Biomolecules, also known as biological molecules, are any molecules that are produced by living organisms. They are essential to the structure and function of cells and are involved in various biological processes.

Definition

Biomolecules: Organic molecules that are present in living organisms and are essential to their structure and function. These molecules include carbohydrates, lipids, proteins, and nucleic acids.

Classification

Biomolecules can be classified into four major types:

1. **Carbohydrates**:
   - **Definition**: Organic compounds composed of carbon, hydrogen, and oxygen, typically with a hydrogen

     atom ratio of 2:1.

   - **Function**: Serve as a primary source of energy (e.g., glucose), provide structural support in plants (e.g., cellulose), and act as signaling molecules.
   - **Examples**: Monosaccharides (glucose, fructose), disaccharides (sucrose, lactose), polysaccharides (starch, glycogen, cellulose).
2. **Lipids**:
   - **Definition**: A diverse group of hydrophobic molecules composed mainly of carbon and hydrogen.
   - **Function**: Store energy, form cellular membranes, and act as signaling molecules.
   - **Examples**: Fats (triglycerides), phospholipids, steroids (cholesterol), waxes.

3. **Proteins:**
    - **Definition:** Large, complex molecules made up of amino acids linked by peptide bonds.
    - **Function:** Catalyze biochemical reactions (enzymes), provide structural support (collagen), transport molecules (hemoglobin), and regulate processes (hormones).
    - **Examples:** Enzymes (amylase), structural proteins (keratin), transport proteins (albumin), antibodies.
4. **Nucleic Acids:**
    - **Definition:** Polymers composed of nucleotides, which consist of a sugar, a phosphate group, and a nitrogenous base.
    - **Function:** Store and transmit genetic information and facilitate the synthesis of proteins.
    - **Examples:** DNA (deoxyribonucleic acid), RNA (ribonucleic acid).

Other Important Biomolecules

- **Vitamins:** Organic molecules that are necessary in small quantities for normal metabolism and cannot be synthesized by the body in sufficient amounts.
- **Minerals:** Inorganic elements that play crucial roles in various physiological functions.

Genes and chromosomes are fundamental components of the genetic material in living organisms, responsible for inheritance and the functioning of all biological processes.

Genes

Definition: Genes are segments of DNA (deoxyribonucleic acid) that contain the instructions for building and maintaining the cells of an organism. They are the basic units of heredity.

Key Points:

- **Structure:** A gene is composed of a sequence of nucleotides in the DNA. These sequences are arranged in a specific order, which determines the genetic information carried by the gene.