

GRAVITY CLASSES

"Come Gravity Feel Success"


11th & 12th BOARD
(NEET & JEE)

5th - 10th (All Subject)

NOTES
BIOLOGY

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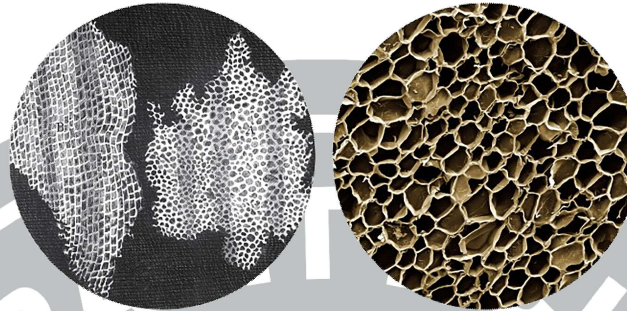
Blue star campus,
patther ki masjid, patna - 6



CELL

- **Cell:-** It is a basic, structural and functional unit of life. Ex.- A little room, Building (Bricks), Human Being (Made of Billions of Cells)
- * **Robert Hook** in 1665 first discovered.
- Cork (Honey Comb) cell of bark of plant looked first.

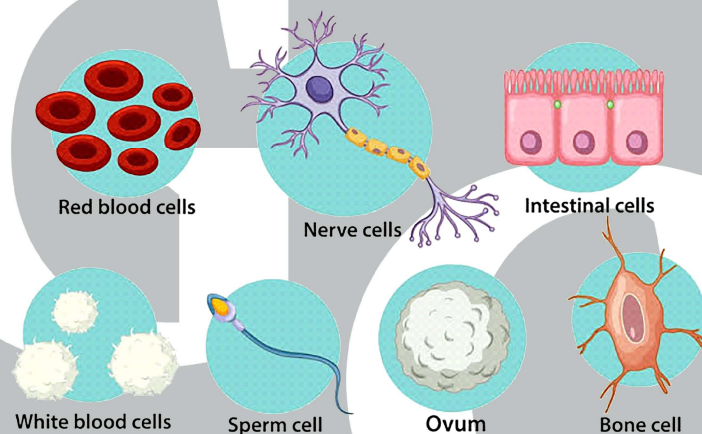
Cork Tissue



* Cell Theory:-

- All living things are composed of cells.
- Cells are the basic units of structure and function in living things.
- New cells are produced from pre-existing cells.

* Various cells from Human Body:-

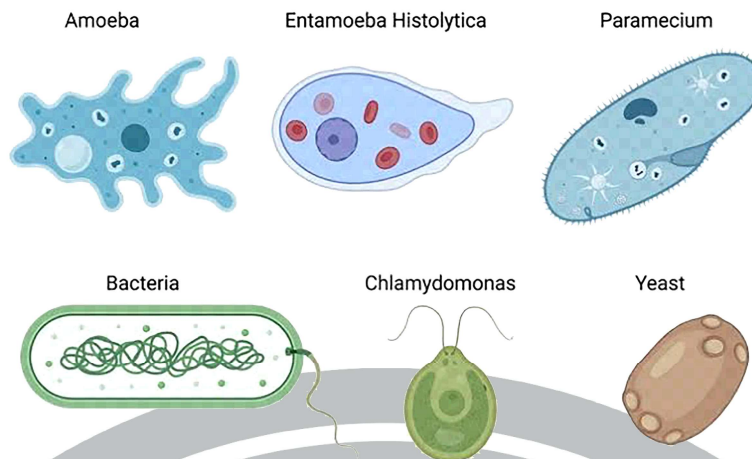


- Smooth Muscle Cells
- Blood Cells
- Nerve Cells [Longest also, Neuron up to 1m]
- Ovum [Largest cell, 20 times sperm cell, 0.1mm size]
- Sperm
- Bone Cells
- Fat Cells

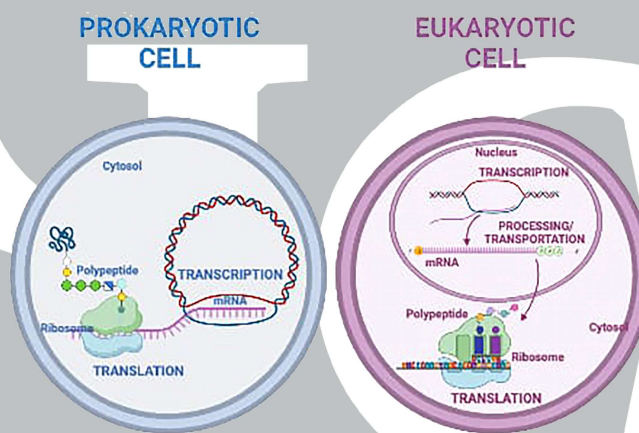
Q. Largest cell in living world?

- Ostrich egg (approx 1.5 kg.)

Types of Organisms (On the basis of number of Cells)	
Unicellular	Multicellular
1. Made of one cell	1. Made of more than one cell
2. Single cell performs all life functions (eat, reproduce, wastes move)	2. Specialized cells perform different life functions (i.e, Nerve cells)
3. Example:- Amoeba, Bacteria	3. Example:- Human cell → Tissue → Organ



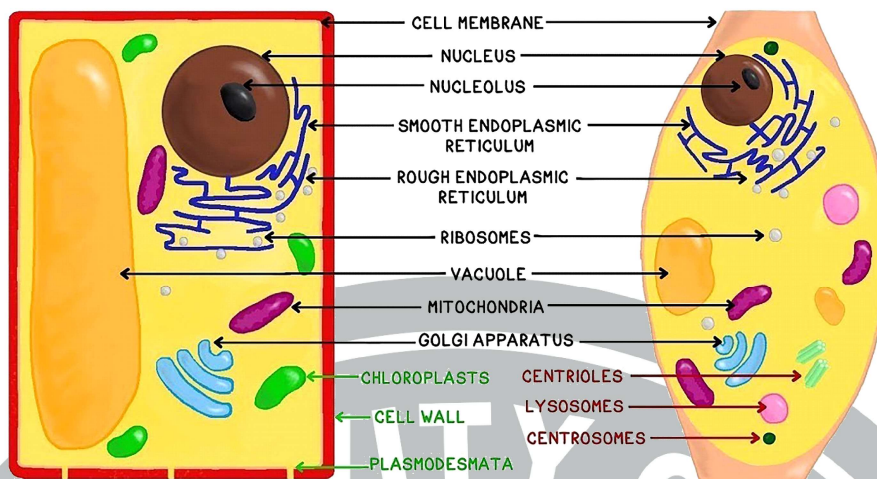
Prokaryotic Cell	Eukaryotic Cell
Pro → Primitive (old type) Karyo → Nucleus	Eu → Developed Karyo → Nucleus
Old form Nucleus is not formed	
1. Size : Generally small (1 – 10 μm) $1 \mu\text{m} = 10^{-6} \text{ m}$, $1\text{nm} = 10^{-9} \text{ m}$	1. Size : Generally Large (5-100 μm)
2. Nuclear region: Nucleus is not well defined and known as Nucleoid	2. Nuclear region: well defined and surrounded by a nuclear membrane.
3. Chromosome: Single Chromo → Colors Some → Thread	3. More than one Chromosome (it holds all info. about organism/cell)
4. Membrane – bound cell organelles absent	4. Present such as Mitochondria, plastids, Endoplasmic, reticulum, Golgi App. Etc.



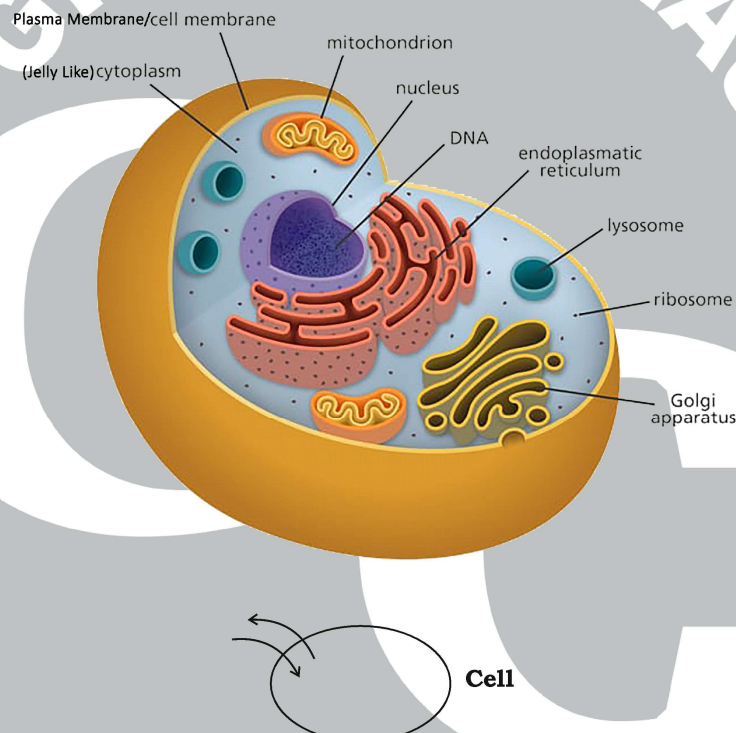
PROKARYOTES	BOTH	EUKARYOTES
Oldest cell type	Have DNA	Evolved from prokaryotes
Small and Simple	Have ribosomes	Larger and More complex
Lack nucleus	Have cytoplasm	Contain nucleus
Lack organelles	Have plasma membrane	Contain organelles
Single celled		Single (Bacteria) celled or Multicellular (Human)

EUKARYOTES	
Plant Cell	Animal Cell
1. Cell wall present. Ex.- Plant skin is hard	1. Cell wall absent. Ex.- Human skin is soft
2. Plastids (perform Photosynthesis make food) present	2. Plastids absent
3. They have large central vacuole	3. They have comparatively smaller vacuole
4. Nucleus present in peripheral (in side)	4. Nucleus present at the center

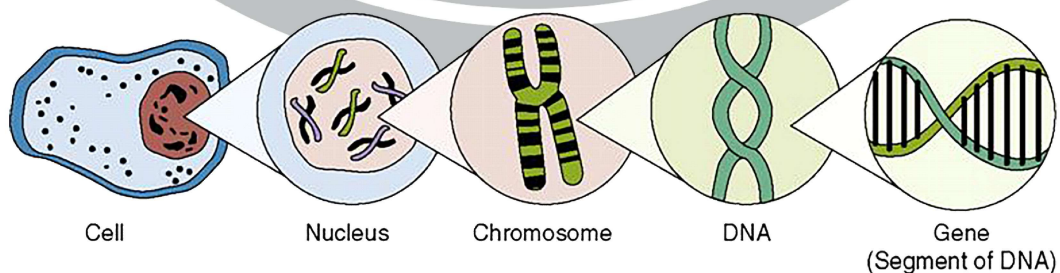
PLANT VS. ANIMAL CELLS

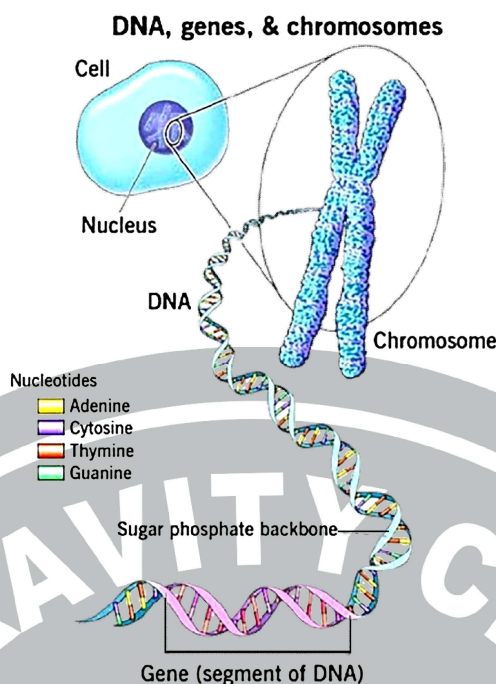


➤ Cell Structure and Organisation:-



- * All activities inside the cell, interaction with Enviroment are possible.
- * **Nucleus:-** All information are present in nucleus of cell/organism. It is also called brain of the cell. (it's discovered by ROBERT BROWN in 1831)





- **Structure:-** Double membrane (nuclear envelope)
- **Function :-**
- Control center of the cell.
- Stores hereditary info. (DNA).
- Makes RNA (Ribo nucleic Acid) [Transferring genetic info. from DNA to ribosomes for protein synthesis]
- Makes ribosomes (nucleous).
- The nucleus contains chromosomes, which are visible as rod-shaped structures only when the cell is about to divide chromosomes contain info for inheritance of features from parents to next generation in the form of DNA (Deoxyribo Nucleic Acid).

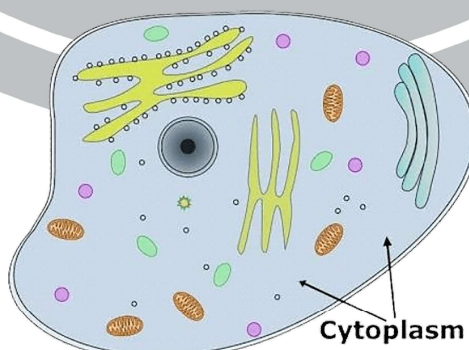
* **Cell Wall:-**

- **Function :-** Provides support and protection for the cell.
- **Structure :-** Lies outside the cell membrane.
- Found in plant, algae, fungi and many bacteria.
- Not found in Animal cells.

➤ **Plasma Membrane/Cell Membrane**

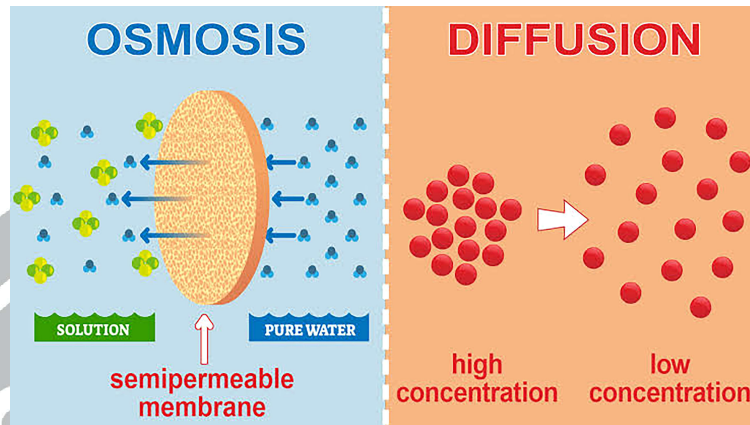
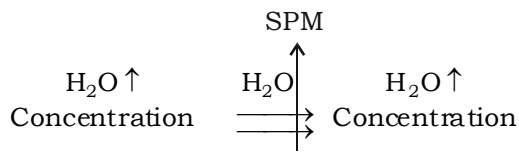
- **Function:-** Physical barrier for the cell, separates internal and external environment, selective permeability.
- **Location:-** Surrounding the cell, outer surface.

* **Cytoplasm:-**



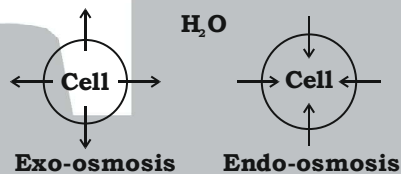
- **Structure:-** Fluid between cell membrane organelles.
- Contains water, salts, organic compound.

- **Function:-** Aids in movements.
- **Semi Permeable Membrane (SPM)**
- Selectively allow to move inside or outside. ex.- Plasma membrane.

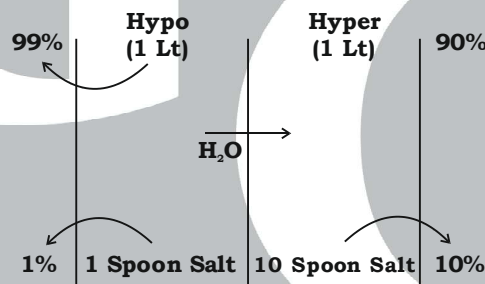


Osmosis and Diffusion → Substances (O_2 , CO_2) Nutrient.

- The process of movement of water inside or outside cell through the membrane (CM) (SPM).



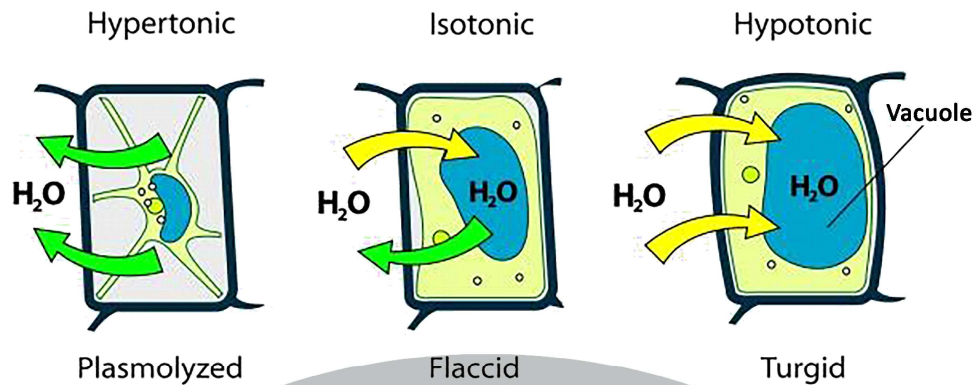
Hypotonic (Less, Dense), Hypertonic (More) and Isotonic Solution (Same).



- So, water moves from Hypo to Hypertonic.
- Salt moves from Hyper to hypo.
- * Isotonic Solution

1+1 Lt	1+1 Lt

- So, No movement will be here.
 - **Plasmolysis:-** It is the shrinking of the cytoplasm of a plant cell in response to diffusion of water out of the cell and into a high salt concentration solution.
- During plasmolysis the cell membrane pulls away from the cell wall.

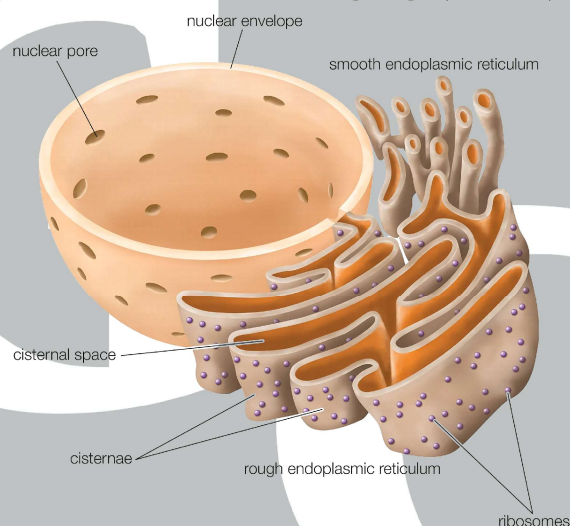


* **Some important Cell Organelles:-**

- Endoplasmic Reticulum.
- Golgi Apparatus.
- Lysosomes.
- Mitochondria.
- Plastids.
- Vacuoles.

➤ **Endoplasmic Reticulum (Manufacturing Unit):-** Scientist (Keith Porter in 1953)

* **Structure:-** The endoplasmic reticulum (ER) is a large network of membrane bound tubes and sheets. It looks like long tubules or round or oblong bags (vesicles).



* **Function :-** The ribosomes which are present in all active cells are the sites of Protein Manufacture.

- The smooth ER helps in the manufacturing of FAT molecules or lipids.

→ **Uses :-**

- Some of these proteins and lipids help in building the cell membrane. This process is known as MEMBRANE BIOGENESIS ex.- Digestion.
- Some other proteins and lipids function as enzymes and hormones.

Note:- The smooth ER of liver cells of vertebrates they are specialised to detoxified any external chemical.

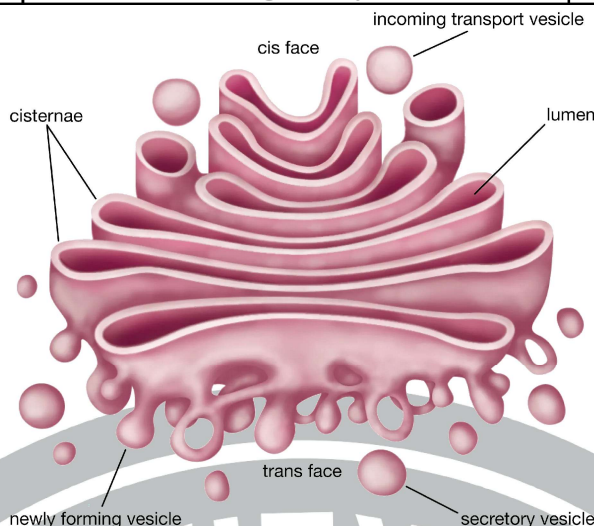
- Liver get damaged of Drunkers.

* **Vertebrates:-** Are those animals who has vertebral cumb.

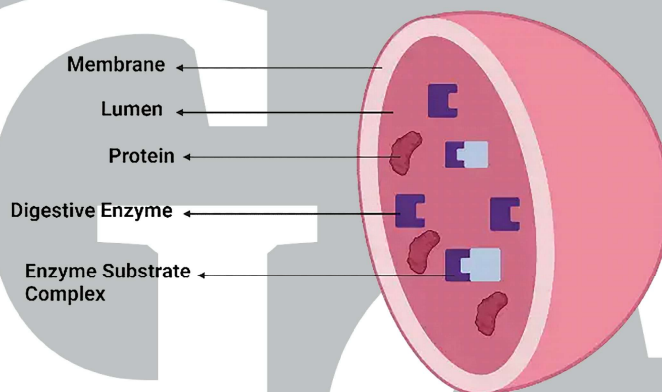
➤ **Golgi Apparatus (Packer and Mover) (GA):-**

- First described by a scientist "Camillo Golgi" in 1898.

* **Structure:-** It consists of a system of membrane bound vesicles arranged approximately parallel to each other in stacks (group) called cisterns. These membranes often have connections with the membrane of ER.



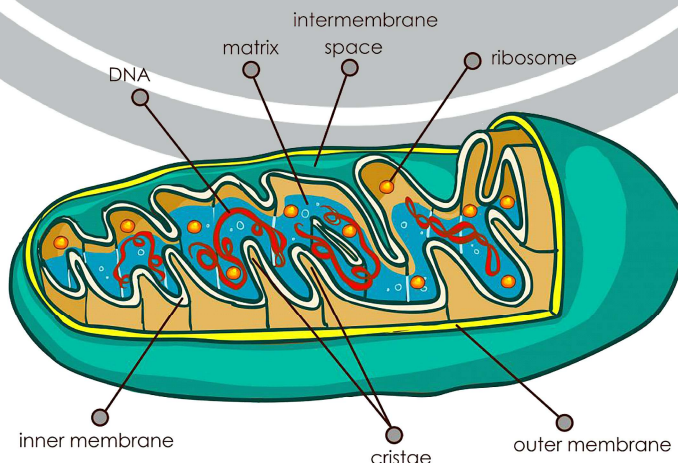
- * **Function:-** These material synthesised near the ER is packaged and dispatched to various targets inside and outside the cell through the Golgi apparatus.
 - Its functions include the storage, modification and packaging of products in vesicles.
 - In some cases complex sugars may be made from simple sugars in the G.A.
 - The G.A is also involved in the formation of LYSOSOMES.
- **Lysosomes (Suicidal Bags/ Garbage Bag):-** (Christian de Duve, 1955)
- * **Structure:-** Structurally, lysosomes are membrane bound sacs filled with digestive enzymes. These enzymes are made of Rough Endoplasmic Reticulum (RER).



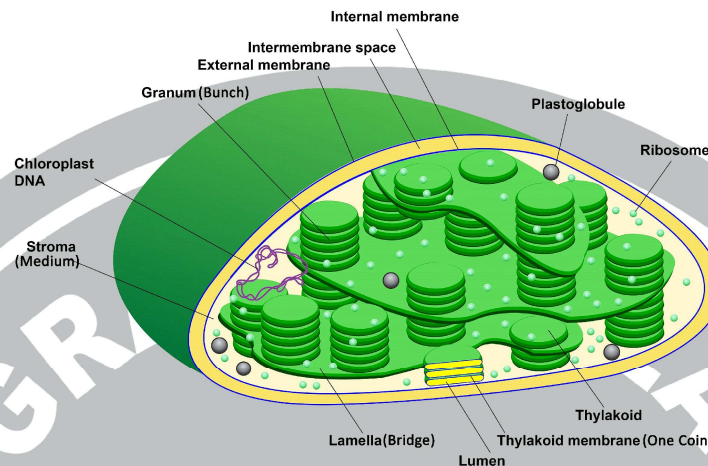
- * **Function:-** Lysosomes are a kind of waste disposal system of the cell. Lysosomes help to keep the cell clean by digesting any foreign material as well as worm-out cell organelles.

Lysosomes break them up as they contain powerful digestive enzymes.

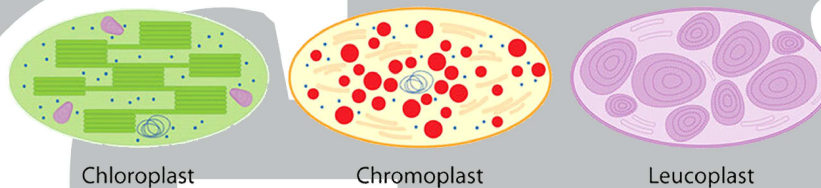
 - When the cell gets damaged, lysosomes may burst and the enzymes digest their own cell. Therefore, lysosomes are also known as the 'suicide bags' of a cell.
- **Mitochondria (Power House of cell):-** [Albert Von Kolliker, 1857]
- * **Structure:-** Mitochondria have two membrane coverings instead of just one. The outer member is very porous while the inner membrane is deeply folded.



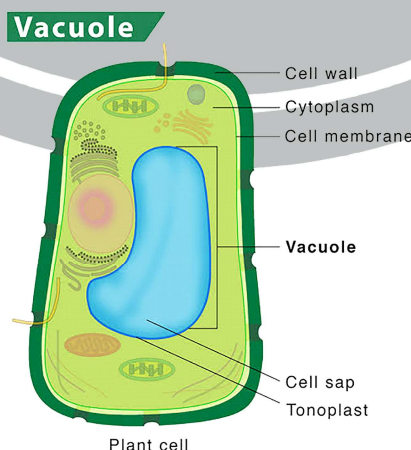
- Mitochondria are known as the 'Power House' of the cell.
- * **Functions:-** The energy required for various chemical activities needed for life is released by mitochondria in the form of ATP (Adenosine Triphosphate) molecules. ATP is also known as the energy currency of the cell.
- Mitochondria are strange organelles in the sense that they have their own self producing semi-autonomous DNA and Ribosomes. Therefore mitochondria are able to make some of their own protein.
- **Plastids:-**
- Sun energy stored in this and convert into ATP in some quantity. [Photo-phosphorylation (Bunch)].



Note:- They are present only in Plant.

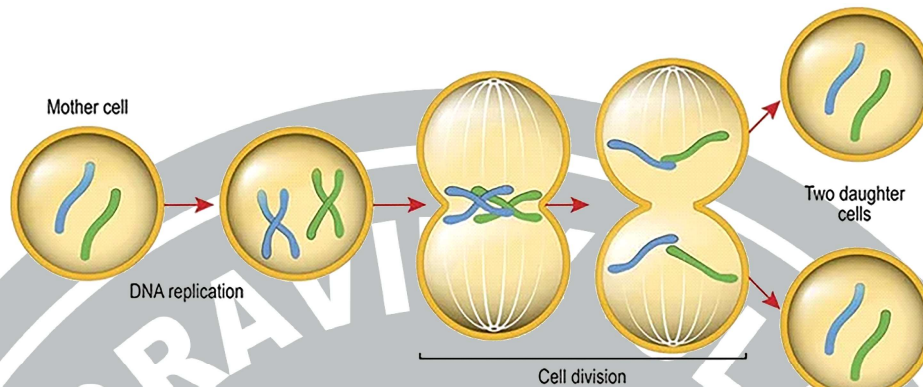


- * **Chloroplast:-** Those plastids which have chlorophyll pigment they are called chloroplast.
- Chloroplasts are important for Photosynthesis in Plant.
- Leucoplasts are primarily organelles in which materials such as starch, oils, fats and protein granules are stored.
- Chloroplast:- Colourful
- Chromoplast:- Green/Chlorophyll Pigment
- Leucoplast:- White/Colourless, White (Roots, Stomp etc).
- Carb. → Amyloplast, Protein → Protoplast, Lipid → Elaioplast
- * **Structure:-** The internal organisation of the plastids consists of numerous membrane layers embedded in a material called the STROMA.
- Like the mitochondria, plastids also have their own DNA and Ribosomes.
- Uniques of Mitochondri and Plastids are they have DNA and Ribosomes.
- **Vacuoles (Storeroom):-**

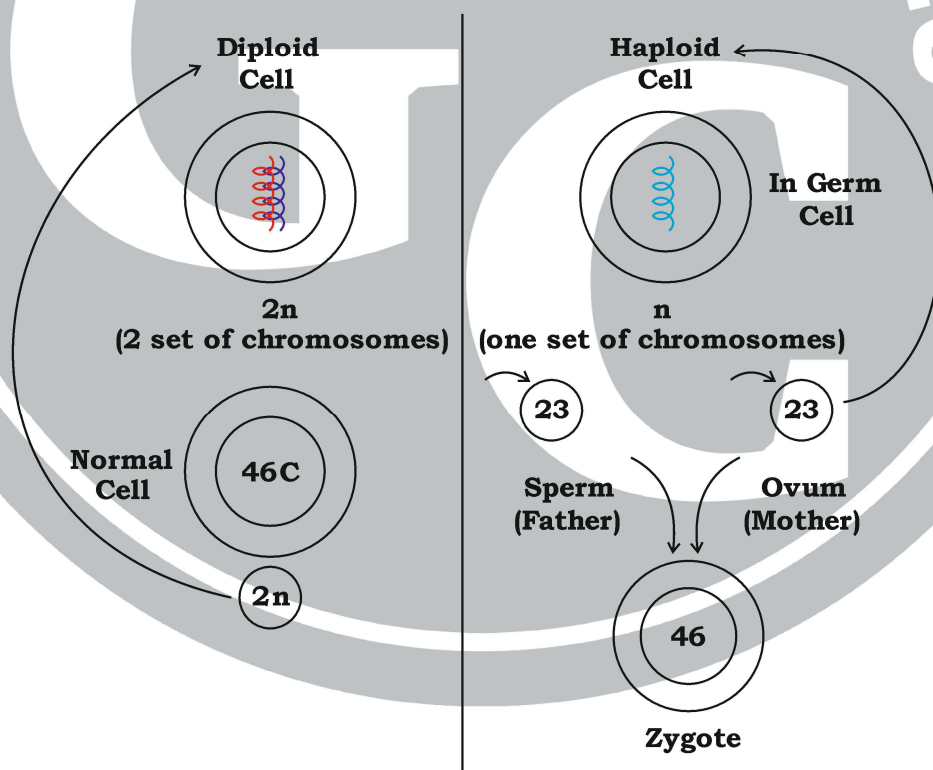


Cell

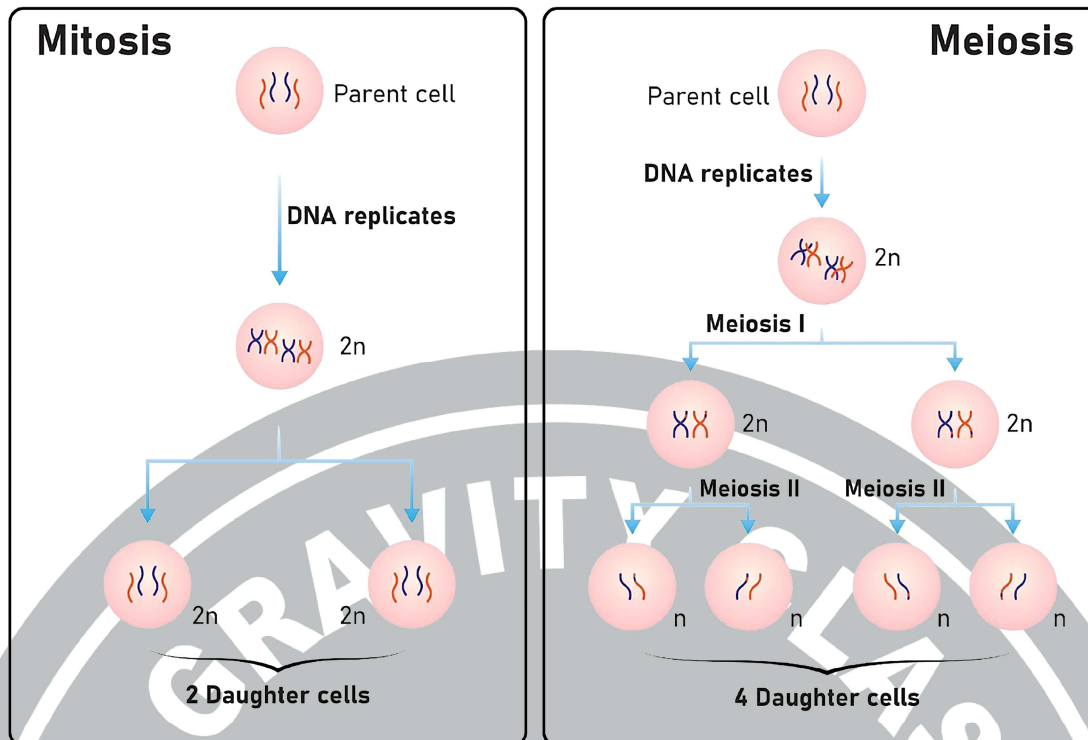
- * **Structures:-** Vacuoles are storage sacs for solid or liquid contents. Vacuoles are small sized in animal cells while plant cells have very large vacuoles.
- * **Function:-** In a plant cells vacuoles are full of sap and provides turgidity and rigidity to the cell.
 - It stores important substances like amino acids, sugar, various organic acids and some proteins.
 - Some unicellular organisms have food vacuoles, while some others have specialised vacuoles to expell water and waste.
- **Cell Division:-** In the cell division first nucleus is divided then the new cell is formed.



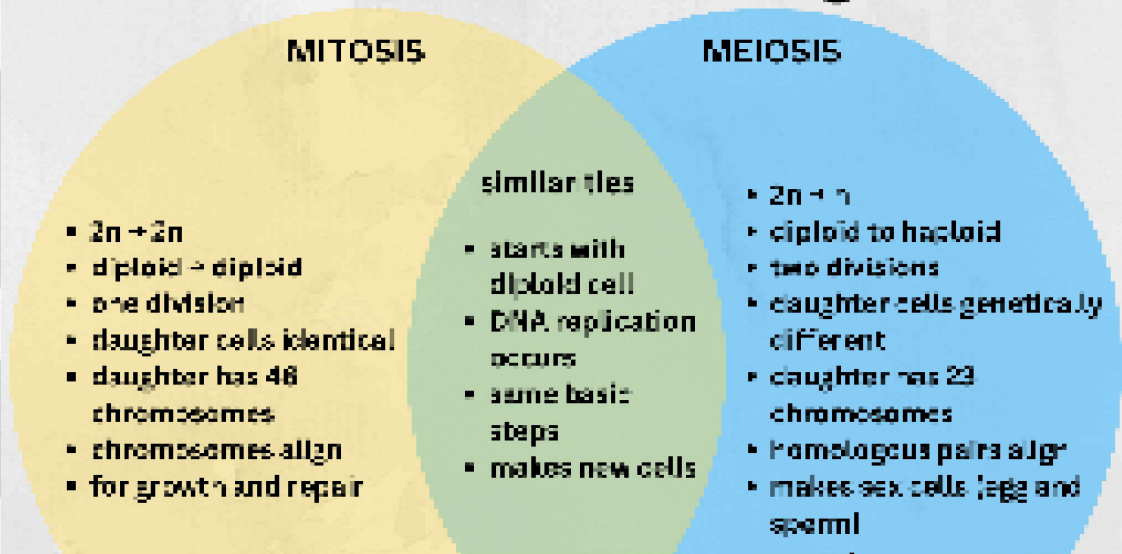
- i. Reason of division in growth of organism.
- ii. Replace dead and injured cells.
- iii. For gamate formation.

➤ **Two Main Cell Type:-**

➤ Two Main types of Cell Division:-



Mitosis vs Meiosis Venn Diagram



GRAVITY CLASSES

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LITERA VALLEY SCHOOL

94%

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