Carbon Compounds

Molecular structure of biologically related molecules are also a branch of organic chemistry, molecular biology, biochemistry, and biophysics concerned with the molecular structure of biological macromolecules, especially proteins and nucleic acids, how they acquire the structures they have, and how alterations in their structures affect their function. These are all carbon based compounds and the interactions each other would be essential factors for the biological activity.

Carbon is very special because it can form so many compounds. The explanation lies deep inside the atom. Carbon atoms can form strong links with four other atoms. This dramatically increases the number of patterns that carbon atoms can make.

Carbon can also link together in long chains or rings, carbon to carbon to carbon to carbon and so on. Chemists call these links chemical bonds; very long chains, made by joining short ones, are called polymers. And, quite unusually, these long chains cannot be destroyed by water or air or be attacked by bacteria. This explains why so many plastics do not disintegrate in the environment in the way that other materials do. Only sunlight can destroy some polymers, causing the chains to break, and the material to become brittle.

Carbon is part of many compounds, all of which have certain common properties. For example:

1. Few carbon based-compounds change quickly at ordinary temperatures, but they begin to react fiercely at high temperatures (as in burning).

2. All carbon compounds that form tissues - plants, tar, oil, natural gas, etc. - will burn (they are combustible) and can be used as a fuel. When they burn, the compound is oxidised and carbon dioxide is produced. The remaining material is nearly pure carbon (which can be seen in the charred nature of burnt wood, for example).

3. Many carbon-based compounds are not attracted to water and so in general do not dissolve in water. As a result, water alone cannot be used to remove grease or oil from a surface, nor will water dissolve our skin, because all of these things are carbon compounds.

4. Groups that contain carbon and nitrogen often have an unpleasant smell in liquid form. Some people compare it to rotting fish. Such smells are mainly confined to the factories where the materials are made. The common fabric material nylon, for example, which is a plastic that contains nitrogen, has no smell once it is made into a yarn.

5. Some compounds of carbon and nitrogen are very unstable and can be made into explosives. Two of the more common explosives are TNT (trinitrotoluene) and nitroglycerine (glycerol trinitrate).

The simplest organic compounds contain molecules composed of carbon and hydrogen. The compound methane contains one carbon bonded to four hydrogens. Ethane is another example of a simple hydrocarbon. Ethane contains two carbon atoms and four hydrogen atoms. In chemistry we use a molecular formula to show how many atoms of each element are present in a molecule. A molecular formula however does not show the structure of the molecule. Scientists often use structural formulas to show the number and arrangement of atoms in a compounds. Below the molecular formula for methane and ethane are shown. Above the molecular formula are their respective structural formula.

CH_4 C_2H_6

Although structural formulas can be very helpful they do not give a complete picture of a molecule. Structural formulas do not tell us anything about the distances between bonds, the angles formed by these bonds, or the size and shape of the molecule. Scientists use three different representation to show what molecules look like.