**Organic Chemistry**

**Organic Compounds** are compounds that contain **Carbon and Hydrogen** but additional elements may also be present.

**Basic Characteristics of Organic Compounds**

* They contain polar covalent bonds
* They form symmetrical molecules
* They are nonelectrolytes since they do not ionize and have no free electrons
* Due to their shape they are nonpolar in the pure hydrocarbon form
* They are hydrophobic in the pure hydrocarbon form
* They can be slightly polar and partially soluble in water when oxygen added.
* They melt at low temperatures so most are found as a liquid or gas at STP
* They have high activation energies
* They are slower to react than inorganic compounds
* Many Organic Compounds are Isomers

**Hydrocarbons -** These compounds contain only Carbon and Hydrogen

**Homologous Series**

**Alkanes, Alkene and Alkynes** are open chain structures called **Aliphatic Compounds**

**Alkanes** – Contain only single carbon to carbon bonds (C-C) so are called **saturated**

Ex:

**Alkenes** – Contain at least one double carbon to carbon bond (C=C) so are called **unsaturated**

Ex:

**Alkynes** – Contain at least one triple carbon to carbon bond (C=C) and are also called **unsaturated**

Ex:

**Aromatic Series** –These are cyclic hydrocarbons forming a ringed structure.

Benzene, Methylbenzene (toluene), Ethylbenzene (styrene)

Ex:

**Simple Organic Compounds Containing single bonded Oxygen**

**Alcohols** – These compounds contain an Oxygen bonded between a Carbon and Hydrogen

**(-OH)** called an **Hydroxyl Group**

Ex:

**Ether** – These compounds contain an Oxygen bonded between two Carbons in a chain.

Ex:

 **Alcohols and Ethers are Isomers**

**Simple Organic Compounds contain a Carbon double bonded to an Oxygen (C=O) called a Carbonyl Group.**

Aldehydes – These compounds contain a Carbonyl group as the terminal Carbon.

Ex:

Ketones – These contain a Carbonyl group as a middle Carbon.

Ex:

**Aldehydes and Ketones are Isomers**

**More Complex Organic Compounds**

**Organic Acids** – weak acids that contain a Carbonyl Group bonded to a Hydroxyl Group.

**- COOH** or  **– C = O** This is called a **Carboxyl Group**

 **|**

 **OH**

Ex:

**Esters** – Compounds that are formed from the dehydration of an Organic Acid and an Alcohol.

 The Carboxyl group and Hydroxyl group lose water and join to form **– COO**.

These are used as fragrances or flavorings, they can occur naturally or be made artificially.

Ex:

**Biochemical Compounds** – Organic Compounds that have special significance in Living Things

Composed of six elements – **C H N O P S**

* Carbohydrates
* Lipids
* Proteins
* Nucleic Acids