

SAFALTA CLASS<sup>TM</sup>

An Initiative by **अमरउजाला**

## Cell:

जीवात्मक      संरचनात्मक      क्रियात्मक

- A cell is the smallest (biological, structural and functional) unit of life.
- Cell (dead cell) was discovered by Robert Hook in 1665 but first living cell was discovered by Antony Van Leuwenhoek.

## Cell Theory:

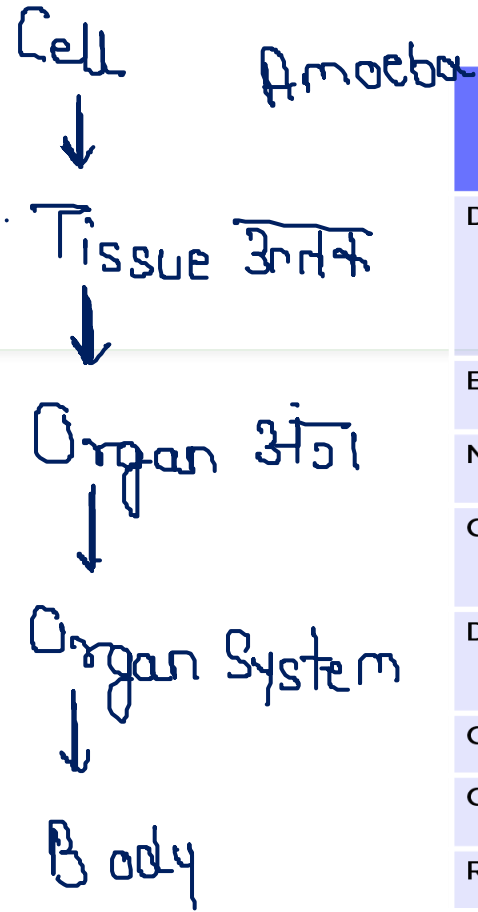
- It was given by theodor Schwann and Matthias Jakob Schleiden

The three principles of the cell theory are as described below:

- All living organisms are composed of one or more cells.
- The cell is the basic unit of structure and organization in organisms.
- Cells arise from pre-existing cells.

Eukaryotic vs. Prokaryotic Cells

Characteristics	Eukaryotic Cells	Prokaryotic Cells
Definition	Any cell that contains a clearly defined nucleus and membrane bound organelles	Any unicellular organism that does not contain a membrane bound nucleus or organelles
Examples	Animal, plant, fungi, and protist cells <i>Protozoa, Algae</i>	Bacteria and Archaea
Nucleus	Present (membrane bound)	Absent (nucleoid region)
Cell Size	Large (10-100 micrometers)	Small (less than a micrometer to 5 micrometers)
DNA Replication	Highly regulated with selective origins and sequences	Replicates entire genome at once
Organism Type	Usually multicellular	Unicellular
Chromosomes	More than one	One long single loop of DNA and plasmids
Ribosomes	Large	Small
Growth Rate/Generation Time	Slower	Faster
Organelles	Present	Absent
Ability to Store Hereditary Information	All eukaryotes have this ability	All prokaryotes have this ability
Cell Wall	Simple: Present in plants and fungi	Complex: Present in all prokaryotes
Plasma Membrane	Present	Present
Cytoplasm	Present	Present

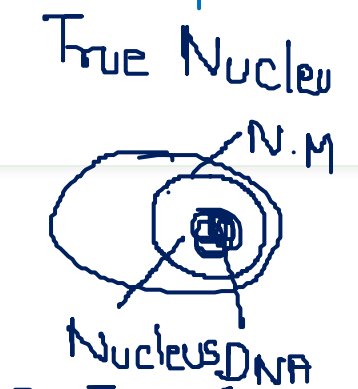


Amoeba

Virus विषाणु:

Non living -  
Acellular अकोशिकीय

Eukaryotic



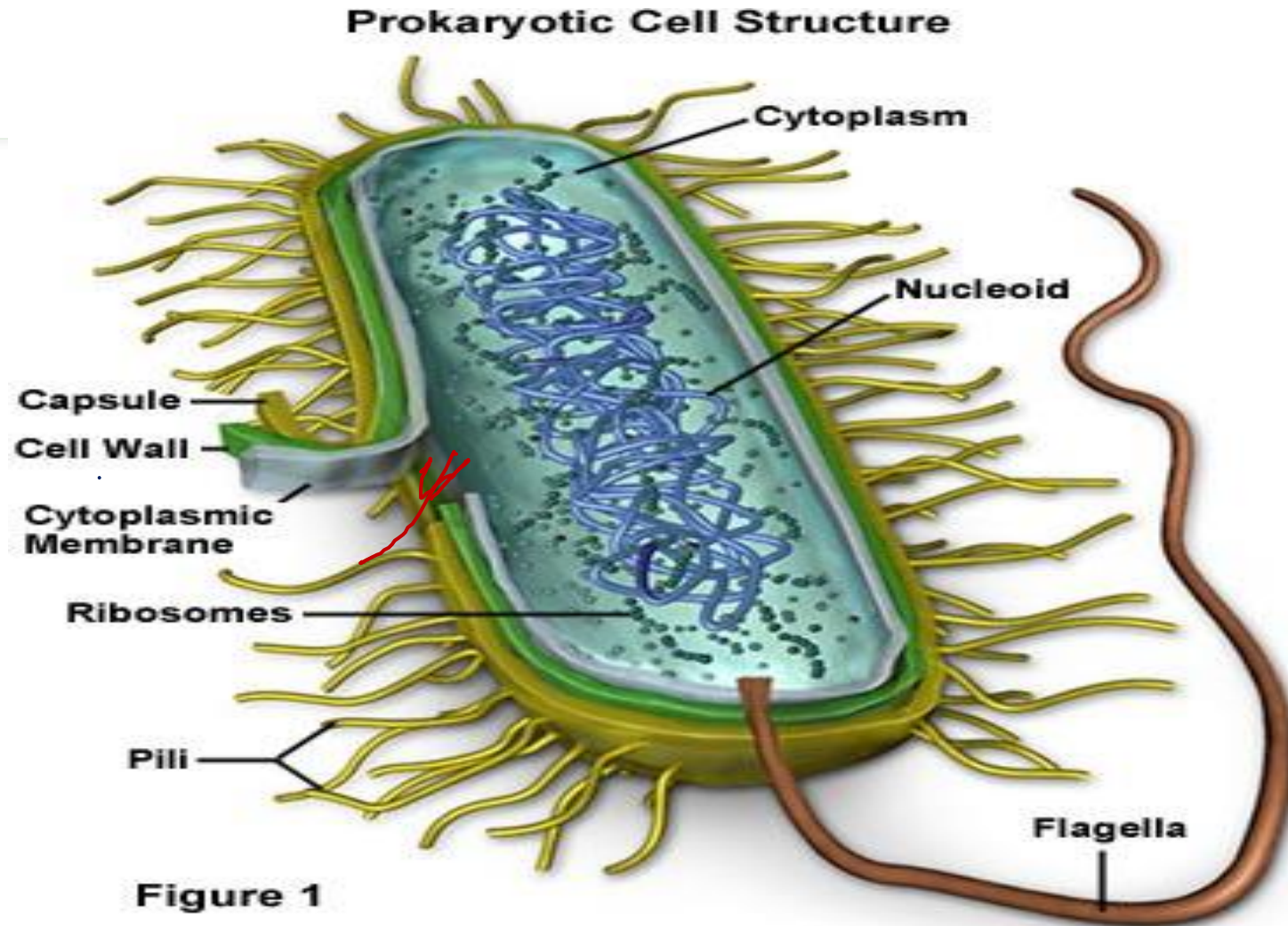
Proka -  
Primitive



Exception of cell theory  
↓  
Virus

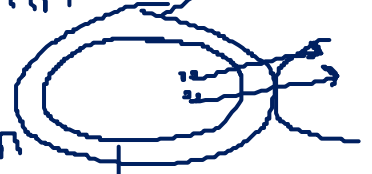
(120-130)  
Sudden change  
"Mutation"  
अचानक

• Prokaryotic Cell (Bacterial Cell): - Organelle  
34101



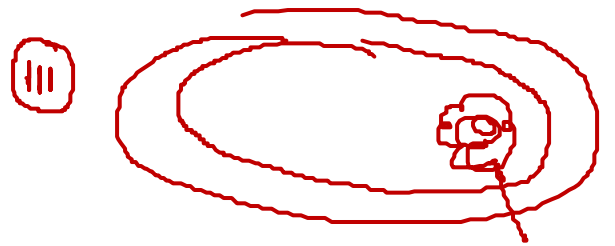
Function	Organelle
Propels the cell	Flagella
Appendages that allow a bacterium to stick to a surface	Fimbriae/pili
Rigid structure that surrounds, supports, and protects the cell	Cell wall
Acts as a selective barrier, allowing passage of oxygen, nutrients, and wastes	Plasma membrane
Site of protein synthesis	Ribosome
Contains the genes that control the cell	Nucleoid

Plant - Cellulose  
Fungus - Chitin  
Bacteria - Pectin  
Cell Wall  
Permeable  
निर्मित



(Pro + Carbs) → Peptidoglycan

fat + Protein  
Lipoprotein  
Fn: Semi Permeable:  
Cell Mem./ Plasma Me  
निर्मित

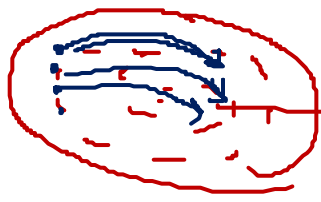


Fn: Inheritance =

\* DNA + Histone

Chromosome  
DNA  
Gene  
Smallest unit of chr.  
DNA + Histone  
Johannsen

IV

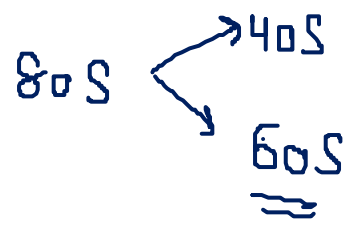
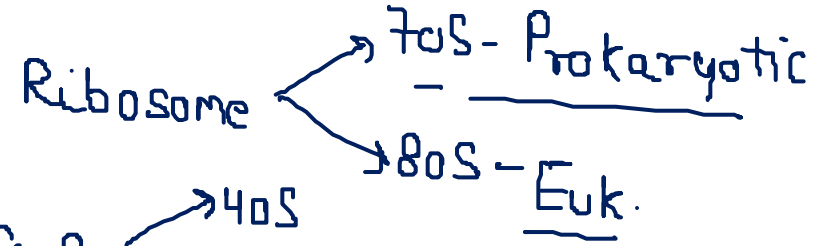
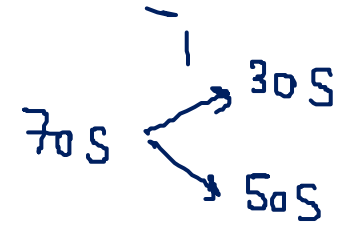


Cytoplasm की शिका द्रव्य :-> liquid part of cell

- Water + Salt
- (a) humidity
- (b) site of anaerobic resp. अक्रियुवीय श्वसन
- (c) ATP (Adenosine tri phosphate)
- (d) transportation Currency of Energy  
of Nutrient → Within the cell

Ribosome : Subunit

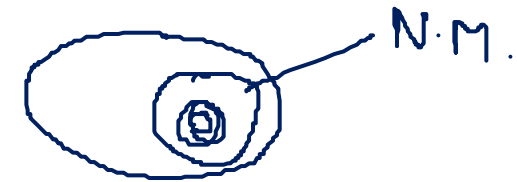
Protein formation



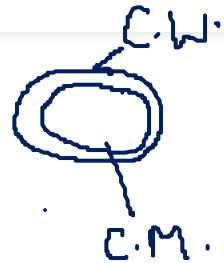
MitoX NucleusX G.Bx N-Mx

\* Sedimentation Coefficient

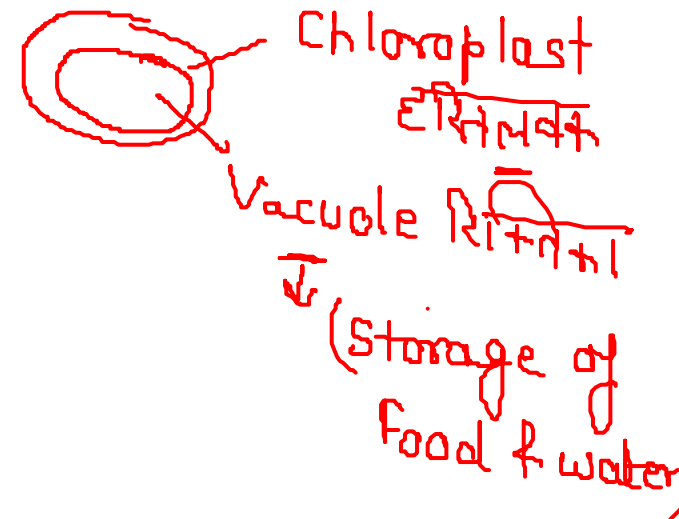
# Eukaryotic Cell: It can be divided into 2 parts-



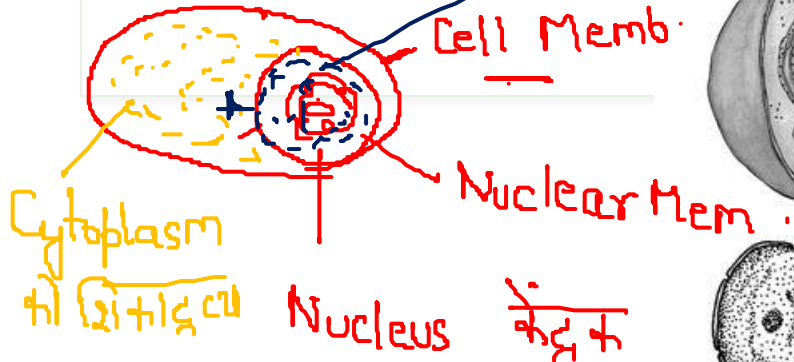
## PLANT CELLS VERSUS ANIMAL CELLS



Plant cells are usually larger in size	Animal cells are smaller in size
Have a rectangular, fixed shape	Have a round, irregular shape
Composed of a cell wall made up of cellulose	Don't have a cell wall
Have one or more, comparatively very smaller vacuoles (A)	Have one, large, central vacuole taking 90% of cell volume (P)
Centrioles are present in lower forms of plants	Centrioles are present in all animals
Composed of chloroplast to produce their own food	Do not contain chloroplast
Don't consist of lysosomes	Consist of lysosomes
Composed of glyoxysomes	Not composed of glyoxysomes
Reserve food in the form of starch	Reserve food in the form of glycogen

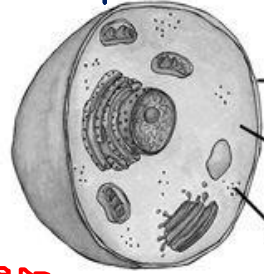


# • Animal Cell:

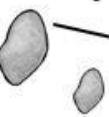


Cytoplasm  
 ती शक्ति  
 Nucleus केंद्र  
 Robert Brown  
 Brain of the Cell  
 F + M → Genetic hub  
 Que: Protoplasm जीवद्रव्य -  
 Cyto + Nucleo  
 ↓  
 Purkinje → Living Fluid of cell

## Nucleoplasm केंद्रद्रव्य उपजा 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 semi-permeable.
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 saccules 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.



cristae



Que :

Largest organ: Skin  
Longest organ-SI

- ① Largest cell : Ostrich egg
- ② Smallest cell : Mycoplasma (PPLO) - Bacteria  
→ Pleuron pneumonia like organism
- ③ Longest cell of human : Neuron ~~नर्वन~~ ~~की~~ ~~शिका~~
- ④ Largest " " : Egg cell ~~अणु~~ ~~की~~ ~~शिका~~
- ⑤ Smallest " " " Sperm ~~शु~~ ~~क्र~~ ~~मणु~~

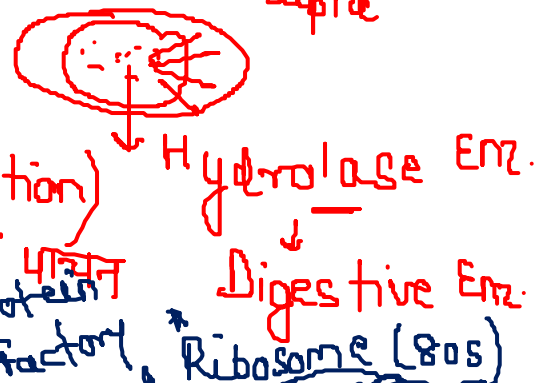
(v) Mitochondria: Richard Altmann, Power house of the Cell  
 ↳ Mother's DNA      Fn: Site of Aerobic resp वायुवीय → 36 ATP  
 ↳ Mito. is dependent on ATP      Cellular resp. कोशिकीय श्वसन

(vi) Golgi Body - Camilleo Golgi (Traffic Police of the Cell)  
 (b) Kidney of the Cell [transportation]

(c) → Packaging of Protein & Lipid  
 Removal of waste

(vii) Lysosome :- Christian De Duve, Suicidal Bag  
 ↳ Golgi body

(a) Cell - Young → kills bacteria  
 Cell - old (Intracellular digestion) → kills itself  
 अंदर कोशिकीय पाचन



(viii) Endoplasmic Reticulum - Keith Porter  
 ↳ virus (Phagocytosis) कोशिका भक्षण

