Lipids

**Lipids**

A lipid is an organic compound that are not able to mix with water. They do not have a polymeric structure. Organisms use lipids to store energy. Lipids consist of repeating units called fatty acids. Fatty acids are organic compounds that have the general formula CH3(CH2)nCOOH, where n usually ranges from 2 to 28 and is always an even number. Lipids are fatts, waxes, phospholipids, carotenoids, steroids, and others.

**Fats and oils**

A fat molecule consists of two kinds of parts: a glycerol backbone and three fatty acid tails. Glycerol is a small organic molecule with three hydroxyl (OH) groups, while a fatty acid consists of a long hydrocarbon chain attached to a carboxyl group.

To make a fat molecule, the hydroxyl groups on the glycerol backbone react with the carboxyl groups of fatty acids in a dehydration synthesis reaction. This yields a fat molecule with three fatty acid tails bound to the glycerol backbone via ester. Triglycerides may contain three identical fatty acid tails, or three different fatty acid tails.

**Waxes**

Waxes are another biologically important category of lipids. Wax covers the feathers of some aquatic birds and the leaf surfaces of some plants, where its hydrophobic (water-repelling) properties prevent water from sticking to, or soaking into, the surface. This is why water beads up on the leaves of many plants, and why birds don’t get soaked through when it rains.

**Phospholipids**

Specialized lipids called phospholipids are major components of the plasma membrane. Like fats, they are composed of fatty acid chains attached to a backbone of glycerol. Instead having three fatty acid tails, phospholipids generally have just two, and the third carbon of the glycerol backbone is occupied by a modified phosphate group.

A phospholipid has a hydrophobic part and a hydrophilic part. The fatty acid chains are hydrophobic, whereas the phosphate-containing group is hydrophilic. In a membrane, phospholipids are arranged into a structure, with their heads facing the water and their tails pointing towards the inside. This organization prevents the hydrophobic tails from coming into contact with the water, making it a low-energy, stable arrangement.

**Carotenoids**

Carotenoids are a class of pigments synthesized by plants, algae, and photosynthetic bacteria. These molecules are the sources of the yellow, orange, and red colors of many plants. Fruit and vegetables provide most carotenoids found in the human diet.

**Steroids**

Steroids are another class of lipid molecules. All steroids have four linked carbon rings and several of them, like cholesterol, also have a short tail. Many steroids also have an –OH functional group attached at a particular sitea nd such steroids are also classified as alcohols, and are thus called sterols. Cholesterol is the most common steroid.