

CELLULAR MICRONUTRIENT ASSAY (CMA)

VITAMINS

Biotin		Vitamin B2	
Delta tocotrienol		Vitamin B3	113% Borderline
MK4		Vitamin B6	
MK7		Vitamin B9	
Pantothenic acid		Vitamin C	
Vitamin A		Vitamin D	
Vitamin B1		Vitamin K1	
Vitamin B12			

MINERALS

Boron		Magnesium	112% Borderline
Calcium	110% Borderline	Manganese	
Chromium		Molybdenum	
Copper		Selenium	
Iodine		Strontium	
Iron		Vanadium	
Lithium	112% Borderline	Zinc	

AMINO ACIDS

Arginine	112% Borderline	L-Tyrosine	
Asparagine		Lysine	
Cysteine	110% Borderline	Methionine	
Glycine		Phenylalanine	
Histidine		Taurine	
Isoleucine	111% Borderline	Threonine	
Leucine		Tryptophan	
L-Glutamine		Valine	121% Insufficient
L-Serine	110% Borderline		

OTHER NUTRIENTS

Carnitine		Lipoic Acid	
Choline		Omega 3 DHA	
Coenzyme Q10		Omega 3 EPA	
Glutathione		Omega 9	
Inositol			

	100% - 109%		Nutrient Sufficiency
	110% - 119%		Borderline Insufficiency
	≥ 120%		Insufficiency*

These laboratory results are not intended to diagnose a disease state. The performance characteristics of all assays have been verified by Cell Science Systems, Corp. All information provided is only a suggested guideline and should not be substituted for professional medical advice, diagnosis, or treatment.

The descriptions that follow are for educational purposes only. Statements are not to be interpreted as treatment recommendations and do not take the place of advice from a qualified practitioner. Please be aware that botanicals and high doses of certain nutrients may interact with medications, botanicals, and medical diagnoses, and therefore may be contraindicated. The patient is encouraged to seek guidance and an individualized food and supplement plan from a qualified nutrition practitioner.

MICRONUTRIENTS TO ADDRESS

- ▶ **Valine** Valine is one of the three branched chain amino acids (BCAAs). **Important for:** • Growth and tissue repair, muscle health • Energy production • Blood glucose regulation • Support of the CNS and cognition • Support of detoxification • Immune function **May be useful for the prevention/treatment of:** stress, anxiety, appetite regulation, and alcohol related brain issues **Good food sources:** dairy products, meat, fish, nuts, seeds, , lentils, mushrooms, sesame seeds, soy protein, leafy greens, and whole grains.
- ▶ **Vitamin B3** Vitamin B3 occurs naturally in two forms, niacin (aka nicotinic acid) and niacinamide (aka nicotinamide). All the body's tissues convert niacin into its active form, nicotinamide adenine dinucleotide which is required for more than 400 enzymes to drive metabolic processes. **Important for:** • Conversion and release of energy from carbohydrate, protein, and fat • Brain function • Influence on serum lipid levels (niacin form only) • Regulation of blood glucose (niacin form only) **May be useful for the prevention/treatment of:** certain cardiovascular, dermatological, and psychiatric issues as well as disorders in hearing, olfactory, taste, addictions, osteoarthritis, ADHD, and insomnia **Good food sources:** meat, chicken, fish, whole grains, nuts, legumes, and dairy products
- ▶ **Arginine** L-arginine is an amino acid, a building block for protein synthesis, and is best known for its effects on the vascular system. **Important for:** • Vasodilation – dilatation and relaxation of blood vessels • Wound healing and enhancement of the immune system • Ammonia detoxification **May be useful for the prevention/treatment of:** anal fissure, congestive heart failure, erectile dysfunction, pre-eclampsia, sickle cell disease, esophageal spasm, infertility, interstitial cystitis, and Raynaud's disease **Good food sources:** meat, poultry, fish, dairy products, peanuts, nuts, seeds, whole grains, legumes, and chocolate.
- ▶ **Lithium** Lithium is a trace mineral that is present in the diet, mainly in grains and vegetables. Some people use lithium supplements as medicine -lithium is available as an FDA approved prescription medication for use in psychiatric conditions. Supplements contain much smaller quantities than prescribed medication. **Important for:** • Modulation of the nervous system function • Modulation of neurotransmitter activity- GABA, serotonin, melatonin • Modulation of circadian rhythms • May be required for normal metabolism and neural communication **May be useful for the prevention/treatment of:** Bipolar disorder, depression, schizophrenia, impulsive aggressive behavior associated with ADHD. **Good food sources:** depending on geographical location due to uneven distribution of lithium in the earth's crust: cereals, potatoes, tomatoes, cabbage, and some mineral waters. It may also be found in some spices such as nutmeg, coriander seeds, or cumin. Small amounts also found in foods from animal origin like sardines and egg yolks. **IMPORTANT:** Lithium interacts with a number of herbs, supplements, medications, and medical conditions. Lithium supplementation should only be used with guidance and monitoring by a qualified practitioner.
- ▶ **Magnesium** Magnesium is an essential mineral, a cofactor in more than 300 cellular reactions, and necessary for the synthesis of energy. **Important for:** • Structural integrity of teeth and bones Energy, DNA, RNA, and protein synthesis Essential fatty acid metabolism • Glutathione (antioxidant) synthesis • Immune support • Transport of calcium and potassium ions across cell membranes • Muscle contraction and nerve function • Regulation of heart rhythm • Regulation of blood glucose • Blood pressure regulation • Regulation of stress response **May be useful for the prevention/treatment of:** angina, arrhythmias, CHF, hypertension, stroke, brittle nails, Meniere's disease, olfactory issues, gastrointestinal issues, constipation, fibromyalgia, headaches, migraines, muscle cramps (especially nocturnal), anxiety, depression, cognitive decline, fatigue, menstrual cramps, PMS, and glucose tolerance. **Good food sources:** spinach, Swiss chard, beet greens, turnip greens, summer squash, pumpkin seeds, sesame seeds, sunflower seeds, cashews, almonds, barley, buckwheat, brown rice, quinoa, millet, wheat germ, kidney beans, soybean flour, tofu.
- ▶ **Isoleucine** Isoleucine is a branched chain amino acid important for energy production and tissue repair. **Important for:** • Blood clotting • Muscle and tissue repair • Energy production • Protein synthesis • Regulation of blood glucose **May be useful for the prevention/treatment of:** anorexia, mania, tardive dyskinesia, prevention of muscle breakdown during exercise, and exercise fatigue **Good food sources:** meat, fish, eggs, nuts seeds, lentils, peas, soy

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MICRONUTRIENTS TO ADDRESS

- ▶ **L-Serine** L-serine is a nonessential amino acid that is synthesized from the amino acid, glycine. It is especially important to proper functioning of the brain and CNS. **Important for:** • Synthesis of proteins and neurotransmitters • Metabolism of fats • Muscle formation • Healthy cognition • Formation of phospholipids for every cell in the body • Formation and maintenance of myelin sheath- protecting nerve cells • RNA and DNA function • Maintenance of a healthy immune system **May be useful for the prevention/treatment of:** schizophrenia, Parkinson's disease, depression, fibromyalgia, and chronic fatigue syndrome. **Good food sources:** meat, poultry, fish, legumes, soybeans
- ▶ **Cysteine** L-cysteine is classified as a "semi-essential" amino acid manufactured from methionine. It is made in small amounts by the liver, but the availability of methionine is necessary **Important for:** • Protein synthesis • Support of the synthesis of glutathione, the body's "master antioxidant" • Immune support • Lipid metabolism • Digestive support • Vascular support • Antioxidation • Anti-inflammation • Nerve protection • Detoxification **May be useful for the prevention/treatment of:** Alzheimer's disease, Parkinson's disease, arthritis, poor intestinal health, dementia, multiple sclerosis, male infertility, and osteoporosis **Good food sources:** beef, pork, chicken, sunflower seeds, walnuts, and soy
- ▶ **Calcium** Calcium is a mineral essential for good health. The most abundant mineral in the body, almost all calcium (99%) is stored in bones and teeth where it supports their strength The body uses this reservoir to maintain a tightly regulated calcium blood level. **Important for:** • Strength of bones and teeth • Muscle tone and contraction • Cardiovascular and nervous system function • The release of hormones and enzymes that impact almost every function in the body. • May be useful in prevention/treatment of brittle nails, leg cramps in pregnancy, pre-eclampsia, obesity, osteoporosis, PMS, periodontal disease. **May be useful for the prevention/treatment of:** dysmenorrhea, osteoarthritis (preliminary evidence), osteoporosis (preliminary evidence), and age-related cognitive decline (preliminary evidence). **Good food sources:** Milk, yogurt, cheese, kale, broccoli, Chinese cabbage, collard greens, mustard greens, turnip greens, salmon and sardines canned with bones, calcium fortified tofu, sesame seeds, blackstrap molasses

IMPORTANT! Identified adverse food reactions- allergies, sensitivities, and intolerances- should be avoided even if these cellular tests have shown those food sources of micronutrients/botanicals to be "beneficial." The CMA and APA test the responses of B and T lymphocytes, not antibodies (IgE-mediated allergies) or cells of the innate immune system (Alcat Test). Patients and practitioners are encouraged to carefully read all product/supplement labels and avoid all ingredients that are contraindicated for any reason.