The cell

Discovery of Cells

- Robert Hooke (mid-1600s)
- Observed sliver of cork
- Saw “row of empty boxes”
- Coined the term cell

Principles of Cell Theory

- All living things are made of cells
- Smallest living unit of structure and function of all organisms is the cell
- All cells arise from preexisting cells

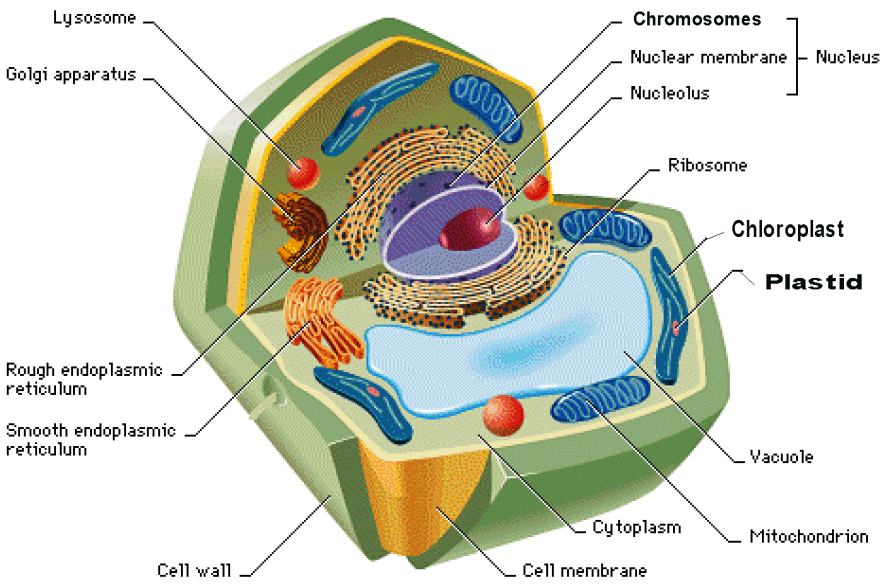
Definition of Cell

A cell is the fundamental and functional unit of life .where many processes occur in it.

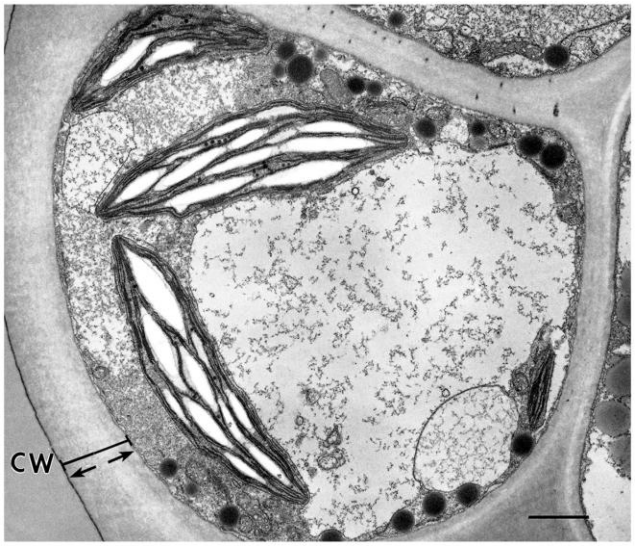
Types of Cell

- Eukaryotic cell like (plant and animal cell)
- Prokaryotic cell like (Bacteria).

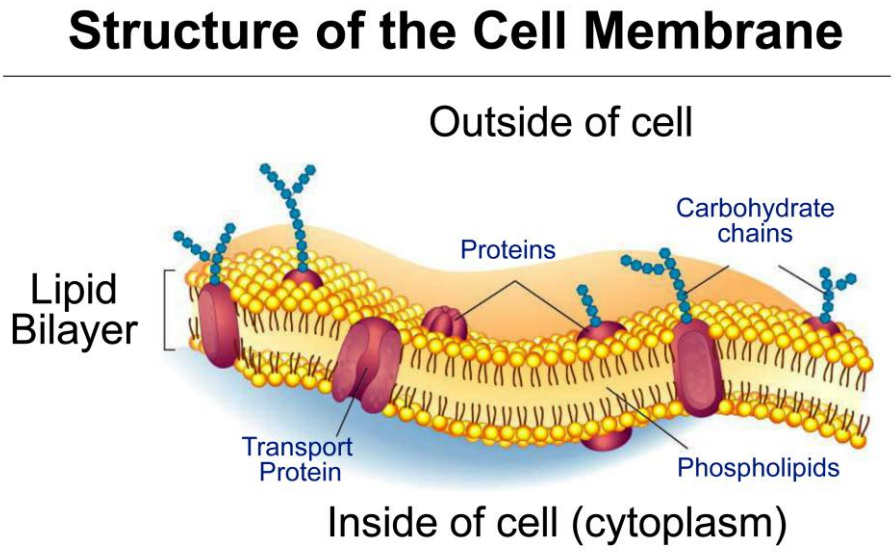
Eukaryotic Cell Structure and Function



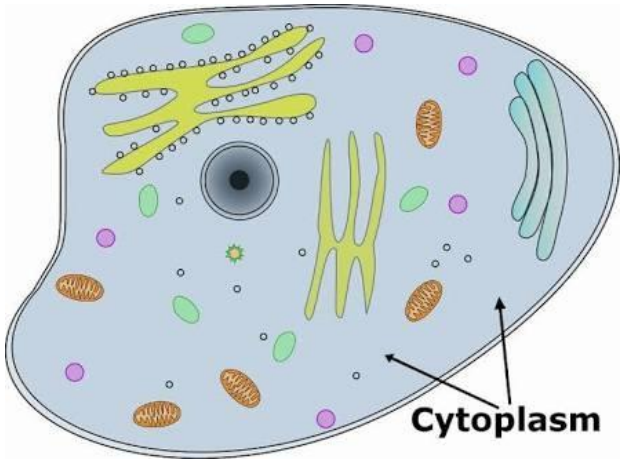
1- **Cell wall:** is a structural layer surrounding some types of cells, situated outside the cell membrane, made of cellulose. It can be tough, flexible, and sometimes rigid. It helps in protecting the plasma membrane and plays a vital role in supporting and protecting the cells.



2- Cell membrane*:* It is a double layered, thin barrier, surrounding the cell to control the entry and exit of certain substances.

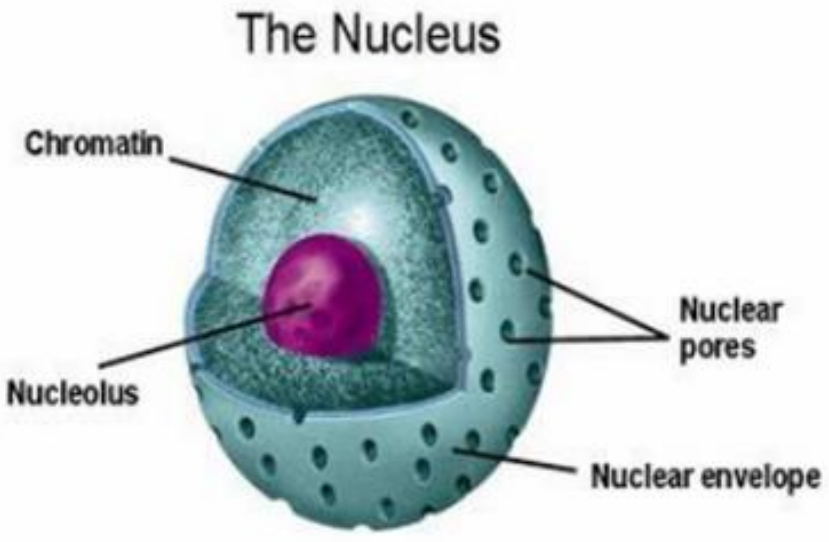


2- Cytoplasm (protoplasm): is the fluid that fills a cell. This protects the cell by keeping the cell organelles separate from each other. This helps to keep a



cell in stable. Cytoplasm is the site, where many vital biochemical reactions take place.

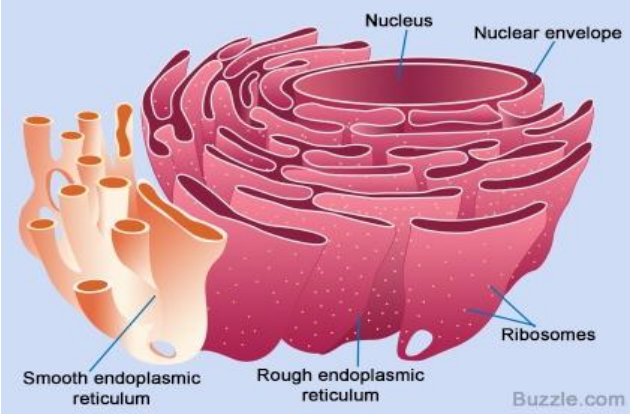
3- Nucleus*:* They are the membrane bound organelles, which are found in all eukaryotic cells. It contains the majority of the cell's genetic material. This material is organized as DNA molecules. It is the very important organelle of a cell as it controls the complete activity of a cell and also plays a vital role in reproduction.



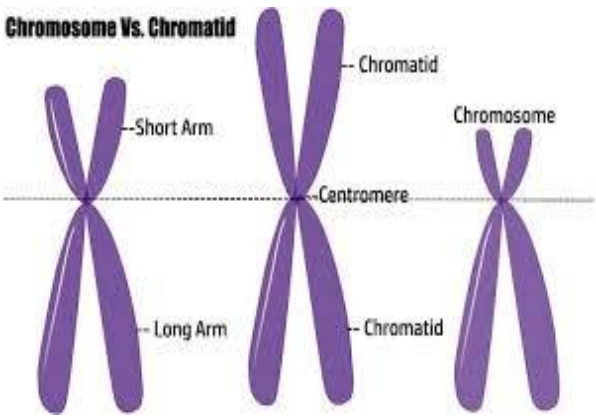
5-Nuclear membrane*:* The bilayer membrane, which protects the nucleus by surrounding around it and acts as a barrier between the cell nucleus and other organs of a cell.

6- Nucleolus*:* is the largest structure in the nucleus of eukaryotic cells. It plays a vital role in the production of cell's ribosome.

7- Chromosomes: It is made up of DNA and stored in the nucleus, which contains the instructions for traits and characteristics.



ER

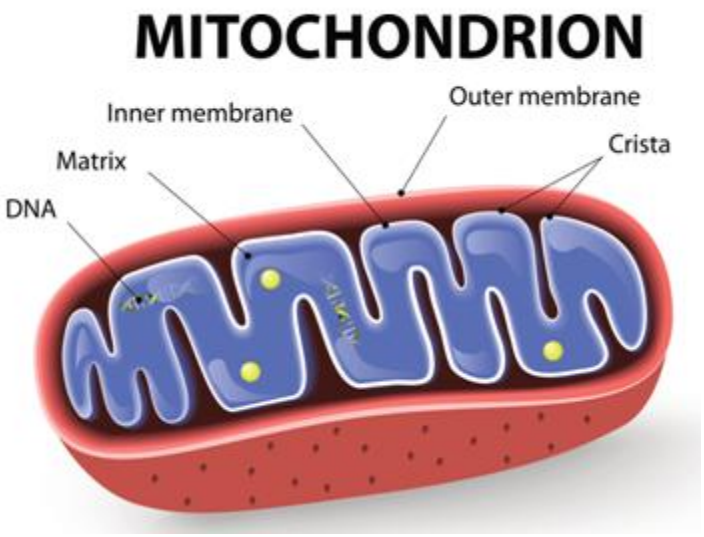


Chromosome

8-Endoplasmic reticulum (ER)*:* organelle in eukaryotic cells that forms an interconnected network of flattened, membrane-enclosed sacs or tube-like structures known as cisternae. It helps in the movement of materials around the cell. It contains an enzyme that helps in building molecules and in manufacturing of proteins. Smooth (ER) synthesize lipids, phospholipid, and steroids.

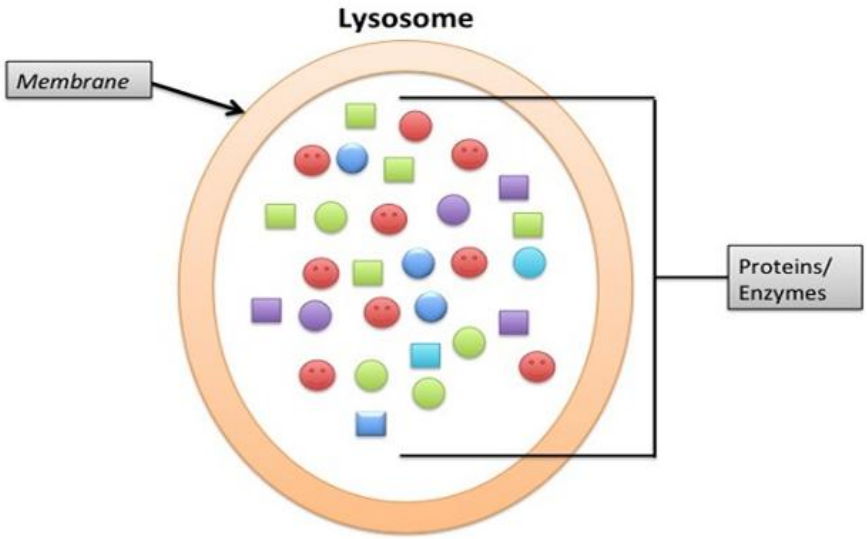
9- Ribosome*:* is a complex molecular machine, found within all living cells, that serves as the site of protein synthesis.

10-**Mitochondria:** They are double membrane, filamentous organelles, which play a vital role in generating and transforming the energy. Mitochondria play a vital role in various functions of the cell metabolisms including oxidative phosphorylation.

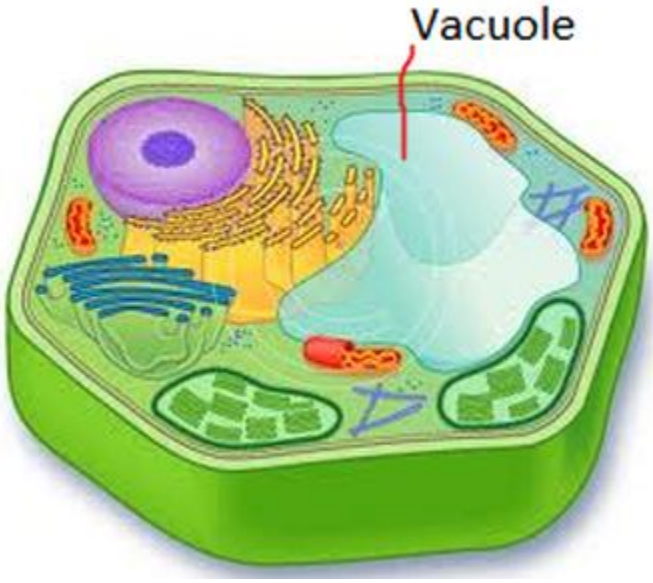


11-Golgi Bodies*:* a complex of vesicles and folded membranes within the cytoplasm of most eukaryotic cells, involved in secretion. It helps in the movement of materials within the cell.

12-Lysosomes (suicidal bags)*:* Are organelles that contain digestive enzymes. They digest excess or worn out organelles, food particles, and engulfed viruses or bacteria.



13-Vacuoles*:* are a membrane-bound organelle are closed sacs .The solution that fills the vacuole is called cell sap. It helps plants in maintaining its shape and it also stores water, food, wastes, etc.



14-Chloroplast: are organelles, specialized compartments, in plant and algal cells .They are the site of photosynthesis.