Unit -2

Structure of cell, its components and their functions.

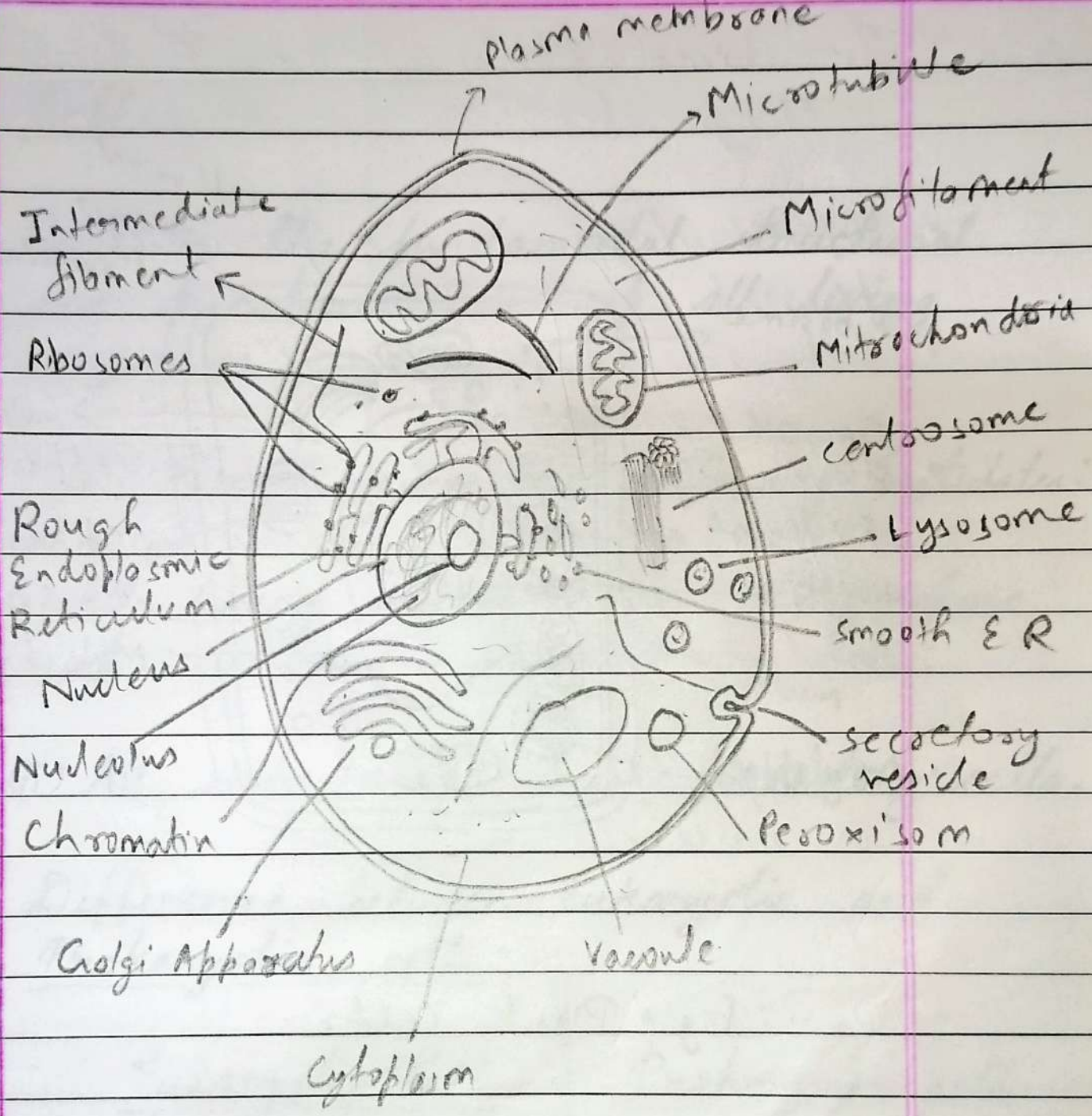

Fig :- Animal Cell.

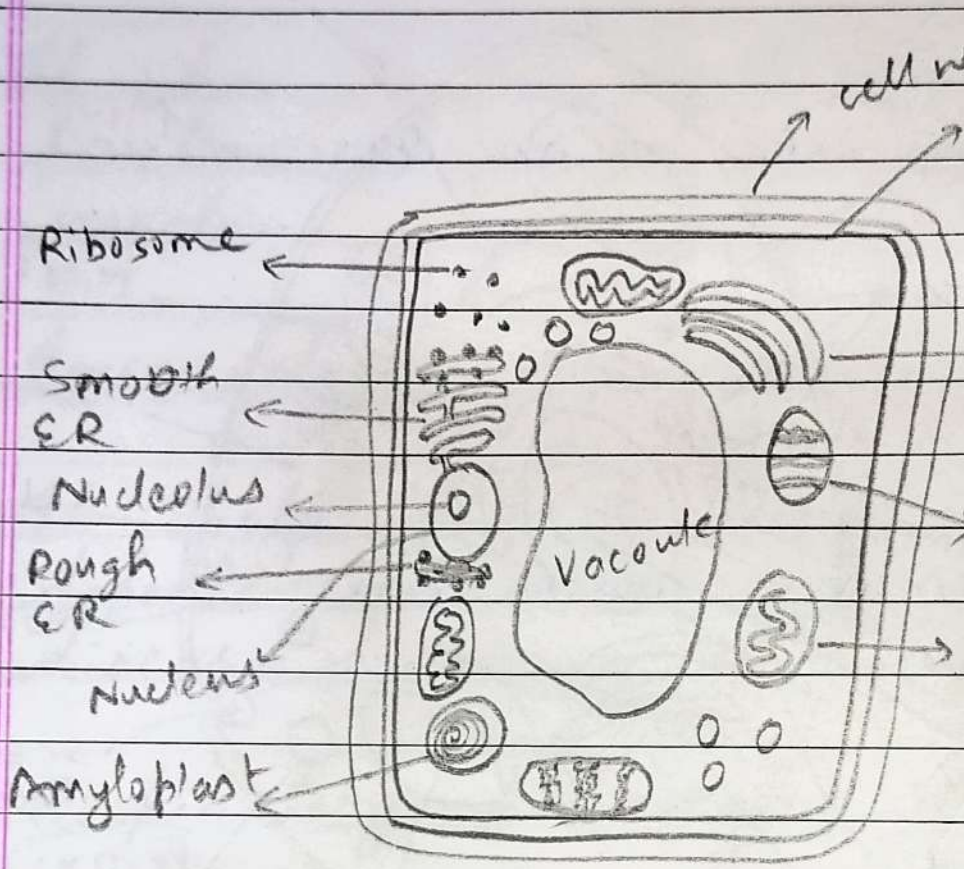

Fig:- Plant cell.

Unit -2

Structure of cell, its components and their functions

Cell:

Cell is the fundamental structural and functional unit of all living organism.

- Cell theory gives the following postulates:-

(i) All living organism are the compose of cells and product of cells.

(ii) All cells arise from prexisting cells.

Difference between Eukaryotic and Prokaryotic cells:

Eukaryotic Cell	Prokaryotic cell.
• Any cell that contain clearly defined nucleus and nuclear membrane.	• Any unicellular organism that does not contain a membrane bound nuclear or nuclear membrane.

→ Ex - Animal, plant, Fungi, etc	• Ex :- Bacteria, Archaebakteria,
• ~~Nucl~~ Neucleolus is present.	• Neucleolus is absent.
• Cell size is large.	• Cell size is small.
• DNA replication is highly regulated with selective origin and sequence.	• DNA replication is done for entire genome at once.
• A type of organism is multicellular.	• The type of organism is unicellular.
• Quantity of chromosome are more than one.	• In prokaryotic cell one long single loop of DNA and plasma.
• Ribosomes are large.	Ribosomes are small
• Growth rate is slow.	• Growth rate is fast.

• Orgel Organelles are present.	• Organelles are absent.
• They have ability to store hereditary information.	• They don't have ability to store hereditary information.
• Simple cell wall is present in plant and fungi.	• Complex cellwall is present in all prokaryotes.
• Cytoplasm is present.	• Cytoplasm is present.

★ Cell Envelope (Plasma membrane):

- Bacteria can be classified into two groups on the basis of the differences in the cell envelope.
- The cell membrane provides protection for a cell.
- It mainly composed of lipid and proteins.

- The measure lipids and phospholipids are arranged in a bilayer.
- Lipids are arranged with the membrane with polar head is outside and non-polar head is inside.
- Hydrophobic portion ensure that non-polar tail of saturated hydrocarbon is protected from the aqueous environment.
- The most important function of the plasma membrane is to transport the molecule inside and outside of the cell.
- This membrane is selective.

The movement of molecules is done by:
(i) Active transport
(ii) Passive diffusion
(iii) Osmosis
(iv) Facilitated diffusion.

☆ Cell Wall

→ Cell wall is a non-living rigid.

→ Cell wall provide a shape to the cell.

→ It protect the cell from mechanical ~~dama~~ damage and infection.

→ It provide a barrier to undesirable macro-molecules, it also help in cell to cell interaction.

☆ Mesosome :-

→ It is a special structure formed by the extension of plasma membrane into the cell.

→ These extension are ~~int~~ in the form of vesicles, tubules and lamellae.

→ Mesosome help in cell ~~was~~ wall formation and locomotion.

→ It also help in DNA replication and distribution to daughter cell.

→ Mesosome help in respiration, secretion, increase the surface area of the plasma membrane

Ribosome and Inclusion body.

- Ribosomes are associated with the plasma membrane of the cell.
- ~~They~~ They are made up of two sub-unit 50S and 30S which when present together form 70S of ribosome.
  S → Strand.

→ Ribosomes are the site of protein synthesis.

→ Several ribosomes may attach to a single mRNA and form a chain called polyribosome or polysomes.
  mRNA : m → massenger.

Inclusion body :

Inclusion body are reserve material in prokaryotic cell and store in cytoplasm.

They are lie free in the cytoplasm.
eg :→ Phosphate granules.

The Endoplasmic reticulum :

Endoplasmic reticulum is a divider of intracellular space into two parts :-

(i) Luminal compartment.
(ii) Extra Luminal compartment

The E.R. bearing ribosomes on their surface is called Rough E.R.

In the absence of ribosome, E.R. called Smooth E.R. (S.E.R.)

The S.E.R. is the measure site of lipid synthesis

Golgi Apparatus (Golgi body).

Golgi bodies perform the function of packaging that to be delivered either to the intracellular target or secreted outside the cell.

Inter - outside
Intra - Inner

Golgi bodies are the important site of formation of glycoprotein and glycolipids.

Lysosomes:

Lysosomes are membrane bound vasicular structure formed by the process of packaging in the golgi body.

They contain all type of hydrolytic enzyme.

(Hydrolytic enzyme: →

Hydrolases, lipases, Proteases, and Carbohydrases.) which are active at acidic pH.

Vacuoles:

The vacuole is the membrane bound space present in cytoplasm.

~~They~~ It contain water, excretory product and other material which are not useful for cell.

Mitochondria

It is a membrane bound structure with the outer membrane and inner membrane, it also dividing the lumen into 2 aqueous compartment which is ~~en~~ inner compartment and outer compartment.

The inner compartment is filled with homogenous material which is called matrix.

The inner membrane ~~for~~ form the number of infoldings called cristae. The cristae increase the surface area.

Mitochondria are the site of ~~ae~~ aerobic respiration.

Mitochondria produces cellular energy in the form of ATP. hence they are called as powerhouse of the cell.

Plastids :

Plastids are found in all plant cell.

They bear specific pigments which is responsible for specific colour.

★ Cytoskeleton:

It is an elaborate network of proteinaceous structure consist of microtubule, Microfilaments and intermediate filaments present in cytoplasm called cytoskeleton.

★ Cilia and Flagella:

→ Cilia and Flagella are hair like growth of the cell membrane.

→ ~~Eff~~ Cilia are small structure cause movement of the cell.

→ Flagella is longer and it is also responsible for cell movement.

★ Centrosomes and Centrioles :

→ Centrosome is an organelle contain ~~to~~ two cylinderical structure called centrioles.

★ Nucleus :

→ Nucleus is a double membrane structure contain genetic materials.

→ It contain cell chromosomes.

→ DNA is present in the chromosomes that provide the genetic information

→ It contain cell ~~hereditely~~ hereditary information and controlled cell growth and reproduction.

→ Nucleus is the site of transcription.

☆ Mitochondria :

Many membrane bound minute vesicles called microbodies that contain various enzyme and it is present in both animal and plant.