

Vitamins

Vitamins are essential nutrients which enable your body to work properly and to stay healthy. They help the body function effectively. Most vitamins can be found in the food that we eat or from vitamin supplements.

Types:

There are two types: water-soluble and fat-soluble vitamins.

The water-soluble vitamins are vitamins B and C.

Fat-soluble vitamins are vitamins A, D, E, and K.

They are present in foods containing fats.

The body absorbs these vitamins as it does dietary fats.

Most vitamins come from food, but sunshine contributes to vitamin D. Some people need or choose to take supplements that provide extra vitamins. The body absorbs fat-soluble vitamins best when a person eats them with higher-fat foods.

FAT-SOLUBLE VITAMINS: (Vitamins A, D, E, and K).

Vitamin A

Vitamin A helps maintain healthy vision. Without vitamin A, a person could experience vision problems and possibly vision loss. Vitamin A is not a single vitamin but a collection of compounds known as retinoids. Retinoids occur naturally in the human body, and they are present in some dietary sources. Some foods provide retinols, which the body can use directly as vitamin A. Others provide provitamin A, compounds that the body converts into vitamin A.

Function

Vitamin A supports several functions throughout the body, including:

- Vision and the immune system

Dietary sources

Animal sources provide preformed vitamin A, or retinols. This type is ready for the body to use. Plant sources provide carotenoids, such as beta-carotene, which is a powerful antioxidant. The body can convert these into vitamin A.

For this reason, lists of ingredients often show vitamin A content as “vitamin A RAE.”

RAE means “retinol activity equivalents.”

Animal sources of vitamin A include:

- fish liver oil, beef liver
- cheese, milk, and other dairy products
- Sources of beta carotene include:
- sweet potato, kale, spinach, and other green, leafy vegetables
- carrots, cantaloupe, black-eyed peas
- fortified breakfast cereals

Recommended intake

Nutritionists measure some vitamins in two ways:

- micrograms (mcg) RAE
- international units (IU)

Food packages usually show the amounts in IU. A diet that contains 900 mcg RAE of vitamin A, which is the recommended intake for males over 14 years of age, would provide around 3,000–36,000 IU of vitamin A, according to the Office of Dietary Supplements (ODS).

Deficiency

A long-term deficiency can lead to a loss of night vision and possibly a total loss of vision.

Overdose

Too much vitamin A can be toxic.

It can affect:

- people who take vitamin A supplements
- those with a high intake of fish liver oil
- people who take medications that contain retinoids, such as acitretin (Soriatane), a treatment for psoriasis

During pregnancy, high levels of vitamin A can harm a growing fetus.

Symptoms of an overdose include:

- headaches, fatigue, nausea, dizziness

In severe cases, coma and death can result. The time a person takes a vitamin can affect its impact. Find out more here about when to take different vitamins

Vitamin D

People obtain vitamin D:

- naturally through exposure to sunlight or in the diet
- through fortified foods, and as supplements

The body obtains the compounds it needs to make vitamin D from food. It also produces vitamin D when ultraviolet (UV) light meets the skin.

Types

Vitamin D is not a single substance but a group of compounds collectively known as calciferol.

The body absorbs calciferol into the bloodstream and then converts it to calcitriol.

Two types occur naturally:

- vitamin D-3, found in animal fats
- vitamin D-2, found in plants, such as mushrooms

Function

Vitamin D has two main roles in the body:

- It maintains bone health.
- It supports the immune system.

Dietary sources

A person can obtain some vitamin D from the sun, but most people will also need to use other sources, too. The main alternative is food.

Dietary sources include:

- oily fish and fish oils
- fortified dairy products, plant-based milks, and cereals
- beef liver and eggs

Recommended intake

Experts measure vitamin D in international units (IU).

Current guidelines recommend that people of all ages intake of 600 IU of vitamin D daily. This is hard to measure, however, as it is not easy for a person to know how much vitamin D they obtain from sunlight.

Deficiency

A vitamin D deficiency can affect:

- older adults and children who do not spend much time out of doors
- people with darker skin
- some people with chronic health conditions
- those who live far from the Equator, where winter days are short
- those with obesity

The main effects of vitamin D deficiency include:

- osteoporosis, or loss of bone mass
- osteomalacia, when bones become soft

- rickets, when a child's bones do not develop as they should
- increased risk of infection and autoimmunity

Overdose

It is rare for a person to have too much vitamin D, but using supplements could trigger this. Having too much vitamin D could lead to high levels of calcium in the blood.

This can lead to:

- nausea
 - headaches
 - low appetite and weight loss
 - a buildup of calcium in tissues and blood vessels
 - heart or kidney damage
 - high blood pressure
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Vitamin E

Vitamin E is an antioxidant that can help the body destroy free radicals. Free radicals are unstable atoms that can cause oxidative stress. Oxidative stress can lead to cell damage, and this can result in cancer and other diseases. Vitamin E may help protect the body from a range of health issues.

Types

There are eight forms of vitamin E, but only alpha-tocopherol meets humans' needs, according to the ODS.

Function

Some reasons why the body needs vitamin E are:

- as an antioxidant
- to boost the immune system
- to dilate blood vessels and help prevent clotting

Dietary sources

Good sources of vitamin E include:

- wheat germ oil
- sunflower seeds and oil
- almonds, hazelnuts, and peanuts
- spinach and broccoli
- kiwi fruit and mango

Recommended intake

Current guidelines recommend people consume the following amounts of vitamin E. Experts measure vitamin E intake in milligrams (mg) AT, but packaging currently uses international units (IU).

Deficiency

Vitamin E deficiency is rare, but it can affect people with Crohn's disease or cystic fibrosis. These conditions affect the liver's ability to absorb vitamin E.

A deficiency can result in:

- nerve and muscle damage that affects movement and coordination
- vision problems
- a weakened immune system

As vitamin E is an antioxidant, a long-term deficiency could increase the overall risk of various diseases.

Overdose

Obtaining vitamin E through natural sources is unlikely to lead to an overdose, although supplement use can increase this risk.

People who use blood-thinning medication, such as warfarin (Coumadin) should ask their doctor before taking vitamin E supplements, as these may interfere with blood clotting.

Vitamin K

Vitamin K helps the body form blood clots. Blood clotting is essential to prevent excessive bleeding.

Types

There are several types of vitamin K.

The two most common groups are:

- Vitamin K-1 (phylloquinone), present in green, leafy vegetables and some other plant sources
- Vitamin K-2 (menaquinones), present in animal sources and fermented foods

There are also synthetic forms and other forms that the body makes.

Function

Apart from blood clotting, vitamin K may also:

- lower the risk of heart disease
- enhance bone health
- reduce the buildup of calcium in the blood

Dietary sources

Food sources of vitamin K-1 and K-2 include:

- kale, liver, spinach, parsley, butter, egg yolks

Recommended intake

Experts do not have enough evidence to recommend a specific intake of vitamin K suitable to meet the needs of 97-98% of healthy individuals.

Instead, they recommend an adequate intake (AI), an amount assumed to provide nutritional adequacy, as follows:

Age (years)	1-3	4-8	9-13	14-18	19 and over
Female	30	55	60	75	90
Male	30	55	60	75	120

Deficiency

The body is not able to store as much vitamin K as it does vitamin A or D. This means a person needs a regular intake of vitamin K, and there is a higher chance of a deficiency.

A vitamin K deficiency may result in:

- excess bleeding and lower bone density, in the long term

Overdose

Taking high quantities of vitamin K does not appear to lead to adverse effects. However, it can interfere with the use of blood-thinning medications, such as warfarin (Coumadin). Vitamin K supplements are available for purchase in pharmacies and online. However, people should speak to a doctor before using them, especially if they use blood thinners or have a condition that affects blood clotting.