

Lecture (8)

Lipid Profile Tests: Estimation of Blood Cholesterol

Submitted by:

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Lipid Profile Tests

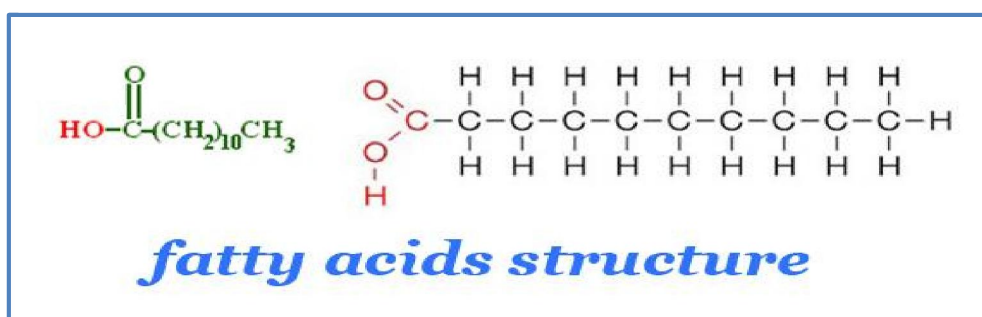
The *lipids* are a large and diverse group of naturally organic compounds that are related by their solubility in non-polar organic solvents (e.g. ether, chloroform, acetone & benzene) and general insolubility in water. Lipids are one of the very important group of compounds that are involved in the life of an organism.

Lipids Properties

- ➔ The lipids are divided in to sub groups depending on their functional characteristics; Such as fatty acids, Fats and oils (saturated or unsaturated), waxes, Phospholipids, steroids.
- ➔ Each lipid has a different structure. All the lipids have a large number of Carbon hydrogen bonds which will make them highly energy rich.
- ➔ The length of the lipid chain which is generally linear is less than the chain length of proteins.
- ➔ the molecular mass of lipids is in between amino acids and proteins.

➤ Types and Structure of Lipids:

- ① Fatty acids are straight chains with carbon chains having 12-20 carbon atoms. They have a terminal carboxylic group and may be saturated or unsaturated.



➤ Function of Lipids:

Triglycerides provide the energy during aerobic metabolism. These triglycerides are stored in the adipose (fat) tissues of the body beneath the skin, within skeletal muscles and around organs. In plants like algae the hydrophobic triglycerides act as media to keep water away from the surface to enable the activity of chlorophyll. The hydrophilic lipids help the clusters to grow together. Cholesterol is the basic lipid that provides structure for steroid hormones, such as estrogen and androgen, cell membranes, and bile acids. The fluid balance within the cell and its outside fluid environment is regulated by these. Fats in the body helps to cushion the organs from shock and also act as energy store.

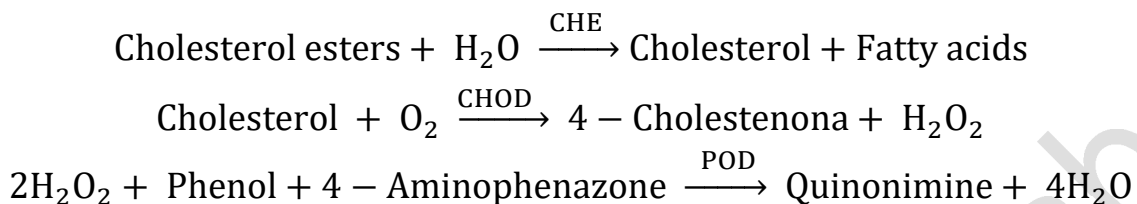
Recent studies show that the lipids help in sending vital signals to the other metabolic activities sensing the deficiencies. The metabolic activities like calcium mobilization, growth, reproduction, and controls like blood pressure, enzymatic actions are monitored by the lipid signaling. Fat soluble vitamins like Vitamin A, Vitamin K and Vitamin E are carried in the body by the fat which is also a lipid.

Total Cholesterol

- Serum or plasma can be used for measuring total cholesterol.
- Patient must be fasting for 12-14 hours.
- Total cholesterol = LDL + HDL + VLDL.
- Normal range for total cholesterol = less than 200 mg/ dl.
- Normal range for LDL is less than 100mg/ dl, it is bad cholesterol when it increase cardiovascular diseases increases.
- Normal range for HDL is more than 60 mg / dl, it is the good cholesterol and it protect the heart.

Principle of Method:

The cholesterol present in the sample originates a coloured complex, according to the following reaction:



The intensity of the color formed is proportional to the cholesterol concentration in the sample.

Procedure:

	Blank	Standard	Sample
Working Reagent	1 ml	1 ml	1 ml
Standard		10 µL	
Sample			10 µL

- Mix and wait for (10 minutes) at room temperature or (5 minutes) at 37 °C
- Read absorbance of the sample and standard against the blank at (505 nm). and apply the calculation.

➔ Calculation: **Creatinine Concentration** = $\frac{A \text{ Sample}}{A \text{ Standard}} \times 200$