

**Class IX**

**Biology**

**Chapter 2 Cell**

**Date—29-04-2020**

**What is a cell?**

The cell is the fundamental structural and functional unit of all living beings. Cells are capable of independent existence and are microscopic.

**Invention of microscope and the discovery of cell**

**Antony van Leeuwenhoek** constructed the first microscope. His microscope consisted of single biconvex lens with magnifying power up to 200 times.

**Robert Hooke** developed a microscope with two biconvex lenses, achieving greater magnification( 2000 times).

Hooke examined a thin slice of cork. He observed tiny "box like" compartments. He called these compartments as cells.

Later with the invention of electron microscope internal structures of cell were studied.

**Cell theory**→ Cell theory is combined work of Mathhias Schleiden (1838), Theodor Schwann (1839) and Rudolf Virchow (1858). It states:-

1. Cell is the functional unit of life.
2. Cell is the structural unit of life.
3. All cells arise from pre existing cells.

**Structure of cell:-**

1. Cell membrane
2. Nucleus
3. Cytoplasm.

**Cell membrane or plasma membrane**

1. It is composed of lipo-protein. It is a living part. According to fluid mosaic model, it is a bilayered phospholipid structure.
2. It has fine pores through which it allows selective material to pass through it. It is selectively permeable.
3. Plant cells have a cell wall surrounding the cell membrane. It is made up of cellulose. It gives shape and rigidity to the cell. It is freely permeable and a non living structure.

**Nucleus**

1. It has a delicate nuclear membrane.
2. It is filled with relatively dense nucleoplasm.

3. In the nucleoplasm, thread like structures called chromatin fibres are present. These are the genetic material.
4. Some densely stained regions are found in the nucleoplasm, called nucleolus. These participate in protein synthesis.

**Cytoplasm** → It is a semiliquid substance, in which the cell organelles are embedded. Some of the cell organelles are as follows:-

**1 Endoplasmic reticulum** → It's a double membranous network. It acts as the supporting framework of cell and distributive pathway.

**2 Ribosomes** → small granules, either scattered in the cytoplasm or attached to endoplasmic reticulum. These participate in protein synthesis. Therefore, they are called "factories for protein synthesis".

**3 Mitochondria** → minute double walled bags with their inner walls produced into finger like processes projecting inwards called cristae. The inner wall contains enzymes for cellular respiration. Therefore, these are sites for cellular respiration.

**4 Lysosome** → small vesicles, budded off from golgi bodies. They contain 40 different types of hydrolytic enzymes. These enzymes digest the foreign substances, stored food and sometimes even themselves.

**5 Centrosome** → found only in animal cells, near the nucleus. It consists of two centrioles which are bundles of microfilaments. They initiate the cell division.

**6 Golgi apparatus** → stacks of membranous sacs found near the nucleus. They are concerned with secretions of the cell i.e. enzymes, hormones etc.

**7 Plastids** → found only in plant cells. Various types of plastids are:-

- a> Leucoplast – colourless plastid. They store starch.
- b> Chromoplast – contain pigments such as xanthophyll and carotene. They impart colours such as yellow, orange and red.
- c> Chloroplast – contain chlorophyll. Imparts green colour and participate in photosynthesis.

**8 Vacuoles** → clear spaces filled with watery solution called cell sap. It is a cell inclusion. Plant cells usually have large, prominent vacuole.

**Protoplasm** → The total living substance in an organism is called protoplasm. Accurate chemical analysis of protoplasm is impossible as it ceases to be protoplasm as soon as it is removed from the organism.

**Prokaryotic and eukaryotic cells** → Prokaryotic cells have a single molecule of DNA as genetic material. They do not possess nuclear membrane and they do not have well organised nucleus. They lack membrane bound organelles such as mitochondria, chloroplast etc. Example bacterial cell.

The eukaryotic cells have well organised nucleus enclosed within a nuclear membrane. They have two or more DNA molecules as genetic material. They have well developed membrane bound cell organelles such as lysosome, mitochondria etc.

### Assignment

1 Who proposed cell theory? Write down the postulates of cell theory?

2 Differentiate between cell membrane and cell wall.

3 Write down the functions of mitochondria , ribosomes , lysosomes and endoplasmic reticulum.

4 State the three types of plastids and the pigments associated with them.

5 Draw and label a plant cell , an animal cell and a bacterial cell .

**Learn the table.**

**Table 1.1** Differences between an animal cell and a plant cell

FEATURE	ANIMAL CELL	PLANT CELL
size and shape	usually smaller in size and oval in shape	comparatively larger in size and rectangular in shape
cell wall	cell wall is absent	cell wall made up of cellulose is present
vacuoles	vacuoles are either absent or if present are small in size and scattered	the vacuoles are well-developed. In a mature plant cell, usually a single large central vacuole is present
Golgi bodies	Golgi bodies are well-developed and present near nucleus	the components of golgi bodies are diffused in the plant cells and are called dictyosomes
centrosome	centrosome and centrioles are present	centrosome and centrioles are absent, instead polar caps are present
plastids	plastids are absent	plastids are present
storage of reserve food	in animal cells, reserve food is stored in the form of glycogen	in plant cells, reserve food is stored in the form of starch or oil