Vitamins

- Vitamins are organic compounds required by the body in small amounts for metabolism, for protection, for maintenance of health and proper growth .
- They cannot be synthesized by the body. Must be obtained by outside sources like diet & sun.
- Vitamins also assist in the formation of hormones, blood vessels, nervous system chemicals and genetic materials .
- They generally act as catalysts, combining with proteins to create metabolically active enzymes that are essential for life reactions.
- Vitamins are of different chemical nature. These are alcohols, aldehydes, organic acids, their derivatives and nucleotide derivatives.

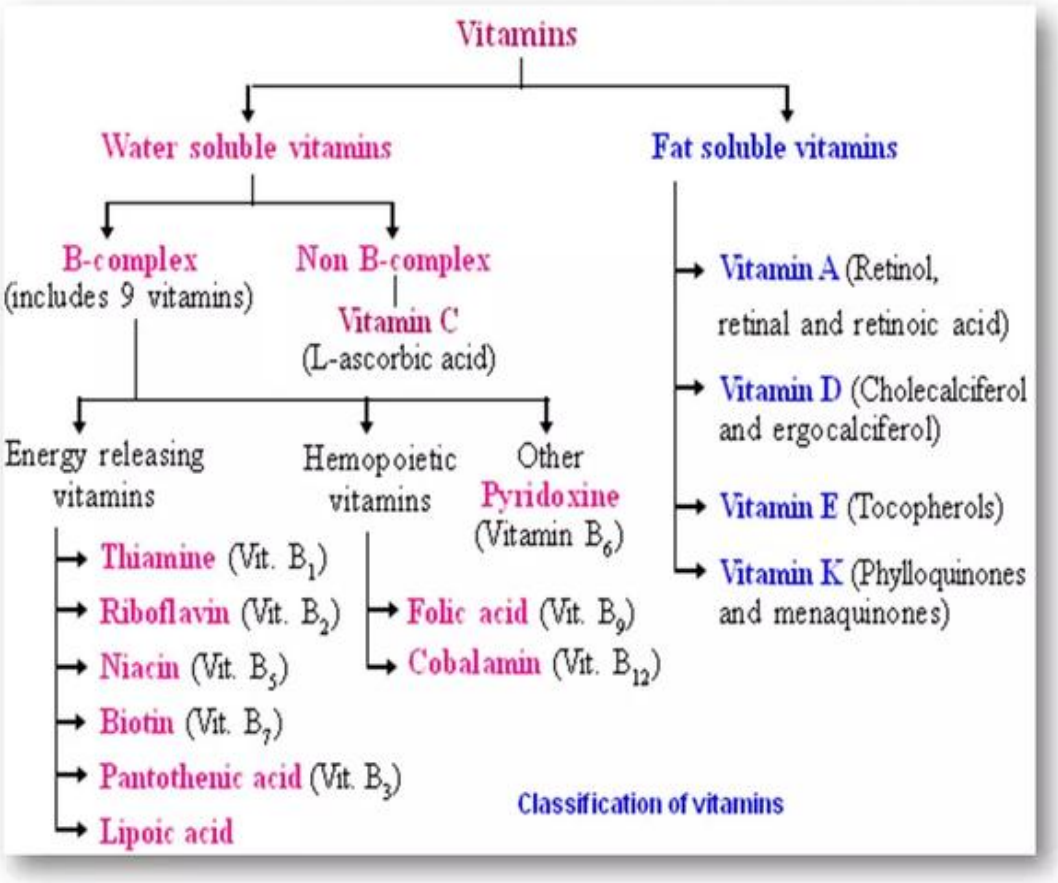
CLASSIFICATION OF VITAMINS

Vitamins are classified according to their ability to be absorbed in fat or water

1. Fat Soluble Vitamins: these are oily and hydrophobic compounds, they are stored in the liver and adipose tissue and not excreted out of the body. Bile salts and fats are needed for their absorption. Vitamins A,D,E and K are fat soluble.

2. Water Soluble Vitamins: Vitamin C and Vitamin B complex (folic acid, cobalamin, ascorbic acid, pyridoxine, thiamine, niacin, riboflavin, biotin, and pantothenic acid) are classified as water soluble. They are not stored in the body, therefore are required daily in small amounts , they are readily excreted in the urine, toxicity is rare. However, deficiencies can occur quickly.

Vitamins are required to perform specific cellular functions. For example, many of the water-soluble vitamins are precursors of coenzymes for the enzymes of intermediary metabolism. In contrast to the water soluble vitamins, only one fat-soluble vitamin (vitamin K) has a coenzyme function.



Classification of vitamins

Water-soluble vitamins

1. vitamin B1(Thiamine)

a. Food Sources

Pork, whole grains, brown rice, vegetables, potatoes, liver, eggs

b. Daily Requirements

1.2mg/1.1 mg (male / female)

c. Function

Helps to release energy from foods, promotes normal appetite, and plays a role in muscle contraction and conduction of nerve signals.

d. Deficiency disease(s)

Mental confusion, muscle weakness, wasting, water retention (edema), enlarged heart, and the disease known as beriberi.

2. vitamin B2 (Riboflavin)

a. Food Sources

Milk and milk products; leafy green vegetables; whole grain foods, breads and cereals.

b. Daily Requirements

1.3mg/1.1 mg (male / female)

c. Function

Needed for energy metabolism; important for normal vision and skin health.

d. Deficiency disease(s)

Skin disorders, cracks at the corners of the mouth, hair loss, itchy and red eyes, reproductive problems, and cataracts.

3. vitamin B3 (Niacin, Niacinamide, Nicotinamide riboside)

a. Food Sources

Meat, poultry, fish, whole grain foods, enriched breads and cereals, vegetables (especially mushrooms, asparagus, and leafy green vegetables), peanut butter

b. Daily Requirements

16 mg/14 mg (male / female)

c. Function

Needed for energy metabolism; important for nervous system, digestive system, and skin health

d. Deficiency disease(s)

Pellagra is the disease state that occurs as a result of severe niacin deficiency. Symptoms include skin problems, digestive issues, and mental confusion. cause flushed skin, rashes, hypotension symptoms, or liver damage .

4. vitamin B5 (Pantothenic acid)

a. Food Sources

Meat, broccoli, avocados

b. Daily Requirements

5 mg/5 mg (male / female)

c. Function

Is involved in energy production, and aids in the formation of hormones and the metabolism of fats, proteins, and carbohydrates from food.

d. Deficiency disease(s)

Paresthesia.

5. vitamin B6 (Pyridoxine, Pyridoxamine, Pyridoxal)

a. Food Sources

Meat, vegetables, tree nuts, bananas

b. Daily Requirements

1.3–1.7 mg/1.2–1.5 mg (male / female)

c. Function

aids in protein metabolism, red blood cell formation, and behaves as an antioxidant molecule. It is also involved in the body's production of chemicals such as neurotransmitters and hemoglobin.

d. Deficiency disease(s)

Dermatitis, swollen tongue, peripheral neuropathy, anemia, depression and confusion, and weakened immune function. A vitamin B6 deficiency in infants can cause irritability, acute hearing issues, and convulsive seizures.

6. vitamin B7 (Biotin)

a. Food Sources

Widespread in foods; also produced in intestinal tract by bacteria

b. Daily Requirements

30 µg/30 µg (male / female)

c. Function

Biotin helps release energy from carbohydrates and aids in the metabolism of fats, proteins and carbohydrates from food.

d. Deficiency disease(s)

Hair loss, skin rashes, and brittle nails,.

7. vitamin B9 (Folates, Folic acid)

a. Food Sources

Leafy vegetables, pasta, bread, cereal, liver

b. Daily Requirements

400 µg/400 µg (male / female)

c. Function

Aids in protein metabolism, promoting red blood cell formation, and lowering the risk for neural tube birth defects. Folate may also play a role in controlling homocysteine levels, thus reducing the risk for coronary heart disease.

d. Deficiency disease(s)

Folate deficiency affects cell growth and protein production, which can lead to overall impaired growth. Anemia is the primary clinical sign of folate deficiency and includes symptoms like fatigue, headache, and heart palpitations. A folate deficiency in women who are pregnant or of child bearing age may result in the delivery of a baby with neural tube defects, such as spina bifida.

8. vitamin B12 (Cyanocobalamin, Hydroxocobalamin, Methylcobalamin, Adenosylcobalamin)

a. Food Sources

Meat, poultry, fish, seafood, eggs, milk and milk products; not found in plant foods

b. Daily Requirements

2.4 µg/2.4 µg (male / female)

c. Function

aids in the building of genetic material, production of normal red blood cells, and maintenance of the nervous system..

d. Deficiency disease(s)

Anemia and neurological changes, such as numbness and tingling in the hands and feet.

9. vitamin C (Ascorbic acid)

a. Food Sources

Found only in fruits and vegetables

b. Daily Requirements

90 mg/75 mg (male / female)

c. Function

Aids in wound healing, bone and tooth formation, strengthening blood vessel walls, improving immune system function, increasing absorption and utilization of iron, and acting as an antioxidant.

d. Deficiency disease(s)

Scurvy ,causing fatigue and a loss of collagen strength throughout the body. Loss of collagen results in loose teeth, bleeding and swollen gums, and improper wound healing.