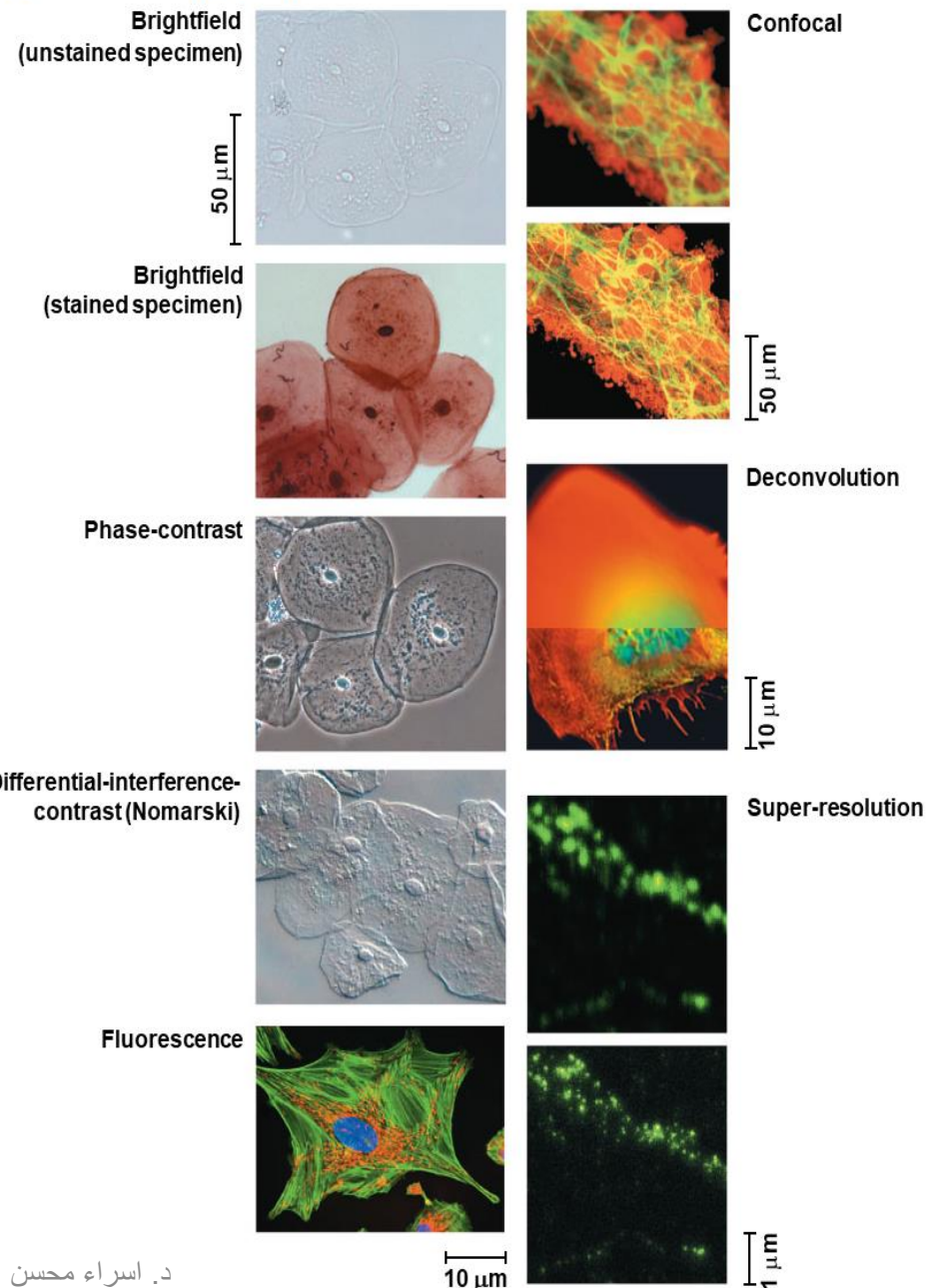
3-Flagella and cilia are the locomotory organs in a eukaryotic cell.

4-A cell wall is the outermost layer of the eukaryotic cells.

5-The cells divide by a process called mitosis.

6-The eukaryotic cells contain a cytoskeletal structure.

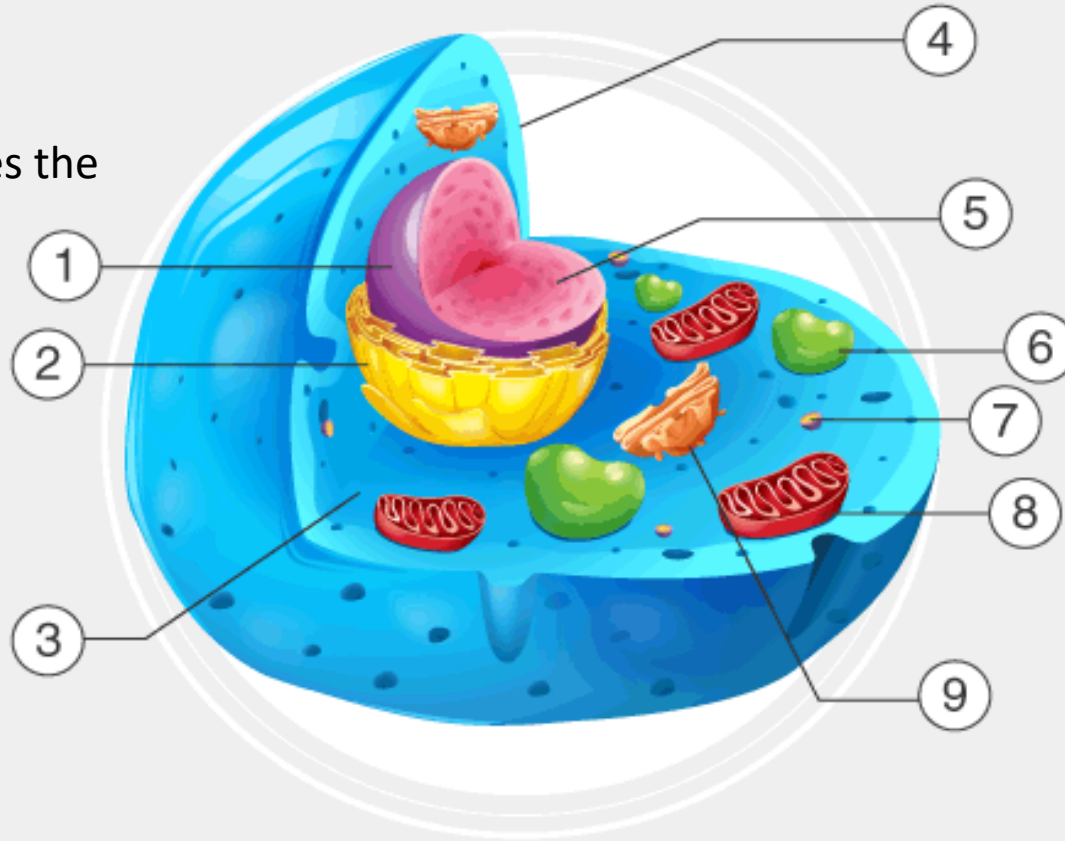
7-The nucleus contains a single, linear DNA, which carries all the genetic information.



EUKARYOTIC CELL

Structure Of Eukaryotic Cell

The eukaryotic cell structure comprises the following:



- | | | | | |
|------------|---------------------------|-----------------|-------------------|-------|
| 1 Nucleus | 2 Endoplasmatic Reticulum | 3 Cytoplasm | 4 Cell Membrane | 5 DNA |
| 6 Lysosome | 7 Ribosome | 8 Mitochondrion | 9 Golgi Apparatus | |

Plasma Membrane

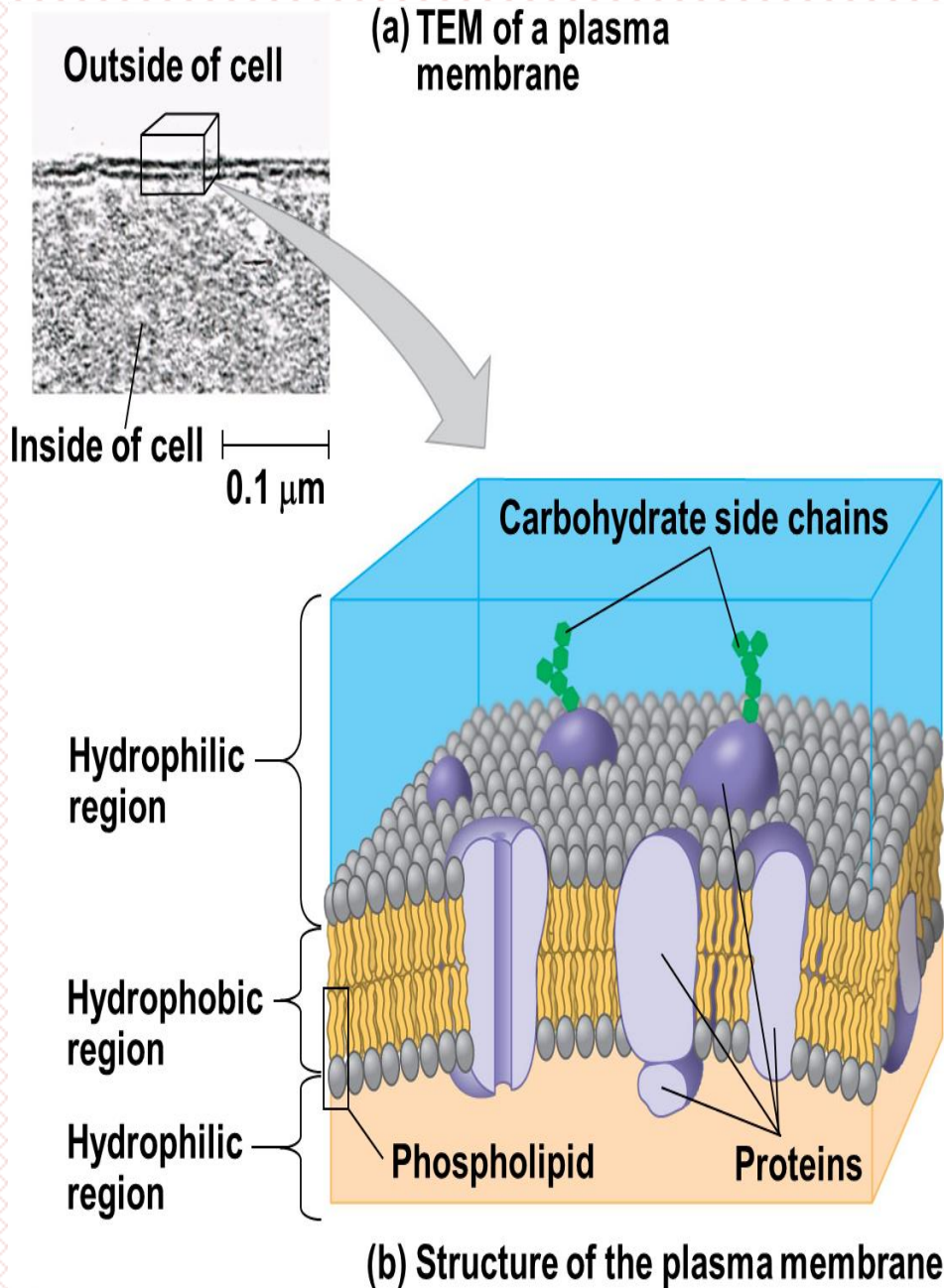
- The plasma membrane separates the cell from the outside environment.
- It comprises specific embedded proteins, which help in the exchange of substances in and out of the cell.

Cell Wall

- A cell wall is a rigid structure present outside the plant cell. It is, however, absent in animal cells.
- It provides shape to the cell and helps in cell-to-cell interaction.
- It is a protective layer that protects the cell from any injury or pathogen attacks.
- It is composed of cellulose, hemicellulose, pectins, proteins, etc.

Cytoskeleton

The cytoskeleton is present inside the cytoplasm, which consists of microfilaments, microtubules, and fibres to provide perfect shape to the cell, anchor the organelles, and stimulate the cell movement.



Endoplasmic Reticulum

It is a network of small, tubular structures that divides the cell surface into two parts: luminal and extraluminal.

Endoplasmic Reticulum is of two types:

- Rough Endoplasmic Reticulum contains ribosomes.
- Smooth Endoplasmic Reticulum that lacks ribosomes and is therefore smooth.

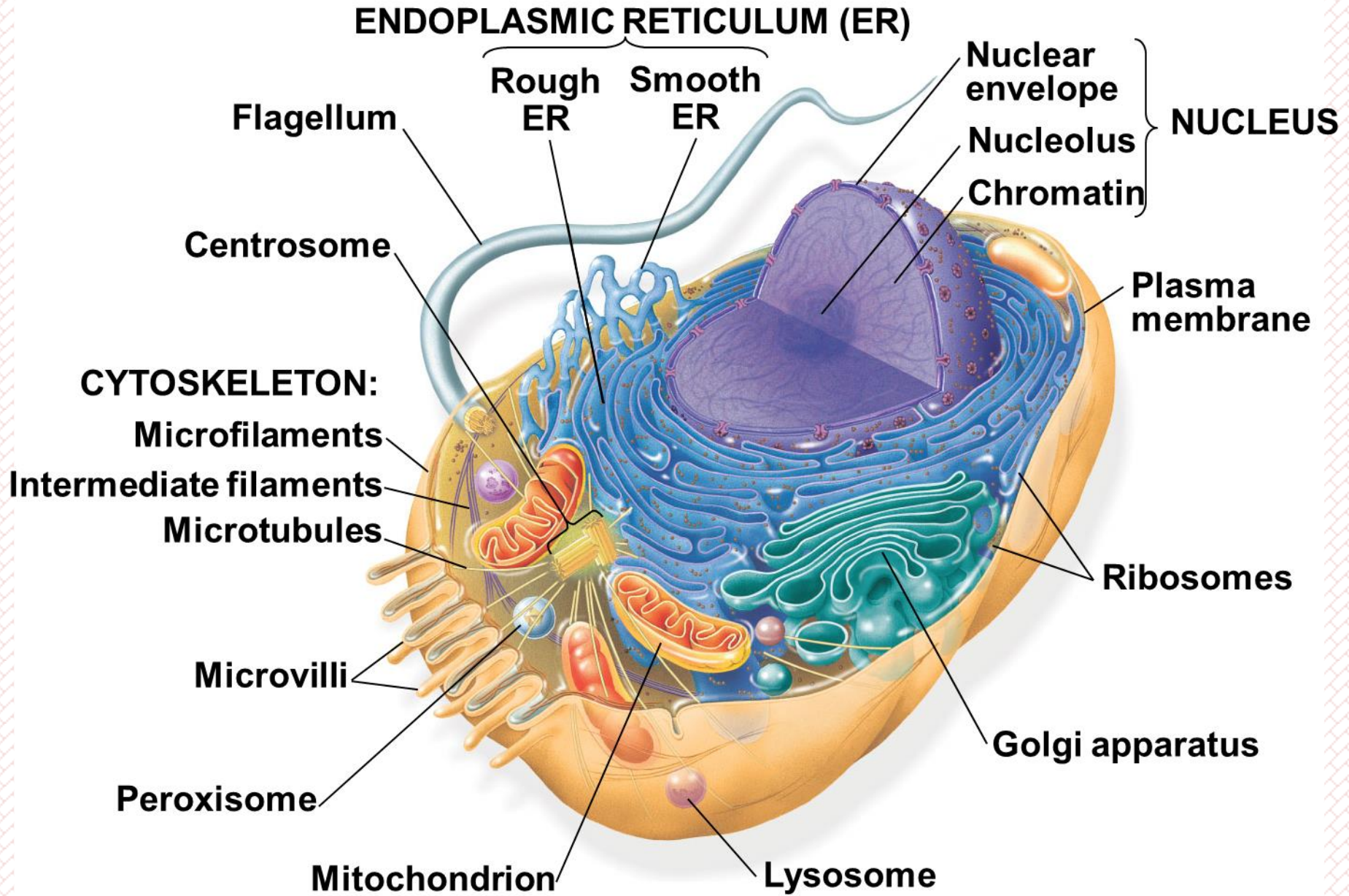
Nucleus

- The nucleoplasm enclosed within the nucleus contains DNA and proteins.
- The nuclear envelop consists of two layers- the outer membrane and the inner membrane. Both the membranes are permeable to ions, molecules, and RNA material.
- Ribosome production also takes place inside the nucleus.

Golgi Apparatus

- It is made up of flat disc-shaped structures called cisternae.
- It is absent in red blood cells of humans and sieve cells of plants.
- They are arranged parallel and concentrically near the nucleus.
- It is an important site for the formation of glycoproteins and glycolipids.

Figure 6.8a



Ribosomes

These are the main site for protein synthesis and are composed of proteins and ribonucleic acids.

Mitochondria

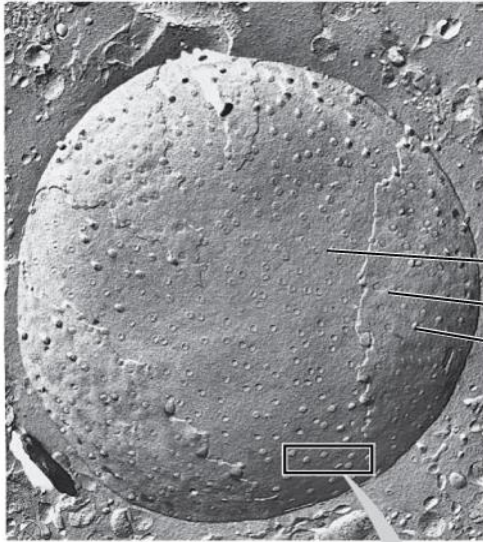
- These are also known as “powerhouse of cells” because they produce energy.
- It consists of an outer membrane and an inner membrane. The inner membrane is divided into folds called cristae.
- They help in the regulation of cell metabolism.

Lysosomes

They are known as “suicidal bags” because they possess hydrolytic enzymes to digest protein, lipids, carbohydrates, and nucleic acids.

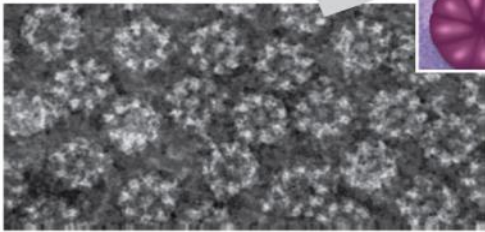
Figure 6.9

1 μm



▲ Surface of nuclear envelope

0.25 μm

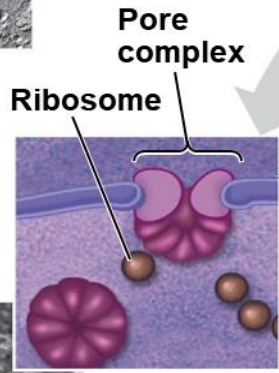


▲ Pore complexes (TEM)

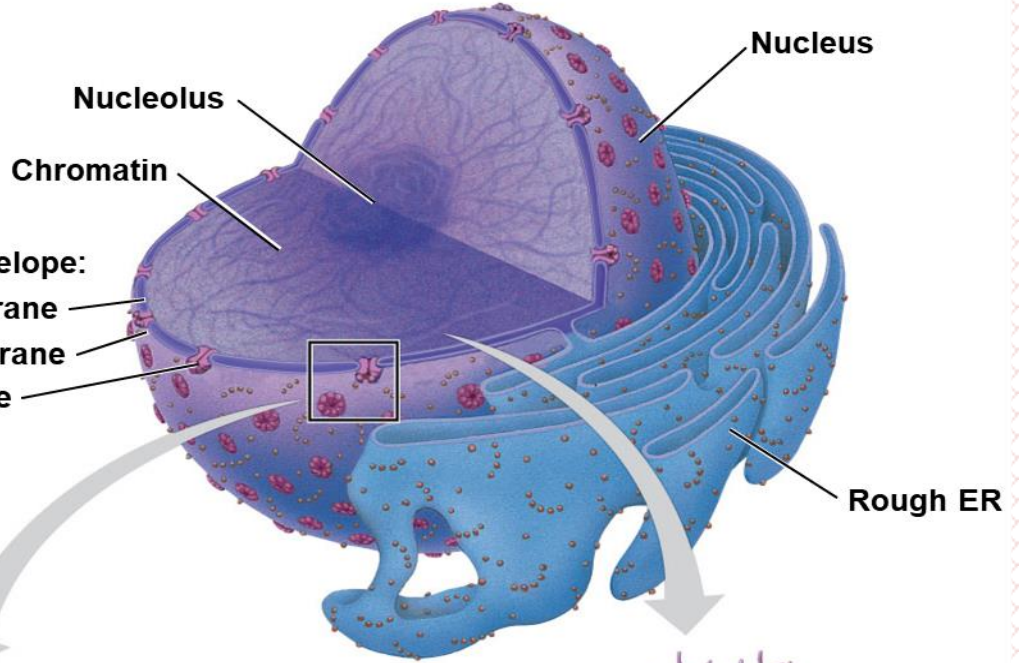
1 μm



◀ Nuclear lamina (TEM)



◀ Close-up of nuclear envelope



▲ Chromatin