

Vitamins and Minerals

Vitamins and minerals are a vital part of a healthy diet. Both vitamins and minerals are considered coenzymes because they assist the enzymes in the body in carrying out all of the daily activities. If a person eats a variety of foods, the chance of developing deficiency of these nutrients is very small

Vitamins:

Vitamins are essential micronutrients, required by the body in small amounts. They are either fat soluble (vitamins A, D, E, & K) or water soluble (the B vitamins & vitamin C).

Vitamin A:

This vitamin is also known as retinol (also called retinal or retinoic acid). Carotenoids, such as beta-carotene, are converted to vitamin A in the intestine.

Sources:

Vitamin A is found mainly in fish liver oils, liver, egg yolk, milk, & butter. Green leafy and yellow vegetables contain carotenoids.

Importance:

- Normal vision
- Healthy skin & other surface tissues
- Defense against infections
- Antioxidant which inhibit the activity of free radicals

Deficiency:

- Night blindness
- Dryness of eye
- Risk of infections
- Poor growth in children

Excess:

Exceeding 25 000 IUs a day for three months can cause liver and skin damage. In children, taking more than 5 000 IUs or 1,5 mg a day can also cause hair loss, bone damage, headache, vomiting and double vision.

High vitamin A intake during pregnancy has been linked to an increased rate of birth defects. Therefore, pregnant women should not take supplements with a high vitamin A content.

Recommended dietary allowances (RDA):

The RDA for this vitamin is usually expressed in microgram, but can also be expressed in International Units (IU) or milligram. The recommended dietary allowances for vitamin A in adults is 900 retinol equivalents (1 retinol equivalent = 1 microgram retinol = 6 microgram beta-carotene), & 1 International Unit = 0.3 micrograms retinol or 0.6 micrograms beta carotene

Vitamin D:

Vitamin D exists in two forms. Vitamin D2 (ergocalciferol) is found in yeast that exposed to ultraviolet light, and vitamin D3 (cholecalciferol) is found in fish liver oils and egg yolk. Vitamin D3 is also produced in the skin when the skin is exposed to sunlight.

Sources:

Cod liver oil (capsules or liquid form), fatty fish such as herring, mackerel, sardines and salmon, as well as trout and tuna, eggs and cheese.

Importance:

Strengths bones and teeth by increasing the rate that minerals like calcium and magnesium are deposited into bones. It's also crucial for the absorption of calcium from food.

Deficiency:

- Abnormal bone growth & repair
- Rickets in children
- Osteomalacia in adults
- Muscle spasms

Excess:

Combining cod liver oil capsules and vitamin D supplements can result in excessive intake. The upper safe limit is 50mcg per day.

Excess vitamin D may cause poor appetite, nausea, vomiting, increased urination, weakness, skin itching, kidney failure, and calcium deposits throughout the body.

Recommended dietary allowances (RDA):

The current RDA is currently 400IU's. Vitamin D is commonly measured in micrograms (mcg). However, International Units (IU) is the unit of measurement for vitamin D that appears on food labels. To convert vitamin D from IU to mcg, 200 IU is equivalent to 5 mcg.

Vitamin E:

Vitamin E (tocopherol) is a powerful antioxidant. It is a fat-soluble vitamin which is stored in the body for only a short time, requiring a regular intake.

Sources:

Oils such as wheat germ oil, sunflower oil, sunflower seeds, nuts such as hazelnuts, almonds, pine nuts sweet potatoes, avocado pears and dark green vegetables such as spinach.

Importance:

- Antioxidant
- Fighting toxins
- Keeping cell walls in good condition and maintaining healthy nerves, skin, muscles, red blood cells, heart and circulation

Deficiency:

- Weak muscles
- Fertility problems
- Slow healing of wounds

Excess:

Vitamin E is a very safe vitamin and even excessive dosages do not cause toxicity.

Recommended dietary allowances (RDA):

The RDA is 30 IU's or 24mg.

Vitamin K:

Vitamin K is a fat-soluble vitamin and is made by bacteria that live in your colon. It's then absorbed back into your bloodstream.

Sources:

Broccoli, brussels sprouts, yogurt, green cabbage, alfalfa, egg yolk, oils such as soya bean oil and fish liver oil, and kelp.

Importance:

Normal blood clotting

Deficiency:

Bleeding

Excess:

Massive doses of vitamin K in supplements (at least 1000 times the RDA) can lead to a build-up in the body, causing liver damage and problems such as jaundice in infants and children.

Recommended dietary allowances (RDA):

No RDA has been established. An average diet will supply 75–150mcg a day. It is seldom found in supplements as your body makes its own vitamin K.

Vitamin B1 (Thiamine):

Sources:

Dried yeast, whole grains, meat, nuts, legumes, & potato.

Importance:

- Carbohydrate metabolism
- Nerve & heart function

Deficiency:

Deficiency can result in a condition known as beriberi. Early symptoms of deficiency include Tingling in fingers and toes, fatigue, irritation, poor memory, sleep disturbances, pain in the chest, loss of appetite, abdominal discomfort and constipation.

Excess:

Although excess water-soluble vitamins are excreted through the urine, taking massive doses can be toxic. A 100 times more than the recommended doses have toxic potential. This can result in the suppression of the respiratory system, which can lead to insomnia, general weakness, rapid pulse, headaches and irritability. In extreme cases, an overdose can be fatal.

Recommended dietary allowances (RDA):

The RDA is 1.2mg.

Vitamin B2 (Riboflavin):

Sources:

The best sources of riboflavin include brewer's yeast, almonds, meat, whole grains, wheat germ, wild rice, mushrooms, soybeans, milk, yogurt, eggs, broccoli, brussel sprouts, and spinach.

Importance:

- Carbohydrate metabolism
- Healthy hair and nails

Deficiency:

Early signs of deficiency include abnormal intolerance of light ("photophobia"), the production of excess tears, burning and itching of the eyes and burning of the lips and tongue.

Later symptoms include cracks in the lips, mouth corners and skin, as well as a purple, swollen tongue.

Excess:

The safe upper limit is 200 mg daily, although high oral doses are generally considered to be non-toxic.

Do not take more riboflavin than is advised on the supplement's label or more than a doctor prescribed.

Recommended dietary allowances (RDA):

RDA is 1.5mg.

Vitamin B3 (Niacin):

Sources:

Dried yeast, liver, meat, fish, legumes, and whole-grain enriched cereal products.

Importance:

- Carbohydrate metabolism
- Chemical reactions in body
- Niacin also blocks the production of cholesterol in the body, thus playing an important part in preventing heart disease.

Deficiency:

Pellagra (dermatosis, inflammation of the tongue, abnormal intestinal and brain function)

Excess:

Taking more than 1 000 mg per day will merely cause the face to look flushed for a while. But a niacin intake of 3 g per day can actually damage the liver – especially if the niacin is taken in the form of slow-releasing supplements.

An overdose of the vitamin may be especially dangerous in people suffering from asthma or peptic ulcers.

Taking large doses of niacin (to lower blood cholesterol levels, for example) should only be done under the guidance of a doctor.

Recommended dietary allowances (RDA):

RDA is 16mg.

Vitamin B6 (Pyridoxine):

Sources:

Dried yeast, liver, organ meats, wholegrain cereals, fish, & legumes.

Importance:

- Amino acid and fatty acid metabolism
- Healthy Nervous system
- Healthy skin

Deficiency:

Anemia, sleeplessness, irritability, anxiety, dry skin, cracked lips, stress and premenstrual symptoms are all possible symptoms.

Excess:

Pyridoxine deficiency is relatively uncommon. It should be noted that extremely high doses could be dangerous. Many of the signs of vitamin B6 toxicity resemble the symptoms of vitamin B6 deficiency.

Recommended dietary allowances (RDA):

RDA is 2 mg.

Biotin:

Sources:

Liver, kidneys, egg yolks, yeast, nuts, and legumes

Importance:

Carbohydrate and fatty acid metabolism

Deficiency:

Inflammation of the skin and lips

Excess:

Intakes of 2 500mcg are generally regarded as the safe upper limit for daily consumption.

Recommended dietary allowances (RDA):

RDA is 60 micrograms

Vitamin B12 (Cobalamin):

Sources:

Liver, meats, eggs, milk & milk products

Importance:

- Maturation of red blood cells
- Nerve function
- DNA synthesis

Deficiency:

- Anemia
- Some psychiatric disorders
- Poor vision

Excess:

The safe upper limit is 3 000mcg per day.

Recommended dietary allowances (RDA):

RDA is 2 micrograms

Folic acid:

Sources:

Fresh leafy green vegetables, fruits, liver, and dried yeast

Importance:

- Maturation of red blood cells
- DNA and RNA synthesis

Deficiency:

- Decrease in the number of all types of blood cells
- Large red blood cells

Excess:

Prolonged, high intake of folic acid can interfere with the body's ability to absorb the mineral zinc.

Recommended dietary allowances (RDA):

RDA is 200 micrograms

Pantothenic acid:

Sources:

Liver, yeast, and vegetables

Importance:

Carbohydrate and fat metabolism

Deficiency:

- Neurologic disease
- Burning feet

Recommended dietary allowances (RDA):

RDA is 6 mg.

Vitamin C:

Sources:

Citrus fruits, tomatoes, potatoes, cabbage, and green peppers

Importance:

- Bone & connective tissue growth
- Wound repair
- Function of blood vessels
- Antioxidant

Deficiency:

Scurvy (bleeding, loose teeth, & inflammation of the gums)

Excess:

Taking more than 5 000mg (5g) or more may cause diarrhoea and may be harmful to the liver. People who suffer from kidney stones should also avoid large doses.

Recommended dietary allowances (RDA):

RDA is 60 mg.

Minerals:

Some minerals are needed by the body in relatively large quantities and they are considered macronutrients. They include sodium, chloride, potassium, calcium, phosphorus, and magnesium. Other minerals are micronutrient because they are needed by the body in small quantities. They include iron, zinc, copper, manganese, molybdenum, selenium, iodine, and fluoride. Deficiencies of minerals, except iron & iodine, are uncommon. Excesses of some minerals may cause toxicity.

Sodium:

Sources:

Salt, beef meat, sardines, cheese, green olives, & corn bread

Importance:

- Acid-base balance
- Nerve & muscle function

Deficiency:

- Low sodium levels in the blood
- Confusion
- Coma

Excess:

- High sodium levels in the blood
- Confusion
- Coma

Recommended dietary allowances (RDA):

RDA is 1 gram.

Potassium:

Sources:

Milk, bananas, prunes, and raisins

Importance:

- Nerve and muscle function
- Acid-base & water balance

Deficiency:

- Low potassium levels in the blood
- Paralysis
- Heart disturbances

Excess:

- High potassium levels in the blood
- Paralysis
- Heart disturbances

Recommended dietary allowances (RDA):

RDA is 2 grams

Calcium:

Sources:

Milk & milk products, meat, fish, egg, cereal products, beans, fruits, & vegetables

Importance:

- Bone & tooth formation
- Blood clotting
- Nerve & muscle function
- Normal heart rhythm

Deficiency:

- Low calcium levels in the blood
- Muscle spasm

Excess:

- High calcium levels in the blood
- Loss of intestinal tone
- Kidney failure
- Abnormal behavior (psychosis)

Recommended dietary allowances (RDA):

RDA is 1 gram

Phosphorus:

Sources:

Milk, cheese, meat, fish, cereals, nuts, & legumes.

Importance:

- Bone & tooth formation
- Acid-base balance
- Component of nucleic acids
- Energy production

Deficiency:

- Irritability
- Weakness
- Blood cell disorders
- Abnormalities of the intestine & kidney

Excess:

The safe upper limit is 1 500mg per day. Large intakes of phosphorus can decrease the calcium levels in the body. Long-term use of antacids can also reduce the body's phosphorus levels.

Soda drinks contain lots of phosphoric acid and drinking too much can reduce calcium levels.

Recommended dietary allowances (RDA):

RDA is 0.9 gram

Magnesium:

Sources:

Leafy green vegetables, nuts, cereal grains, and seafood

Importance:

- Bone & tooth formation
- Nerve & muscle function
- Enzyme activation

Deficiency:

- Low magnesium levels in the blood
- Abnormal nerve function

Excess:

- High magnesium levels in the blood
- Low blood pressure
- Respiratory failure
- Heart rhythm disturbances

Recommended dietary allowances (RDA):

RDA is 0.3 grams.

Iron:

Sources:

Soybean flour, beef, kidneys, liver, beans, clams, & peaches

Importance:

- Formation of enzymes
- The main component of red blood cells and muscle cells

Deficiency:

- Anemia
- Difficulty in swallowing
- Spoon-shaped nails
- Intestinal abnormality
- Decreased work performance
- Impaired learning ability

Excess:

- Iron deposits
- Liver damage (cirrhosis)
- Diabetes mellitus
- Skin pigmentation

Recommended dietary allowances (RDA):

RDA is 12 milligrams.

Zinc:

Sources:

Organ meats, and seafood

Importance:

- Component of enzymes and insulin
- Healthy skin
- Wound healing
- Growth

Deficiency:

- Slowed growth
- Delayed sexual maturation
- Diminished taste sensation

Excess:

The suggested upper safe limit is 50mg per day for a limited time. Too much zinc can deplete the body of iron and copper, leading to deficiencies of these minerals.

Recommended dietary allowances (RDA):

RDA is 15 milligrams.

Copper:

Sources:

Organ meats, nuts, dried legumes, and whole-grain cereals.

Importance:

- Enzyme component
- Formation of red blood cells
- Bone formation

Deficiency:

Anemia in malnourished children

Excess:

- Copper deposits in the brain
- Liver damage

Recommended dietary allowances (RDA):

RDA is 2 milligrams.

Manganese:

Sources:

Whole-grain cereals, and dried fruits

Importance:

Enzyme component

Deficiency:

- Weight loss
- Skin irritation
- Nausea & vomiting
- Changes in hair color
- Slowed hair growth

Recommended dietary allowances (RDA):

RDA is 3.5 milligrams.

Selenium:

Sources:

Meats and other animal products

Importance:

Necessary for synthesis of an antioxidant enzyme

Deficiency:

Muscle pain & weakness

Excess:

More than 200mcg isn't recommended. More than 3.2mg can lead to hair loss and halitosis.

Recommended dietary allowances (RDA):

RDA is 60 micrograms.

Iodine:

Sources:

Seafood, iodized salt, & dairy products

Importance:

Formation of thyroid hormones

Deficiency:

- Enlargement of the thyroid gland
- Cretinism
- Deaf-mutism
- Abnormal fetal growth & brain development

Excess:

Occasionally causes high levels of thyroid hormone

Recommended dietary allowances (RDA):

RDA is 150 micrograms.

Fluoride:

Sources:

Tea, coffee, & fluoridated water

Importance:

Bone & tooth formation

Deficiency:

- Increased risk of dental cavities
- Possibly bone thinning

Excess:

More than 0.5mg per kg body weight can lead to fluorosis, which manifests as chalky white patches on the teeth.

Recommended dietary allowances (RDA):

RDA is 2.5 mg.