

VITAMIN

Vitamin	Primary function	Deficiency
Vitamin A	Normal vision and normal cell development in the body	Night blindness, dry eyes, softening of the cornea
Thiamin	A coenzyme for energy metabolism, nervous-system function	Beriberi
Riboflavin	A coenzyme in energy metabolism, normal vision	Ariboflavinosis
Niacin	A coenzyme in energy metabolism	Pellagra
Pantothenic acid	Part of a coenzyme used in energy metabolism	Convulsions or anemia
Vitamin B₆	Part of a coenzyme used in amino-acid metabolism, helps make red blood cells, assists in the conversion of the amino acid tryptophan to the vitamin niacin	Anemia, nerve damage, seizures, skin problems, sores in the mouth
Biotin	Part of a coenzyme used in energy metabolism, used in cell growth, helps maintain a steady blood-sugar level, strengthens hair and nails	Changes in mental state, dry skin, fine and brittle hair, fungal infections, hair loss or total alopecia, muscular pain, skin rash, seborrheic dermatitis
Folate or folic acid	Part of a coenzyme used in the synthesis of new cells	Behavioral disorders, diarrhea, loss of appetite, sore tongue, headaches, heart palpitations, infant neural tube defects, irritability, low birth weight babies, megaloblastic anemia, premature babies, weakness, weight loss
Vitamin B₁₂	Part of a coenzyme used in the synthesis of new cells	Megaloblastic anemia, nerve-cell death, numbness or tingling of the extremities, pernicious anemia
Vitamin C	Antioxidant, collagen formation in the skin, helps immunity	Scurvy
Vitamin D	Maintains the normal levels of calcium and phosphorus in the blood	Osteomalacia, osteoporosis, rickets
Vitamin E	Antioxidant	Neurological disorders leading to poor transmission of nerve impulses, muscle weakness, and degeneration of the retina
Vitamin K	Blood clotting	Bleeding diathesis (causing problems with blood coagulation)

MINERAL

Mineral	Primary function	Deficiency
Calcium	Bone health, maintenance of normal blood pressure, muscle contraction	Hypocalcemia, low blood calcium usually caused by other medical conditions, osteoporosis can result from chronic calcium and vitamin D deficiency
Chloride	Maintains fluid and electrolyte balance	Hypochloremia, usually caused by repeated vomiting in combination with low intakes
Chromium	Aids in carbohydrate metabolism	Impaired glucose tolerance, increased blood cholesterol and triglycerides
Copper	Part of various enzymes, used for electron transport	Deficiency is uncommon with exception of malnutrition
Fluoride	Bone and tooth health	Increased cavity formation
Iodine	Component of thyroid gland, a form of the hormone thyroxine regulates metabolic rate	Goiter (large growth on the thyroid gland), reproductive damage, hypothyroidism
Iron	Part of hemoglobin	Low iron stores, iron-deficiency anemia, can affect cognition and immune function in children
Magnesium	Part of bones and teeth, protein creation, muscle activity, activator of metabolism of macronutrients	Hypomagnesemia, low blood magnesium, occurs when other major minerals are deficient. Occurs with kidney disease and with alcoholism
Manganese	Cofactor for enzymes that facilitate metabolic processes and prevent damage by free radicals	Deficiency not seen in humans eating normal diets
Molybdenum	Purine degradation, formation of uric acid, enzyme reactions	Deficiency not seen in humans eating normal diets
Phosphorus	Part of bones and teeth	Hypophosphatemia, low blood phosphorus, occurs with underlying disease conditions
Potassium	Maintains fluid and electrolyte balance	Hypokalemia, low blood potassium, usually caused by vomiting and diarrhea, or use of diuretics (promotes urine formation), eventually irregular heartbeat
Selenium	Antioxidant, which protects substances from being oxidized and thus decreases the adverse effects of free radicals	Muscle pain, muscle weakness, and cardiomyopathy (structural change in the heart such as enlargement of the heart)
Sodium	Maintains fluid and electrolyte balance	Hyponatremia, low blood sodium, usually a result of vomiting, diarrhea, diuretics (promotes urine formation), or profuse sweating
Sulfur	Part of certain vitamins, part of sulfur-containing amino acids, determines shape of protein molecules	Deficiency not seen in humans
Zinc	Taste perception, coenzyme	Deficiency can result in delayed wound healing, impaired appetite, and diarrhea