9Th Class

➢ Cell Structure

❖ **Introduction to Cells:** Cells are the basic structural and functional units of all living organisms. They vary in size, shape, and function, but they all share certain common features.

❖ **Cell Theory:** The cell theory states that:

1. All living organisms are composed of one or more cells.
2. The cell is the basic unit of structure and organization in organisms.
3. Cells arise from pre-existing cells through cell division.

❖ **Types of Cells:** There are two main types of cells:

1. Prokaryotic Cells: These cells lack a true nucleus and membrane-bound organelles. Examples include bacteria and archaea.
2. Eukaryotic Cells: These cells have a true nucleus and membrane-bound organelles. Examples include animal cells, plant cells, fungal cells, and protist cells.

❖ **Cell Structure:**

- **Cell Membrane:** Also known as the plasma membrane, it surrounds the cell and regulates the movement of substances in and out of the cell.
- **Nucleus:** It contains the genetic material (DNA) of the cell and controls cellular activities.
- **Cytoplasm:** The gel-like substance within the cell where organelles are suspended.
- **Organelles:** These are specialized structures within the cell that perform specific functions. Examples include mitochondria, endoplasmic reticulum, Golgi apparatus, lysosomes, and chloroplasts (in plant cells).

❖ **Plant Cell vs. Animal Cell:** While both plant and animal cells share many similarities, there are some key differences:

- Plant cells have a cell wall, chloroplasts, and a large central vacuole, which animal cells lack.
- Animal cells may have centrioles, which are absent in most plant cells.

❖ **Cell Division:** Cell division is the process by which cells reproduce. It involves two main stages:

- **Mitosis:** The division of the nucleus to produce two identical daughter nuclei.
- **Cytokinesis:** The division of the cytoplasm to form two separate daughter cells.

Conclusion: Understanding the structure and function of cells is essential for understanding the biology of living organisms. Cells are incredibly diverse and specialized, yet they all share common features that reflect their fundamental role as the building blocks of life.