

NUTRIENT FUNCTIONS & DEFICIENCY SYMPTOMS

Nutrient deficiencies alter bodily functions and processes at the most basic cellular level. These processes include water balance, enzyme function, nerve signaling, digestion, and metabolism. Resolving these deficiencies is important for optimal growth, development, and function.

NUTRIENT	POTENTIAL	WHAT IT DOES	WHERE IT'S FOUND	SYMPTOMS/ MANIFESTATIONS
ALPHA LIPOIC ACID	COMMON	Energy, blood flow to nerves, glutathione levels in brain, insulin sensitivity, effectiveness of vitamins C, E, antioxidants	Supplementation, spinach, broccoli, beef, Brewer's yeast, some organ meats	Diabetic neuropathy, reduced muscle mass, atherosclerosis, Alzheimer's, failure to thrive, brain atrophy, high lactic acid
ASPARAGINE	LESS COMMON	Synthesizes many important cellular proteins; increases resistance to fatigue and improves smooth liver function.	Animal foods, asparagus, nuts, and legumes.	Fatigue, immune system stress, autoimmune disorders, severe allergy infections
BIOTIN	LESS COMMON	Carbs, fat, amino acid metabolism (the building blocks of protein)	Salmon, meats, vegetables, grains, legumes, lentils, egg yolks, milk, sweet potatoes, seeds, nuts, wheat germ	Depression, nervous system, premature graying, hair, skin
CALCIUM	VERY COMMON	Bones, teeth, helps heart, nerves, muscles, body systems work properly, needs other nutrients to function	Dairy, wheat/soy flour, molasses, Brewer's yeast, Brazil nuts, broccoli, cabbage, dark leafy greens, hazelnuts, oysters, sardines, canned salmon	Osteoporosis, osteomalacia, osteoarthritis, muscle cramps, irritability, acute anxiety, colon cancer risk
CARNITINE	LESS COMMON	Energy, heart function, oxidize amino acids for energy, metabolize ketones	Red meat, dairy, fish, poultry, tempeh (fermented soybeans), wheat, asparagus, avocados, peanut butter	Elevated cholesterol, liver function, muscle weakness, reduced energy, impaired glucose control
CHOLINE	VERY COMMON	Required for neurotransmitter synthesis, cell-membrane signaling, lipid transport, homocysteine reduction; brain and memory development	Beef, beef liver, wheat germ, egg, fish (scallops/cod), potatoes, kidney beans, milk, brussels sprouts, broccoli, peanuts	Liver dysfunction, decreased serum cholesterol, hypercholesterolemia, depression, cognitive decline
CHROMIUM	COMMON	Assists insulin function, increases fertility, carbohydrate/fat metabolism, essential for fetal growth/development	Supplementation, Brewer's yeast, whole grains, seafood, green beans, broccoli, prunes, nuts, potatoes, meat	Metabolic syndrome, insulin resistance, decreased fertility
COQ10	COMMON	Powerful antioxidant, stops oxidation of LDL cholesterol, energy production, important to heart, liver and kidneys	Oily fish, organ meats, whole grains	Congestive heart failure, high blood pressure, angina, mitral valve prolapse, fatigue, gingivitis, immune system, stroke, cardiac arrhythmias
COPPER	LESS COMMON	Bone formation, involved in healing process, energy production, hair and skin coloring, taste sensitivity, stimulates iron absorption, helps metabolize several fatty acids	Oysters, seeds, dark leafy vegetables, organ meats, dried legumes, whole grain breads, nuts, shellfish, chocolate, soybeans, oats, blackstrap molasses	Osteoporosis, anemia, baldness, diarrhea, general weakness, impaired respiratory function, myelopathy, decreased skin pigment, reduced resistance to infection
CYSTEINE	LESS COMMON	Powerful antioxidant, detoxification agent, reduces homocysteine levels	Fish, meat, egg, dairy, broccoli, brussels sprouts, cabbage, dates, garlic, ginseng, nuts, onions, lentils, peppers, sunflower seeds	Impaired antioxidant defenses, depressed immune function, rheumatoid arthritis, hypertension, skin disorders, hair loss, asthma, cystic fibrosis, pulmonary disease
FOLATE	VERY COMMON	Mental health, infant DNA/RNA, adolescence and pregnancy, with B12 to regulate RBC production, iron function, reduce homocysteine	Supplementation, fortified grains, tomato juice, green vegetables, black-eyed peas, lentils, beans	Anemia, immune function, fatigue, insomnia, hair, high homocysteine, cardiovascular disease
N - ACETYL CYSTEINE (NAC) & GLUTATHIONE	MOST COMMON	Glutathione production, lowers homocysteine, lipoprotein (a), heal lungs, inflammation, decrease muscle fatigue, liver detoxification, immune function	Meats, ricotta, cottage cheese, yogurt, wheat germ, granola, oat flakes	Free radical overload, elevated homocysteine, cancer risk, cataracts, macular degeneration, immune function, toxin elimination
GLUTAMINE	VERY COMMON	Energy production, protein synthesis, detoxification	High protein foods (e.g. milk and meat)	Intestinal disorders, gastric ulcers, alcohol addition, burns, immunodeficiency syndrome
INOSITOL	LESS COMMON	Essential for hormone function, cell signaling, cell membrane components	Cantaloupe, orange, grapefruit, mango, lime, kiwi, nectarine, kidney beans, green beans, peanut butter	Alopecia, eczema, insomnia, constipation, hyperlipidemia
LIPOIC ACID	COMMON	Energy production, detoxification	Organ meats (heart, liver, kidney), spinach, broccoli, tomatoes, peas, brussels sprouts	Reduced muscle mass, brain atrophy, increased lactic acid production, seizures, immunodeficiency syndrome, failure to thrive

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MAGNESIUM	VERY COMMON	Essential for proper cell function, enzyme activation, neuromuscular activity, energy metabolism, bone and cartilage health, collagen formation	Oat bran, brown rice, mackerel, spinach, almonds, Swiss chard, lima beans, edamame, potato with skin, black eyed peas, banana, blackstrap molasses	Trousseau and Chvostek signs, muscle spasms, tetany, cardiac arrhythmias, ataxia, vertigo, convulsions, thrombophlebitis, hemolytic anemia, osteoporosis, Meniere's disease
MANGANESE	COMMON	Skeletal development; can be toxic at high levels	Blackstrap molasses, raw pineapple, oatmeal, pecans, brown rice, spinach, almonds, peanuts, sweet potato, lima beans, green tea, black tea	Bone malformation, eye and hearing impairment, hypertension, infertility, cardiovascular disease, memory loss, muscle cramping and tremors, carbohydrate intolerance
PANTOTHENATE	LESS COMMON	RBC production, sex and stress-related hormones, immune function, healthy digestion, helps use other vitamins	Meat, vegetables, whole grains, legumes, lentils, egg yolks, milk, sweet potatoes, seeds, nuts, wheat germ, salmon	Stress tolerance, wound healing, skin problems, fatigue
SELENIUM	LESS COMMON	Helps optimize antioxidant performance	Brazil nuts, walnuts, tuna, oysters, clams, halibut, shrimp, salmon, crab, brown rice, sunflower seeds, beef	Heart disease, cancer, depressed immune function, inflammatory diseases
SERINE	LESS COMMON	Essential for protein synthesis, energy production, phospholipid synthesis	Fish, meats, egg, and dairy, asparagus, beans, fenugreek, lentils, seaweed, spinach, watercress	Neuropathy, neuritis, behavioral disturbances
VITAMIN A	LESS COMMON	Eyes, immune function, skin, essential cell growth and development	Milk, eggs, liver, fortified cereals, orange or green vegetables, fruits	Night blindness, immune function, zinc deficiency, fat malabsorption
VITAMIN B1	VERY COMMON	Carb conversion, breaks down fats and protein, digestion, nervous system, skin, hair, eyes, mouth, liver, immune system	Pork, organ meats, whole grain and enriched cereals, brown rice, wheat germ, bran, Brewer's yeast, blackstrap molasses	Heart, age-related cognitive decline, Alzheimer's, fatigue
VITAMIN B2	VERY COMMON	Metabolism, carb conversion, breaks down fats and protein, digestion, nervous system, skin, hair, eyes, mouth, liver	Brewer's yeast, almonds, organ meats, whole grains, wheat germ, mushrooms, soy, dairy, eggs, green vegetables	Anemia, decreased free radical protection, cataracts, poor thyroid function, B6 deficiency, fatigue, elevated homocysteine
VITAMIN B3	LESS COMMON	Energy, digestion, nervous system, skin, hair, eyes, liver, eliminates toxins, sex/ stress hormones, improves circulation	Beets, Brewer's yeast, meat, poultry, organ meats, fish, seeds, nuts	Cracking, scaling skin, digestive problems, confusion, anxiety, fatigue
VITAMIN B6	COMMON	Enzyme, protein metabolism, RBC production, reduces homocysteine, nerve and muscle cells, DNA/RNA, B12 absorption, immune function	Poultry, tuna, salmon, shrimp, beef liver, lentils, soybeans, seeds, nuts, avocados, bananas, carrots, brown rice, bran, wheat germ, whole grain flour	Depression, sleep and skin problems, confusion, anxiety, fatigue
VITAMIN B12	VERY COMMON	Healthy nerve cells, DNA/RNA, red blood cell production, iron function	Fish, meat, poultry, eggs, milk, milk products	Anemia, fatigue, constipation, loss of appetite/weight, numbness and tingling in the hands and feet, depression, dementia, poor memory, oral soreness
VITAMIN C	COMMON	Enzyme activation, second messenger roles (transmitting hormonal information), blood clotting, cell and cell organelle membrane function, nerve impulse transmission and muscular contraction, tone and irritability	Supplementation, broccoli, brussels sprouts, cantaloupe, cauliflower, citrus, guava, kiwi, papaya, parsley, peas, potatoes, peppers, rose hips, strawberries and tomatoes	Muscular and nervous irritability, muscle spasms, muscle cramps and tetany, tooth decay, periodontal disease, depression, possibly hypertension
VITAMIN D	VERY COMMON	Calcium and phosphorus levels, calcium absorption, bone mineralization	Sunlight, milk, egg yolks, liver, fish	Osteoporosis, calcium absorption, thyroid
VITAMIN K	LESS COMMON	Aids in the formation of clotting factors and bone proteins and the formation of glucose into glycogen for storage in the liver	Kale, green tea, turnip greens, spinach, broccoli, lettuce, cabbage, beef liver, asparagus, watercress, cheese, oats, peas, whole wheat	Excessive bleeding, a history of bruising, appearance of ruptured capillaries or menorrhagia (heavy periods)
ZINC	MOST COMMON	Supports enzymes, immune system, wound healing, taste/smell, DNA synthesis, normal growth & development during pregnancy, childhood and adolescence	Oysters, red meat, poultry, beans, nuts, seafood, whole grains, fortified breakfast cereals, dairy	Growth retardation, hair loss, diarrhea, impotence, eye and skin lesions, loss of appetite, taste, weight loss, wound healing, mental lethargy