

# Chapter 5 – Quick Revision Sheet

---

## The Fundamental Unit of Life



### Cell — The Fundamental Unit of Life

A cell is the smallest unit capable of performing all vital life processes like respiration, nutrition and reproduction. Every living organism—from tiny bacteria to large plants and animals—is made of cells, which is why the cell is called the structural and functional unit of life.



### Discovery of Cell

In 1665, Robert Hooke observed cork under a microscope and noticed tiny box-like compartments which he named cells. Later, Schleiden and Schwann (1839) proposed the Cell Theory stating that all living organisms are made of cells, and Rudolf Virchow (1855) added that new cells arise only from existing cells.



### Cell Size & Shape

Cells vary greatly in size and shape depending on their function. For example, nerve cells are long to carry impulses, muscle cells are elongated to help contraction, and red blood cells are round to transport oxygen efficiently throughout the body.



## Basic Structure of Cell

Most cells have three main parts: the plasma membrane, cytoplasm, and nucleus. The plasma membrane forms the protective boundary, the cytoplasm contains the organelles where chemical reactions occur, and the nucleus acts as the control centre of the cell.



## Plasma Membrane

The plasma membrane is a thin protective boundary around the cell that is selectively permeable, allowing substances to move in and out through diffusion, osmosis, and active transport.



## Cell Wall - *Plant Cells*

Plant cells possess an additional rigid outer layer called the cell wall, mainly made of cellulose, which provides strength, protection and a definite shape to the cell while preventing it from bursting when water enters.

## **Nucleus — Control Centre**

The nucleus is the most important organelle of the cell because it controls cell activities such as growth, metabolism and reproduction. It contains chromosomes made of DNA, which carry genetic information responsible for inheritance.

## **Important Cell Organelles**

Different organelles perform specific tasks inside the cell: mitochondria produce energy (ATP) and are called the powerhouse of the cell, ribosomes synthesize proteins, the endoplasmic reticulum transports materials, the Golgi apparatus modifies and packages substances, lysosomes digest wastes, while vacuoles store water, food, and wastes, and plastids in plant cells help in photosynthesis, storage, and colour.

## **Plant Cell vs Animal Cell**

Although plant and animal cells share many organelles, plant cells contain a cell wall, plastids and a large vacuole, which help maintain their rigid structure and enable photosynthesis, while animal cells lack a cell wall and plastids and usually have smaller vacuoles.