



MINERAL ELEMENTS:

Minerals are important constituents of our body that make up our teeth and bones and are also found in muscles, blood and soft tissue, they are important in maintaining the correct water-salt balance of the body. If the mineral salt content of our body is upset then we develop either swollen or shrunken tissues, minerals are removed from the body each day so they must be taken in each day.

The **essential minerals** are seven in number: calcium, phosphorus, potassium, sulphur, sodium, chlorine and magnesium. These are required in **larger quantities** than other minerals.

These other minerals are called **trace elements or trace minerals** because they are only needed in very small amounts each day. Here we include iron, iodine, copper, manganese, zinc

Mineral	Source in food	Deficiency symptoms	Function
Calcium	Milk and milk products Green vegetables Seafoods Eggs Oranges Carrots	Porous bones Rickets Poor bone growth Poor tooth development Poor blood clotting Muscular weakness	Normal bone and tooth development Normal blood clotting Normal muscular action
Phosphorus	Milk, cheese Meat Egg yolk Fish	Porous bones Rickets Poor bone development Poor tooth development	Normal bone and tooth development Activation of enzymes. Aids in energy production (ATP)
Sodium	Table salt, baking powder Milk, cheese Meats Egg white	Muscle weakness Vomiting Headache Nerve problems	In body fluids Maintains normal osmotic pressure Normal nerve and muscle action
Potassium	Cereal grains Meat Beans, peas Bananas Some other fruits and vegetables	Muscular weakness Fast heart beat Heart problems	Nerve and muscle action Normal acid-base balance of fluids
Iron	Meats (red), especially liver Beans, peas, cereals Egg yolk, prunes	Anaemia Weakness Weight loss Low haemoglobin	Constituent of haemoglobin, which carries oxygen in the blood
Iodine	Table salt (iodized) Seafoods Plants grown in iodine-containing waters	Cretinism in infants Myxoedema in adults Goitre neck in those on low-iodine diets Mental and physical retardation	Part of the hormone thyroxine which regulates metabolic rate
Fluorine	In many foods in small quantities In fluoridated water	Dental decay	Improved resistance to tooth decay

vitamins

vitamins can be grouped into :

fat-soluble vitamins (A, D, E, K)

water-soluble vitamins (B&C)

functions of vitamin A

The main way in which a vitamin may be given a list of functions is to observe the symptoms that arise when a vitamin-deficient diet is fed to an experimental animal. These symptoms are also seen in people who become ill because they have not eaten sufficient vitamin A.

functions of vitamin D

Vitamin D is needed for proper development of the bones and teeth because it helps make the "vitamin D hormone" that allows us to use calcium and phosphorus. Without this vitamin we fail to use calcium properly.

In children poor bone development and bent bones is called *rickets*. This disease is found in children on poor diets and/or living where there is little sunshine"

functions of vitamin E

This vitamin does not appear to function as an enzyme, but seems to protect other chemicals from being oxidized because it takes up oxygen. It is, as mentioned previously, an antioxidant.. There is an interesting association between vitamin E and a trace element called *selenium*. It seems that in some cases this mineral can take the place of vitamin E.. The two are perhaps needed together normally.

Function of vitamin K

This vitamin aids in the production of an essential ingredient for clotting the blood.

Water-soluble vitamins:

There are nine B vitamins. They function as they function as coenzymes. that is they are associated with enzyme activity in cells. They are all found in whole grain cereals. If the cereal is refined the parts that contain the vitamins.

Thiamine (B1),Riboflavin (B2) ,Niacin, (Nicotinamide)

The other important water-soluble vitamins considered here are:

Pantothenic acid,Biotin,Pyridoxine (B6),Folacin (folic acid),Cobalamin (cyanocobalamin) (B12)

Vitamin C:

This vitamin is called *ascorbic acid* .

Function of vitamin C

Vitamin C is' used in the cell chemistry that maintains tissues in a healthy state. without it the tissues become damaged and blood capillaries rupture beneath the skin. The formation of red blood cells needs this vitamin.

WATER

Our bodies contain a great deal of water: between 50 and 60%. A newborn baby's body has even more water: between 70 and 75%. For this reason an infant will need proportionally more fluids daily and can become more quickly dehydrated by loss of water. The proportion of water in the body reduces gradually as we get older.

Water is contained in different parts of the body known as *compartments*. The water inside our cells is described as *intracellular* water, that outside the cells as *extracellular* water. The water in both intracellular and extracellular compartments contains dissolved substances. The intracellular compartment contains larger amounts of potassium and phosphorus. The extracellular compartment contains more sodium and chlorine and has a composition similar to the ancient seas from which man's ancestors emerged: it is a salt solution of about 0.9% sodium chloride.

We lose water all the time in our breath, through our skin as sweat, and in our urine and faeces. This water has to be replaced otherwise we die. We can survive many days without food, a minute or two without oxygen and a day or so without water. If we lose about 10% of our body weight due to dehydration we become seriously ill as our blood becomes thicker, our tongue swells and our kidneys fail. If we lose up to 20% due to dehydration, we die.

Each day we need to take in about 1500–1900 cm³ of water in some form or other. We need more if we exercise greatly or lose body fluids through vomiting, bleeding or diarrhoea.