- What are Water-Soluble Vitamins?

1- B-complex Vitamins:

- Eight of the water-soluble vitamins are known as the vitamin B-complex group: thiamin (vitamin B1), riboflavin (vitamin B2), niacin (vitamin B3), vitamin B6 (pyridoxine), folate (folic acid), vitamin B12, biotin and pantothenic acid.

- The B vitamins are widely distributed in foods, and their influence is felt in many parts of the body. They function as coenzymes that help the body obtain energy from food. The B vitamins are also important for normal appetite, good vision, and healthy skin, nervous system, and red blood cell formation.

- **B1 (thiamine):** Thiamine plays an essential role in metabolism by helping convert nutrients into energy.
- **B2 (riboflavin):** Riboflavin helps convert food into energy and also acts as an antioxidant.
- **B6 (pyridoxine):** Pyridoxine is involved in amino acid metabolism, red blood cell production and the creation of neurotransmitters.
- **B12 (cobalamin):** Perhaps the most well-known of all the B vitamins, B12 is vital for neurological function, DNA production and red blood cell development.

Vitamin B12 deficiency

- Vitamin B12 deficiency is found to cause neurological and psychiatric problems in adults between 40–90 years of age. It rarely affects people younger than this. The neurological manifestations include myelopathy (disease of the spinal cord), neuropathy (disease of the nerves), sensory disturbances, gait abnormalities, and weakness, while the psychiatric problems range from cognitive and behavioral disturbances to dementia.

Causes of vitamin B12 deficiency

- Vitamin B12 or folate deficiency anemia occurs when a lack of either of these vitamins affects the body's ability to produce fully functioning red blood cells.
- **Pernicious anemia:**
- Pernicious anemia is an autoimmune condition that affects the stomach.
- In the stomach, vitamin B12 is combined with a protein called intrinsic factor. This mix of vitamin B12 and intrinsic factor is then absorbed into the distal ileum.
- Pernicious anemia causes the immune system to attack the cells in the stomach that produce the intrinsic factor, which means the body is unable to absorb vitamin B12.

2- Vitamin C (Ascorbic acid)

- Good sources of vitamin C are fresh fruits and vegetables, especially citrus fruits.
- It is as a cofactor for the enzyme required in the hydroxylation of proline and lysine in collagen formation.
- Dietary deficiency of vitamin C eventually leads to scurvy, a serious disease characterized by the weakening of collagenous structures that results in widespread capillary hemorrhaging