

<u>Vitamin</u>	<u>Functions</u>	<u>Sources</u> Plant-Based*	<u>Signs of Deficiencies</u>	<u>Signs of Excessive Intake</u>
<b>A</b> <b>(Retinol)</b>	Essential for growth; Vision in dim light; Maintenance of soft mucous tissue.	Can be formed in the body from its precursor (beta-carotene), found in cabbage, carrots, kale, lettuce, broccoli, spinach, squash, pumpkin, papaya, mango, melon, guava, grapefruit, tomato, yellow/red fruits, orange/yellow vegetables.	Deficiency can lead to: Stunted growth; Night blindness; Xerophthalmia (dry, ulcerated eyes); Keratomalacia (dry, ulcerated eyes); Defective dental development; Skin Disorders.	Early indications of excess vitamin A can include dry skin and itching. Vitamin A can be stored in the body in such large quantities that it can become toxic. Symptoms may include: dizziness, nausea, headaches and vomiting.
<b>B1 (Thiamin, Aneurine)</b>	Formation of the enzyme thiamin pyrophosphate; promotes normal metabolism, appetite, digestion, and growth; Brain development and function.	Green peas, beet greens, potatoes, asparagus, acorn squash, Brussels sprouts, yeast, soybeans, navy beans mung beans, Brazil nuts, macadamia and pistachio nuts, sunflower, sesame, and chia seeds, legumes, whole wheat.	Moderate deficiency may induce anxiety, depression and irritability.  Extreme deficiency can lead to the disease "Beriberi"-involving nerve inflammation, muscular weakness and, in extreme cases, heart failure.	Excessive doses (possibly by injection) may lead to toxic symptoms such as: Allergic reactions; Disturbance of heart beat; Nervousness; Shaking and Swellings.
<b>B2</b> <b>(Riboflavin)</b>	Production of acetylcholine, noradrenaline, serotonin (neurotransmitters essential to the brain); Release of energy from carbohydrates; Synthesis of arachidonic acid, linoleic acid and linolenic acid (essential fatty acids); Tissue respiration.	Soybeans, spinach, beet greens, collard greens, asparagus, almonds, pistachios, mushrooms, sesame, sunflower and chia seeds, pumpkin and squash seeds.	Deficiency can lead to: Ariboflavinosis; Dizziness; Eczema; Insomnia; Oversensitivity to light; Scaly Scalp.	Overdose is unlikely but extremely large doses are associated with numbness and itching.
<b>B6</b> <b>(Pyridoxine)</b>	Many functions, including: Maintaining healthy skin and nerves; Formation of red blood cells; Formation of hormones essential for functioning of the brain; Synthesis & breakdown of amino	Green vegetables, spinach, onions, winter squash, sweet potatoes, potatoes, sunflower seeds, bananas, raisins, tofu, whole grains.	Rare, but can lead to: Loss of appetite; Anaemia; Fatigue; Nervousness; Insomnia; Memory problems; Menstrual problems.	Excessive intake can lead to poisoning and damage to the central and peripheral nervous systems, especially the sense of touch.

	acids; Resistance to disease; Fight signs of premature ageing.			
<b>B9 (Folic Acid)</b>	Synthesis of nucleic acids; Pre-conception & in early pregnancy folic acid is thought to help prevent neural tube defects and other congenital foetal malformations.	Black-eyed peas, most beans, green leafy vegetables (spinach, turnip greens, etc.), asparagus, broccoli, cauliflower, cos or Romaine lettuce, nuts, avocado, whole grains, mango, guava, kiwi, papaya, pomegranate.	Megaloblastic anaemia (includes several types of anaemia); Apathy / Depression; Dizziness; Dull grey-looking skin.	
<b>B12 (Cyanocobalamin)</b>	Synthesis of nucleic acids; Maintenance of myelin in the nervous system; Correct functioning of Folic Acid.	(Derived from a bacteria found on food—may be in organic soil, unwashed raw mushrooms grown in manure enriched compost, fortified cereals, Brewer's yeast, soya milks, Vecon vegetable stock.)**	Affects most body tissues, especially those containing rapidly dividing cells; Pernicious anaemia; Degeneration of the nervous system (incl. loss of sensation and poor co-ordination); Tongue infections.	
<b>C (Ascorbic Acid)</b>	Antioxidant Properties; Maintaining healthy connective tissues; Integrity of cell walls; Synthesis of collagen; Improves resistance to infections; Promotes healthy function of phagocytes (a type of white blood cell); May help to reduce allergic reactions (by inhibiting the action of histamine).	Citrus fruits (pineapple, oranges, kiwi, strawberries, etc), peaches, guavas, lemons, sweet peppers, potatoes, tomatoes, cauliflower, cabbage, broccoli, green leafy vegetables (spinach, lettuce, etc.).	Mild deficiency: Tender joints; Soft/Bleeding gums; Reduced immunity to diseases; Weakness.  Extreme Deficiency: Scurvy.	Sudden high intake of vitamin C can cause diarrhoea. Very high dosage can lead to stomach problems in some people.
<b>D</b>	Absorption of calcium and phosphorous (from the intestine & deposition of them in the bone). Regulation of the permeability of cell membranes.	Ergocaldiferol (Vit D2) from plant sources: mushrooms.  Cholecalciferol (Vit D3) is produced by the action of sunlight on 7-dehydrocholesterol, which is in the skin. Enjoy 20 –60 minutes of ultraviolet B sun-rays per day on 50-75% of unclothed body. The darker the skin type the more the need for UVB rays. If over 50, you may need twice the sunshine as your younger counterpart.**	Deficiency may be due to poor diet or to insufficient sunlight and can lead to:  Decalcified bones; Rickets (in children); Problems in dental development (in children); Osteomalacia (in adults); Muscle weakness and cramps; Osteoporosis - if deficiency over extended period of time.	Over-calcification of the bones and teeth; Formation of calculus stones in the kidneys and other organs; Hardening of arteries.  In cases of extreme over-dose, vitamin D may lead to poisoning. Symptoms may include: General discomfort; Itchy eyes and skin; Extreme thirst; Diarrhoea.

<b>E (Tocopherols and Tocotrienols)</b>	Antioxidant properties; Muscle Development; Production of red blood cells. Reproductive functions.	Spinach, asparagus, broccoli, soya beans, sweet potatoes, whole grains, avocados, tomatoes, sunflower seeds, hazelnuts, peanuts, almonds, kiwi, mango, peaches.		Some vitamin E can be safely stored in the body but excessive doses may result in stomach problems and diarrhoea.
<b>K</b>	Needed for formation of prothrombin by the liver - for blood clotting.	Leafy greens (kale, collards, spinach, watercress, etc.), asparagus, cabbage, Brussels sprouts, broccoli, scallions, molasses, nuts, seaweed, herbs (basil, sage, thyme, curry), chili powder, cayenne. Also synthesized by bacteria in the large intestines.	Deficiency may lead to: Osteoporosis	Some people with liver diseases cannot tolerate supplements of vitamin K.

\*Plant-based vitamins are often superior to animal-based sources and without the ill effects of animal consumption which is correlated to high rates of chronic disease while the opposite is true for plant-based diets.

A calorie adequate balanced diet, rich in a wide variety of fresh fruit and vegetables, is sufficient to meet a person's nutritional requirements. This table is not all-inclusive.

\*\*Due to our sterile environment, we do not consume bacteria the way we used to. Although B12 can be synthesized by some individuals in the gut, many have lost this ability and supplementation may be necessary. Likewise, in colder climates, adequate sunshine exposure might not be viable and Vitamin D supplementation may be considered. Other than Vitamin B12 and Vitamin D, supplements are only recommended short term (after blood work has confirmed a deficiency and in the rare circumstance that a dietary or lifestyle intervention has not proved fruitful). *Always consult with your physician or health care provider before taking any supplements or making any dietary changes.*