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Cell Prokaryotic Eukaryotic Multicellular

Introduction to Cells

In 1665, Robert Hooke first discovered and introduced the term 'cell'. A cell is the structural and functional unit of all living organisms. Organisı organisms have many cells that function coordinately.

Cell Structure and Components

The size, shape, and volume of cells relate to their specific functions. Generally, a cell has a plasma membrane, nucleus, and cytoplasm. The environment.

Historical Discoveries

In 1674, Leeuwenhoek observed living cells in protists and bacteria. Robert Brown discovered the nucleus in 1831. Purkinje coined the term "Pro stating that all plants and animals are composed of cells, and the cell is the basic unit of life. Virchow expanded this theory in 1855 by sugge

Prokaryotic and Eukaryotic Cells

Prokaryotic cells are primitive cells without a well-defined nuclear membrane. Their genetic material lies as a single chromosome called nuc cyanobacteria.

Eukaryotic cells have a well-defined nucleus enclosed by a nuclear envelope and membrane-bound organelles. Examples include plant, an

Unicellular and Multicellular Organisms

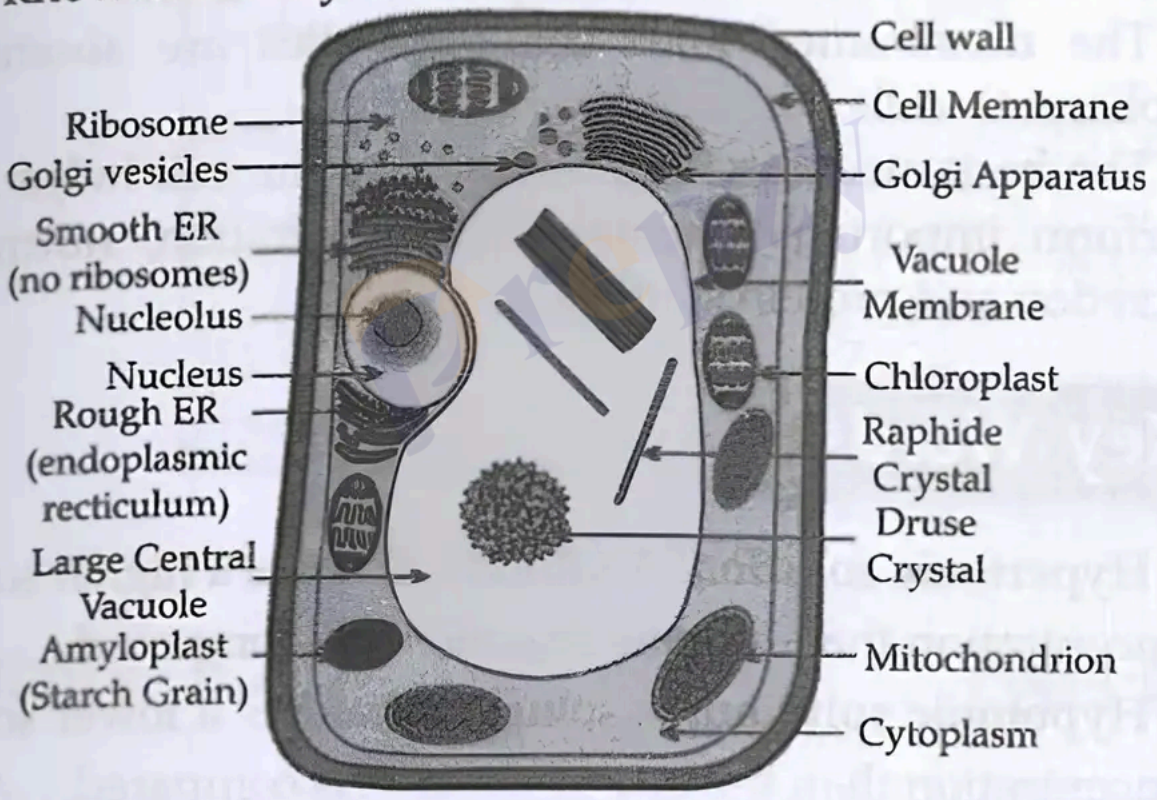
Unicellular organisms consist of a single cell that performs all life processes such as digestion, respiration, excretion, and reproduction. Exam

Multicellular organisms consist of many specialized cells organized into tissues, organs, and organ systems to perform different functions. Ex

Differences Between Plant and Animal Cells

Plant cells have a rigid cell wall made of cellulose external to the plasma membrane, large central vacuoles for storage, and plastids such a important for cell division. Both cell types have organelles like the nucleus, mitochondria, Golgi apparatus, endoplasmic reticulum, and ribos

Plant Cell	
1. Cellulose cell wall present external to cell membrane.	1. No plas
2. Vacuoles are usually large.	2. Ger usu
3. Plastids are present.	3. Plas
4. Centrioles are absent.	4. Cer
5. The golgi body is present in the form of units known as dictyosomes.	5. The



Cell Organelles Mnemonics

To remember cell organelles, use the mnemonic: *"Cup Mein Garam Coffee Pina Roz Verna Egg Lena"*.

- C: Cytoplasm
- M: Mitochondria
- G: Golgi bodies
- C: Centrosome
- P: Plastids
- R: Ribosomes
- V: Vacuoles
- E: Endoplasmic reticulum

- L: Lysosomes

Cellular Components

The plasma membrane is a thin, selectively permeable membrane made of lipids and proteins. It separates the cell contents from the outsi endocytosis.

Osmosis is the diffusion of water through a selectively permeable membrane. Cells respond differently in various solutions:

- **Hypotonic solution:** Cell gains water.
- **Hypertonic solution:** Cell loses water (plasmolysis).
- **Isotonic solution:** No net water movement.

Chromosomes are rod-like structures formed by condensed chromatin during cell division. Each chromosome consists of two chromatids jo 46 chromosomes (23 pairs), with each parent contributing 23.

Plant, fungal, and bacterial cells have both plasma membrane and cell wall. The cell wall is rigid, non-living, and composed mainly of cellulo

The nucleus is a spherical, usually central cell component bounded by a double-layered nuclear envelope. It contains chromosomes during activities.

Cells are classified as prokaryotic (no defined nucleus, nucleoid region) or eukaryotic (defined nucleus with nuclear membrane).

The cytoplasm is the fluid between the nucleus and plasma membrane, containing vital chemicals and organelles. Organelles include endo

ER is a network of membranes; rough ER has ribosomes and synthesizes proteins, smooth ER synthesizes lipids and detoxifies substances. Go enzymes and act as waste disposal.

Mitochondria are double-membraned organelles with their own DNA and ribosomes, known as the cell's powerhouse, providing energy. Plas

Vacuoles store cell sap in plants, providing turgidity, and assist in nutrition and osmoregulation in unicellular organisms. Centrosomes, found

Prokaryotic cells lack membrane-bound organelles. The cell's structural organization enables vital functions like respiration, nutrition, excreti

Solved Examples

Practice Set

- **Level 1 – Easy:** What is the main difference between prokaryotic and eukaryotic cells?
- **Level 2 – Moderate:** Explain how the cell wall benefits plant cells but is absent in animal cells.
- **Level 3 – Challenging:** Describe the process and significance of osmosis in plant cells when placed in a hypertonic solution.

Answer Key

- **Level 1:** Prokaryotic cells lack a well-defined nucleus and membrane-bound organelles, while eukaryotic cells have a defined nucleus a
- **Level 2:** The cell wall provides mechanical strength and protection to plant cells and helps them withstand changes in the environment needs.
- **Level 3:** Osmosis is the movement of water from a region of low solute concentration to high solute concentration through a selectively from the cell wall (plasmolysis), which can affect cell function and plant health.

Quick Reference Table

Common Mistakes and Misconceptions

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