



**Guidelines:**

**Dear Students**


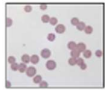
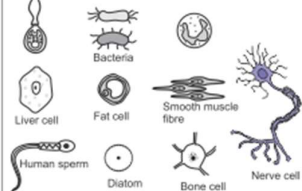

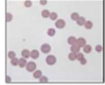


- Refer to the content shared below.
- These notes will help you to understand the concept of the lesson.
- Do the assignment questions in the Biology notebook.
- Link for Textbook:-  
[http://ncertbooks.prashanthellina.com/class\\_9.Science.Science/CHAP%205.pdf](http://ncertbooks.prashanthellina.com/class_9.Science.Science/CHAP%205.pdf)

**TOPIC:- STRUCTURAL ORGANISATION OF A CELL**

All living **organisms**, including plants, animals, bacteria and fungi, are made up of **cells**. Cells are the smallest parts of all living organisms.

**Cell – Number, Size and Shape**

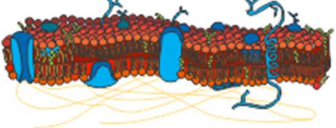
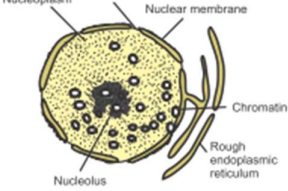

Cell: The basic structural and functional unit of all living organisms.

Cell number	Cell Size	Cell Shape
<p><b>Unicellular organisms:</b> are made up of single cell, e.g. amoeba, bacteria, chlamydomonas</p> 	<p>Cells are extremely small, therefore they can be only observed under microscope.</p> <p>Cells are measured in micrometers or microns.</p> 	<p>The shape of the cell varies in different organisms. The shape of plant cell is different from that of an animal cell. They may be spherical, oval, elliptical, spindle-shaped, cuboidal, polygonal, columnar, or flat plate-like.</p> 
<p><b>Multicellular organisms:</b> are made up of millions of cells e.g. plants, animals</p> 	<p>Mycoplasma - smallest cell</p>  <p>Nerve cell – longest cell</p>  <p>Ostrich egg- largest cell</p> 	

**A typical cell has the following major components:-**

- Cell/Plasma membrane
- Nucleus
- Cytoplasm
- Cell organelles

## Cell Structure

<p><b>Cell membrane</b></p>  <ul style="list-style-type: none"> <li>• It is the outer most covering of the cell.</li> <li>• It is made up of two layers of lipids(fat) molecules with proteins</li> </ul> <p><b>Functions:</b></p> <ul style="list-style-type: none"> <li>• It is a semi permeable (allows selected ) which regulates entry and exit of only few molecules in and out of the cell.</li> <li>• Gives definite shape to the cell, protects cell organelles</li> </ul>	<p><b>Nucleus</b></p>  <p>It is dense, spherical or oval shaped body, located at the center of the cell.</p> <p><b>Functions:</b></p> <ul style="list-style-type: none"> <li>• Controls and regulates all functions of the cell</li> <li>• Cell division</li> <li>• Contains genetic material</li> </ul>	<p><b>Cytoplasm</b></p>  <p>It is a semi-fluid substance. Tiny living bodies called <b>organelles</b> lie suspended in cytoplasm.</p> <p><b>Functions:</b></p> <ul style="list-style-type: none"> <li>• Many chemical reactions take place here</li> <li>• Each organelle has a specific function</li> </ul>
<p>Cell wall - The protective wall outside the cell membrane. It is found only in plant cell. It is made up of cellulose.</p>		

Kindly refer to the link shared for better understanding of a typical cell. It will enable you to experience and visually interpret the cell structure.

<https://youtu.be/1Z9pqST72is>

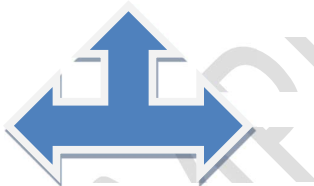
## PLASMA/CELL MEMBRANE

All cells have a cell membrane around them. The cell membrane is a thin layer that encloses the cell contents and separates the cell from its environment.

Many different substances have to pass in and out of a cell in order to function. The cell membrane controls the entry and exit of the substances. We can say the cell membrane is **selectively permeable**. The organelles are also surrounded by membranes.

There are two main processes that control the movement of molecules in and out of the cell:-

### I. DIFFUSION



### II. OSMOSIS

DIFFUSION	OSMOSIS
It is the spontaneous movement of a substance from a region of high concentration to a region where its concentration is low.	It is the movement of water molecules through such a selectively permeable membrane from a region of high water concentration to a region of low water concentration.
It occurs in all the three states of matter:- Solid, liquid and gas.	It occurs only in the liquid state- water molecules.
Eg- Plants exchange gases through stomata ; Cellular wastes like carbon dioxide are eliminated; a perfume sprayed in one corner of a room can eventually be smelt all over,etc	Eg – Raisins that are added to sweet dishes like halwa or kheer absorb water and swell up; the skin on our fingers gets shrivelled when we dip our hands in water for long.

A plant or animal cell placed in a salt or sugar solution could undergo one of the three given possibilities:-

### ISOTONIC SOLUTION

If the concentration of solution of the surrounding medium is the same as that of the cell then there is no **net** movement of water molecules, even though water still crosses the cell membrane in both the directions.

### HYPOTONIC SOLUTION

If the concentration of the medium surrounding the cell has a higher water concentration and low solute concentration, i.e. the outside solution is very **dilute**, the cell will **gain water** by osmosis (**Endosmosis**). Such a solution is known as a hypotonic solution. The cell is likely to gain water and **swell up**.

### HYPERTONIC SOLUTION

If the concentration of the medium surrounding the cell has a lower water concentration and high solute concentration, meaning that the outside solution is very **concentrated**, the cell will **lose water** by osmosis (**Exosmosis**). Such a solution is known as a hypertonic solution. The cell is likely to lose water and **shrink**.

NOTE- Osmosis is a special case of diffusion through a selectively permeable membrane.

Kindly refer to the link shared below to study the selectively permeable nature of Plasma membrane in an elaborate way:-

1. **Osmosis with an Egg**

<https://www.youtube.com/watch?v=SrON0nEEWmo>

2. **Osmosis with Raisins**

<https://www.youtube.com/watch?v=ZRdCRNYz-Cw>

**Amoeba** possesses a flexible cell membrane that enables the cell to engulf food by the process of **Endocytosis**, which occurs with the help of **Pseudopodia**.

**ASSIGNMENT:-**

1. Plasma membrane is a selectively permeable membrane. Justify.
2. Explain how substances like water ; oxygen and carbon dioxide move in and out of a cell.
3. Imagine that the cell membrane of a cell is ruptured. Describe all that can happen because of it.
4. What will happen to a plant cell if it is kept in a:
  - (i) hypotonic solution
  - (ii) hypertonic solution.
5. Select the correct option:-
  - (i) Plasmolysis occurs due to  
A .Diffusion    b. Endosmosis    c. Exosmosis    d. Absorption
  - (ii) The solution that has higher water concentration than the cell is known as  
a. Hypertonic    b. Hypotonic    c. Isotonic    d. None of these
  - (iii) Raisins soaked in high concentrated solution of sugar \_\_\_\_i\_\_\_\_. The process involved is known as \_\_\_\_ii\_\_\_\_.  
a. i- shrink, ii- endosmosis    b. i- swell, ii- exosmosis  
c. i- shrink, ii- exosmosis    d. i- swell, ii- endosmosis

BBPS, PITAMPURA