

Nutritional Requirements

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○ Nutritional Requirements

- Nutrition means either preparation of food or Supply of nutrients for the release of energy.
- The chemical substances required for the production of energy, for the growth and for body building are called *Nutrients*
- The procurement of *nutrients* is called Nutrition
- The important nutrients required for the body are *carbohydrates, fats, proteins, vitamins and minerals*
- Some nutrients like carbohydrates, proteins, fats and mineral like sodium are required in large quantities and they are known as *Macro-nutrients*.
- Some nutrients like vitamins and minerals like iron, zinc molybdenum etc are required in very minute doses, (even in micrograms), are known as micro-nutrients.



○ CARBOHYDRATES

- Carbohydrates are a group of compounds with Carbon, Hydrogen and Oxygen.
- They are classified into two groups – ***Simple Carbohydrates*** and ***Complex Carbohydrates***.
- Simple Carbohydrates are sugars like Glucose, Fructose etc.,
- Complex Carbohydrates are Sucrose, Maltose, Lactose etc.,
- Cellulose is present in plant cells and it is not digested in the human digestive system.
- It has no nutritive value in man but the presence of cellulose in food helps to avoid constipation.
- Excess glucose is converted into
 - non-essential amino acids,
 - glycogen and
 - Fats.
- One gram of Carbohydrates gives 4 kilo calories of energy



- **Glycogen** is called Animal Starch
- **Lactose** is called Milk sugar
- **Sucrose** is called cane sugar.
- Sports persons take glucose to get instant energy
- If we eat only rice, only carbohydrates are supplied to the body and body building materials (proteins) will be deficient.
- If we eat only proteins, body will be built up but for daily metabolic activities, energy will not be supplied.
- Hence for healthy growth, all type of nutrients are required for the body.
- Food having all the nutrients in required quantity for the body is called **Balanced diet**.



PROTEINS

- Proteins are body building substances with Carbon, Hydrogen, Oxygen, Nitrogen. and Sulphur in small amounts.

Proteins have 24 types of amino acids, out of these 20 are present in most of the proteins

Based on our requirement, amino acids are classified into

- *Essential amino acids* and
- *Non-essential amino acids.*
- Examples of essential amino acids are Isoleucine, Leucine, Lysine etc.,
- Examples of Non-essential amino acids are Alanine, Arginine, Aspartic acid etc.
- *Histidine* is the essential amino acid only for infants but not for adults.



- The proteins from animal sources like Milk, Meat, Eggs, Fish etc., are rich sources of proteins and are called as ***Biologically complete proteins***.
- Proteins from vegetable sources like Pulses, Beans, Legumes etc, contain lesser amount of amino acids when compared to animal sources. Hence they are called as ***Biologically incomplete proteins***.

Function of proteins

- Proteins are used in -
 - various metabolic pathways as enzymes.
 - Chemical coordination as hormones.
 - body building.
 - repair and maintenance of tissues.
 - maintenance of osmotic pressure.
 - the production of energy



○ FATS

- Fats are the organic compounds with Carbon, Hydrogen and Oxygen and are made up of fatty acids and Glycerol.
- Fatty acids are divided into:-
 - Saturated fatty acids.
 - Unsaturated fatty acids.
- The fatty acids required for our body and not present in our body are called as ***Essential fatty acids***.
Ex:- Linoleic acid, Linolenic acid.
- Fats are present in both plant and animal foods like Milk, Ghee, Butter, Cheese, Eggs etc.,
- Plant sources are usually in the form of Oils like Groundnut oil, Mustard, Sesame, Coconut, Palm etc.,
- Fats are solids at 20°C. Liquid fats are called oils.
- It is easy to store fats in the body as fats are insoluble in water and can be easily stored in solid form.



- Cholesterol is saturated fatty acid. When excess cholesterol is consumed, it is deposited along the walls of the arteries and interferes with the blood flow. This may lead to ***Heart attacks***
- Vanaspathi is prepared by converting unsaturated fatty acids present in vegetable oils to saturated fatty acids.

FUNCTIONS

- One gram of fats yield 9.45 Kilo calories of energy
- The fats under the skin helps in preserving the body heat.
- Fats are used in the body to generate energy.
- It is required for the formation of membranes in all the cells.
- Growth and development will not be normal if the required amounts of unsaturated fatty acids are not provided in the diet



○ MINERALS

○ SODIUM :

- Sodium ions maintain the osmotic balance in the body and also for the activity of the nervous system.
- Sodium ions maintain salts in plasma.
- Potassium maintains salts in cytoplasm of a cell.

○ IODINE

- Iodine is component of thyroxine, a hormone of thyroid gland, iodine is required for the production of thyroid hormone.
- Deficiency of iodine results in Hypothyroidism and enlargement of the thyroid gland (a condition is known as goiter) and reduction in metabolic rate and physical growth.
- To prevent the Iodine deficiency, now-a-days iodine is added to the common salt (Iodised salt).
- Naturally iodine is found in vegetables and sea food.



○ FLUORINE

- Fluorine is required for proper formation of

Bone and *enamel* on the teeth and prevents *dental caries*.

- Fluorine present in the soil gets dissolved in the ground water and is a major source for fluorine for the body.
- **Fluorosis** is a disease caused due to **excess fluorine** in water.

- In people affected with fluorosis the teeth become yellow and bone deformations are seen.
- So they can't stand erect and walk properly.



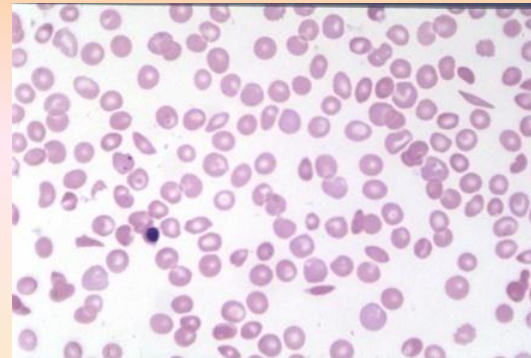
CALCIUM

- Calcium is the major element required for the body.
- It forms about 1.5 to 2% of the body weight in an adult.
- It is required for the formation of bones, teeth, coagulation of blood, for muscle contraction, for production of milk in lactating females.
- We require about 400 – 500 mg. of calcium per day.



○ IRON

- Iron is major element used in the formation of Haemoglobin.
- About **60-70%** of iron in the body is present in blood.
- Deficiency of iron causes ***anaemia***.
- **Source:** The best sources of iron are liver, eggs, meat, fish, cereals, nuts, green leafy vegetables and dried fruits, oat, meals.
- It is the major component in haemoglobin and it helps to carry O₂ from lungs to the cells.
- It is also present in proteins involved in electron transport and respiration.



○ WATER

- Water is the most essential constituent of life.
- About **90%** of water is present in protoplasm.
- Water is available to the body through three sources-drinking water, water stored in food and metabolic water.

