

Organic Molecules: The Building Blocks of Life

Introduction

Living organisms are made up of organic molecules that contain carbon atoms bonded to hydrogen, oxygen, and other elements. The four major types of organic molecules - carbohydrates, lipids, proteins, and nucleic acids - are essential for life. Let's explore their composition and importance.

Carbohydrates: Energy Sources

Carbohydrates are molecules made of **carbon**, **hydrogen**, and **oxygen** atoms, typically in a 1:2:1 ratio. The basic formula is (CH₂O).

Types of Carbohydrates:

1. **Monosaccharides** (Simple Sugars)
 - Single sugar units like glucose and fructose.
 - Glucose is the primary energy source for cells
2. **Disaccharides** (Double Sugars)
 - Two monosaccharides joined together
 - Examples: sucrose (table sugar), lactose (milk sugar)
3. **Polysaccharides** (Complex Carbohydrates)
 - Long chains of monosaccharides
 - Examples: starch (plant storage), glycogen (animal storage), cellulose (plant structure)

Lipids: Energy Storage and Protection

Lipids are molecules that don't dissolve in water. They include fats, oils, waxes, and certain vitamins.

Key Types:

1. **Triglycerides**
 - Made of **glycerol** and **three fatty acids**
 - Primary function is energy storage
 - Provide **insulation** and **protection**
2. **Phospholipids**
 - Form cell membranes
 - Have both water-loving and water-fearing parts

Proteins: Structure and Function

Proteins are large molecules made of **amino acids**. They perform various crucial functions:

- Enzymes are catalysts of chemical reaction
- Structural support – almost being part of every structure
- Transport molecules – hemoglobin is a protein that transport iron.
- Immune system components – antibodies when we get infection
- Muscle contraction – for movement

Nucleic Acids: Genetic Information

Nucleic acids (DNA and RNA) store and transmit genetic information.

Components:

1. DNA (Deoxyribonucleic Acid)

- Contains genetic instructions for the formation of the proteins.
- All features of a cell are encoded here.

2. RNA (Ribonucleic Acid)

- It's very important for protein synthesis.

Summary

These four types of organic molecules work together to:

- Provide energy (carbohydrates, lipids)
- Build structures (proteins, lipids)
- Control cell functions (proteins)
- Store genetic information (nucleic acids)

Understanding these molecules helps us comprehend how living things function at the molecular level.