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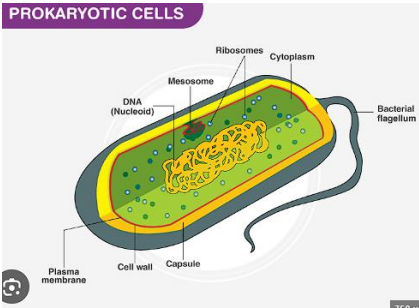
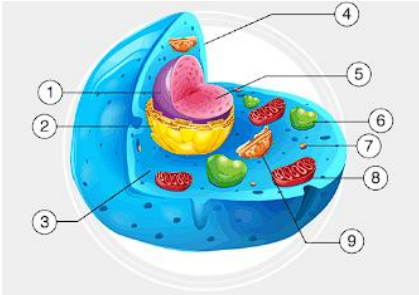
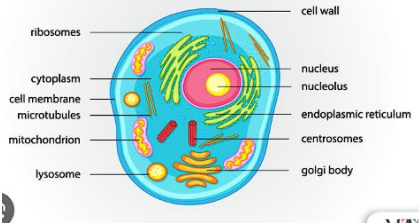
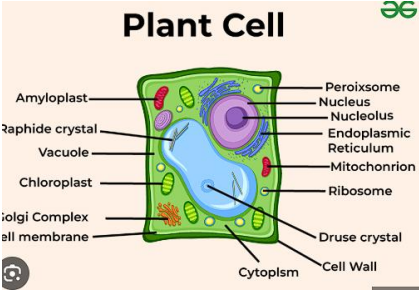


1. **Cell Membrane (Plasma Membrane)** – The outer boundary of the cell, which controls the movement of substances in and out.
2. **Cytoplasm** – The gel-like substance inside the cell, excluding the nucleus, where many cell processes occur.
3. **Nucleus** – The control center of the cell, containing genetic material (DNA).
4. **Mitochondria** – Known as the "powerhouse" of the cell, these organelles generate energy (ATP).
5. **Endoplasmic Reticulum (ER)** – A network of membranes involved in protein and lipid synthesis. It comes in two types:

o **Rough ER** – Studded with ribosomes, involved in protein synthesis.

o **Smooth ER** – Involved in lipid synthesis and detoxification.
6. **Golgi Apparatus** – An organelle that modifies, sorts, and packages proteins for secretion or use within the cell.
7. **Ribosomes** – The site of protein synthesis, found either floating in the cytoplasm or attached to the rough ER.
8. **Lysosomes** – Contain digestive enzymes to break down waste materials and cellular debris.
9. **Cytoskeleton** – A network of protein filaments and tubules that provides shape and structural support to the cell.
10. **Chloroplasts** – Found in plant cells, they capture light energy for photosynthesis.

2. Cell Types

Cell Type	Characteristics / Features	Examples
<div>Prokaryotic Cells</div> <div></div>	<div>1. Simple, unicellular organisms.</div> <div>2. Lack a membrane-bound nucleus and organelles.</div> <div>3. Genetic material is located in the nucleoid region, not enclosed by a membrane.</div> <div>4. Smaller size, typically ranging from 1–10 micrometers.</div> <div>5. Reproduce by binary fission- Cell wall usually present (made of peptidoglycan in bacteria)</div>	Bacteria (e.g., <i>Escherichia coli</i> , <i>Streptococcus</i>)
<div>Eukaryotic Cells</div> <div></div>	<div>1. Larger and more complex cells, typically 10–100 micrometers in size.</div> <div>2. Contain a membrane-bound nucleus that houses genetic material.</div> <div>3. Have membrane-bound organelles, such as mitochondria and the endoplasmic reticulum.</div> <div>4. Can exist as unicellular or multicellular organisms.</div> <div>5. Reproduce through mitosis (asexual reproduction) or meiosis (sexual reproduction).</div>	Animal cells, Plant cells, Fungi, Protists
<div>Animal Cells</div> <div></div>	<div>1. Eukaryotic cells without cell walls.</div> <div>2. Possess a flexible cell membrane composed of phospholipids.</div> <div>3. Contain centrioles to organize microtubules during cell division.</div> <div>4. Have small, temporary vacuoles for storage purposes.</div> <div>5. Contain mitochondria for energy production through cellular respiration.</div>	Human cells, Muscle cells, Nerve cells, Red blood cells
<div>Plant Cells</div> <div></div>	<div>1. Eukaryotic cells with a rigid cell wall made of cellulose.</div> <div>2. Contain chloroplasts for photosynthesis, housing chlorophyll.</div> <div>3. Possess a large central vacuole for water and nutrient storage and maintaining cell shape.</div> <div>4. Contain plastids, such as chromoplasts, for pigment storage.</div> <div>5. Lack centrioles for cell division, utilizing microtubules instead.</div>	Elodea, Oak tree cells, Rose cells



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<div><div>Fungal Cells</div><div></div></div>	<div><div><div>1. Eukaryotic cells with a cell wall made of chitin.</div><div>2. Lack chloroplasts and do not perform photosynthesis.</div><div>3. Possess smaller vacuoles compared to plant cells.</div><div>4. Can be unicellular (e.g., yeasts) or multicellular (e.g., molds and mushrooms).</div><div>5. Reproduce both sexually and asexually, typically via spores.</div></div></div>	<div><div>Yeast (<i>Saccharomyces cerevisiae</i>), Mushroom cells, Molds</div></div>
<div><div>Protist Cells</div><div></div></div>	<div><div><div>1. Eukaryotic cells that do not fit into the plant, animal, or fungal categories.</div><div>2. Can be unicellular or multicellular.</div><div>3. May possess features like flagella or cilia for movement.</div><div>4. Some contain chloroplasts for photosynthesis, while others are heterotrophic.</div><div>5. Often found as aquatic organisms.</div><div>6. Exhibit diversity in structure and function.</div></div></div>	<div><div>Amoeba, Paramecium, Algae (e.g., <i>Chlamydomonas</i>), Euglena</div></div>

3. Other Key Terms

1. **Cell Wall** – A rigid outer layer found in plant, fungal, and bacterial cells, providing structural support.

2. **Vacuoles** – Membrane-bound sacs within the cytoplasm that store substances like nutrients, waste products, and water. Plant cells usually have a large central vacuole.

3. **Plasmids** – Small circular DNA molecules found in prokaryotes (and sometimes in eukaryotic cells) that are separate from the chromosomal DNA.

4. **Centrioles** – Structures involved in cell division in animal cells, helping in the formation of the mitotic spindle.

5. **Nucleolus** – A small dense structure inside the nucleus, involved in the production of ribosomes.

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