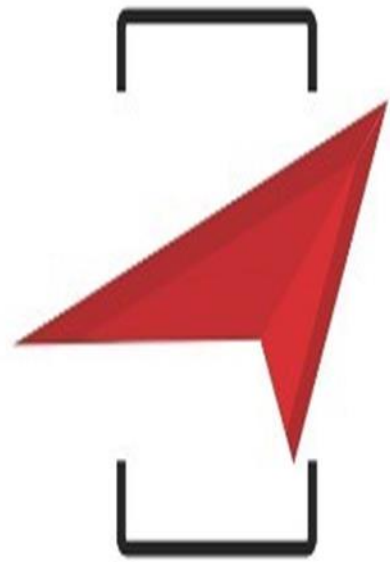


CDS, AF CAT



# SAFALTA CLASS<sup>TM</sup>

An Initiative by **अमर उजाला**

## Cell: कोशिका

जीविकी संरचनात्मक क्रियात्मक

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

## 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.

\* Virus ← Exception of Cell Theory

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	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

Cell कोशिका

Tissue ऊतक

Organ अंग

Organ System

Body शरीर

Algae शैवाल

Virus विषाणु



एकदलीय

बहुदलीय

Amoeba

Bacteria

Eu

Archae

Blue Green

Algae

जीवाणु

एडी

शैवाल

\* Virus

↓

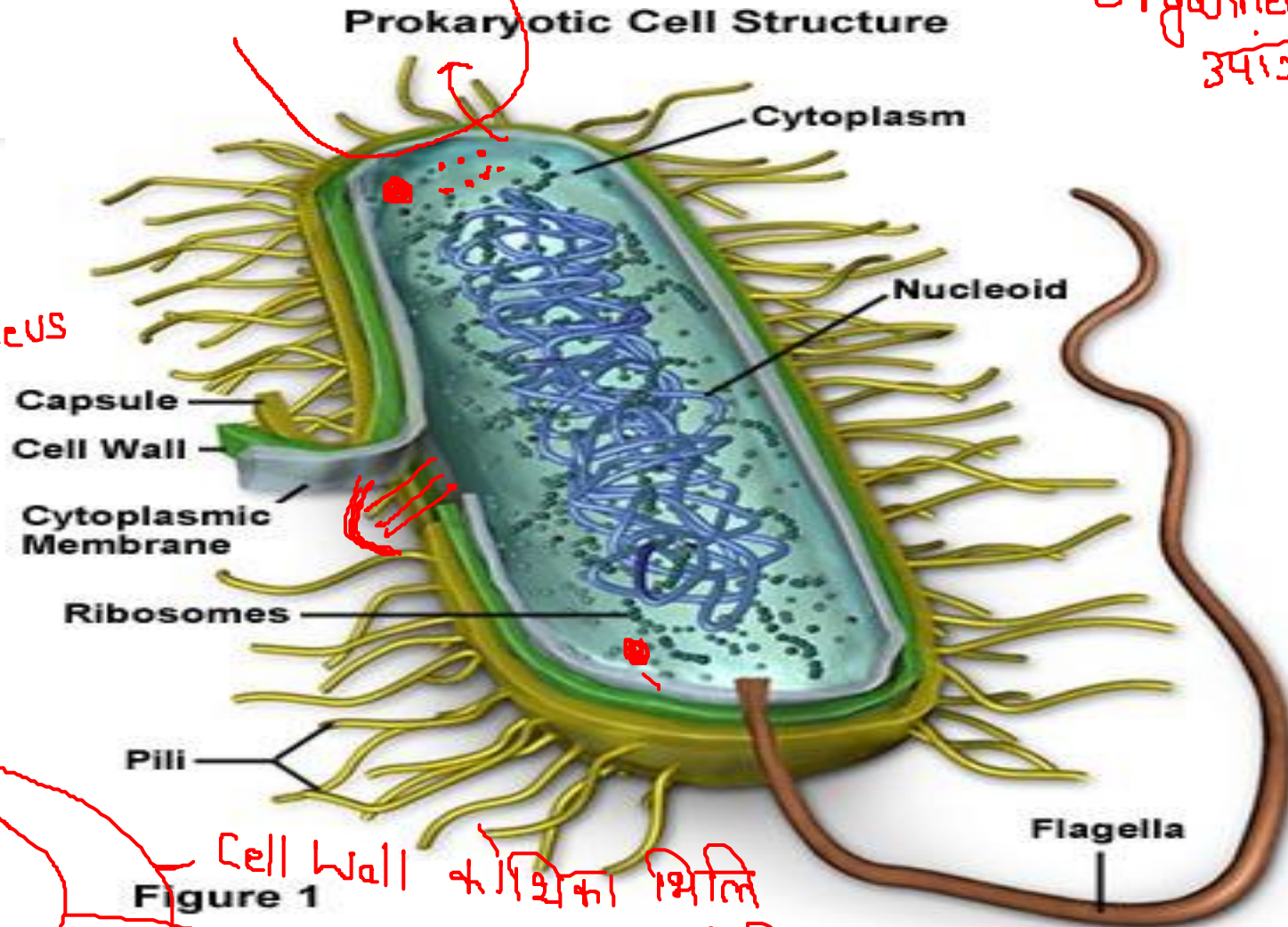
Acellular

अकोशिकीय



# • Prokaryotic Cell (Bacterial Cell):

Organelles  
अंग



Pro-Primitive

Karyon - Nucleus  
केंद्रक

Eu-True

Karyon - Nucleus

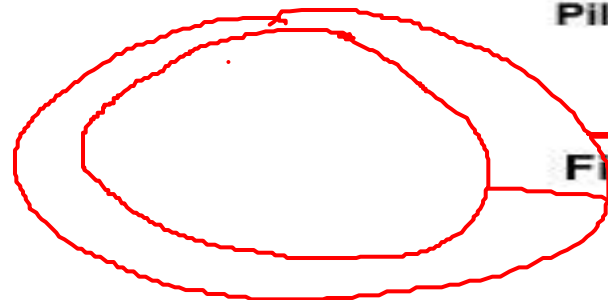


Figure 1

Cell Wall कोशिका भित्ति  
Cell Memb. कोशिका झिल्ली

## Cell Wall:

It is the outermost layer of plant, bacteria and fungal cell.

Composition:

- Plant Cell: Cellulose (carbohydrates) \*\*\*
- Bacteria cell: Pectin (protein+ carbohydrates)
- Fungal Cell: Chitin (carbohydrates) \*

Function of Cell wall:

- Provides rigidity to cell. मजबूती
- Provides Protection to Cell.

Temp → Light

Permeable परिवार

40-50 °C  
Lactobacillus  
↓  
Milk

पौधा      जीवाणु      फंगस

## Cell Membrane/ Plasma Membrane:

कोशिका झिल्ली

It is the outermost layer of animal cell while second most layer of plant, bacteria and fungal cell.

Composition: It is composed of "Lipoprotein" (fat + protein).

Function: Transportation of nutrients from one cell to another.

Nature: Semi permeable in nature.

अर्ध पारगम्य

ल्लिपक प्रोटीन

Lipo  
↓  
Lipid  
(Fat वसा)

कोशिकाद्रव्य

**Cytoplasm:** It is the liquid part of cell.

Composition: Water + salt



Function:

तरलता

- It provides liquidity to cell.
- \* Sites of anaerobic respiration
- Provides energy (2 ATP)
- Transportation of nutrients within the cell.

Anaerobic resp. अवायुवीच	Aerobic वायुवीच
→ Absence of O <sub>2</sub>	→ Present of O <sub>2</sub>
↓ Cytoplasm	↓ Mito

Adenosine Tri Phosphate - Currency of Energy

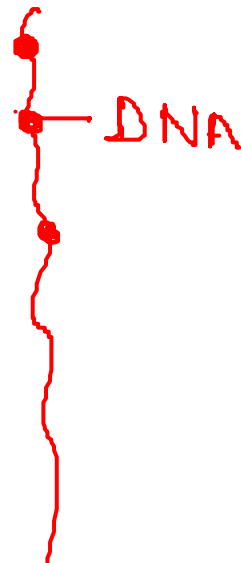
कृमिका

**Chromosome:** DNA molecule is packed in a thread like structure called Chromosome.

Composition: "DNA + Histone protein"

Function: Helps in inheritance. आनुवंशिकता

Smallest unit of chromosome: Gene (discovered by Johannsen).



जीन  
↓  
DNA + Histone

~~Nucleus, Mitochondria~~

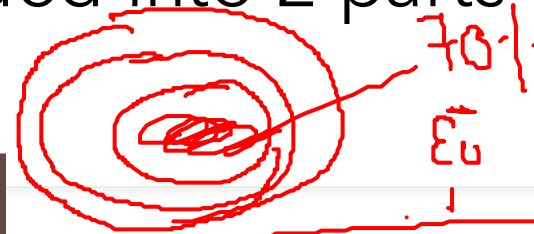


# Eukaryotic Cell: It can be divided into 2 parts-

↓  
Developed  
Nucleus

## 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	Have one, large, central vacuole taking 90% of cell volume
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



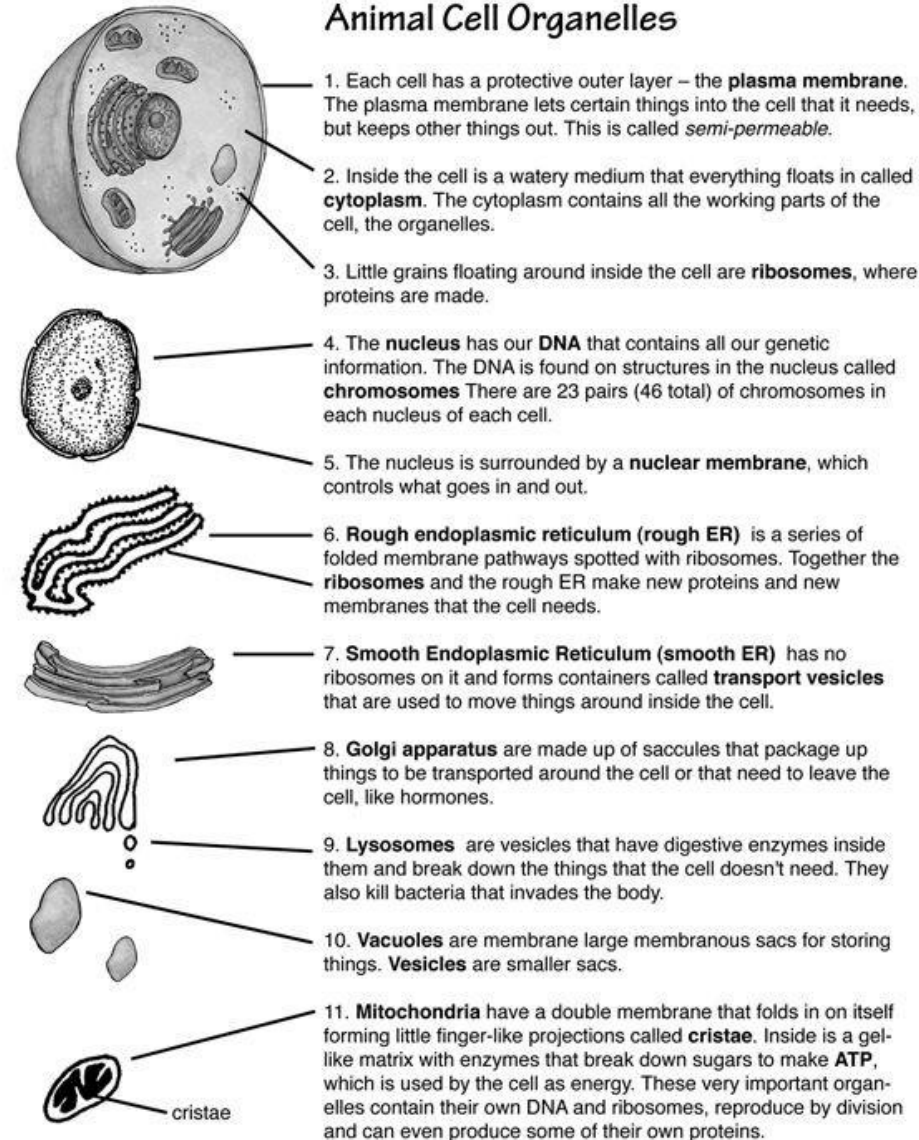
↓  
Plant cell  
↓  
Animal



Present      Absent  
= एरिनात  
→ Chloroplast

↓  
Vacuoles  
रिक्ति

# • Animal Cell:



## Nucleus:

The nucleus. The nucleus is the information Centre of the cell and is surrounded by a nuclear membrane in all eukaryotic.

- Discovered by **Robert Brown**.

### Function of Nucleus:

- It is commonly known as the Brain of the cell because it controls all the activities of the cell.
- Also known as Genetic Hub because it consists of mother and father's DNA.

**Nucleoplasm:** Similar to the cytoplasm of a cell, the nucleus contains nucleoplasm, also known as karyoplasm, or karyolymph or nucleus sap.

**Protoplasm:** The colorless material comprising the living part of a cell, including the cytoplasm, nucleus, and other organelles.

Protoplasm = Cytoplasm + Nucleoplasm

It was used in 1839 by **J. E. Purkinje** for the material of the animal embryo.

**Mitochondria:** Mitochondria are membrane-bound cell organelles that generate most of the chemical energy needed to power the cell's biochemical reactions.

Discovered by Richard Altmann.

Function:

- Site of aerobic respiration (cellular respiration).
- Provides maximum energy(36 ATP) needed for the functioning of the cell, hence it is known as the Power House of the Cell.
- Also contains Mother's DNA.
- Mitochondria is totally dependent upon ATP.

**Golgi body:** It is a complex of vesicles and folded membranes within the cytoplasm of most eukaryotic cells.

Discovered by Camilleo Golgi.

Function:

- It is the cell's post office. A major function is the modifying, sorting and packaging of proteins for secretion.
- It is also involved in the transport of lipids around the cell.
- Helps in the creation of lysosomes.