



THE CELLULAR FOUNDATION OF LIFE

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Bio 111 TECHNICAL ENGLISH

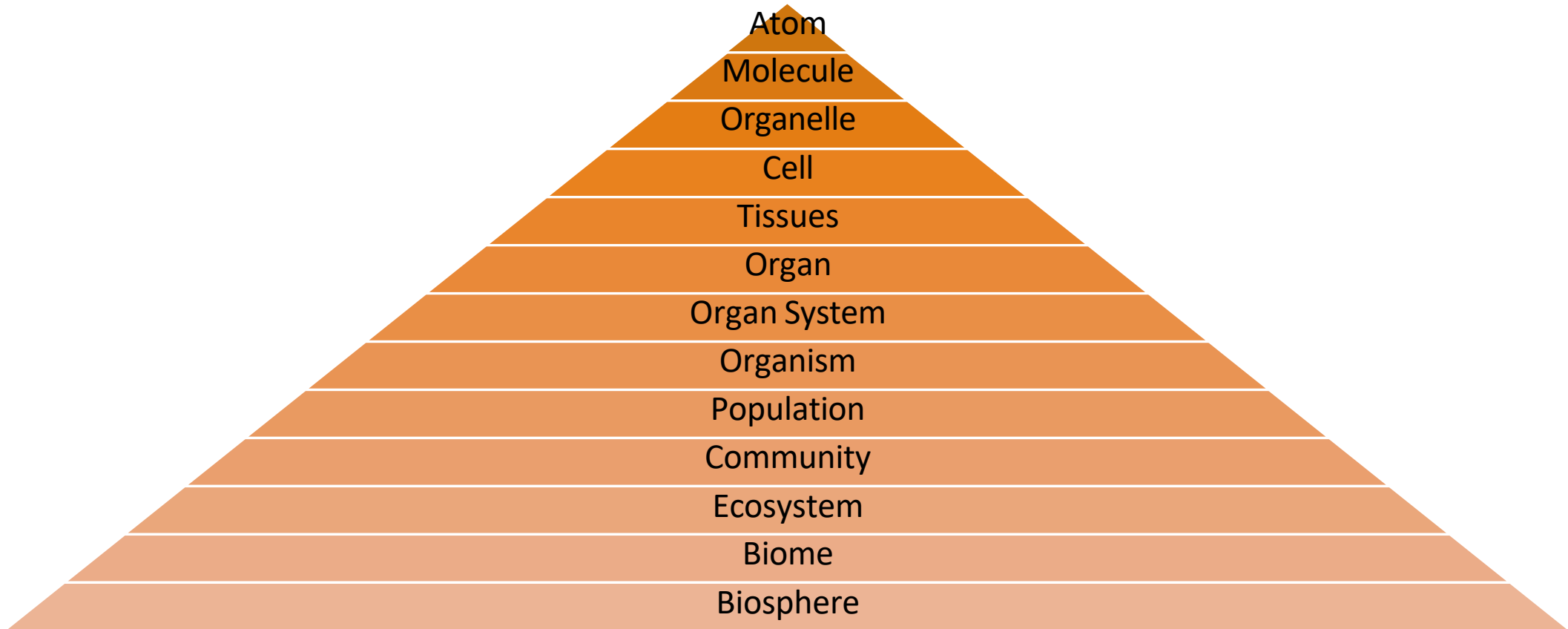
Week 2

1-5/10/2024

Objectives

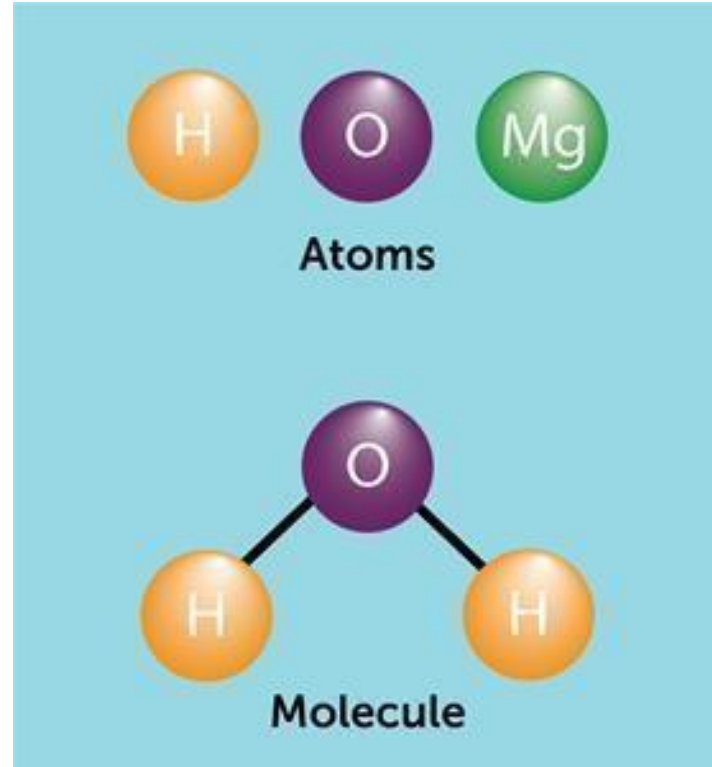
- By the end of the class the students will be able to:
- Biological level of organisation
- Cellular Processes and Functions
- Understand the Basic Structure of Cells

The Biological Levels of Organization



Atom: A unit of matter; the smallest unit of a chemical element.

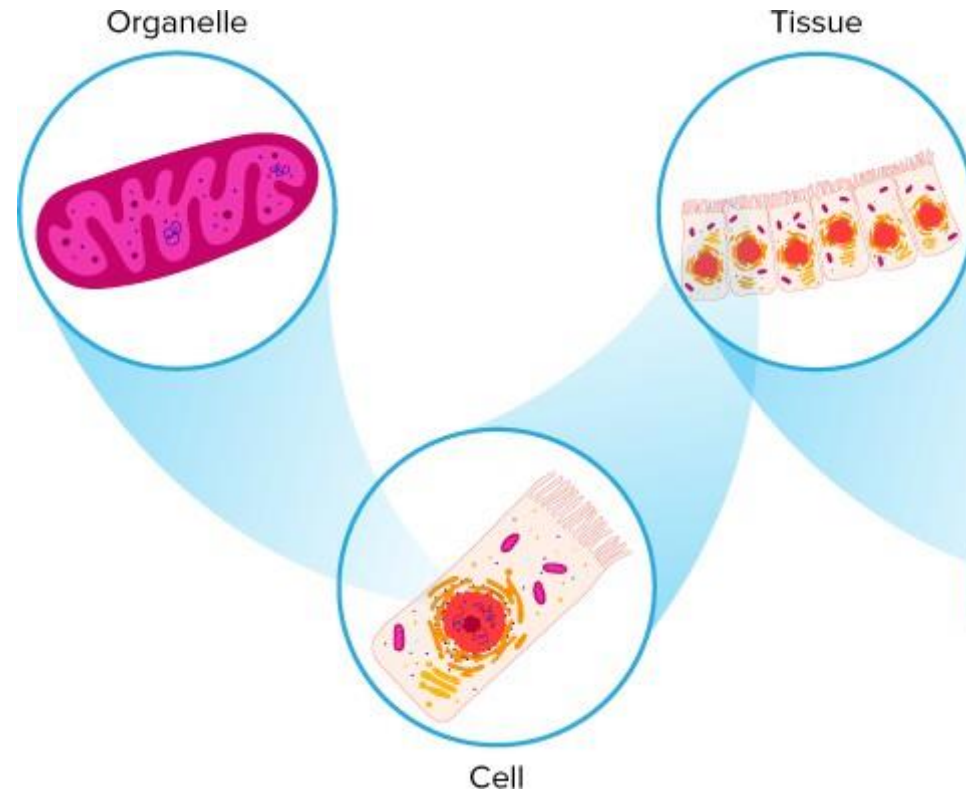
Molecule: A group of two or more atoms held together by a chemical bond



Organelle: Any of the specialized structures within a cell that perform a specific function. For example, the nucleus is an organelle.

Cell: The smallest structural and functional unit of an organism that contains organelles.

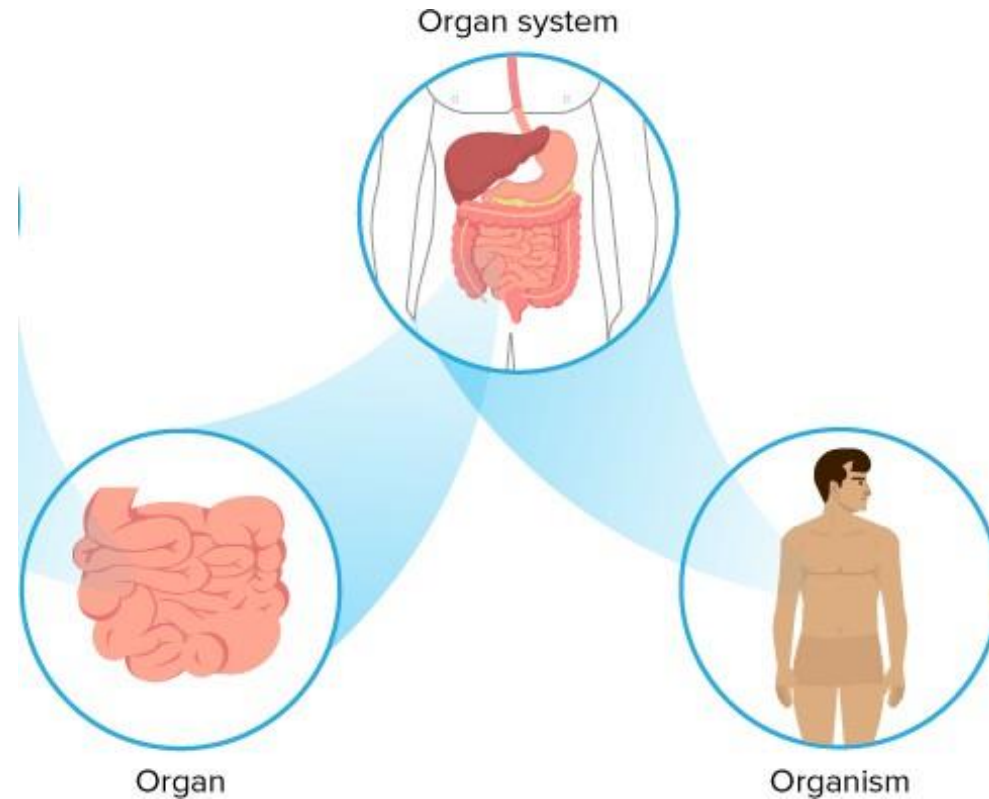
Tissues: A group of similar cells carrying out the same function.



Organ: A structure formed of tissues operating together to perform a common function

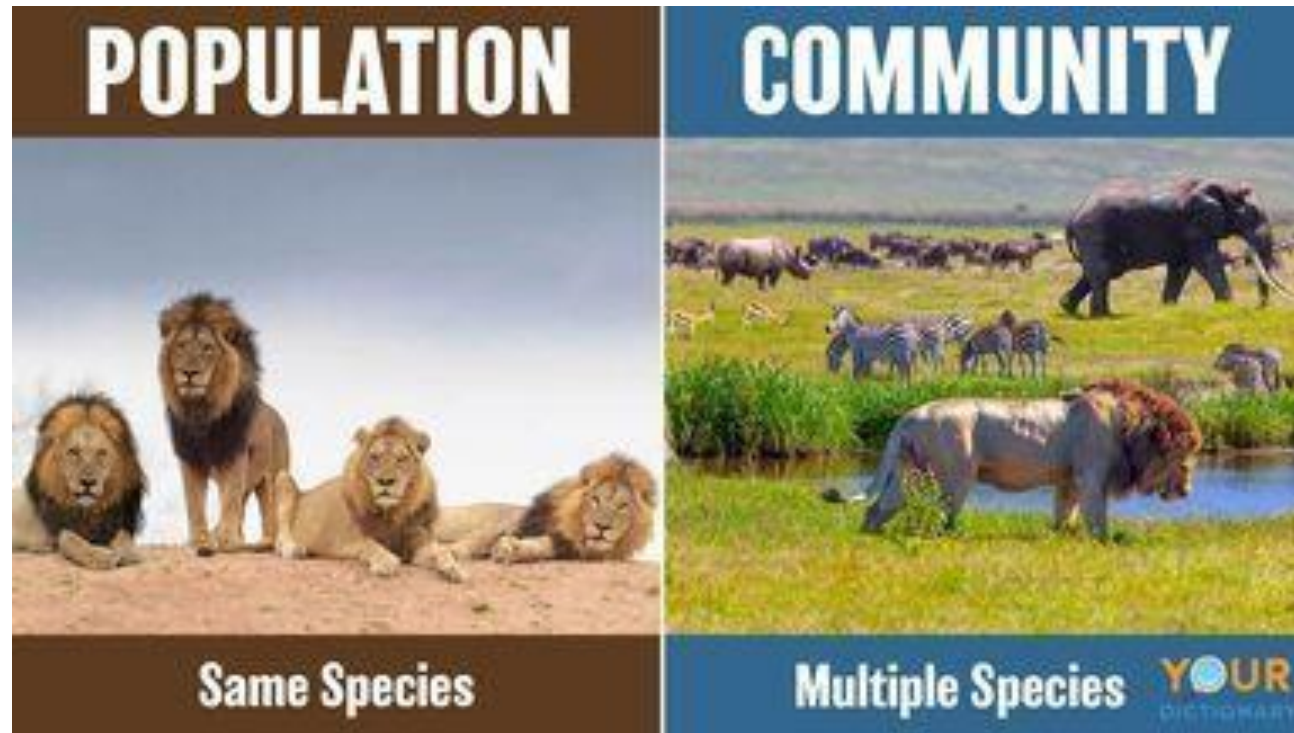
Organ System: A group of organs that work together to perform a specific function.

Organism: An individual form of life that is capable of growing and reproducing, and have one or more cells.



Population: A group of individuals of a particular species living in a specific ecosystem at the same time.

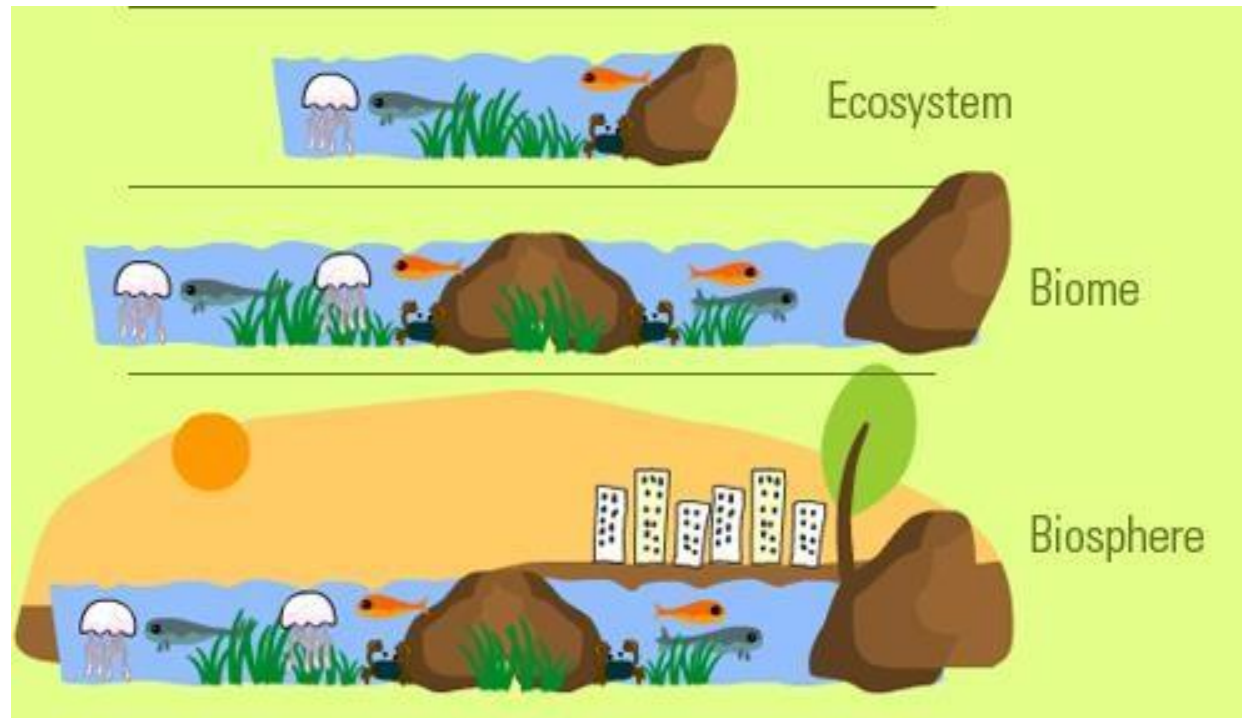
Community: A collection of populations living in a specific ecosystem at the same time.



Ecosystem: A system consisting of biotic and abiotic components that function together as a unit.

Biome: Large areas on Earth with similar conditions, such as similar climates and similar living organisms. (Collection of similar ecosystems)

Biosphere: Part of the Earth where living things thrive and live. (Collection of Biomes)



ASSESSMENT

Write the definition of the following terms:

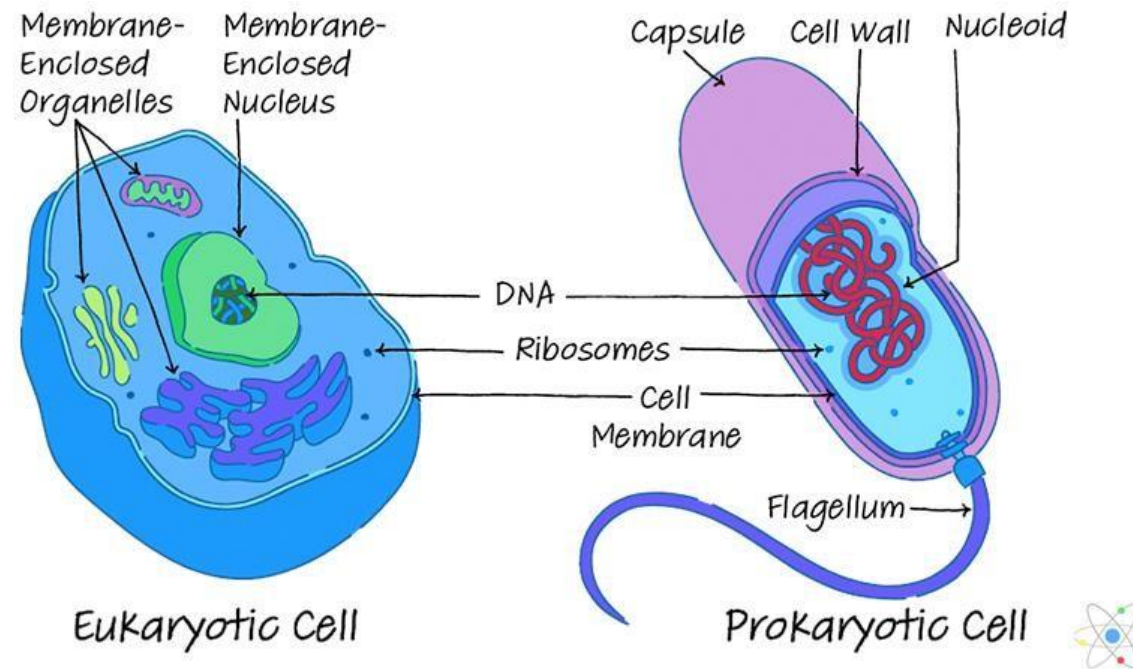
1. Organelle
2. Cell
3. Tissues

What is the difference between:

1. Population vs. Community
2. Biome vs. Biosphere
3. Atom vs. Molecule

Eukaryote: Organisms whose cells contain a nucleus and other membrane-bound organelles

Prokaryote: Unicellular organisms that lack a nucleus and membrane-bound structures.



Cell Wall: The protective, outer layer of a plant cell.

Cell Membrane: Also called the plasma membrane, is found in all cells and separates the interior of the cell from the outside environment.

Cytoplasm: The gel-like fluid inside the cell

Cytoskeleton: A structure that helps cells maintain their shape and internal organization.

Nucleus: A membrane-bound organelle that contains the cell's genetic material

Nucleolus: A region found within the cell nucleus that is concerned with producing and assembling the cell's ribosomes.

Ribosome: A sphere-shaped structure within the cytoplasm of a cell that is composed of RNA and protein and is the site of protein synthesis

Endoplasmic Reticulum (ER): A network of membranes inside a cell through which proteins and other molecules move.

Rough Endoplasmic Reticulum (RER): Organelle covered in ribosomes and plays a role in the synthesis of proteins.

Smooth Endoplasmic Reticulum (SER): Organelle not covered in ribosomes and plays a role in the production and storage of lipids and steroids.

Golgi apparatus: The organelle that helps process and package proteins and lipid molecules

Vesicle: Organelles that contain a lipid bilayer and transport materials and function in metabolism and enzyme storage

Vacuole: Membrane-bound organelle that removes waste and stores water/nutrients.

Mitochondria: The organelle that generates most of the chemical energy needed to power the cell's biochemical reactions. (Powerhouse of the cell)

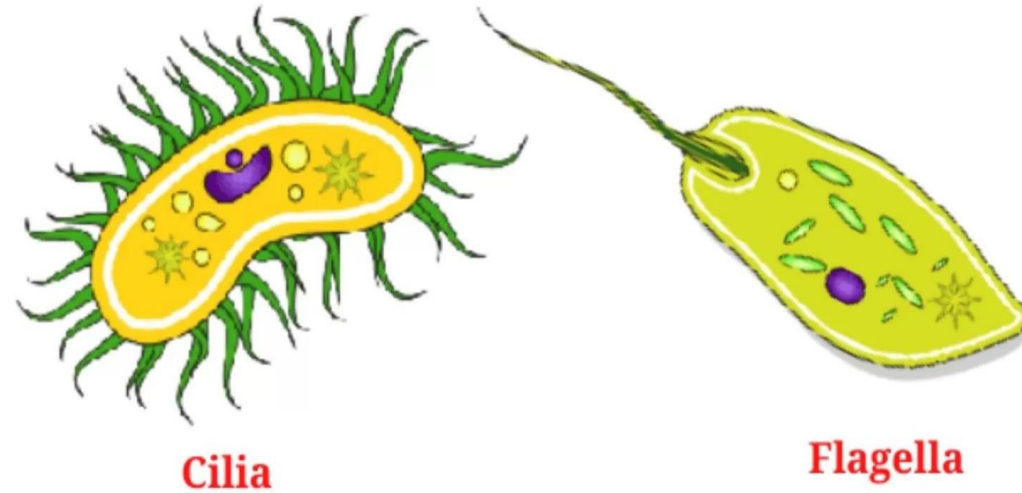
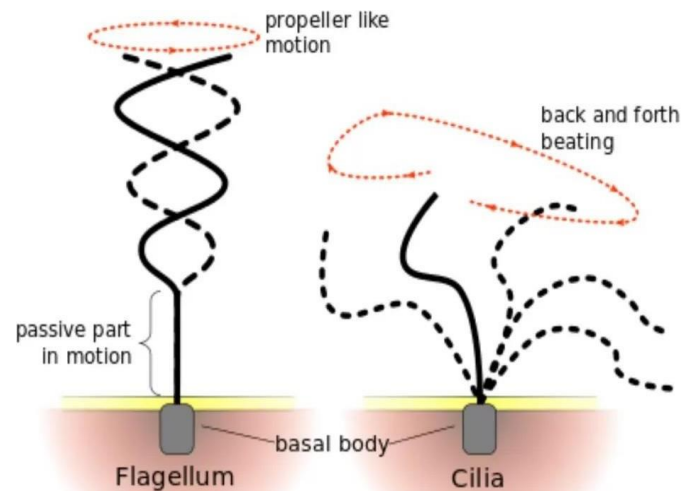
Peroxisome: A membrane-bound organelle containing enzymes (such as catalase) which act in oxidative reactions.

Lysosome: A membrane-bound cell organelle that contains digestive enzymes

Chloroplast: An organelle within the cells of plants and certain algae that is the site of photosynthesis

Cilium (plural: cilia): Short, hair like cell organelle extending from the surface of a living cell.

Flagellum (plural: flagella): Long, threadlike cell organelle present on the surface of a living cell.



ASSESSMENT

Circle the correct term:

1. Unicellular organisms that lack a nucleus and membrane-bound structures are *Eukaryotes* / *Prokaryotes*
2. A structure that helps cells maintain their shape and internal organization is *Cytoskeleton* / *Cytoplasm*
3. A membrane-bound cell organelle that contains digestive enzymes is *Peroxisome* / *Lysosome*
4. The organelle that helps process and package proteins and lipid molecules is *Golgi Apparatus* / *Nucleolus*

Define the following:

1. Vacuole
2. Nucleus
3. Ribosome
4. Cell Membrane
5. Flagella

Pinocytosis: A cellular process by which fluids are ingested by cells.

Phagocytosis: A cellular process for ingesting and eliminating particles, including foreign substances, microorganisms, and apoptotic cells.

Gap Junction: A type of cell junction in which adjacent cells are connected through protein channels.

Plasmodesmata: Small channels that directly connect the cytoplasm of neighboring plant cells to each other.

Extracellular Matrix: A large network of proteins and other molecules that surround, support, and give structure to cells and tissues in the body

Active Transport: Movement of substances from a region of lower concentration to a higher concentration with the use of energy.

Passive Transport: Movement of substances from an area of higher to lower concentration without the use of energy.

Facilitated Transport: Movement of materials across the plasma membrane with the help of membrane proteins.

Diffusion: The passive movement of molecules or particles from an area of higher concentration to an area of lower concentration.

Osmosis: The transport of water through a semipermeable membrane from an area of high water concentration to an area of low water concentration

Selectively Permeable: A membrane that allows only some substances and molecules to pass into or leave the cell.

Solute: A substance that can be dissolved by a solvent to create a solution.

Solvent: A substance that dissolves a solute, resulting in a solution.

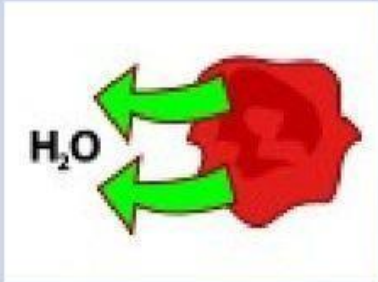
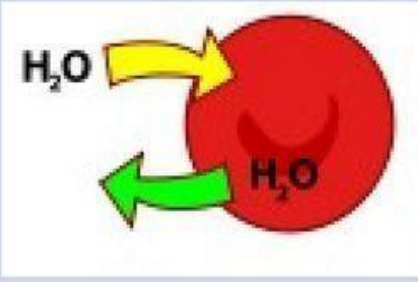
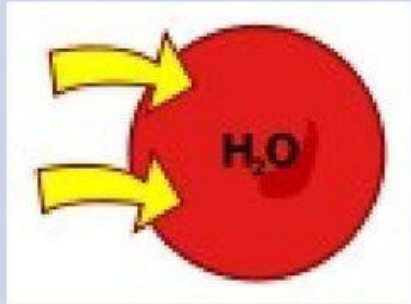
Osmolarity: The measurement of solute concentration of a solution.

Hypertonic: Describes a solution in which extracellular fluid has higher osmolarity than the fluid inside the cell.

Hypotonic: Describes a solution in which extracellular fluid has lower osmolarity than the fluid inside the cell.

Isotonic: Describes a solution in which the extracellular fluid has the same osmolarity as the fluid inside the cell.

Hypertonic vs. Isotonic vs. Hypotonic Solutions

Hypertonic	Isotonic	Hypotonic
Higher solute OUTSIDE	Equal solute	Higher solute INSIDE
Higher water INSIDE	Equal water	Higher water OUTSIDE
Water moves OUT	No net movement	Water moves IN
Cell SHRINKS	Normal	Cell SWELLS
		

ASSESSMENT

Write the difference between the following:

1. Pinocytosis and Phagocytosis
2. Gap Junction and Plasmodesmata
3. Active Transport and Passive Transport

True or False. Correct the False statements.

1. Hypotonic describes a solution in which extracellular fluid has higher osmolarity than the fluid inside the cell.
2. Plasmodesmata is a membrane that allows only some substances and molecules to pass into or leave the cell.
3. Extracellular Matrix is a large network of proteins and other molecules that surround, support, and give structure to cells and tissues in the body



References

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