Chapter 1: Fundamental unit of life

Cell is called as fundamental unit of life.

Cell means small room.

They are the building blocks of living things.

Robert Hook in 1665 observed a thin slice of oak tree cork under his own microscope and found structure same like that of honey comb. He named those structures as cell.

Cell Theory

In 1676 Antonie Van Leeuwenhoek constructed an improved microscope and became the first to observe a microorganism.

In 1838 and 1839 two scientist Matthias Schleiden and Theodore Schwann proposed cell theory and stated the

1. All living organisms are composed of one or more cells
2. The cell is the most basic unit of life

Further In 1855 Rudolf Virchow stated that

3. All cells arise only from pre-existing cells

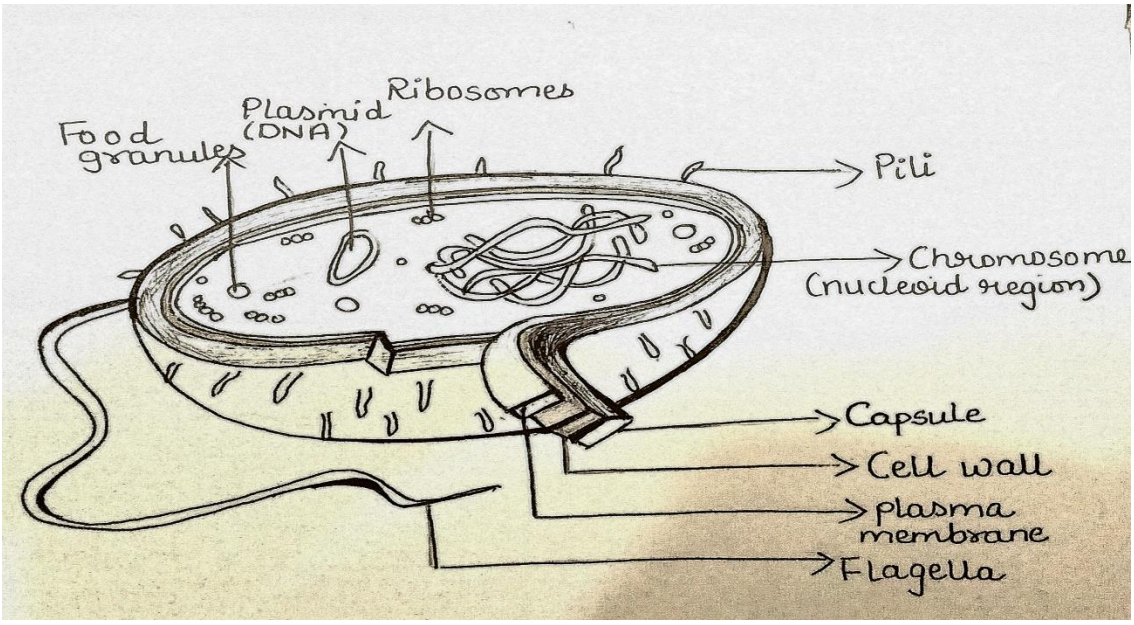
The living organisms are classified into 2 major groups

1. Prokaryotes
2. Eukaryotes

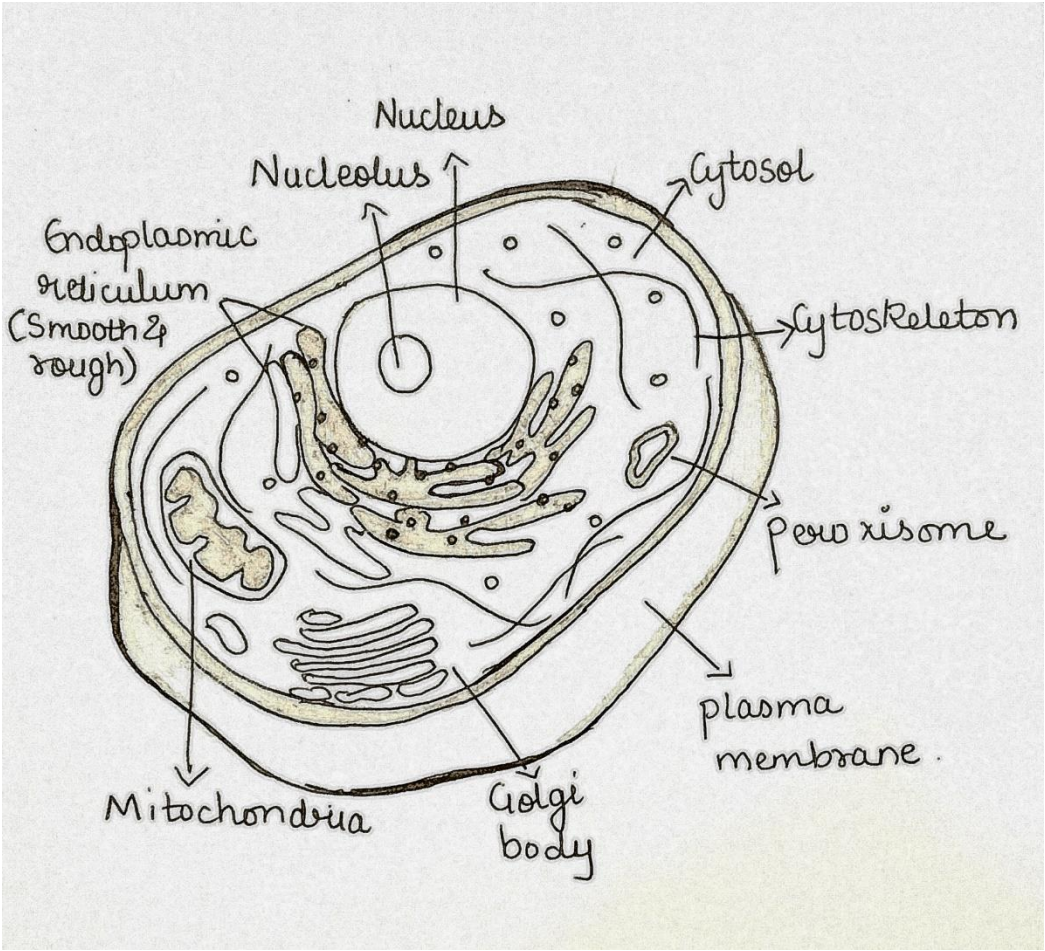
It was Chatton in 1937 who proposed this nomenclature .

Difference between Prokaryotic cell and Eukaryotic cell

Prokaryotic cell	**Eukaryotic cell**
1. It does not true nucleus and have no nuclear membrane and membrane bound cell organelles.	1. It possess true nucleus with nuclear membrane and membrane bound cell organelles.
2. It consist of single, circular DNA molecule.	2. It consist of double strand DNA molecule.
3. They are almost made up of peptidoglycans	3.They are made up of cellulose chitin and pectin.
4. Carbohydrates and sterols and absent	4.Carbohydrates and sterols are present.
5. Cell division occurs through binary fussion	5.Cell division takes place through mitosis
6. They are small in size about 0.2 – 2 macrometers	6.They are large in size about 10 – 100 macrometers



Prokaryotic cell



Eukaryotic cell

Cell organelles in plants and animals

Plants	Both	Animals
.Cell wall .Large Vacuole .Chloroplast	.Mitochondria .Golgi Bodies .Rough and smooth endoplasmic reticulum .Nucleus .Cytoplasm .Ribosomes . Lysosomes	.Plasma membrane . Small vacuole

1. Cell wall

Cell wall is the outermost covering of the plant cell

It is a hard layer

It is freely permeable as it let enter any molecule or particle.

It is made up of cellulose.

Any substance can move across cell wall by the process of diffusion.

What is diffusion?

It is the process of movement of substance from high concentration to low concentration region.

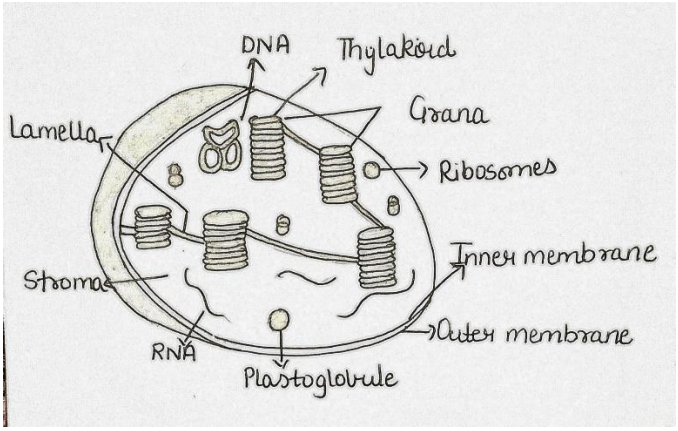
2. Vacuoles

They are membrane bound cell organelles that have different function in animal cell and plant cell.

In animal cell it is small in size whereas in plant cell it is big in size.

In animal cell it stores waste or other material while in plant cell it stores water.

3. Chloroplast



It is only found in plants.

It contains coin like structures called Thylakoid

Entire sack of thylakoid is called as Grana.

2 grana are joint together by lamella.

Matrix inside the chloroplast is called as stroma.

It covert light energy into chemical energy by the process of photosynthesis.

Chloroplast are also known as plastids and there are 3 types of plastids.

Chloroplast - They are green colour pigment

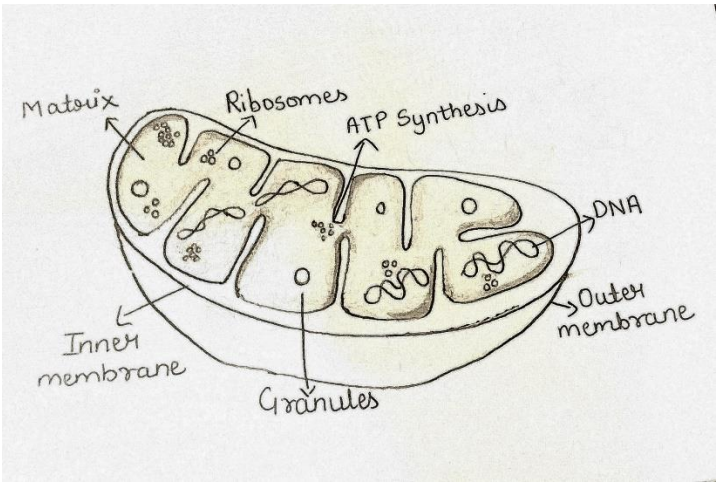
Chromoplast - Pigment other than green

Leucoplast- Helps in storage of food

Fun Fact

Chloroplast and Mitochondria have their own DNA.

4. Mitochondria



It is also known as power house of the cell as it produces energy in the form of ATP (Adenosine tri phosphate)

It is a double membrane bound cell organelle

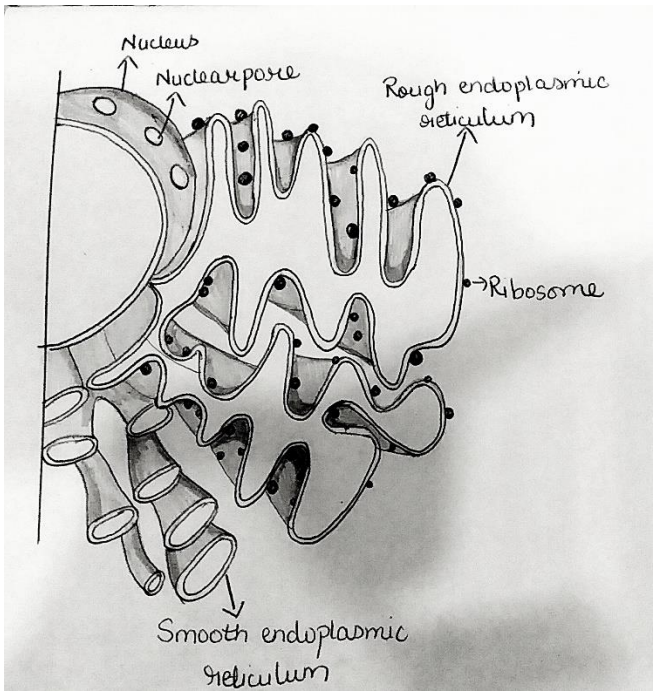
There are around 100,000to 600,000 mitochondria in each cell.

5. Golgi body

It is also called as dispatch centres.

Its main work is to modify, transport and packing of proteins and lipids which are received from endoplasmic reticulum

6. Rough endoplasmic and smooth endoplasmic reticulum



They are also known as protein factory as protein is synthesised here.

They are also responsible for production and secretion of steroid hormones and synthesis of essential lipids.

Metabolism of carbohydrates take place here.

There are 2 type of Endoplasmic reticulum

1. Rough endoplasmic reticulum

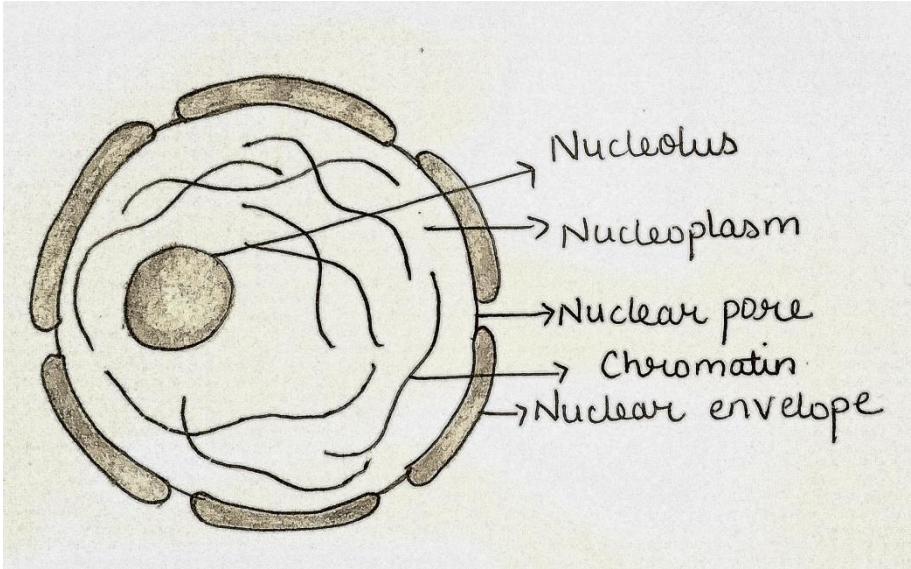
2. Smooth endoplasmic reticulum

The ER with ribosomes on it is called Rough Endoplasmic reticulum (RER)

On smooth endoplasmic reticulum (SER) ribosomes are absent.

RER is the place where protein are produced and SER is place where Lipids and Cholesterol are produced.

7. Nucleus



It helps in the growth of a cell.

It contains genetic matter and hence decides the hereditary characteristics of an organism.

It stores DNA and RNA.

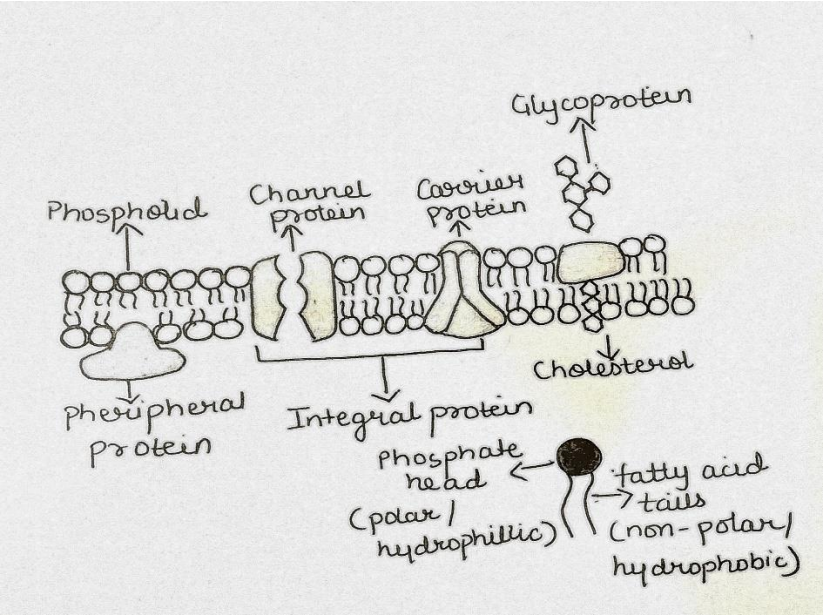
8. Ribosomes

It is the site for protein synthesis as mRNA is transcribed here.

It is an intercellular structure.

It is a complex of RNA and Protein and is also known as ribonucleoprotein.

9. Plasma membrane



It is made up of carbon compounds like lipids and protein.\

It is the outermost covering of the animal cell.

It is semipermeable membrane.

It provides protection to the cell.

10. Lysosome

They function as the digestive system of the cell.

Its function is to discard unwanted cellular content.

In some case lysosome release a digestive enzyme with digest the whole cell. This leads to the death of the cell. Hence it is also called as suicidal bag of the cell.