



SNS COLLEGE OF NURSING

SARAVANAMPATTI,COIMBATORE-35

DEPARTMENT OF NURSING

COURSE NAME : BSC (N) I YEAR

SUBJECT : BIOCHEMISTRY

UNIT I: INTRODUCTION

TOPIC :STRUCTURE OF CELLS



INTRODUCTION

- The cell structure comprises individual components with specific functions essential to carry out life's processes. These components include- cell wall, cell membrane, cytoplasm, nucleus, and cell organelles. Read on to explore more insights on cell structure and function.



STRUCTURE OF CELL

- Cell Membrane
- Cell Wall
- Cytoplasm
- Nucleus
- Cell Organelles



CELL MEMBRANE



- The cell membrane supports and protects the cell. It controls the movement of substances in and out of the cells. It separates the cell from the external environment. The cell membrane is present in all the cells.
- The cell membrane is the outer covering of a cell within which all other organelles, such as the cytoplasm and nucleus, are enclosed. It is also referred to as the plasma membrane.



CELL MEMBRANE

- By structure, it is a porous membrane (with pores) which permits the movement of selective substances in and out of the cell. Besides this, the cell membrane also protects the cellular component from damage and leakage.
- It forms the wall-like structure between two cells as well as between the cell and its surroundings.
- Plants are immobile, so their cell structures are well-adapted to protect them from external factors. The cell wall helps to reinforce this function.



Cell Wall

- The cell wall is the most prominent part of the plant's cell structure. It is made up of cellulose, hemicellulose and pectin.
- The cell wall is present exclusively in plant cells. It protects the plasma membrane and other cellular components. The cell wall is also the outermost layer of plant cells.

CELL WALL

- It is a rigid and stiff structure surrounding the cell membrane.
- It provides shape and support to the cells and protects them from mechanical shocks and injuries.



Cytoplasm

- The cytoplasm is a thick, clear, jelly-like substance present inside the cell membrane.
- Most of the chemical reactions within a cell take place in this cytoplasm.
- The cell organelles such as endoplasmic reticulum, vacuoles, mitochondria, ribosomes, are suspended in this cytoplasm.



Nucleus



- The nucleus contains the hereditary material of the cell, the DNA.
- It sends signals to the cells to grow, mature, divide and die.
- The nucleus is surrounded by the nuclear envelope that separates the DNA from the rest of the cell.
- The nucleus protects the DNA and is an integral component of a plant's cell structure.



Cell Organelles

- Cells are composed of various cell organelles that perform certain specific functions to carry out life's processes. The different cell organelles, along with its principal functions, are as follows
- **Nucleolus**
- **Nuclear membrane**
- **Chromosomes**
- **Endoplasmic reticulum**



Cell Organelles

- **Golgi Bodies**
- **Ribosome**
- **Mitochondria**
- **Lysosomes**
- **Chloroplast**
- **Vacuoles**



Cell Organelles and their Functions

- **Nucleolus:**The nucleolus is the site of ribosome synthesis. Also, it is involved in controlling cellular activities and cellular reproduction.
- **Nuclear membrane:**The nuclear membrane protects the nucleus by forming a boundary between the nucleus and cell organelles.

FUNCTIONS

- **Chromosomes:**Chromosomes play a crucial role in determining the sex of an individual. Each human cells contain 23 pairs of chromosomes.
- **Endoplasmic reticulum:**The endoplasmic reticulum is involved in the transportation of substances throughout the cell. It plays a primary role in the metabolism of carbohydrates, synthesis of lipids, steroids and proteins.

- **Golgi Bodies:** Golgi bodies are called the cell's post office as it is involved in the transportation of materials within the cell.
- **Ribosome:** Ribosomes are the protein synthesisers of the cell.
- **Mitochondria:** The mitochondrion is called “the powerhouse of the cell.” It is called so because it produces ATP – the cell's energy currency.

FUNCTIONS

- **Lysosomes:** Lysosomes protect the cell by engulfing the foreign bodies entering the cell and help in cell renewal. Therefore, they are known as the cell's suicide bags.
- **Chloroplast:** Chloroplasts are the primary organelles for photosynthesis. It contains the pigment called chlorophyll.
- **Vacuoles:** Vacuoles store food, water, and other waste materials in the cell.

Types of Cells

- Cells are similar to factories with different labourers and departments that work towards a common objective. Various types of cells perform different functions. Based on cellular structure, there are two types of cells:
 - Prokaryotes
 - Eukaryotes



Prokaryotic Cells



- Prokaryotic cells have no nucleus. Instead, some prokaryotes such as bacteria have a region within the cell where the genetic material is freely suspended. This region is called the nucleoid.
- They all are single-celled microorganisms. Examples include archaea, bacteria, and cyanobacteria.
- The cell size ranges from 0.1 to 0.5 μm in diameter



Prokaryotic Cells

- The hereditary material can either be DNA or RNA.
- Prokaryotes generally reproduce by binary fission, a form of asexual reproduction. They are also known to use conjugation – which is often seen as the prokaryotic equivalent to sexual reproduction (however, it is NOT sexual reproduction).



Eukaryotic Cells

- Eukaryotic cells are characterised by a true nucleus.
- The size of the cells ranges between 10–100 μm in diameter. This broad category involves plants, fungi, protozoans, and animals.
- The plasma membrane is responsible for monitoring the transport of nutrients and electrolytes in and out of the cells. It is also responsible for cell to cell communication.



Eukaryotic Cells

- They reproduce sexually as well as asexually.
- There are some contrasting features between plant and animal cells. For eg., the plant cell contains chloroplast, central vacuoles, and other plastids, whereas the animal cells do not.



CONCLUSION



- Cells have many structures inside of them called organelles. These organelles are like the organs in a human and they help the cell stay alive. Each organelle has its own specific function to help the cell survive.



ASSESSMENT



1. Highlight the cell structure and its components.
- 2.State the types of cells.
- 3.What is the function of Golgi bodies?



REFERENCES

- Shivananda Nayak b , " Hand book of Biochemistry & Nutrition (For B.sc Nursing students)
- Biochemistry for nurses,Uma Bhardwaj,Ravindra Bhardwaj,Pearson Publication.

THANK YOU