

ASSIMILATION AND METABOLISM

Assimilation is the process by which food materials after being absorbed are built up into complex constituents of the organism.

Metabolism refers to all the chemical processes taking place within an organism. It involves two processes

- i) **Catabolism.** Breaking down of organic compounds from complex to simpler with liberation of energy
- ii) **Anabolism.** Building up of organic compounds from simple to complex using energy.
The body's metabolic center is the liver.

FUNCTION OF THE LIVER

1. Assimilation and metabolism of carbohydrates (glucose). Glucose once absorbed is transported in the hepatic portal vein to the liver and is either broken down in respiration to provide energy or stored as glycogen. Stored glycogen is released as glucose under the influence of the hormones insulin produced in the pancreas which also controls its utilization in the body.
2. Assimilation and metabolism of proteins. The body is unable to store proteins or amino acids and any surplus is destroyed in the liver. Excess amino acids brought to the liver by the hepatic portal vein are deaminated by the liver cells. In this process the amino (NH₂) group is removed from the amino acid the formation of ammonia. Another product Keto acids are oxidized in respiration to produce energy.
3. Assimilation and metabolism of lipids. The end products of digestion i.e. fatty acids and glycerol's are absorbed and taken into the lacteal and later the lymphatic system they are transferred to the liver. Both can be used for respiration to provide energy or they may be used to form fats which are stored in the body's fat depots e.g. under the skin in the adipose tissue.
4. Storage of iron and other minerals. This is mainly from the worn out red blood cells destroyed in the liver. The iron is stored for future use in the formation of haemoglobin in new red blood cells.
5. Production of bile. The bile is synthesized from broken down worn out red blood cells and is stored in the gall bladder before being transferred to the duodenum where they act on fats and lipids.
6. Manufacture of plasma proteins. This includes fibrinogen important for the clotting of blood. Other plasma proteins include albumen and globulin.
7. Storage of vitamins mainly A, D, and B12.
8. Production of heat. This is because of the many metabolic reactions taking place in the liver. The heat is distributed around the body and is useful in temperature regulation.
9. Formation of red blood cells. This is only done in the foetus. In adults these cells are produced in the bone marrow.
10. Storage of blood. The blood vessels (veins) in the liver can expand and contract to a great extent such that it stores blood ranging from 300-1500cm³.
11. Elimination of sex hormones. These include testosterone and oestrogen. After they have done their work, they are either modified by the liver or sent to the kidney for excretion or eliminated in the bile.
12. Detoxification. The liver makes harmful/poisonous substances harmless by altering their chemical structure.