

Organic Compounds – those containing C (typically H, O and N as well)

Vitalism- belief in a life force outside the jurisdiction of chemical/physical laws

Early 19th century organic chemistry believed only living organisms could produce organic compounds

Mechanism- belief that all natural phenomena are governed by physical & chemical laws

Carbon

- atomic number #6; 4 valence electrons
- readily bonds with other C atoms forming straight chains, branched chains or rings

Hydrocarbons – molecules containing only C and H

- fossil fuels
- fats have hydrocarbon chains

Isomers – compounds with the same molecular formula but with very different structures and properties

3 Types of Isomers:

1. Structural – isomers differ in the covalent arrangement of their atoms
2. Geometric - share same covalent partnerships, but differ in their spatial arrangements



3. Enantiomers – mirror images of each other

Functional Groups

- I. Hydroxyl group ($--OH$) called alcohols, polar, water soluble
- II. Carbonyl group ($--CO$) found in sugars, polar, water soluble
- III. Carboxyl group ($--COOH$) called carboxylic acids, donates protons, polar, water soluble
- IV. Amino group ($--NH_2$) called amines, polar, weak base, water soluble
- V. Sulfhydryl group ($--SH$) called thiols, proteins
- VI. Phosphate group (H_3PO_4) loses protons, acid properties, polar, water soluble
- VII. Methyl group ($--CH_3$) nonpolar, hydrophobic

Polymer – large molecule consisting of many identical or similar subunits connected together

Monomer – subunit or building block

Macromolecule – large organic polymer

Most polymerization reactions in living organisms are condensation reactions (dehydration synthesis) requires energy.

Hydrolysis – a reaction that breaks the covalent bonds between monomers by adding water molecules.

Four Groups of Organic Compounds:

1. Carbohydrates – sugars & starches $C(H_2O)_n$

A. Monosaccharides – single or simple sugars (glucose, galactose, fructose)

-- can be burned (oxidized) to yield CO_2 , H_2O and energy

-- glucose (principle source of energy in living things)

B. Disaccharide - a two unit or double sugar joined by a glycosidic linkage

Glycosidic linkage – covalent bond formed by a condensation reaction between two sugar monomers

