

NUTRITION_UNIT3_FATS

1. What are fats?

Ans – They are concentrated source of energy. They are also known as lipids. They are insoluble in water but soluble in organic solvents like ethanol, ether, benzene and acetone.

2. How are lipids classified based on the structure?

Ans – Lipids are broadly classified into simple, complex, derived lipids and waxes which are further subdivided into different groups.

3. What are simple lipids?

Ans – Simple lipids are the esters of fatty acids with various alcohols (usually glycerol). They are further classified into mono, di or tri glycerides.

4. What are compound lipids?

Ans – They are a combination of simple lipids with a non lipid substances such as:

- carbohydrate in glycolipids
- phosphorus in phospholipids
- proteins in lipoproteins

5. What are derived lipids?

Ans – Lipids such as cholesterol, steroid hormones and fat soluble vitamins are produced during the breakdown of simple or compound lipids and they are known as derived lipids. Derived lipids are further divided into 3 groups that is: steroids., fatty acids and alcohol.

6. What are steroids?

Ans – They are compounds that occur in nature in free state and esters with fatty acids. Steroid are mainly of two types;

- animal steroids - cholesterol
- plant steroids - phytosterol

7. What is cholesterol?

Ans – It is a substance that is produced by both plants and animals. Most of the body cholesterol is synthesized in the liver and some of it is absorbed from the diet. Cholesterol helps in the creation of bile acids.

8. What are fatty acids?

Ans – They are building blocks of fats in our bodies. Inside our body, fats are broken down into fatty acids that gets absorbed into blood.

9. What is an alcohol?

Ans – It is an organic substance that is formed when hydroxyl group is substituted for the hydrogen atom.

10. What are waxes?

Ans – They are esters of long chain alcohol and fatty acids. They are found in nature of coatings on leaves and stems of plants and they prevent the loss of excess water. Some examples of waxes are paraffin wax and bees wax.

11. What is the difference between the saturated and unsaturated fatty acids?

Ans – **Saturated** fats are solid at room temperature, while **unsaturated** fats are liquid at room temperature. This is because **saturated and unsaturated** fats differ in their chemical structures. Saturated fats have no double bonds between the carbon atoms and unsaturated fats have double bonds between the carbon atoms.

Saturated fats – example, ghee, butter.

Unsaturated fats – vegetable oils, olive oil, palm oil, etc.,

12. What is the difference between essential and non essential fatty acids? Give example of each.

Ans – The body can synthesize most of the fats it needs from the diet. However, two essential fatty acids, linoleic and alpha-linolenic, cannot be synthesized in the body and must be obtained from food. These basic fats, found in plant foods, are used to build specialized fats called omega-3 and omega-6 fatty acids.

13. What is the calorie value of fats?

Ans – The calorific value is - 9 kilo calories

14. What is the RDA (recommended dietary allowances) value of fat?

Ans – Almost 20% of total energy should come from fats. Normal adult and nursing mothers require 10 to 20 grams of fat. Children and adolescents require 15 to 20 grams of fat per day. Infants require 25 to 30 grams of fat/day. At least 50% of the fat intake should contain vegetable oils rich in essential fatty acids.

15. What are the functions of fats?

- The functions of fats are:
- They help in transport and absorption of fat soluble vitamins.
- They act as sources of essential fatty acids.
- Excess of fats gets stored in the fat deposits (adipose tissue)
- Fats supply fatty acids.
- Fats give support to vital organs like heart kidney and intestines.
- Fats beneath the skin provides insulation against cold.
- Some animal fats such as fish liver oil, butter, ghee, etc supply vitamin A
- Phospholipids are essential constituents of nervous tissue.
- At the time of starvation, stored fat can be used for energy generation.

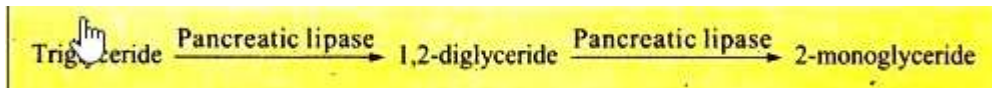
16. How does the digestion and absorption of fats take place?

Ans – No digestion fats take place in mouth. In the stomach, the gastric lipase triggers the hydrolysis of fat molecules. That is fat molecules break down into smaller molecules under the action of gastric lipase. Most of the digestion of fats takes place in small intestine. Most of the fat in the human food is present in the form of Triacylglycerol (TAG). When the food reaches to the duodenum, the ingested fat gets mixed with the bile and pancreatic lipase.

Ingested fats +bile+ lipase

The bile emulsifies fats that is breaks down large fat globules into smaller molecules. These emulsified fats are subjected to the action of pancreatic lipase.

The pancreatic lipase breaks down the fats into fatty acids + monoglycerides



The end products of digestion are converted into very small droplets called miscelles. The miscelles are absorbed by the enterocytes.

Once inside the intestinal cells the fats are resynthesized into lipids that are characteristics of the animal species. The resynthesized lipids pass in the blood stream in the form of chylomicron molecules. The waste products formed after the digestion of fats gets excreted out.

Metabolism of fats

- Short chain fatty acids enter the circulation directly but mostly fatty acids combine together with glycerol again and circulate in the form of chylomicrons.
- Lipoprotein lipase acts on chylomicrons to produce new fatty acids.
- These fatty acids get stored in the adipose tissue. During starvation, fatty acids are broken down in liver into ketone bodies.

Role of liver in lipid metabolism

- Liver helps in the synthesis of fatty acids and triglycerides from the by-products of carbohydrate digestion.
- It is an important site for the synthesis of cholesterol.
- It is a major site for the oxidation of fatty acids.
- It is a site for the formation of ketone bodies

17. How is excess fat stored?

Ans – The excess fat is stored in the form of white adipose tissue and brown adipose tissue.