**Lipids**

Introduction:

Lipids are a class of [hydrocarbon](http://human.freescience.org/htmx/hydrocarbons.php)-containing [organic compounds](http://en.wikipedia.org/wiki/Organic_compounds). Lipids are soluble in [nonpolar](http://en.wikipedia.org/wiki/Nonpolar) [solvents](http://en.wikipedia.org/wiki/Solvents) (such as [ether](http://human.freescience.org/htmx/ethers.php) and [chloroform](http://human.freescience.org/htmx/chloroform.php)) and are relatively insoluble in water.

**Functions of lipids:**

1- Lipids are a good source of energy for the body (9kcal/gm).

2- Lipids are major structural components of membranes, e.g., phospholipids, glycolipids and sterols.

3- Cholesterol, a sterol, is a precursor of many steroid hormones and is also an important component of plasma membrane.

4- Lipid helps in absorption of fat soluble vitamins

 (A,D,E and K), it acts as a solvent for the transport of fat soluble vitamins.

5- Bile acids derived from cholesterol act as an emulsifying agent and help the digestion and absorption of lipids.

* **Classification of lipids:**

Lipids can be classified into:

1- Simple lipids.

a2- Compound lipids.

3- Derived lipids.

**1-Simple lipids:**

These are esters of fatty acids (F.A) with different alcohols.Simple lipids are classified into two types, depending on the type of alcohols:

**A- Neutral lipids.**

**B- Waxes.**

**A-Neutral lipids:**

**Neutral lipids:**

Esters of fatty acid with glycerol are called (glyceride).

**Condensation**

**Glycerol + 3fatty acids ----------------------------→ triglyceride (fat) + water**

**Glycerol:-**

Is a simple [polyol](http://en.wikipedia.org/wiki/Polyol) compound,it has three [hydroxyl groups](http://en.wikipedia.org/wiki/Hydroxyl_group). The glycerol backbone is central to all [lipids](http://en.wikipedia.org/wiki/Lipid) known as [triglycerides](http://en.wikipedia.org/wiki/Triglycerides) , glycrophospholipids & glycroglycolipids.

* **Fatty acids:-**

Fatty acids are long chain mono carboxylic acid. Fatty acids have hydrophilic (COOH) and hydrophobic (hydrocarbon chain) groups in the structure. Fatty acids serve as a major fuel for most cells and they are precursors of all other classes of lipid.

- Individual fatty acids can range in length from **4 to 22** carbons,

-Fatty acids may be **saturated,** which means that each carbon has a single bond to another carbon and 2 hydrogen atoms.





-fatty acids may be **unsaturated,** which means that a carbon has two bonds to the adjacent carbon, called a double bond, and a single bond to another carbon and a hydrogen atom.

-A monounsaturated fat has **1 double bond.**

 - A polyunsaturated fat has **2 or more double bonds** in the carbon chain.

 

The melting point and hardness of the fatty acid is affected by:

* The length of the carbon chain.
* The degree of unsaturation.
* As chain length increases, melting point increases. As the degree of
* unsaturation increases, the melting point decreases.