

In The Name Of Allah

Biological Sciences

Cell Structure And Function (2018 (3d))

1- Definition:

- Cells are the smallest living units of structure and function of all living things.
- The word cell is derived from the Latin word cellula which means a little room.
- The cell was derived by Robert Hooke in 1665.

Structure And Functions:

2- Common Things in all cells:

i) Cell Membrane

• All cells have cell membrane which separates the inside from its environment.

• It is composed of four different types of molecules

(i) Phospholipids

(ii) Cholesterol

(iii) Proteins

(iv) Carbohydrates

ii) Cytoplasm:

- Which is jelly like fluid.
- The living content of the protoplasm between plasma membrane and nucleus is cytoplasm.
- These living content collectively form protoplasm.

(iii) DNA:

- Which is cell's genetic codes that determine all the characteristics of a living thing.

3- Broad Categories of Cell:

Cells have two categories are given below.

i) Eukaryotic Cells:

- They have organelles which includes the nucleus and other special parts.
- They are more advanced complex cells such as those found in plant and animal cells.

ii) Prokaryotic Cell:

- They don't have a nucleus and membrane enclosed organelles.
- They do have genetic material but it's not contain within a nucleus.
- They are always one called or unicellular organisms such as bacteria.

Add diagrams

4- Organelles:

- It means little organ.
- They are special parts of cells that have unique jobs to perform.
- Each types of organelle has a definite structure and a specific role in the function of the cell.

5- Nucleus:

- The nucleus contain DNA or genetic material.

⇒ DNA

- DNA dictates what the cell is going to do and how its going to do it.

Chromatin:

- Chromatin the tangled spread out form of DNA found inside the nuclear membrane.
- When a cell is ready to divide DNA condenses into structures known as chromosomes.

⇒ Nucleolus:

- The nucleus also contain a nucleolus which is a structure where ribosomes are made.
- After ribosomes leaves the nucleus they will

have the important job of "synthesizing" or making proteins.

- Outside the nucleus the ribosomes and the rest of the organelles float around in cytoplasm, which is jelly-like substance.

Cytoplasm:

Ribosomes may wander freely within the cytoplasm or attach to the endoplasmic reticulum, sometimes abbreviated ER

(i) ER

- * There are two types as:

(a) Rough ER

(b) Smooth ER

Rough ER

Smooth ER

- It has ribosomes attached to it

- It doesn't have ribosomes attached to it

- * The ER is a membrane enclosed passageway for transporting materials such as proteins, synthesized by ribosomes.

(a) Protein:

- Protein and other materials emerge from

the ER in small vesicles.

Golgi Apparatus (Golgi Body):

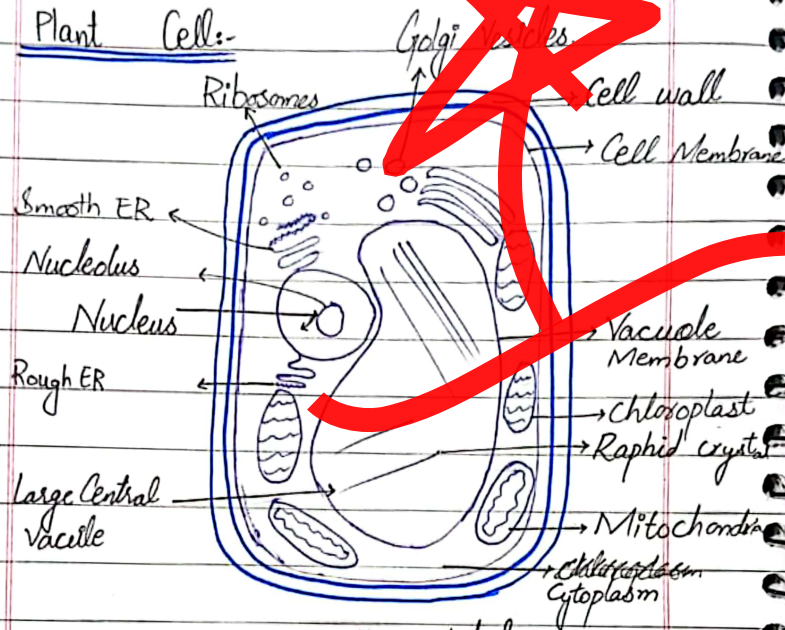
- They receive them.
- As proteins move through the Golgi body they're customized into forms that the cell can use.
- The Golgi body does this by folding the proteins into usable shapes, or adding other material on them such as lipid or carbohydrates.

6- Vacuoles:

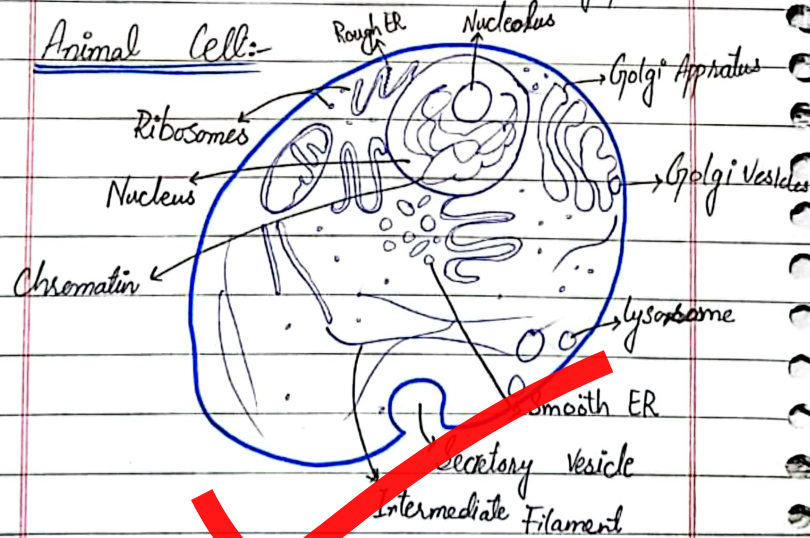
- Vacuoles are sac-like structures that store different materials.

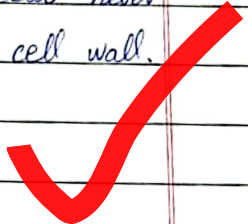
Plant Cell

Plant Cell:-



Animal Cell:-



| <u>Plant Cell</u> | <u>Animal Cell</u> |
|--|--|
| (i) Cell Membrane: | |
| <ul style="list-style-type: none"> • It is the semi-permeable membrane that is present within the cell wall. • It is composed of a thin layer of protein and fat | <ul style="list-style-type: none"> • It is selectively permeable and allows only certain molecules to pass through. • It is a double-layered membrane made up of phospholipids that surrounds the entire cell. |
| (ii) Cell Wall: | |
| <ul style="list-style-type: none"> • It is a rigid layer which is composed of cellulose, pectin and hemicellulose. • It is located outside the cell membrane. | <ul style="list-style-type: none"> • Animal cells never have a cell wall.  |
| (iii) Nucleus: | |
| <ul style="list-style-type: none"> • The nucleus is a membrane-bound structure that is present only in eukaryotic cells. | <ul style="list-style-type: none"> • The nucleus contain the genetic material DNA located in the nucleolus region of the nucleus. |

- The vital function of a nucleus is to store DNA or hereditary information required for cell division and growth.

(i) Nucleolus:

- It manufactures cell protein-producing structures and ribosomes.

(ii) Ribosomes:

- They are the smallest membrane-bound organelles which comprise RNA and protein.
- They are the sites for protein synthesis hence also referred to as the protein factories of the cell.

- The nucleus is separated from the rest of the cell by a nuclear membrane. It also regulates the growth and division of cells.

- Ribosomes are found freely in the cytoplasm of the cell or attached to the membranes of ER.
- They help in the synthesis of protein.

Common Things in Both cells.

(v) Endoplasmic Membrane:

- It consists of a network of membranous sacs called cisternae that branches off from the nuclear membrane.

- It is of two types.

Rough Endoplasmic Reticulum,

Smooth Endoplasmic Reticulum.

- It helps in transporting proteins synthesised by the ribosomes.

(vi) Golgi Apparatus:

- They are found in all eukaryotic cells, which are involved in distributing synthesised macromolecules to various parts of the cell.

- Golgi Apparatus receives proteins from endoplasmic reticulum and package (synthesised by ribosomes) them into vesicles.

(vi) Mitochondria:

- They are the double-membraned organelles found in the cytoplasm of all eukaryotic cells.
- They provide energy by breaking down carbohydrate and sugar molecules hence they are also called powerhouses of cells.
- These are also known as powerhouses of cells because they produce energy.
- It consists of an outer membrane and an inner membrane. The inner membrane is divided into folds called crista.
- They help in the regulation of cell metabolism.

(vii) Lysosome:

- Lysosome are called suicidal bags as they hold digestive enzymes in an enclosed membrane.
- They known as suicidal bags because they hold hydrolytic enzymes to digest protein, lipid, carbohydrates and nucleic acid.

(vii) Chloroplast:

- They are heterogenous, coloured plastid which is responsible for pigment synthesis and for storage in photosynthesis eukaryotic organisms.
- It have red, orange, and yellow coloured pigments which provide colour to all rip fruits and flowers.

(viii) Plastids:

• These are double-membraned structure and are found only in plant cell.

• These are of three types:

(a) Chloroplast that contains chlorophyll and is involved in photosynthesis.

(b) Chromoplast that contains carotenoid pigment called carotene that provide the plants red, yellow or orange colours.

(c) Leucoplast that are colourless and store oil, fat, carbohydrates.

Conclusion:

- Eukaryotic cell: Plant and Animal cells with a nucleus and membrane-enclosed organelles.

- Prokaryotic Cell: Unicellular organisms without a nucleus or membrane-enclosed organelles.
- All cells have a cell membrane, cytoplasm and genetic material.
- Both plant and animal cells have mitochondria.

You have got potential
Good luck!

Your notes are fine
Focus on your
spelling

And incorporate diagrams
wherever required