

Vitamins in the Diet and their Health Effects

Vitamin (scientific name)	Major Food Sources	Main Health Effects	Notable Nutrition
Fat soluble			
Vitamin A (retinol, retinal, retinoic acid)	Liver, beef, eggs, shrimp, fish; some cheeses; many milks (cow and other) are fortified with vitamin A.	Vision, skin, bone health, white blood cells (immune functioning).	Vitamin A, sometimes called preformed vitamin A, is only in animal foods; beta-carotene, found only in plants, can be converted easily into vitamin A in the body. Most people obtain adequate vitamin A or beta-carotene, and too much is toxic. High amounts of preformed vitamin A may also compromise bone health.
Vitamin D (calciferol, cholecalciferol)	Fish, fortified milks, some dairy products; sunlight is the major source.	Bone health, dental health, key regulator of minerals calcium and phosphorous; potential associations with obesity and type 2 diabetes.	Known as the “sunshine vitamin,” as the vast majority comes not from food but from the sun; it’s synthesized in the skin during exposure to the sun’s UVB rays. Some research suggests vitamin D levels are too low in many people though research is ongoing.
Vitamin E (tocopherol)	Vegetable oils, whole grains, wheat germ, nuts.	Potent antioxidant (i.e., squelches unstable molecules that can damage or kill healthy cells).	There are different forms of vitamin E, including gamma-tocopherol and other tocopherols, that you might see on a food ingredient list. Food sources are limited hence recent studies suggest that some people do not get enough.
Vitamin K (phylloquinone, menaquinone)	Many green vegetables (e.g., spinach, kale, broccoli, cabbage), eggs, fortified milk .	Blood clotting; newer evidence shows a role in bone health.	Bacteria in the intestine synthesize vitamin K, meeting about half of daily needs. People on blood thinners (i.e., anticoagulants) shouldn’t overdo vitamin K foods, which can lead to excessive bleeding.
Water soluble			
Vitamin B (thiamin)	Small amounts in many foods; fortified flour, bread, baked goods, etc.	Key cofactor involved in energy metabolism (i.e., converts food into energy); essential across the body.	In the US, fortification of flour with various “B-complex” vitamins ensures intakes that prevent deficiencies. Ongoing research is considering the impact on various chronic diseases of the brain, including

			dementia and Alzheimer's disease.
Vitamin B₂ <i>(riboflavin)</i>	Fortified flour, bread, baked goods, etc; milk, yogurt, liver.	Key cofactor involved in energy metabolism (i.e., turns food into energy); helps convert vitamin B ₆ and folate into forms the body can use; essential across the body, particularly for growth and red blood cell production.	The small amounts in many foods allow most people to obtain enough, though alcoholics and the elderly may become deficient if diet is inadequate.
Vitamin B₃ <i>(niacin, nicotinic acid)</i>	Fortified flour, bread, baked goods, etc; mushrooms, peanut butter.	Key cofactor involved in energy metabolism (i.e., turns food into energy); essential across the body.	Synthesized in the body from the amino acid tryptophan (with vitamin B ₆), so deficiencies are rare.
Vitamin B₅ <i>(pantothenic acid)</i>	Small amounts in many foods, including broccoli, tomato, and avocado; fortified flour, bread, baked goods, etc; milk, yogurt, liver	Key cofactor involved in energy metabolism (i.e., turns food into energy); essential across the body; participates in synthesis of fats, hormones, and other components.	The small amounts in many foods allow most people to obtain enough.
Vitamin B₆ <i>(pyridoxal, pyridoxine, pyridoxamine)</i>	Soy products (such as tofu), non-citrus fruits, meat, fish.	Helps lower homocysteine, a risk factor for heart disease; assists in the synthesis of niacin and serotonin; influences cognition.	A growing evidence base considers the impact of higher intakes on various neurological conditions, including dementia and Alzheimer's disease, as well as mental health conditions such as depression, but more research is needed.
Vitamin B₁₂ <i>(cobalamin)</i>	Fortified cereals and soymilk, liver, meat.	Helps lower homocysteine, a risk factor for heart disease; assists in cell synthesis and break down of fatty acids and amino acids.	Older adults, vegans who don't consume fortified products (or supplements), and those taking acid-blockers are at risk for deficiency due to decreased absorption in the gut from food-based sources; deficiency can impact cognition and nerves and allows build-up of homocysteine.

			These populations should consider a supplement, which can be absorbed by the body (as it's a different chemical form).
Biotin	Small amounts in many foods, including whole grains and egg yolks.	Key cofactor involved in energy metabolism (i.e., turns food into energy) and glucose synthesis, as well as fat metabolism.	Some is synthesized in the body by bacteria, and the small amounts in many foods ensure most people get enough.
Vitamin C (<i>ascorbic acid, ascorbate</i>)	Fruit (and 100% fruit juice), especially citrus and strawberries; Brussels sprouts, spinach, broccoli, peppers.	Potent antioxidant, (i.e., squelches unstable molecules that can damage or kill healthy cells); assists in synthesis of collagen and neurotransmitters serotonin and norepinephrine.	High in many foods that people regularly consume, so deficiency is rare. Hypothesized to prevent and cure common colds, but evidence is very weak.
Choline	Many foods, especially peanuts.	Helps make and release the neurotransmitter acetylcholine, which aids in many nerve and brain activities. Plays a role in metabolizing and transporting fats.	Synthesized by the body, so deficiency is unlikely.
Folate (<i>folic acid, folacin</i>)	Fortified flours and breakfast cereals, as well as some vegetables and legumes.	Helps lower homocysteine, a risk factor for heart disease; cell synthesis; prevents neural tube defects (NTDs) like spina bifida when consumed early in conception.	Studies in the late twentieth century showed that inadequate folate intake during early conception led to birth defects of the brain and spinal cord. Scientific consensus was reached over time, leading to fortification policies that have reduced the global incidence of NTDs.
