

LESSON-28 NUTRITION AND HEALTH

Food is the basic necessity of life. We all know that regular supply of food is essential for human beings in order to keep fit and to carry on all the life processes. In this lesson, we will learn about nutritional requirement of the body and the problems of health related to specific deficient nutrition.

- Food is required for the proper growth and development of the body.
- Food provides nutrients required for a healthy body.
- Biological Classification of Food Health Food can be classified into three categories based on their functions- Energy giver-carbohydrates and fats, body building-proteins, protective/regulatory-minerals and vitamins.
- Nutrition is the sum of the processes by which an organism takes in, metabolises and utilises food substance for its various biochemical activities.
- On the basis of quantity required by the body, nutrients are classified into two categories :
- **Macronutrients** (Nutrients required in a large amount): Carbohydrates, fats, proteins and water contained in food comprise macronutrients. **Micronutrients** (nutrients required in small amount)-Vitamins and minerals form only a small fraction of the total weight of the food.
- Carbohydrates are the chemical compounds made up of carbon, hydrogen and oxygen. They release energy on biological oxidation with the help of cellular enzymes. They are the cheapest source of energy. The three types of carbohydrates that we consume in our food are : (i) sugars (ii) starch (iii) cellulose

Carbohydrates			
Sugar		Starch	Cellulose
Monosaccharides	Disaccharides		
Glucose (found in molasses, honey and sweet fruits like grapes)	Sucrose (found in sugarcane and sugar beet)	Storage form of carbohydrates (found in cereals, grains, seeds, roots, potato, rice, wheat, barley, maize, nuts etc.)	Found in cellulose of plants, seed coats, fruits, vegetables and cereals
Fructose (Found in honey and ripe fruits)	Maltose (found in sprouted cereals) Lactose (found in milk)		

Functions of carbohydrates

- Lactose sugar promotes growth of intestinal bacteria that facilitate the absorption of calcium.
- Excess carbohydrates are converted into glycogen and fat and serve as reserve sources of energy.
- Cellulose provides faecal bulk and helps in bowel movement.
- Glucose is the only source of energy for the central nervous system.

Fats

- ✚ Fats are members of lipids. Like carbohydrates, fats are also made up of carbon, hydrogen and oxygen. Fats are the richest source of energy.
- ✚ Fats are insoluble in water but soluble in solvents like acetone, and benzene.
- ✚ Chemically fats are triglycerides. One gram of fat on biological oxidation gives about 9.0 kcal (37 kilojoules) of energy

Proteins

Proteins are extremely large molecules composed of many amino acids. Proteins are complex organic compounds rich in carbon, hydrogen, oxygen, nitrogen and sometimes phosphorous and sulphur also. Proteins are needed by the body for

- growth and development
 - repair and maintenance
 - the synthesis of antibodies, enzymes, and hormones
- ✚ They can also be used as a source of energy. 1 gram of protein yields about 4 kcal of energy. Building blocks of proteins are the amino acids.
- ✚ **Nutritionally, amino acids belong to two categories:** (a) **Essential amino acids:** These are the amino acids which cannot be synthesised in the animal body and must be supplied with food e.g. leucine.
- ✚ (b) **Non essential amino acids-** which can be synthesised in the body particularly from carbohydrates and need not be supplied in the diet. E.g. alanine.

Sources:

- ✚ **Animal sources:** Milk, egg, fish, bean, meat, and liver. Contain adequate amount of essential amino acids.
- ✚ **Plant sources:** Whole cereals (wheat and maize), pulses, nuts, grams, and legumes.
- ✚ Proteins are required for building and maintaining body tissues.
- ✚ Proteins are found in all the enzymes e.g. Trypsin, pepsin and rennin.

Vitamins

- ✚ Vitamins are complex chemical substances required by the body in very small amounts. They do not yield energy but act as biocatalysts in the body. They are essential for good health and protect the body from various diseases.
- ✚ They are essential for the utilisation of other nutrients that we take in our diet.
- ✚ **Vitamins are grouped into two classes:**
 - (a) Water soluble vitamins are vitamins B complex and C
 - (b) Fat soluble vitamins are vitamins A, D, E and K

Vitamins and deficiency diseases:

	Vitamin	Deficiency diseases
1.	Vitamin B ₁ (Thiamine)	Beri-beri
2.	Vitamin B ₂ (Riboflavin)	Riboflavinosis; photophobia
3.	Vitamin B ₃ (Niacin)	Pellagra
4.	Vitamin B ₁₂ (Cyanocobalamine)	Pernicious anaemia.
5.	Vitamin C (Ascorbic Acid)	Scurvy
Fat Soluble Vitamins		
6.	Vitamin A (Retinol)	Night blindness Xerophthalmia, or keratinol acid
7.	Vitamin D (Calaciferol)	Rickets in children Osteomalacia
8.	Vitamin E (Tocopherol)	Reproduction failure in Males and Females
9.	Vitamin K (Phylloquinone)	Faulty blood clotting

Minerals

- ✚ Minerals are micronutrients required in varying amounts for proper functioning, normal growth and keeping good health of our body. They are inorganic elements, occurring in the form of their salts e.g. calcium, potassium, sodium, phosphorus, iron etc.
- ✚ They do not supply energy to our body but are essential for protection against diseases and also have role in body functions.

Functions of Minerals:

- Essential for development of bone and teeth e.g. calcium, phosphorus.
- Regulate the fluid balance and acid alkalinity of body fluids e.g. sodium, potassium, chloride.
- Iron is major component of haemoglobin, which helps in transport and release of oxygen.
- Iodine is required for the synthesis of thyroid hormone thyroxine, which regulates the rate of oxidation energy sources within cells.
- Zinc, copper and magnesium regulate a host of vital reactions in our body.

BALANCED DIET

A balanced diet is one that contains all essential nutrients in suitable proportion and amount to provide necessary energy and keeps the body in a healthy state.

A balanced diet has the following qualities:

- It meets the nutrient requirement of the body,
- It consists of different types of food items,
- It provides adequate amount of energy

What Is Health And Disease?

- **Health** is a state of complete physical, mental, and social well being and not merely absence of disease or infirmity.
- **Disease:** Disease is a malfunctioning process related to a certain part of the whole body in which normal functions are disturbed or damaged. Disease literally means not at ease (dis = not)
- **Deficiency diseases:** The diseases which occur due to deficiency of one or more nutrients (proteins, carbohydrates, vitamins and minerals) in our diet are called deficiency diseases.
- **Malnutrition:** The condition resulting from lack of nutrients in the diet is called malnutrition

Protein energy malnutrition (PEM)

- Protein energy malnutrition results in two diseases : (i) Marasmus, and (ii) Kwashiorkor
- **Marasmus:** It is caused due to the deficiency of carbohydrates, fats and proteins. It usually affects infants below the age of one year.
- **Kwashiorkor:** This disease develops when mothers stop feeding their babies with breast milk and the child is given traditional family food having low protein in it.

MINERAL DEFICIENCY DISEASES

- An excessive intake of fat soluble vitamins A and D results in hypervitaminosis.
- An excessive intake of food for prolonged periods results in obesity. An obese person suffers from cardiovascular diseases, respiratory problems and diabetes.

Test Yourself

1. Differentiate between
 - (i) Marasmus and Kwashiorkor.
 - (ii) Essential amino acids and Non-Essential amino acids.
2. State four important functions of fat
3. Define hypervitaminosis. Name two vitamins which when taken regularly in diet cause hypervitaminosis.