

WATER-SOLUBLE VITAMINS

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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.

Thiamin: Vitamin B1

Thiamin, or vitamin B1, helps to release energy from foods, promotes normal appetite, and is important in maintaining proper nervous system function.

Food Sources for Thiamin

Sources include peas, pork, liver, and legumes. Most commonly, thiamin is found in whole grains and fortified grain products such as cereal, and enriched products like bread, pasta, rice, and tortillas. The process of enrichment adds back nutrients that are lost when grains are processed. Among the nutrients added during the enrichment process are thiamin (B1), niacin (B3), riboflavin (B2), folate and iron.

RDA (Required Daily allowance)

Males: 1.2 mg/day; Females: 1.1 mg/day

Riboflavin: Vitamin B2

Riboflavin, or vitamin B2, helps to release energy from foods, promotes good vision, and healthy skin. It also helps to convert the amino acid tryptophan (which makes up protein) into niacin.

Food Sources

Sources include liver, eggs, dark green vegetables, legumes, whole and enriched grain products, and milk. Ultraviolet light is known to destroy riboflavin, which is why most milk is packaged in opaque containers instead of clear.

RDA

Males: 1.3 mg/day; Females: 1.1 mg/day

Deficiency

Under consumption of riboflavin is rare. However, it has been known to occur with alcoholism, malignancy, hyperthyroidism, and in the elderly. Symptoms of deficiency include cracks at the corners of the mouth, dermatitis on nose and lips, light sensitivity, cataracts, and a sore, red tongue.

10.3.1 Niacin: Vitamin B3, Nicotinamide, Nicotinic Acid

Niacin, or vitamin B3, is involved in energy production, normal enzyme function, digestion, promoting normal appetite, healthy skin, and nerves.

Food Sources for Niacin

Sources include liver, fish, poultry, meat, peanuts, whole and enriched grain products.

RDA

Males: 16 mg/day; **Females:** 14 mg/day

Vitamin B6: Pyridoxine, Pyridoxal, Pyridoxamine

Vitamin B6, otherwise known as pyridoxine, pyridoxal or pyridoxamine, aids in protein metabolism and red blood cell formation. It is also involved in the body's production of chemicals such as insulin and hemoglobin.

Food Sources for Vitamin B6

Sources include pork, meats, whole grains and cereals, legumes, and green, leafy vegetables. The RDA for vitamin B6 is 1.3 mg/day for adult males and females through age fifty.

Folate: Folic Acid, Folacin

Folate, also known as folic acid or folacin, 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.

Food Sources for Folate

Sources of folate include liver, kidney, dark green leafy vegetables, meats, fish, whole grains, fortified grains and cereals, legumes, and citrus fruits. Not all whole grain products are fortified with folate..

RDA

The RDA for folate is 400 mcg/day for adult males and females. Pregnancy will increase the RDA for folate to 600 mcg/day.

Vitamin B12: Cobalamin

Vitamin B12, also known as cobalamin, aids in the building of genetic material, production of normal red blood cells, and maintenance of the nervous system.

Food Sources for Vitamin B12

Vitamin B12 can only be found only in foods of animal origin such as meats, liver, kidney, fish, eggs, milk and milk products, oysters, shellfish. Some fortified foods may contain vitamin B12.

RDA

The Recommended Dietary Allowance (RDA) for vitamin B12 is 2.4 mcg/day for adult males and females

10.3.1 Biotin

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

Food Sources for Biotin

Sources of Biotin include liver, kidney, egg yolk, milk, most fresh vegetables, yeast breads and cereals. Biotin is also made by intestinal bacteria.

RDA

The Adequate Intake (AI) for Biotin is 30 mcg/day for adult males and females

Pantothenic Acid

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

Food Sources for Pantothenic Acid

Sources include liver, kidney, meats, egg yolk, whole grains, and legumes. Pantothenic Acid is also made by intestinal bacteria.

RDA

The Adequate Intake (AI) for Pantothenic Acid is 5 mg/day for both adult males and females.

10.4 VITAMIN C: ASCORBIC ACID, ASCORBATE

The body needs vitamin C, also known as ascorbic acid or ascorbate. Vitamin C benefits the body by holding cells together through collagen synthesis; collagen is a connective tissue that holds muscles, bones, and other tissues together. Vitamin C also 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.

Since our bodies cannot produce or store vitamin C, an adequate daily intake of this nutrient is essential for optimum health. Vitamin C works with vitamin E as an antioxidant, and plays a crucial role in neutralizing free radicals throughout the body. An antioxidant can be a vitamin, mineral, or a carotenoid, present in foods, that slows the oxidation process and acts to repair damage to cells of the body. Studies suggest that vitamin C may reduce the risk of certain cancers, heart disease, and cataracts. Research continues to document the degree of these effects.

Food Sources for Vitamin C

Consuming vitamin C-rich foods is the best method to ensure an adequate intake of this vitamin. While many common plant foods contain vitamin C, the best sources are citrus fruits (orange, kiwi fruit, grape etc.)

RDA

The Recommended Dietary Allowance (RDA) for Vitamin C is 90 mg/day for adult males and 75 mg/day for adult females For those who smoke cigarettes, the RDA for vitamin C increases by 35 mg/day, in order to counteract the oxidative effects of nicotine.