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((Cell Biology))

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**Introduction
to Cell Biology**

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The Cell

The cell (from Latin **cell** meaning small room) is the basic structural, functional and biological unit of all known organisms. A cell is the smallest unit of life. Cells are often called the building blocks of life. The study of cell is called Cell Biology, Cellular Biology or **Cytology**.

Cell biology, is the branch of biological science that studies the structure, function, and behavior of cells. Cells are the fundamental structural and functional units of all living organisms, forming the basic building blocks of life. From single-celled organisms such as bacteria to complex multicellular organisms like humans, every living being depends on the proper functioning of cells.

The study of cell biology focuses on understanding **cellular components, including the cell membrane, cytoplasm, nucleus, and various organelles**, as well as **the processes that occur within cells such as metabolism, cell division, communication, and energy production**. By examining how cells grow, reproduce, and interact with their environment, scientists gain insight into how tissues, organs, and entire systems function.

Cell biology **plays a crucial role in advancing medicine, biotechnology, genetics, and molecular biology**. Many diseases, including cancer and genetic disorders, originate from cellular dysfunction. Therefore, understanding cellular mechanisms helps in developing new treatments and medical technologies.

In 1665, the cell was discovered by **Robert Hook**. It is a small united area where all kinds of actions and reactions collectively take place. Some cells have membrane- bound organelles and some do not have. Depending upon the internal structure of the cell, two types of cells are found in an organism namely



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Biologists classify cells into two broad categories the Prokaryotes and Eukaryotes. The primary difference between a prokaryotic cell and a eukaryotic cell is the presence or absence of a nucleus, a membrane-bound structure that houses the DNA. Prokaryotic cells lack a nucleus, whereas eukaryotic cells possess a nucleus. Despite their differences, both types of cells have a plasma membrane, a membrane that regulates what enters and exists a cell.

A comparison between Prokaryotic cell as in bacteria and Eukaryotic cell as a plant

| Prokaryotic Cell | Eukaryotic Cell |
|---|---|
| Nucleus is absent | Nucleus is present |
| Membrane-bound nucleus absent. | Membrane-bound Nucleus is present. |
| Cell wall chemically complex | Cell wall is present in plants and fungi and chemically simpler |
| Mitochondria absent | Mitochondria present |
| One chromosome is present, but not true chromosome plastids | More than one number of chromosomes is present. |
| Chloroplasts absent; chlorophyll scattered in the cytoplasm | Chloroplasts present in plants |
| Vacuoles absent | Vacuoles present |
| Sexual reproduction is absent divided by binary fission | Sexual reproduction is present divided by mitosis meiosis |
| Golgi apparatus absent | Golgi apparatus present |

