

# Introduction to Cell Biology

## 1. Definition of Cell Biology

Cell Biology, also known as Cytology, is a branch of biology that deals with the study of cells, their structure, function, chemical composition, and interactions. The cell is the basic structural and functional unit of life, and all living organisms are composed of one or more cells.

## 2. Historical Background

The development of cell biology is closely linked with the invention and improvement of the microscope. In 1665, Robert Hooke first observed dead cells in cork and coined the term 'cell'. Later, Anton van Leeuwenhoek discovered living cells, including bacteria and protozoa, using simple microscopes. The formulation of the cell theory by Schleiden and Schwann established the foundation of modern cell biology.

## 3. Cell Theory

- All living organisms are composed of one or more cells.
- The cell is the basic structural and functional unit of life.
- All cells arise from pre-existing cells (added later by Rudolf Virchow).

## 4. Types of Cells

Cells are broadly classified into prokaryotic and eukaryotic cells. Prokaryotic cells lack a true nucleus and membrane-bound organelles and are found in organisms such as bacteria. Eukaryotic cells possess a well-defined nucleus and membrane-bound organelles and are found in plants, animals, fungi, and protists.

## 5. Importance of Cell Biology

- Helps in understanding the structure and function of living organisms.
- Forms the basis of medical science, genetics, biotechnology, and molecular biology.
- Essential for understanding diseases at the cellular level.
- Plays a crucial role in research related to cancer, stem cells, and genetic disorders.

## 6. Scope of Cell Biology

Cell biology has a wide scope and is closely associated with disciplines such as molecular biology, genetics, biochemistry, immunology, and biotechnology. Advances in cell biology have contributed significantly to modern medicine, agriculture, and industrial applications.