Molecules of Life

Organic Compounds

Most of the molecules in living things are organic molecules. They contain carbon and hydrogen. The fact that carbon has 4 electrons in its outermost shell means that it is capable of covalently bonding with other atoms to fill its outermost shell producing different shapes including chains, rings, and branches.

SPONCH- major atoms of organisms

Covalent Bonds – bonded atoms that sharing of a pair of electrons.

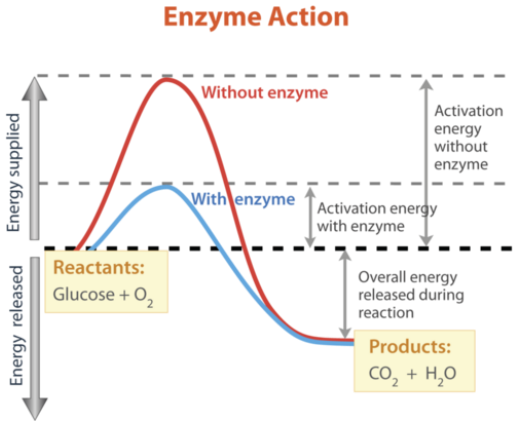
Chemical Reactions- Enzymes

Metabolism is the sum of all chemical reactions in an organism. Enzymes lower the activation energy of a reaction to speed it up.

Catalyst- substance that speeds up a chemical reaction

Enzyme- Protein that acts on a substrate as a biological catalyst

Activation Energy- energy needed to start a reaction



Polymer Synthesis-

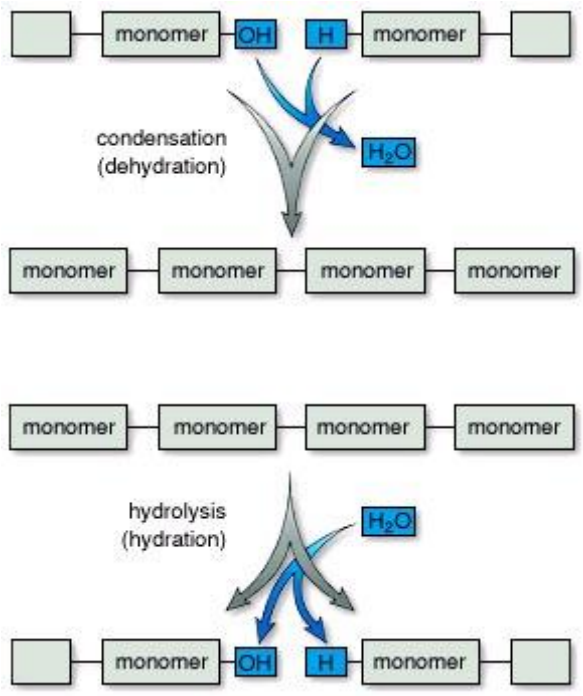
Many organic molecules consist of subunits, called monomers, that are joined together to form what are referred to as polymers.

Monomers - One unit molecule of which a polymer is made.

Polymers - A macromolecule made by joining many monomers together.

Condensation (dehydration) reactions- Monomers are joined together to form polymers, and create water molecules in the process.

Hydrolysis - Polymers are broken down by, which is the splitting of a covalent bond by the addition of water.



Macromolecules

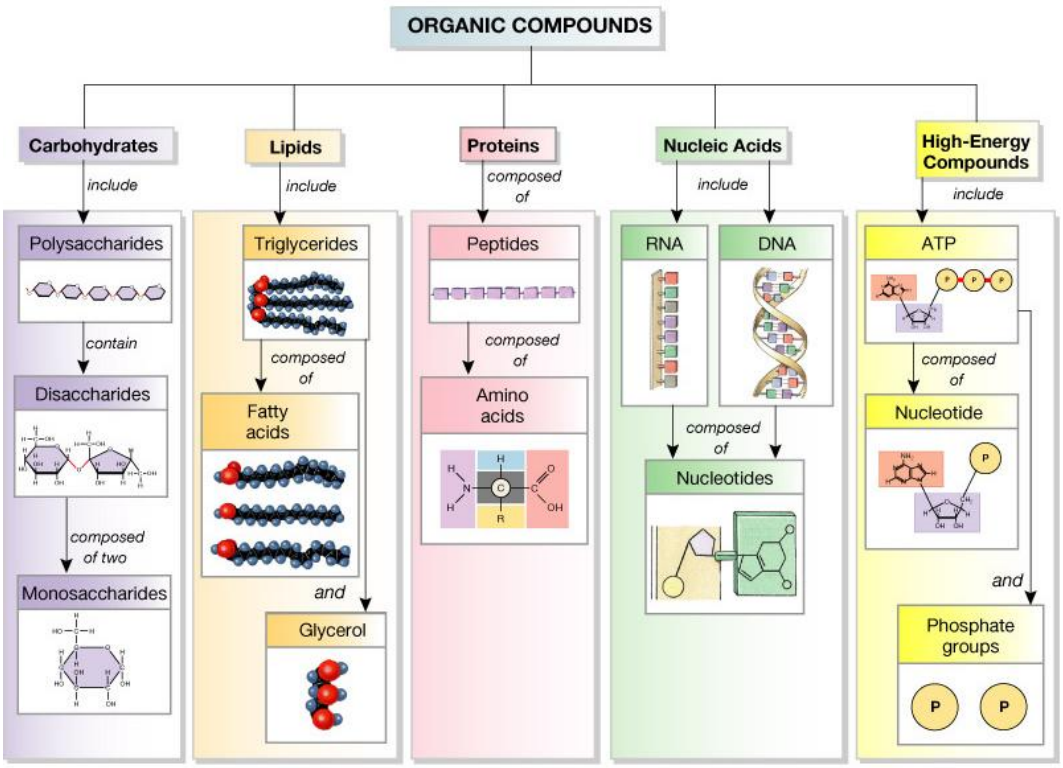
There are 4 major kinds of organic molecules, carbohydrates, lipids, proteins and nucleic acids. Each of these exists as a polymer, composed of the monomers shown in the table.

Carbohydrates - Organic compound characterized by the presence of CH_2O groups; includes monosaccharide, disaccharides, and polysaccharides; quick energy for the cell

Lipids - Organic compound that is insoluble in water; notably fats, oils, and steroids; contain C,H and a little O.

Proteins - Organic compound that is composed of either one or several polypeptides; used for structure, hormones, or enzymes; contain C,H,O,N, and sometimes S

Nucleic Acids - A polymer of nucleotides; contains the genetic information/code of the cell



Water

Organisms are composed of 50- 98% water. Water is called the universal solvent. It dissolves many of the chemicals taken in by organisms form the environment. It dissolves food, maintains our temperature, and performs other essential functions.

Adhesive- Stick to other material

Cohesive- Sticks to itself

Polar- Partial charges (dissolves)

pH- measure of acidity- buffers prevent change

Thermally stable (specific heat)- resist change in temperature

Freezing- turning into a solid

Boiling- turning into a gas