

**Class IX<sup>th</sup> (Biology Notes)**  
**Chapter-5 (The Fundamental Unit Of Life)**

**A) Cell** - Cell is the smallest structural and functional unit of life. It is called structural unit as all living organism are made up of cells and functional unit as it is the smallest structure capable of performing basic life processes.

Two postulates of the cell theory are-

1. All organisms are made up of cells.
2. All cells exist from pre- existing cells.

**B) Who discovered cell-**It was discovered by **Robert Hooke** in 1665. Other discoveries about cell are:

- a) Robert Brown –Nucleus of the cell in 1831
- b) Anton Van Leeuwenhoek – Free living cells in pond water (bacteria) in 1674
- c) Purkinje – Fluid substance of cell (Protoplasm) in 1839
- d) J.E.Virchow- Expanded cell theory (all cells arise from pre-existing cells) in 1855
- e) M.J. Schleiden and T. Schwann – Gave cell theory (cell is basic unit of life) in 1838-39
- f) The discovery of electron microscope in 1940 helped to understand complex structure of cell and its organelles.

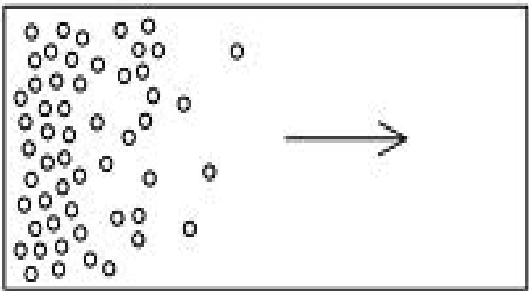
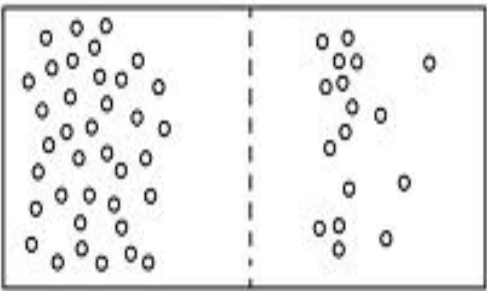
**C) What are cell organelles-** Each cell has got certain basic components within it known as cell organelles. Each kind of cell organelle performs a special function that is why a cell is able to live and perform all its function in any organism. These organelles are suspended in the cytoplasm.

**D) Basic components of cell-** Plasma membrane, Nucleus and cytoplasm.

**E) PLASMA MEMBRANE:**

- a) It is the outermost layer of animal cell.
- b) It gives shape to the cell and provides mechanical support and protection to the inner contents of the cell.
- c) It is protective covering of the cell.
- d) It is called selectively permeable membrane as it allows the entry and exit of some materials in and out of the cell.
- e) It is highly flexible, living membrane made up of organic molecules- proteins and lipids.

**F) What is difference between diffusion and osmosis-**

<b><u>DIFFUSION</u></b>	<b><u>OSMOSIS</u></b>
1. The process of movement of molecules from a region of higher concentration to lower concentration to spread uniformly in given space.	1. The process of movement of water molecules from region of higher concentration to lower concentration through semi-permeable membrane.
2. It is seen in solids, liquids and gases.	2. It is seen only in liquids.
3. It helps in exchange of gases like CO <sub>2</sub> and O <sub>2</sub> between cell as well as its external environment.	3. It helps in absorption of water by plant cells and unicellular organisms.
4. 	4. 

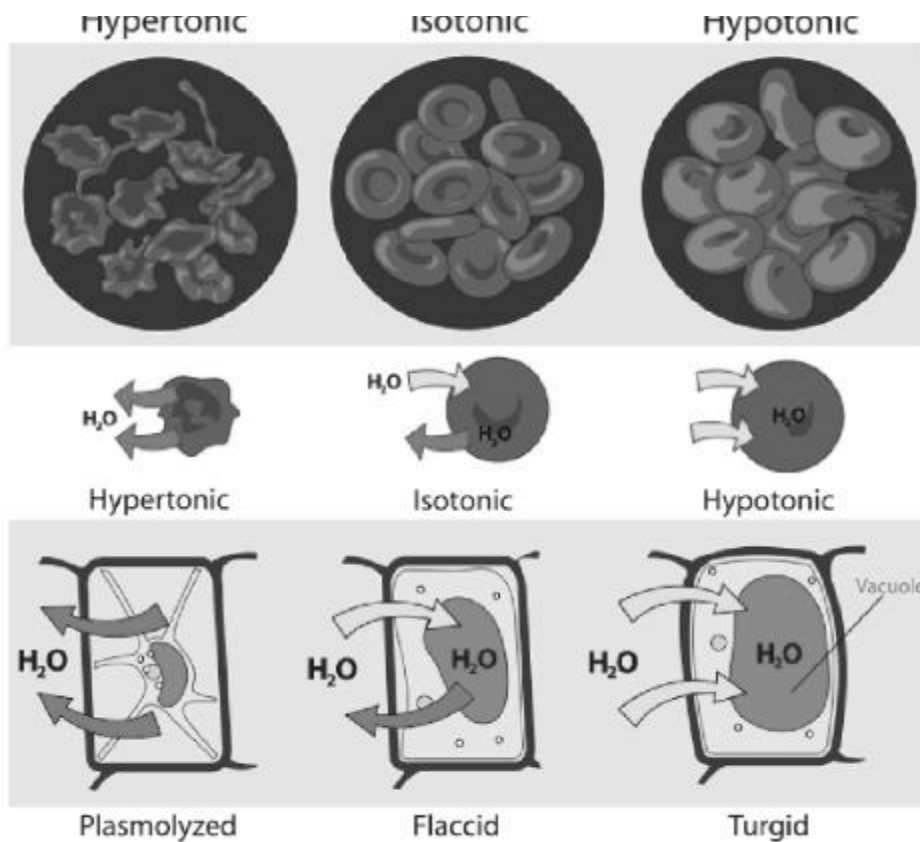
**G) What happens when we put an animal cell into a solution of salt or sugar?**

**\*\* Solute + Solvent ----- SOLUTION**

Three things can happen-

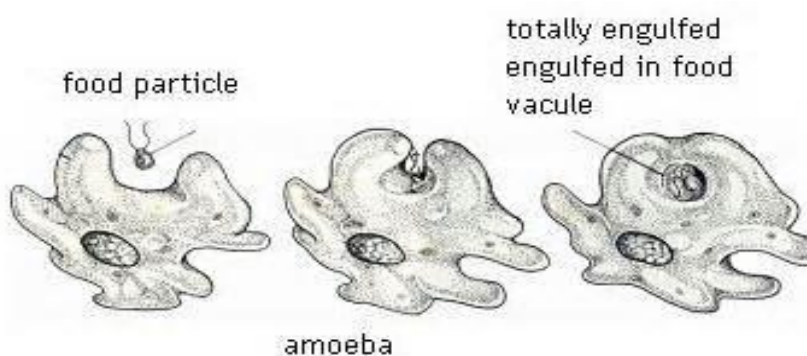
- Higher water concentration than a cell in surrounding medium i.e. the solution is dilute-forms hypotonic solution-Cell gains water and swells up (becomes turgid)-process is Endosmosis.
- Lower concentration of water than a cell in surrounding medium i.e. the solution is concentrated-forms Hypertonic solution- Cell loses water and shrinks (plasmolysed i.e. becomes flaccid)-process is Exosmosis.
- Same concentration inside and outside the cell-forms Isotonic solution- No change and remains normal cell.

**Conclusion:** Osmosis is special kind of diffusion through plasma membrane which can be affected by the amount of substance dissolved in water.



**H)** What is **Plasmolysis**- When living plant cell loses water through osmosis, there is shrinkage or contraction of the contents of the cell away from the cell wall. This phenomenon is called as PLASMOLYSIS.

**I)** What is **Endocytosis** – It is the process which enables the cell to engulf in food and other material from its external environment. It takes place as cell membrane is highly flexible. Example – Unicellular organism Amoeba acquires its food through this process.



**J) What is Cytoplasm-** It is fluid medium present within a cell between cell membrane and nucleus in which all the cell organelles remain suspended. It is the main medium in which all cellular reactions take place in the cell.

**K) NUCLEUS-**

- a) It is known as the brain of the cell as it regulates all major activities of the cell.
- b) It is surrounded by double layered covering called as nuclear membrane which has tiny pores called NUCLEOPORES.
- c) The fluid within the nucleus is called NUCLEOPLASM. It contains two types of nuclear structures- **NUCLEOLUS** and **CHROMATIN**.
- d) In the nucleoplasm thread like coiled structures are present called chromatin network. They carry chromosomes which carry genes. They are highly coiled and made up of DNA molecules.
- e) A small spherical structure called NUCLEOLUS is also present within the nucleus which helps in making RNA (Ribo nucleic acid) molecules. It is a site where ribosomes are formed.
- f) When a cell divides the chromatin condenses to form short thread like structures called chromosomes which are composed of DNA (Deoxy-Ribo Nucleic Acid) and proteins.
- g) Nucleus also regulates cell division (formation of cells from one cell), synthesis and storage of proteins.
- h) Functional segments of the chromosomes are called genes, which are the carriers of hereditary information from one generation to the next.

**L) CELL WALL-**

- a) It is composed of cellulose i.e. Complex carbohydrate. It provides structural strength and rigidity to plants.
- b) It is present only in plant cell, is non-living, fully permeable.
- c) It gives proper shape to the cell.
- d) It protects aquatic plants living in hypotonic medium by preventing them from bursting.

**M) What is difference between Prokaryotes and Eukaryotes?**

<b><u>PROKARYOTES</u></b>	<b><u>EUKARYOTES</u></b>
1) Don't have a well organized nucleus.	1) They have well organized nucleus.
2) Don't have nuclear membrane.	2) They have a nuclear membrane.
3) E.g. bacteria, blue green algae.	3) E.g. Amoeba, onion cell.
4) Size of cell is small i.e. 1-10 microns.	4) Size of cell is large i.e. 5-100 microns.
5) The nucleus region is with a	5) The nucleus region is well

nuclear membrane and so it is called nucleoid.	defined area surrounded by a nuclear membrane.
6) A single chromosome is present	6) More than one chromosome is present
7) Membrane bound cell organelles are absent.	7) Membrane bound cell organelles is present.

N) Difference between plant cell and animal cell-

<u>PLANT CELL</u>	<u>ANIMAL CELL</u>
1. Cell wall present	1. Cell wall absent
2. Plastids present	2. Plastids absent
3. Vacuole single and large	3. Vacuole many and small
4. Nucleus present near periphery and not in centre	4. Nucleus present in centre
5. Mitochondria less in number	5. Mitochondria more in number
6. Golgi body many and scattered called as Dictyosomes	6. Golgi body single and near the nucleus
7. Centriole absent	7. Centriole present with centrosomes

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**St. Gregorios School, Dwarka**  
**Class 9<sup>th</sup> (Session 2020-21)**  
**Biology Worksheet – 1 (Chapter – 5 The Fundamental Unit Of Life)**

Q1 Draw a labelled diagram of plant cell and animal cell.

Q2 What are genes? Where are they located?

Q3 Name the two nucleic acids found in cells. Expand them.

Q4 What is Plasmolysis? What happens to a plasmolysed cell when it is placed in a hypotonic solution?

Q5 Differentiate between-

- a) Cytoplasm, Nucleoplasm and Protoplasm
- b) Chromatin and Chromosome

Q6 Differentiate between Hypotonic, Hypertonic and Isotonic solution.

What will happen to an animal cell if placed in them?

Q7 Why is plasma membrane called selectively permeable membrane?

Q8 Justify the statement “a cell is the structural and functional unit of life”.

Q9 List three distinguishing features between prokaryotic cells and Eukaryotic cells in terms of (i) size of the cells (ii) number of chromosomes in the cell and (iii) nuclear region.

Q10 A unicellular algae put in distilled water does not burst whereas an Amoeba would burst. Why?

Q11 Define Osmosis. How is it different from diffusion?

Q12 how does an Amoeba obtain its food?

Q13 Who presented the cell theory? What does the cell theory state?

Q14 How is a bacterial cell different from an onion peel cell?

Q15 What is the difference between cell membrane and cell wall?

**St. Gregorios School, Dwarka**  
**Class 8<sup>th</sup> (Session 2020-21)**  
**Biology Worksheet- 1 (Chapter-2 Microorganisms)**

Q1 What are microorganisms?

Q2 What are the major groups of microorganisms?

Q3 How do Virus differ from other microorganisms?

Q4 Identify the causative microbe for the diseases mentioned below:

- a) Influenza
- b) Typhoid
- c) Malaria
- d) Polio

Q5 What is meant by Fermentation? Name the scientist who discovered fermentation.

Q6 Which microorganism is used to make bread and cakes soft and fluffy? Describe how this happens?

Q7 Explain the formation of curd from the milk.

Q8 Explain the discovery of penicillin.

Q9 How does a vaccine works?

Q10 What are antibiotics? What precautions must be taken while taking antibiotics?

Q11 How do microorganisms help in cleaning the environment?

Q12 Where do rhizobium bacteria live? What is their function?

Q13 Differentiate between antibiotics and antibodies?

Q14 Identify and draw the microorganisms (algae, fungi and protozoa) given below-

- a) Amoeba
- b) Chlamydomonas
- c) Bread Mould
- d) Spirogyra

Q15 Name them:

- a) The scientist who discovered the vaccine for smallpox.
- b) Two antibiotics
- c) The instrument used to see microorganisms.
- d) Two nitrogen fixers