

# Cell Structures, Membranes, Molecular Movement

## Cells

### Cell theory:

1. the smallest clearly defined unit of life is the cell
2. all living organisms are made up of one or more living cells
3. cells arise only from other cells

## Structural Types of Cells

### Prokaryotic/Prokaryotes

- nucleoid region = DNA
- cytoplasm = everything inside cell, including the fluid
- ribosomes = assemble amino acids into proteins
- plasma membrane = encloses the cytoplasm
- bacterial cell wall = protects cell and helps maintain its shape

### Eukaryotic/Eukaryotes

- organelles = membrane-bound compartments
  - membrane = a thin, semi-permeable sheet that encloses something
1. provide a designated place for metabolic activities to occur
  2. allow cells to maintain specific conditions required for each reaction
  3. many chemical reactions occur on or utilize membrane surface

## Cell Structures

- cytoplasm
- plasma membrane

### 1. Manufacturing

Nucleus

Ribosomes

Endoplasmic Reticulum: Rough & Smooth

Golgi Apparatus

Vacuoles/Vesicles

= Endomembrane System

## 2. Breakdown

Lysosomes

Peroxisomes

## 3. Energy Processing

Chloroplasts

- stroma = space within inner membrane, filled with thick, sugary fluid
- thylakoids = membranous sacs that house chlorophyll
- chlorophyll = green pigment that absorbs solar energy

Mitochondria

- cristae = highly folded inner membrane
- matrix = fluid-filled space within inner membrane

## 4. Support & Communication

Cytoskeleton

- Structural support
- Cell movement

Cell Junctions

Cell Walls

## Membranes

Phospholipid bilayer

Fluid mosaic of embedded molecules

## Functions of embedded membrane molecules:

1. cell identification/recognition
2. enzyme catalysts
3. receptors
4. cell junctions
5. molecular transport

## Molecular Transport

### 1. Passive transport

**simple diffusion** = the movement of molecules from an area where they are more concentrated to an area where they are less concentrated

- requires no cellular energy
- powered by heat in the environment

A) Facilitated diffusion/transport = movement involves a transport protein

B) Osmosis = movement of water across a membrane

- isotonic environment = equal concentration of solute inside and outside of cell
- hypotonic environment = concentration of solutes inside the cell is higher than outside the cell
- hypertonic environment = concentration inside cell less than outside cell

### 2. Active transport

- solute is moved UP the concentration gradient
- requires cellular energy

3. **Endocytosis** - large molecules into cell

4. **Exocytosis** - large molecules out of cell