



Tikrit University
College of Veterinary Medicine

Lect.3: biology

Subject name: The Cell

Subject year: First stage

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Lecturers link

The Cell

The branch of biology which deals with the study of the Cell is known as cytology . The cell is regarded as a structural and functional unit of living organisms.

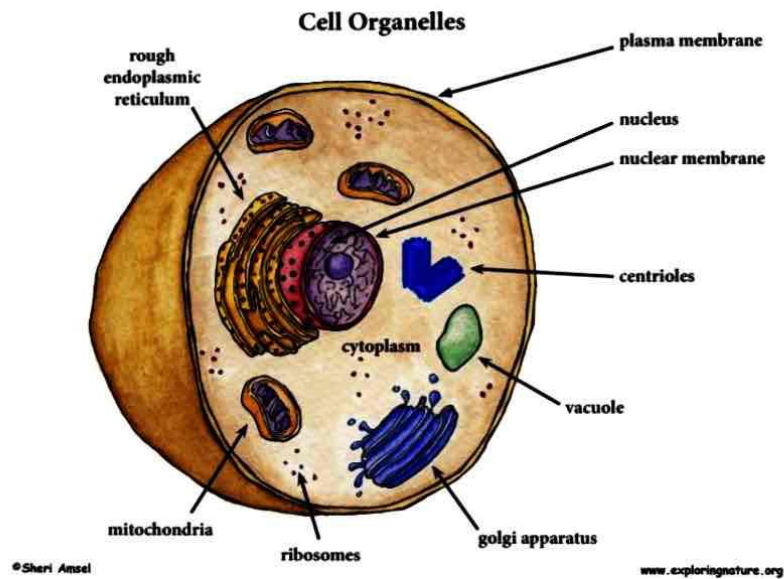
Cell Organelle Facts:

1. Each cell has a protective outer layer – **the plasma membrane**. The plasma membrane lets certain things into the cell that it needs, but keeps other things out. This is called *semipermeable*.
2. Inside the cell is a watery medium that everything floats in called **cytoplasm**. The cytoplasm contains all the working parts of the cell, the **organelles**.
3. Little grains floating around inside the cell are **ribosomes**, where proteins are made.
4. The nucleus has our **DNA** that contains all our genetic information. The DNA is found on structures in the nucleus called **chromosomes** There are 23 pairs (46 total) of chromosomes in each nucleus of each cell.
5. The **nucleus** is surrounded by a **nuclear membrane**, which controls what goes in and out.
6. **Rough endoplasmic reticulum** (rough ER) is a series of folded membrane pathways spotted with ribosomes. Together the ribosomes and the rough ER make new proteins and new membranes that the cell needs.
7. **Smooth Endoplasmic Reticulum** (smooth ER) has no ribosomes on it and forms containers called transport *vesicles* that are used to move things around inside the cell.
8. **Golgi apparatus** are made up of *sacculles* that package up things to be transported around the cell or that need to leave the cell, like *hormones*.

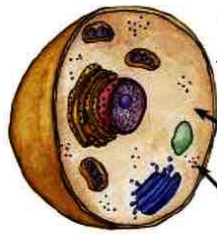
9. **Lysosomes** are vesicles that have digestive enzymes inside them and break down the things that the cell doesn't need. They also kill bacteria that invades the body.

10. **Vacuoles** are membrane large membranous sacs for storing things. **Vesicles** are smaller sacs.

11. **Mitochondria** have a double membrane that folds in on itself forming little finger-like projections called *cris*tae. Inside is a gel-like matrix with enzymes that break down sugars to make ATP, which is used by the cell as energy. These very important organelles contain their own DNA and ribosomes, reproduce by division and can even produce some of their own proteins.



Animal Cell Organelles



1. Each cell has a protective outer layer – the plasma membrane. The plasma membrane lets certain things into the cell that it needs, but keeps other things out. This is called semipermeable.

2. Inside the cell is a watery medium that everything floats in called cytoplasm. The cytoplasm contains all the working parts of the cell, the organelles.

3. Little grains floating around inside the cell are ribosomes, where proteins are made.



4. The nucleus has our DNA that contains all our genetic information. The DNA is found on structures in the nucleus called chromosomes. There are 23 pairs (46 total) of chromosomes in each nucleus of each cell.

5. The nucleus is surrounded by a nuclear membrane, which controls what goes in and out.



6. Rough endoplasmic reticulum (rough ER) is a series of folded membrane pathways spotted with ribosomes. Together the ribosomes and the rough ER make new proteins and new membranes that the cell needs.



7. Smooth Endoplasmic Reticulum (smooth ER) has no ribosomes on it and forms containers called transport vesicles that are used to move things around inside the cell.



8. Golgi apparatus are made up of sacculi that package up things to be transported around the cell or that need to leave the cell, like hormones.



9. Lysosomes are vesicles that have digestive enzymes inside them and break down the things that the cell doesn't need. They also kill bacteria that invades the body.

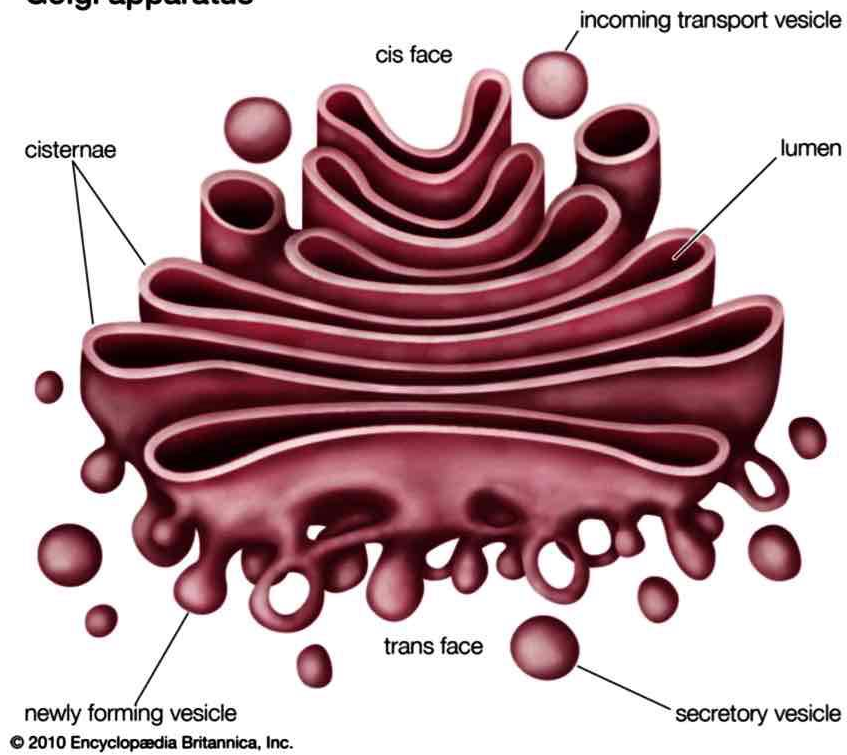


10. Vacuoles are membrane large membranous sacs for storing things. Vesicles are smaller sacs.



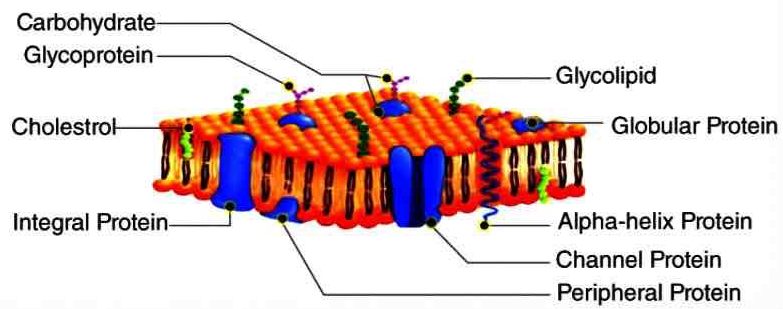
11. Mitochondria have a double membrane that folds in on itself forming little finger-like projections called cristae. Inside is a gel-like matrix with enzymes that break down sugars to make ATP, which is used by the cell as energy. These very important organelles contain their own DNA and ribosomes, reproduce by division and can even produce some of their own proteins.

Golgi apparatus



CELL MEMBRANE

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Mitochondria Structural Features

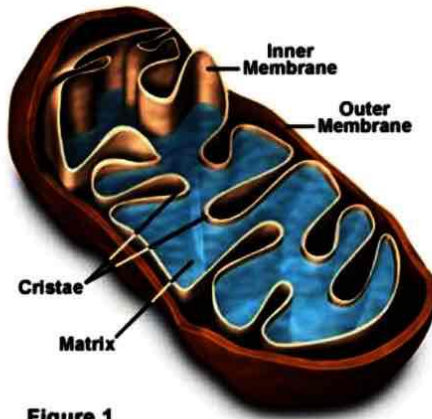
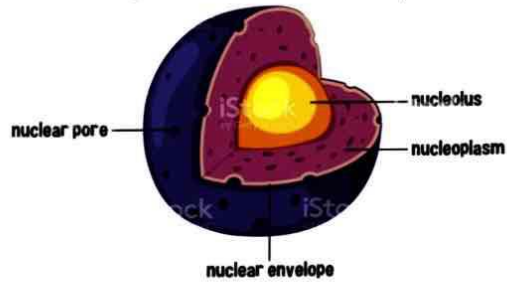
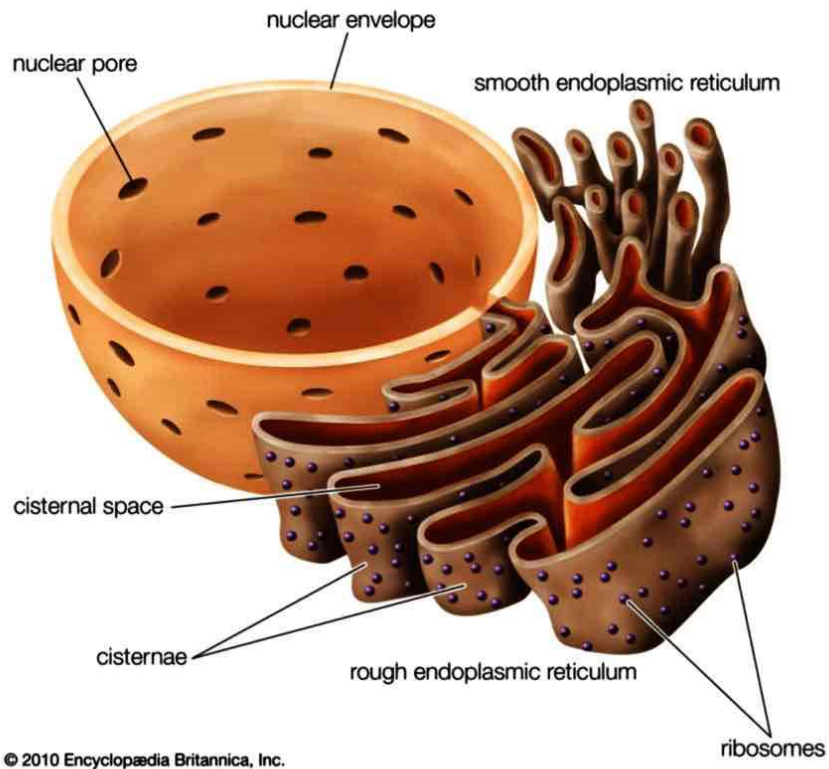


Figure 1

Cell Nucleus Anatomy



Endoplasmic reticulum



Mitosis: a process of cell duplication, or reproduction, during which one cell gives rise to two genetically identical daughter cells. Strictly applied, the term *mitosis* is used to describe the duplication and distribution of chromosomes, the structures that carry the genetic information.

Stages of Mitosis

Prophase

Mitosis begins with prophase, during which chromosomes recruit condensin and begin to undergo a condensation process that will continue until metaphase.

Prometaphase

Prometaphase begins with the abrupt fragmentation of the nuclear envelope into many small vesicles that will eventually be divided between the future daughter cells.

Metaphase

Next, chromosomes assume their most compacted state during metaphase, when the centromeres of all the cell's chromosomes line up at the equator of the spindle.

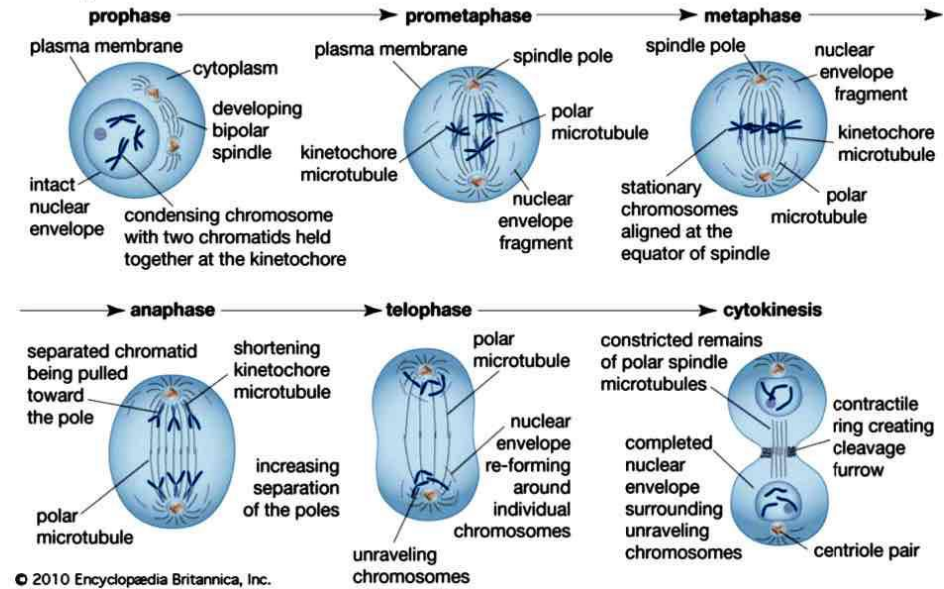
Anaphase

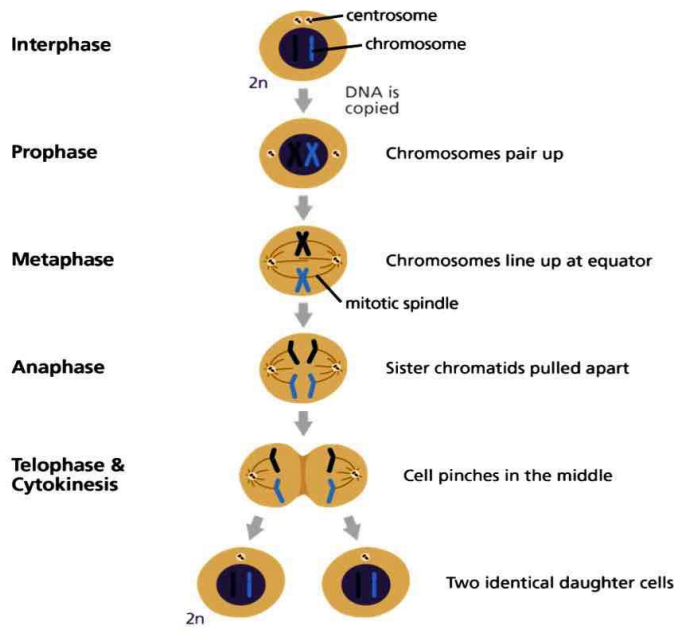
The progression of cells from metaphase into anaphase is marked by the abrupt separation of sister chromatids.

Telophase and Cytokinesis

Mitosis ends with telophase, or the stage at which the chromosomes reach the poles. The nuclear membrane then reforms, and the chromosomes begin to decondense into their interphase conformations. Telophase is followed by cytokinesis, or the division of the cytoplasm into two daughter cells. The daughter cells that result from this process have identical genetic compositions

Mitosis, or somatic cell division





2n - diploid

مراحل الانقسام الخيطي المتساوي

