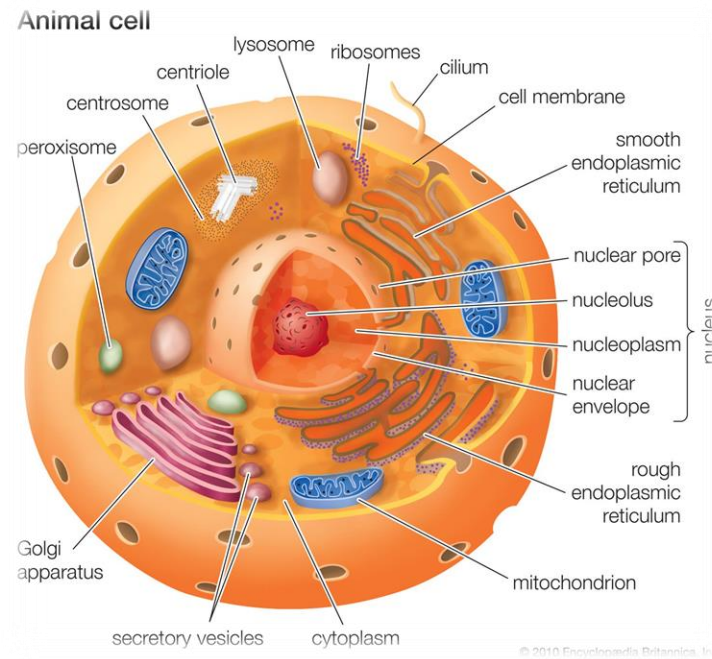


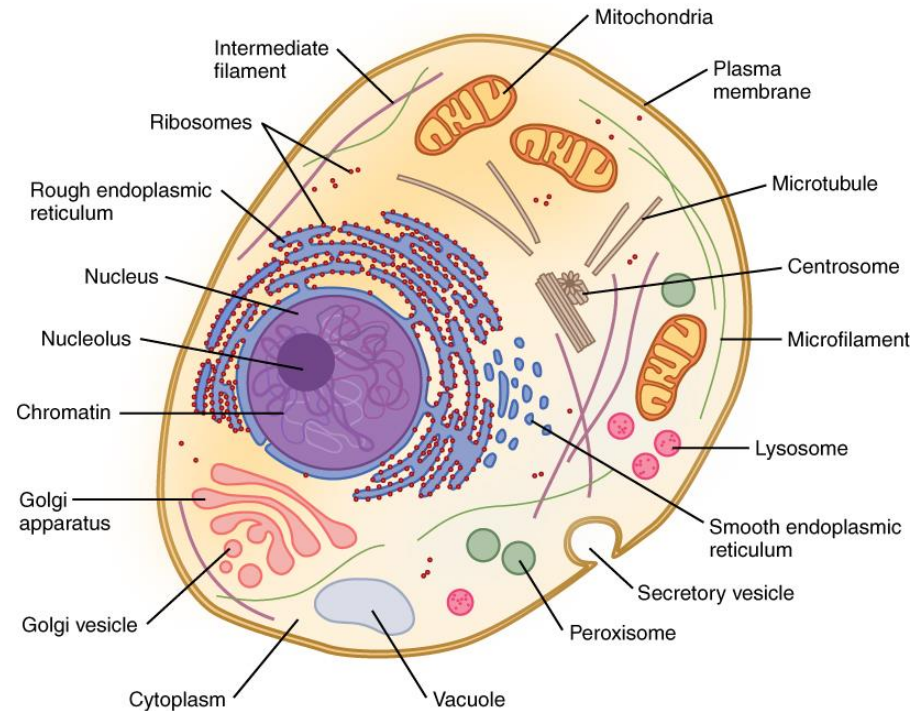
# FUNDAMENTAL UNIT OF LIFE

## CELL ORGANELLES



# CYTOPLASM

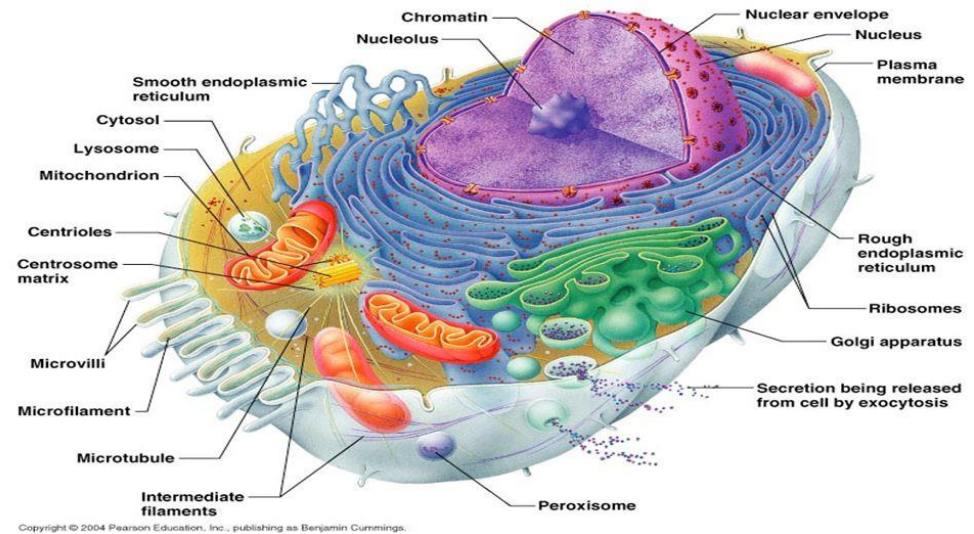
- large region of a cell enclosed by the cell membrane.
- The cytoplasm is the fluid content inside the plasma membrane.
- It also contains many specialised cell organelles.



# CELL ORGANELLES

- Structures found in the cytoplasm of a cell..
- May be membrane bound ( found in eukaryotic cell only) or not membrane bound( found both in prokaryotic cell/eukaryotic cell)
- Each cell organelle performs a specific function for the cell

## Cell Organelles



# CELL ORGANELLES

Single Membrane  
bound cell organelles

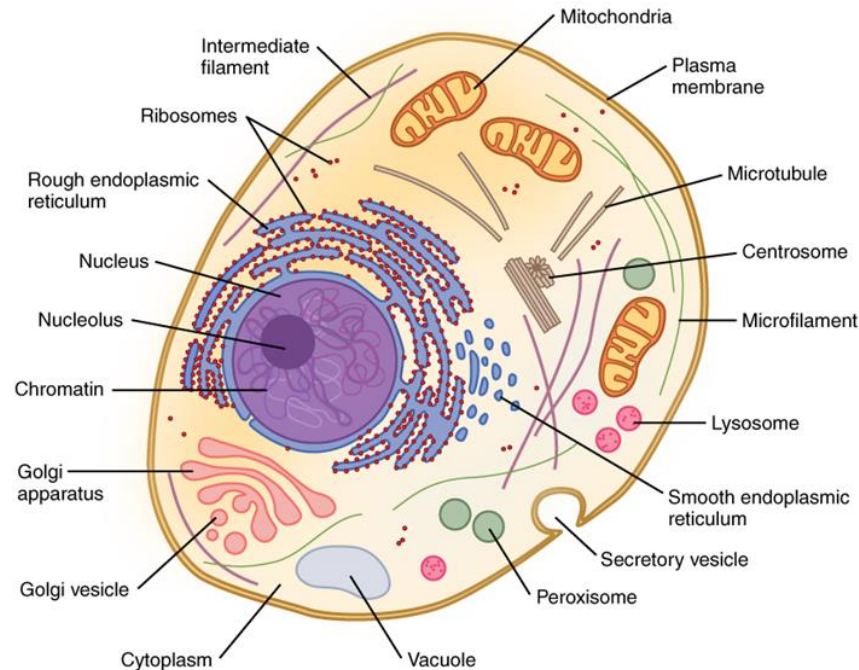
eg. ER, Lysosomes,  
Golgi apparatus, & Vacuoles  
Peroxisomes

Double Membrane  
bound cell organelles

eg. Mitochondria,  
Plastids  
These 2 also have their  
OWN DNA material

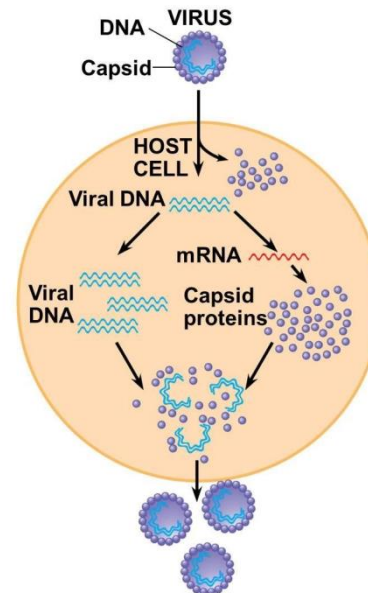
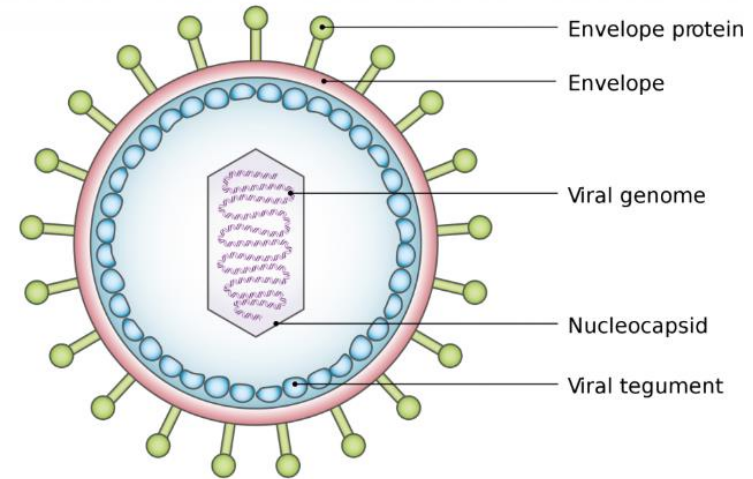
Non Membrane  
bound cell organelles

eg. Ribosome,  
Centrosomes,  
Microtubules



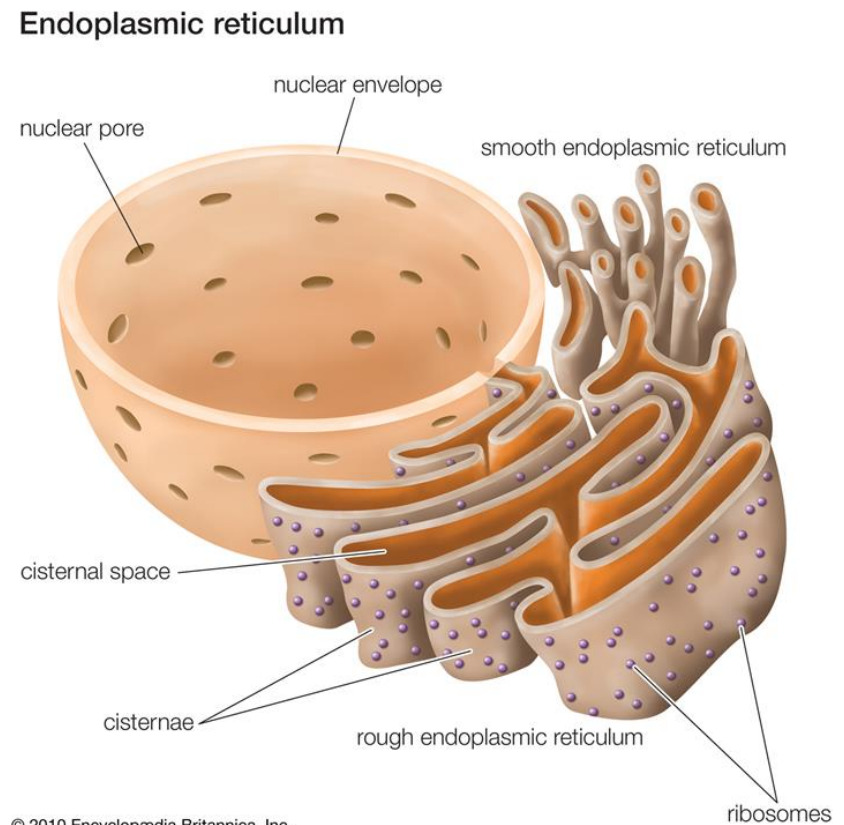
# ADVANTAGE OF MEMBRANE BOUND STRUCTURES in a cell

- Eukaryotic cells have nuclear membrane as well as membrane-enclosed organelles.
- significance of membranes
- Example – VIRUS
- Viruses lack any membranes and hence do not show characteristics of life until they enter a living body and use its cell machinery to multiply



# CELL ORGANELLES- ENDOPLASMIC RETICULUM

- It is a large network of membrane-bound tubes and sheets.
- Two types of ER— rough endoplasmic reticulum (RER) and smooth endoplasmic reticulum (SER)

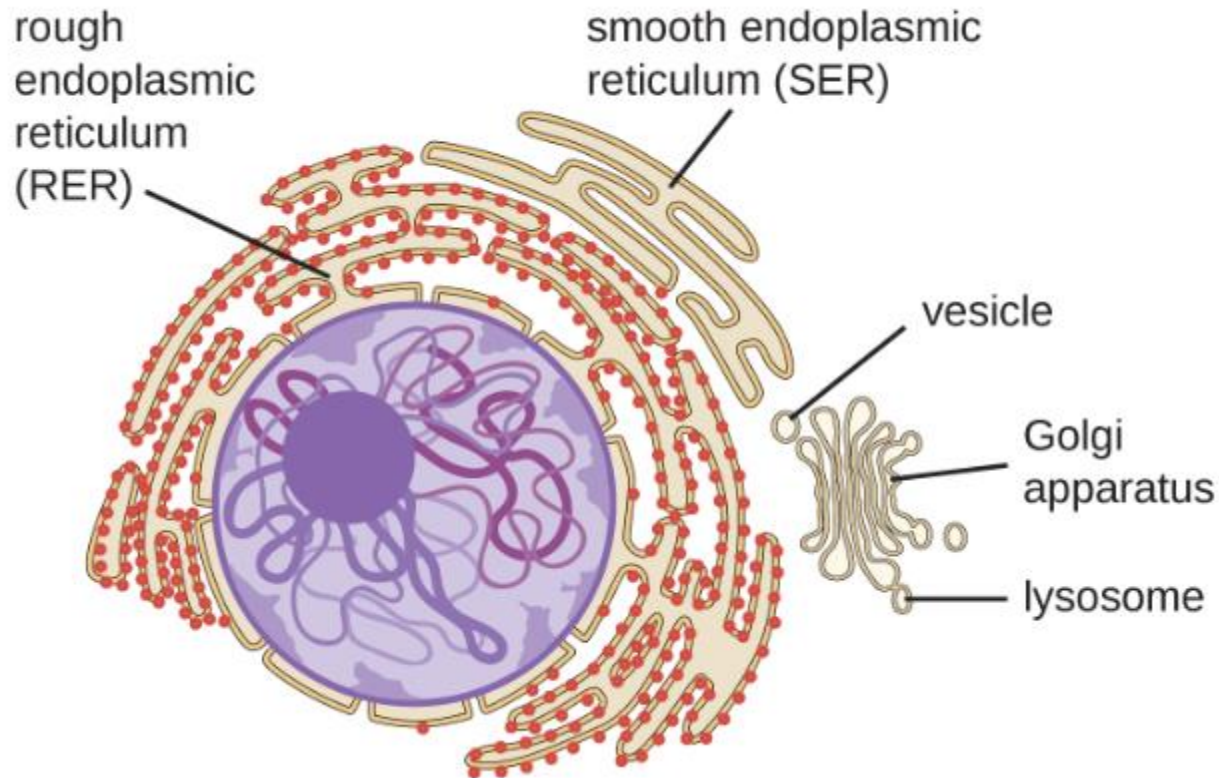


## Smooth ER

- Made of tubules mainly.
- Helps in steroid, lipids and Polysaccharide synthesis.
- Ribosomes are absent.
- Helps in membrane biogenesis.

## Rough ER

- Made of Cisternae and vesicles.
- Helps in protein synthesis.
- Contains ribosome on its surface.



# FUNCTIONS OF ENDOPLASMIC RETICULUM

- serve as channels for the transport of materials (especially proteins) between various regions of the cytoplasm or between the cytoplasm and the nucleus.
- proteins and lipids help in building the cell membrane( MEMBRANE BIOGENESIS)
- Also Proteins and lipids function as enzymes and hormones
- Forms cytoplasmic framework providing a surface for some of the biochemical activities of the cell.
- In the liver cells of vertebrates, SMOOTH ENDOPLASMIC RETICULUM plays a role in detoxifying many poisons and drugs.

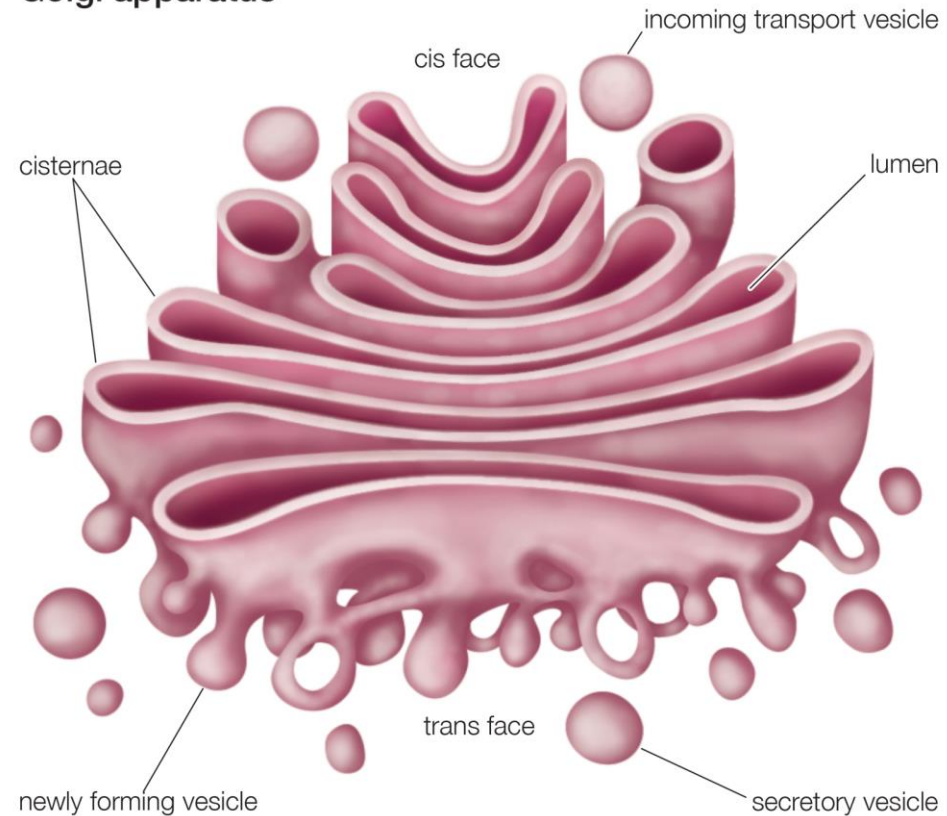


# GOLGI APPARATUS



**Camillo Golgi**

**Golgi apparatus**



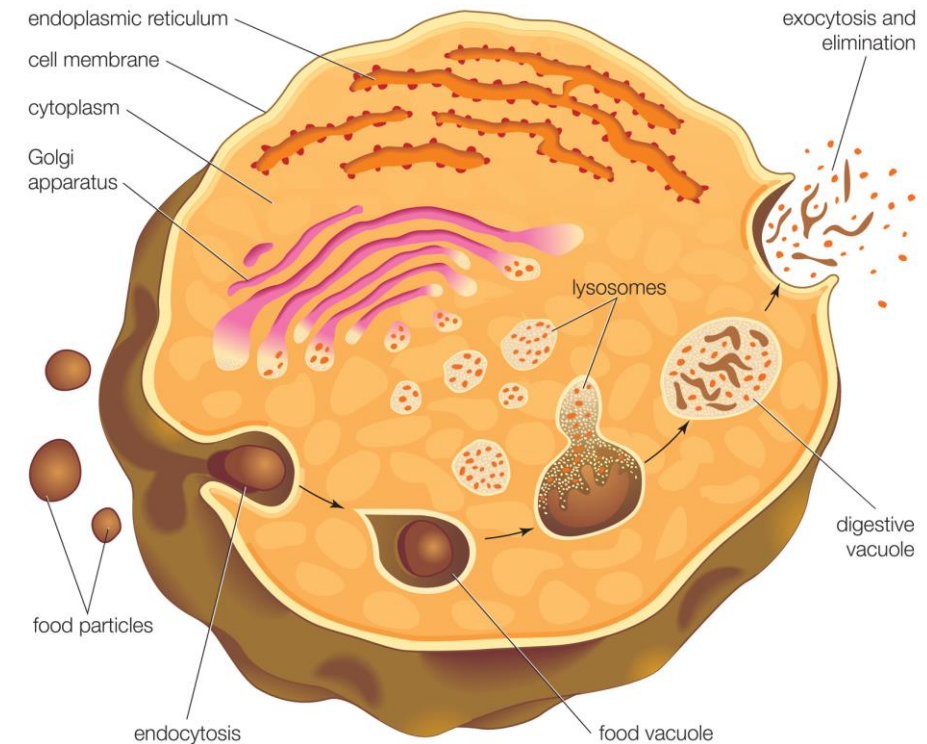
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# GOLGI APPARATUS

- a system of membrane-bound vesicles (flattened sacs) arranged approximately parallel to each other in stacks called cisterns.

## Functions

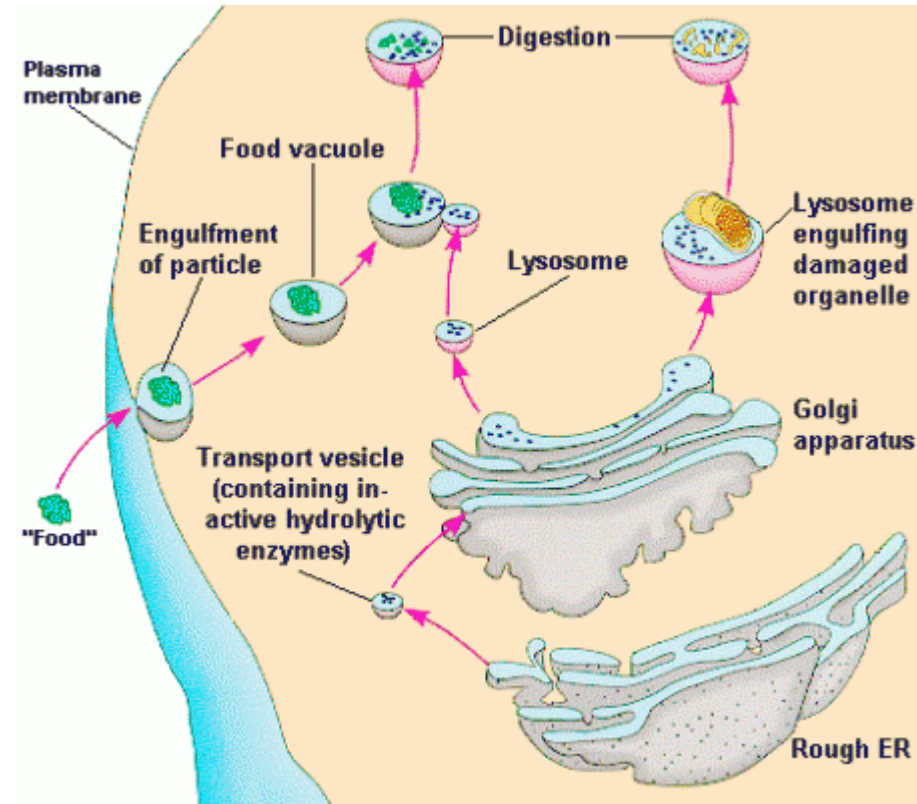
- Its functions include the storage, modification and packaging of products in vesicles. Formation of complex sugars from simple sugars.
- involved in the formation of lysosomes



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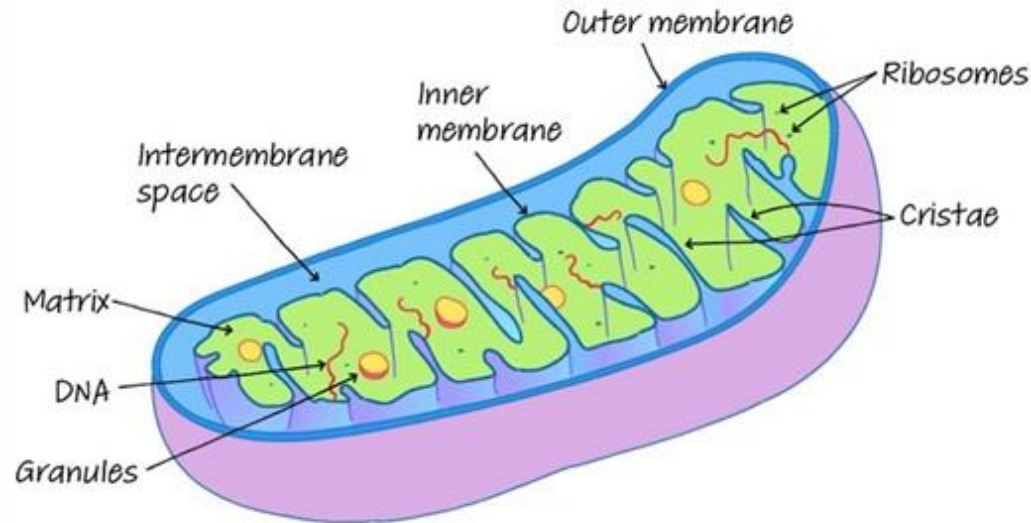
# LYSOSOMES

- Membrane-bound sacs filled with digestive enzymes (produced in RER).
- waste disposal system of the cell
- To keep the cell clean by digesting any foreign material as well as worn-out cell organelles.
- 'suicide bags' of a cell

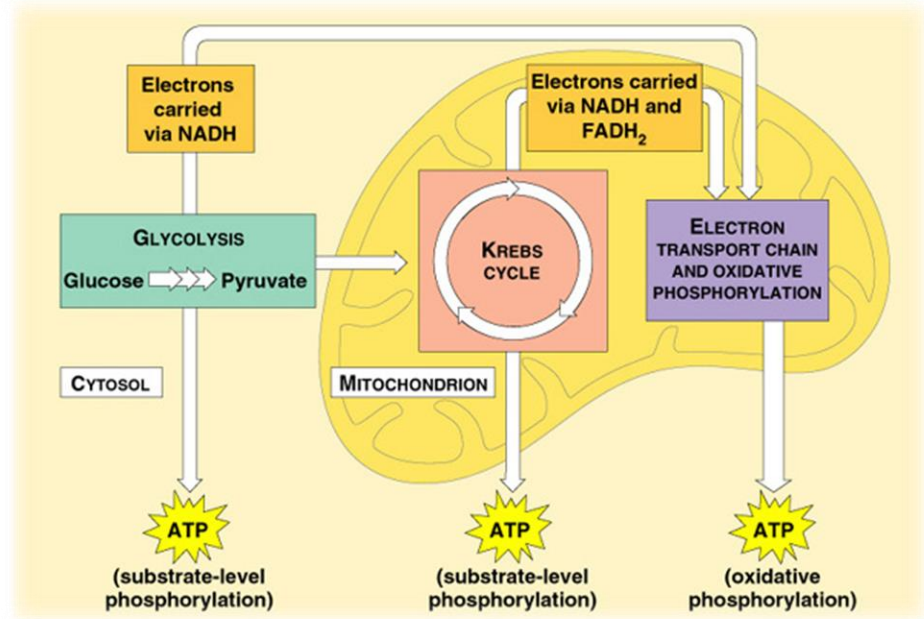


# MITOCHONDRIA

- Mitochondria have two membrane coverings.
- outer membrane is porous
- The inner membrane is deeply folded.
- These folds increase surface area for ATP generating chemical reactions.
- mitochondria are able to make some of their own proteins.
- They have their own DNA and ribosomes

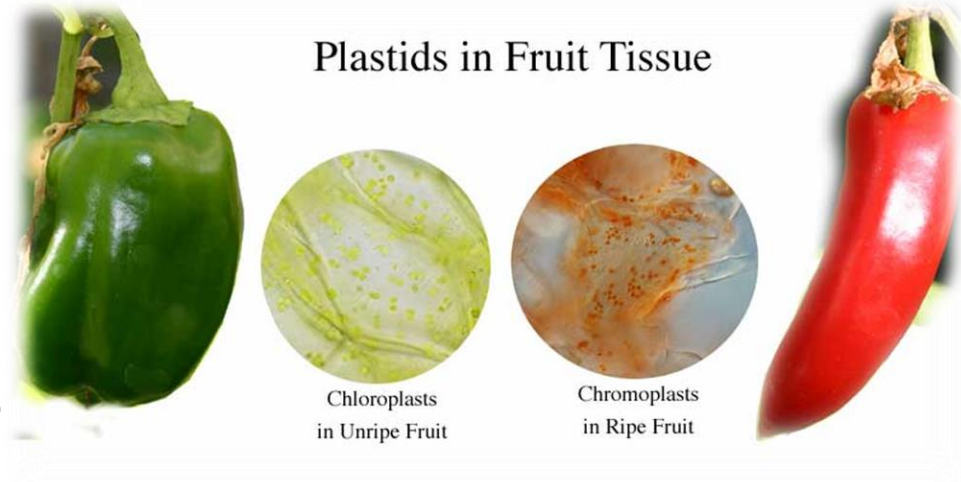


- The energy required for various chemical activities needed for life is released by mitochondria in the form of ATP (Adenosine triphosphate) molecules. It is also known as “POWER HOUSE OF THE CELL”.
- **ATP is known as the energy currency of the cell.**
- For making new chemical compounds.
- for mechanical work.



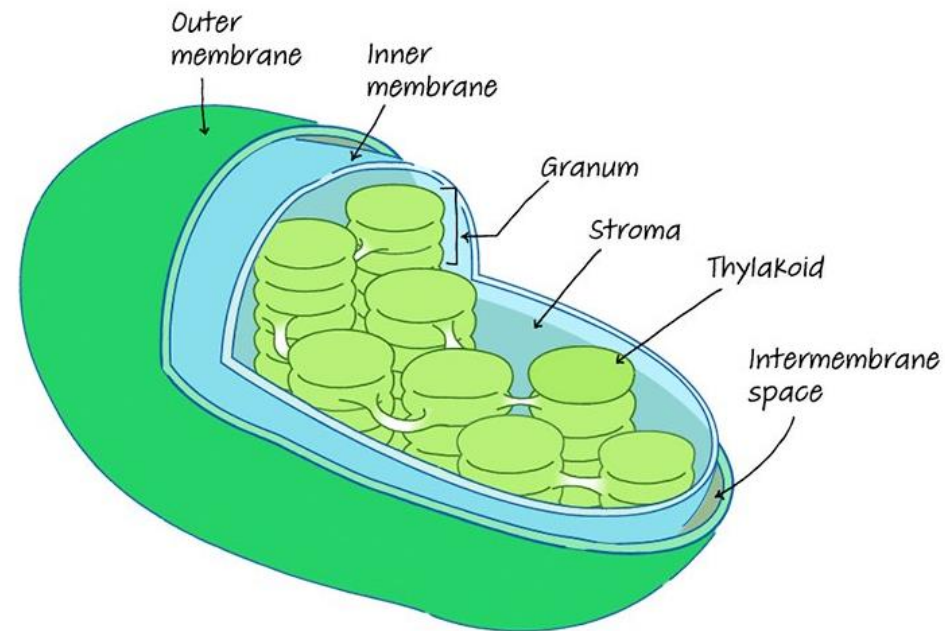
# PLASTIDS

- are present only in plant cells.
- Two types of plastids
- **Chromoplasts- coloured plastids**
- **Leucoplasts (white or colourless plastids)**



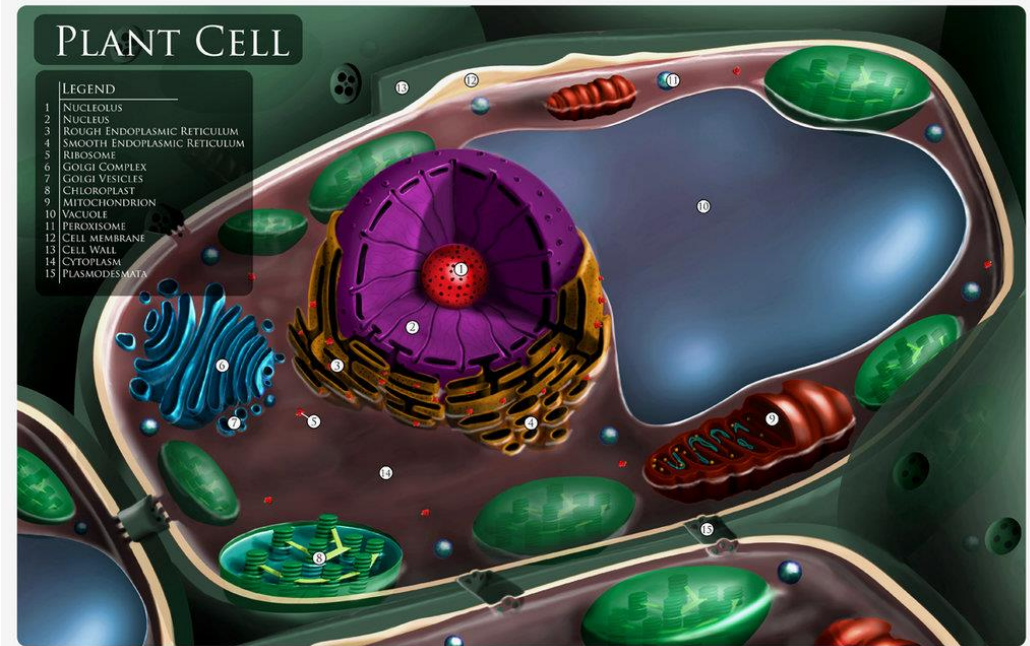
## Chloroplasts

- Chromoplasts containing the pigment chlorophyll.
- Chloroplasts also contain various yellow or orange pigments in addition to chlorophyll.
- Chloroplast consists of numerous membrane layers embedded in a material called the stroma.
- Plastids also have their own DNA and ribosomes.
- Chloroplasts are important for photosynthesis in plants



# VACUOLES

- Vacuoles are storage sacs for solid or liquid contents.
  - small sized in animal cells
  - large vacuoles seen in plants located centrally.
  - Vacuoles in plant cell contain cell sap( fluid)
- Function
- Store house of amino acids, sugars, various organic acids and some proteins.
- provide turgidity and rigidity to the cell

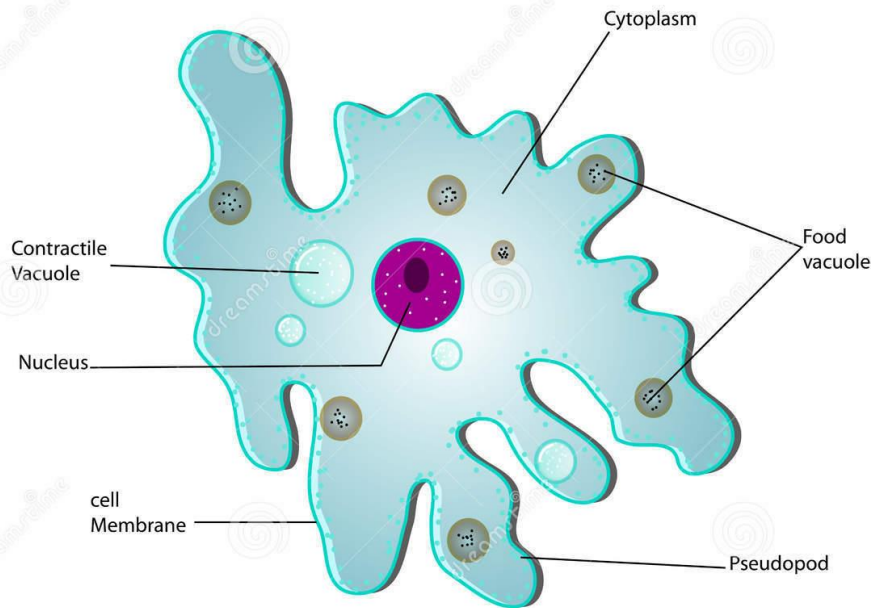




# TYPES OF VACUOLES

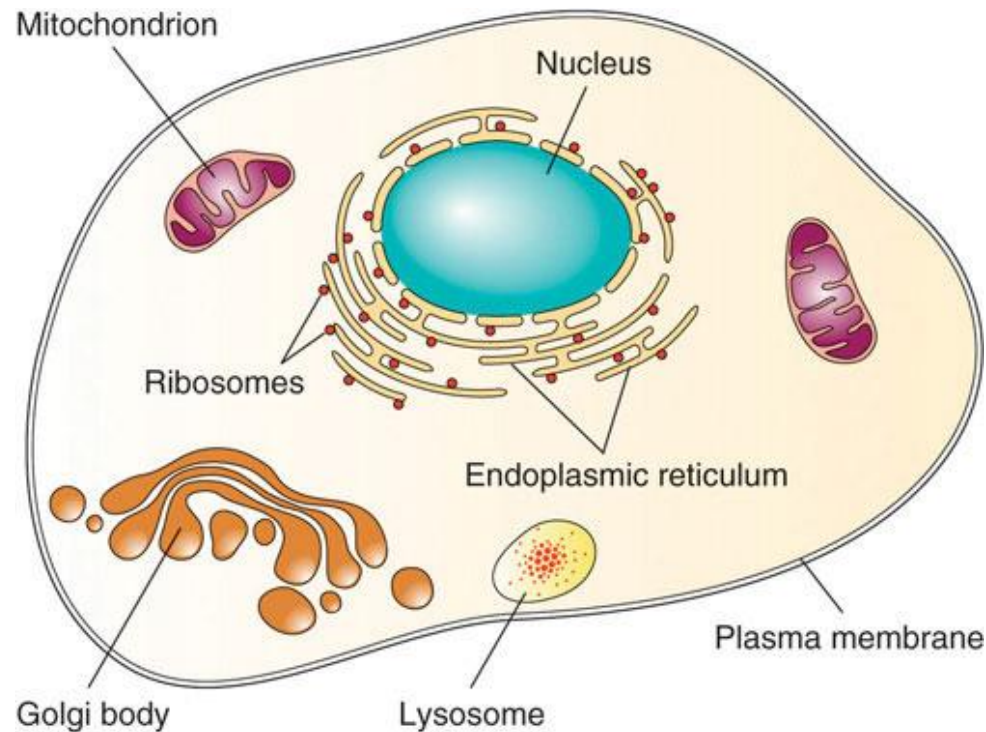
- **Food vacuole**
  - contains the food items
  - Amoeba

- **Contractile vacuole**
- specialised vacuoles play important roles in expelling excess water and some wastes from the cell.



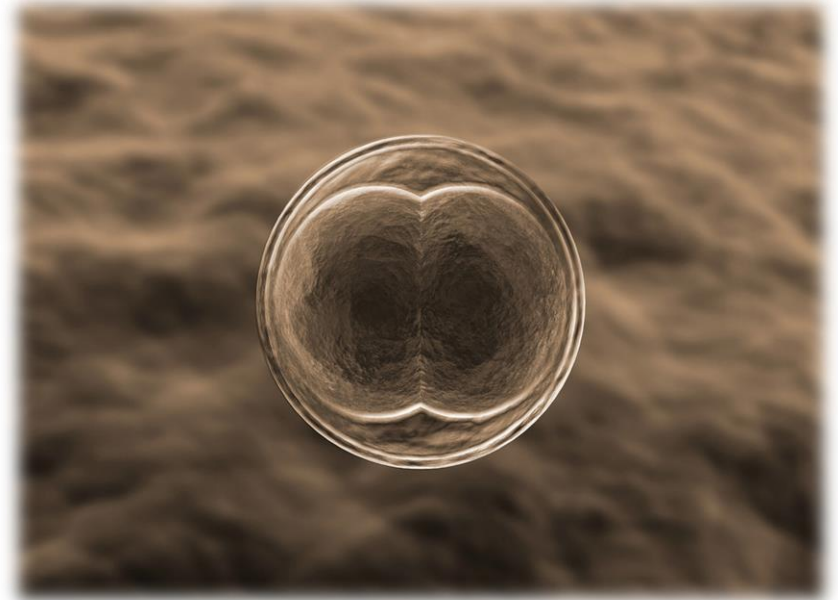
# Cell- structural and functional unit of living organisms

- Each cell acquires its structure and ability to function because of the organization of its membrane and organelles in specific ways. The cell thus has a basic structural organisation.
- This helps the cells to perform functions



# Cell Division

- The process by which new cells are made is called cell division.
- Why the cell has to divide?
  - New cells are formed in organisms in order to grow, to replace old, dead and injured cells
  - to form gametes required for reproduction



# Types of cell division

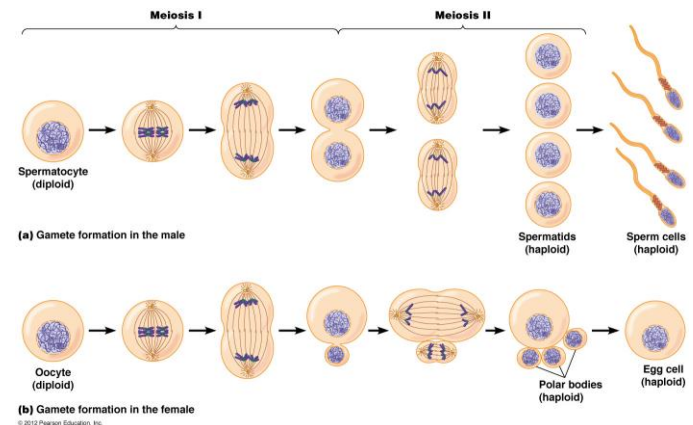
## MITOSIS

- The process of cell division by which most of the cells divide for growth is called mitosis.



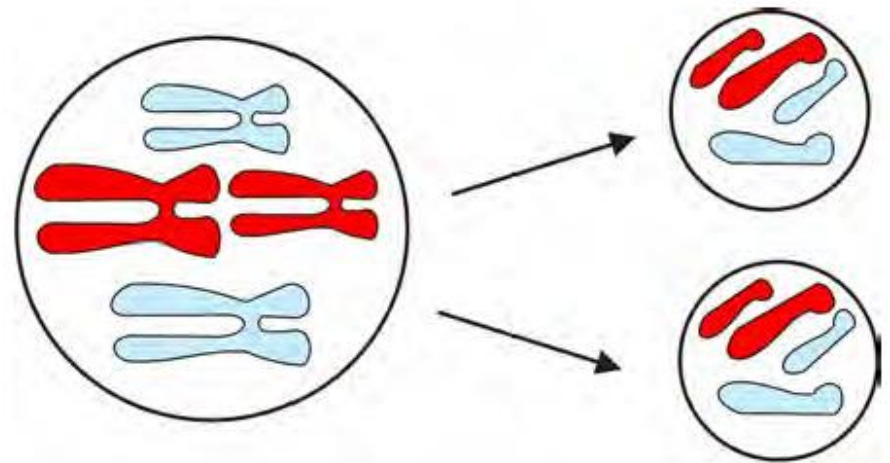
## MEIOSIS

- Specific cells of reproductive organs in plants and animals will undergo a cell division to produce gamete cells. This cell division is called meiosis.



# MITOSIS

- Each cell that undergoes cell division is called mother cell.
- The mother cell divides to form TWO daughter cells.
- Each daughter cell will have **SIMILAR** number of chromosomes as mother cell has.
- Involved in growth and repair of tissues.



# MEIOSIS

- It occurs in reproductive organs or tissues.
- Each cell during meiosis will divide two times (twice) and produces 4 Daughter cells.
- Each daughter cell will have half the number of chromosomes than that of its mother cell and are called gametes
- They fertilize ( fusion of gametes) to produce offspring ( new one)

