CELL SCIENCE SYSTEMS

Lab Director
Harold Alvarez, M.D.

Patient Information:	PATIENT II, PRETEND				
Date of Birth:	11/04/1977	Gender:	F	**Lab ID:**	**68220**
Date Received:	02/11/2010	Date Collected:	01/01/2010	Date Reported:	04/02/2021
Clinic ID:	10804	Physician:	Sample Physician		

CELLULAR NUTRITION ASSAYS

CMA (CELLULAR MICRONUTRIENT ASSAY)

Nutrient Sufficiency | Borderline Nutrient Insufficiency | Nutrient Insufficiency

Vitamins

Biotin	131%	Insufficient	Vitamin B2		
Delta tocotrienol			Vitamin B3		
MK4	130%	Insufficient	Vitamin B6		
MK7			Vitamin B9	115%	Borderline
Pantothenic acid			Vitamin C	119%	Borderline
Vitamin A			Vitamin D		
Vitamin B1			Vitamin K1		
Vitamin B12	118%	Borderline			

Minerals

Boron			Manganese		
Calcium			Molybdenum		
Chromium			Potassium		
Copper	124%	Insufficient	Selenium	132%	Insufficient
Iodine			Strontium		
Iron			Vanadium		
Lithium	113%	Borderline	Zinc	123%	Insufficient
Magnesium					

Amino Acids

Arginine			L-Tyrosine		
Asparagine			Lysine	>140%	Insufficient
Cysteine	>140%	Insufficient	Methionine	111%	Borderline
Glycine	>140%	Insufficient	Phenylalanine		
Histidine	116%	Borderline	Taurine		
Isoleucine			Threonine		
Leucine			Tryptophan		
L-Glutamine			Valine		
L-Serine					

Other Nutrients

Alpha-Ketoglutarate			Glutathione	118%	Borderline
Carnitine	>140%	Insufficient	Inositol	124%	Insufficient
Choline					

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Significant Micronutrients

- **Lysine**

Lysine is an essential amino acid that plays an important role in the production of enzymes and hormones, as well as the growth and development of bones and muscles. **Important for:** • Building muscle protein • Increasing collagen production and tissue repair • Supporting the production of enzymes, antibodies, and hormones • Promoting calcium absorption • Immune support **May be useful for the prevention/treatment of:** recurring herpes simplex infections/cold sores, diabetes, high triglycerides, and stress **Good food sources:** Meat, fish, poultry, dairy, eggs, soybeans, and legumes. Note: a significant amount of lysine is destroyed by harsh cooking techniques like high temperature baking, grilling, and frying.

- **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

- **Carnitine**

L-carnitine is a derivative of the amino acids, methionine and lysine, and is synthesized in the liver, kidneys, and brain. It plays a key role in energy production and is found in almost every cell of the body. Only L-carnitine is biologically active and is the form found in food. It is concentrated in skeletal and cardiac muscle tissues. **Important for:** • Mitochondrial function and energy production • Immune, brain, liver, and cardiac function • Elimination of toxic compounds • Blood lipid levels- reduction of triglycerides, increase in HDL **May be useful for the prevention/treatment of:** · certain cardiovascular issues and common diagnoses such as asthma, celiac disease, cirrhosis, IBD, diabetes, erectile dysfunction, NAFLD, fatigue, PCOS, COPD, and more. **Good food sources:** animal foods such as meat, fish, poultry, and dairy products (mostly in whey).

- **Glycine**

Although not considered "essential" because it is made from serine, glycine is considered a conditionally essential amino acid because there are many metabolic demands for it- including heme biosynthesis, collagen formation, and its role in digestion, detoxification and neurotransmitter action. **Important for:** • Collagen formation • Heme synthesis • Detoxification • Glutathione synthesis • Energy source/synthesis of glucose • Brain neurotransmitter effect/CNS function • Anti-cancer • Antioxidation **May be useful for the prevention/treatment of:** • Schizophrenia • Stroke • Seizures • Memory and cognitive performance in psychosis risk syndrome • Cystic fibrosis • Gout • Insomnia • Venous leg ulcers • Certain types of cancer **Good food sources:** gelatin, protein rich foods including meat, fish, dairy, and legumes

- **Selenium**

Selenium is an essential trace mineral found in soil, water, and some foods. **Important for:** • Antioxidation • Anti-inflammatory • Immune function enhancement • Antiviral • Reproductive support • Thyroid hormone metabolism • DNA synthesis **May be useful for the prevention/treatment of:** burns, depression, certain types of cancer, cardiovascular disease, CHF, dementia/cognitive decline, Down syndrome, hepatitis, male infertility, lymphedema, myotonic dystrophy, oral leukoplakia, Osgood-Schlatter, and thyroiditis **Good food sources:** seafood and organ meats. Brazil nuts, sunflower seeds, brown rice, shiitake mushrooms, chia seeds, lima beans, cabbage, spinach

- **Biotin**

Biotin is an essential B vitamin also known as vitamin B7. **Important for:** • The conversion of carbohydrates, proteins and fats into energy. • Health of skin, nails, eyes, liver, and nervous system. **May be useful for the prevention/treatment of:** diabetes, brittle nails, seborrheic dermatitis of infancy, MS, and uremic neuropathy **Good food sources:** meat, fish, egg yolks, liver, poultry, dairy products, seeds, nuts, sweet potatoes, spinach, and broccoli

- **MK4**

Vitamin K is a general name of a family of compounds with a common chemical structure-Vitamin K1 (phylloquinone or phytonadione), vitamin K2 (menaquinone), and vitamin K3 (menadione- no longer used in fortified foods/supplements). Vitamin K2 is a group of compounds which are classified according to their chemical structures- MK4 through MK13.. MK4, MK7, and MK9 are the most well studied menaquinones. Menaquinones, mostly originating from bacteria, are present in various animal based and fermented foods. Menaquinones are also produced by bacteria in the gut. MK4 is produced from vitamin K1 (phylloquinone). **Important for:** • Regulation of bone demineralization Directs calcium deposits to bones instead of soft tissue • Anti-inflammation • Anticoagulation • Antioxidation • Supports bone growth and development • Supports cardiovascular health • insulin sensitivity, energy utilization **May be useful for the prevention/treatment of:** beta-thalassemia, rheumatoid arthritis, cirrhosis, hepatitis, myelodysplasia, cardiovascular issues, osteoporosis, Alzheimer's disease, cognitive decline, wrinkles, diabetes, metabolic syndrome, arthritis, neurological issues, certain types of cancer, kidney disease, kidney stones, PCOS, anxiety, depression, postmenopausal bone loss, and cavities **Good food sources:** Dietary vitamin K2 is found in some fermented foods (ie, natto, cheese) where the specific menaquinone compound that is formed depends on the bacterial species and fermentation conditions. So not all fermented foods have the same menaquinone profile. An individual's dietary intake of vitamin K2 can vary greatly based on food selection and geography. MK4 is typically found in eggs, grass-fed meat, chicken, soft cheese, butter, liver (goose, chicken) chicken

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CNA CELLULAR NUTRITION ASSAYS

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Significant Micronutrients

Copper

Copper is an essential trace mineral found in all body tissues. **Important for:** • Red blood cell formation (along with iron), anemia prevention • Myocardial contractility • Maintenance of the health of blood vessels, nerves • Immune support, wound healing • Generation of energy from carbohydrate • Antioxidation (cofactor for SOD- superoxide dismutase) • Anti-inflammation support • Bone and tissue integrity • Cholesterol and glucose regulation **May be useful for the prevention/treatment of:** aortic aneurysm, burns, osteoporosis, peptic ulcer, RA, and disorders of taste **Good food sources:** Organ meats, seafood, nuts, especially cashews and walnuts, seeds, especially sesame and sunflower seeds, legumes, lentils. soybean, shiitake mushrooms, greens, asparagus, summer squash, wheat-bran cereals, and whole-grains and cocoa.

Inositol

Inositol is structurally similar to glucose. It was once considered to be part of the B vitamin complex but now known to be produced in the human body so is now referred to as a pseudovitamin. Inositol is present in two forms, myo-inositol and D-chiro-inositol. **Important for:** • Cell membrane components, cell signaling • Lipoprotein components • Proper function of hormones • Possibly enhancing insulin sensitivity **May be useful for the prevention/treatment of:** Alzheimer's disease, bronchopulmonary dysplasia (BPD), depression, diabetes (d-chiro inositol)/gestational diabetes, NAFLD, OCD, panic attacks, and PCOS **Good food sources:** whole grains, buckwheat, peanuts, legumes, nuts, seeds, grapefruit, other citrus fruits, and cantaloupe

Zinc

Zinc is an essential mineral involved in numerous aspects of cellular metabolism. It is a major component of over 300 metabolic enzymes. **Important for:** • Immune function and wound healing • Protein and DNA synthesis • Growth and development • Proper sense of taste and smell, visual function, hearing • Antioxidation and anti-inflammation • Protection of cell membranes Production of stomach acid **May be useful for the prevention/treatment of:** acne, brittle nails, warts, hearing, olfactory and taste disorders, colds, gastroenteritis, age-related macular degeneration, anorexia nervosa, ADHD, depression, RA, psoriatic arthritis, BPH, body odor, cirrhosis, cancer, and more. **Good food sources:** Oysters, meat, poultry, seafood, legumes, nuts, seeds, peanuts, egg yolks, whole grains, wheat bran, wheat germ, fruit, and dairy products.

Vitamin C

Vitamin C (ascorbic acid) is a water soluble vitamin that is essential for human survival. **Important for:** • Antioxidation • Anti-inflammation • Immune function • Blood vessel formation • Muscle formation • Collagen production • Brain Health/neurotransmitter production • Absorption of iron • Blood lipid regulation • Detoxification **May be useful for the prevention/treatment of:** allergic rhinitis,asthma, cardiovascular issues, certain types of cancer, cold and flu, GI issues- constipation, gallstones, gastritis, UTIs, muscle cramps, dysfunctional uterine bleeding, glaucoma, depression, diabetes, obesity, post exercise muscle soreness, and sinusitis **Good food sources:** citrus fruits, raspberries, strawberries pineapple, kiwi, cantaloupe, greens, cruciferous vegetables- Brussels sprouts, broccoli, squash, green beans, carrots, potatoes, tomatoes, peppers

Vitamin B12

Vitamin B12 is a group of compounds called cobalamins. **Important for:** • DNA (genetic material) synthesis • Red blood cell formation • Nervous system and immune system function • Metabolism of homocysteine **May be useful for the prevention/treatment of:** issues of the skin, ears/nose/throat, issues associated with aging, and certain conditions/disorders of the cardiovascular, gastrointestinal, musculoskeletal, immune, and nervous systems **Good food sources:** Vitamin B12 is found almost exclusively in animal products- meat, poultry, fish, eggs, and dairy products. Beef liver and clams are the highest sources. B12 fortified breakfast cereals and nutritional yeasts.

Glutathione

Glutathione is produced in the liver from the amino acids, glycine, cysteine, and glutamic acid. It is considered the body's "master antioxidant". **Important for:** • DNA synthesis and repair • Metabolism of toxins and carcinogens • Immune support • Prevention of oxidative cell damage • Protein and prostaglandin synthesis • Transport of amino acids • Antioxidation,-fights free radicals • Antiviral • Anti-inflammation **May be useful for the prevention/treatment of:** cancer, Parkinson's disease, neurodegenerative disorders, flu, AMD, glaucoma, cataracts, diabetes, heart disease, asthma (not inhaled glutathione), lung disease, liver disease, GI disease, CFS, and side effects of chemotherapy **Good food sources:** Fruit, vegetables, and meat but glutathione is poorly absorbed from the GI tract. Consuming foods used in cysteine production is recommended- onions, garlic, chives, leeks. Supplementing with N-acetyl L Cysteine can boost glutathione levels. Glutathione can be taken IV or in liposomal supplemental form.

Histidine

Histidine, an essential amino acid, is involved in a wide range of metabolic processes in the body, and is needed for growth and tissue repair. **Important for:** • Protection of nerve cells • Metabolism of the neurotransmitter, histamine • Immune, gastric, and sexual function • Manufacturing of red and white blood cells • Protection of tissues against radiation and heavy metals **May be useful for the prevention/treatment of:** rheumatoid arthritis, allergic diseases, ulcers, and anemia caused by kidney failure or kidney dialysis **Good food sources:** beef, lamb, pork, poultry, fish, cheese, nuts, seeds, eggs, legumes, soybeans, quinoa, and whole grains.

Vitamin B9

Vitamin B9, more commonly known as folate (naturally-occurring form of B9) or folic acid (a synthetic form), is a water-soluble vitamin that is part of the B vitamin family. **Important for:** • Growth and development • Homocysteine and vitamin B12 metabolism • Brain and CNS function • Immune system function • Cardiovascular support • Red blood cell production • Reproductive health **May be useful for the prevention/treatment of:** Alzheimer's disease, cardiovascular disease, homocysteine lowering,anemia, migraines, restless legs, dermatitis, autism, depression, cognitive decline/dementia, age-related macular degeneration, birth defects, diarrhea, hearing loss, osteoporosis, cervical dysplasia, ulcerative colitis, and recurrent miscarriages **Good food sources:** Spinach and other leafy greens, green vegetables, beets, banana, melon, legumes, yeast, mushrooms, oranges and tomato juice.

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Significant Micronutrients

- **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 behavor 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.

- **Methionine**

Methionine is an essential amino acid that is involved in the synthesis of important protein molecules and other amino acids. **Important for:** • The support of detoxification of toxins and heavy metals • Antioxidant function • Digestive support • The availability of folate • The support of healthy liver function • Reduction of histamine in blood • Exercise recovery, connective tissue production, and cardiovascular health • Hair and nail strength **May be useful for the prevention/treatment of:** pancreatitis, Parkinson's disease, urinary tract infections, and diaper rash **Good food sources:** Brazil nuts, meat, poultry, fish, yogurt, cheese, eggs, legumes, soybeans, sesame seeds, and grains

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.

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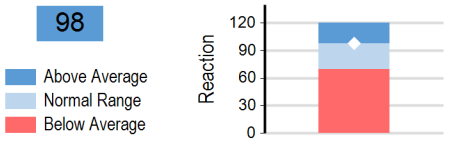
CELLULAR NUTRITION ASSAYS

REDOX / APA (ANTIOXIDANT PROTECTION ASSAY)

The Redox score indicates an average response.

The Redox Score is an indication of your resistance to oxidative stress, relative to the general population. An average or below average response can be improved by appropriate use of nutrients and antioxidants as determined by the Antioxidant Protection Assay and guidance from your practitioner.



No Significant Response | Protective | Highly Protective

Antioxidants / Anti-inflammatories

Acai Berry	124%	Highly Protective	Milk Thistle	123%	Highly Protective
Andrographis	117%	Protective	NADH		
Astaxanthin			Noni Berry		
Astragalus	118%	Protective	Omega 3 DHA	110%	Protective
Beta-Carotene			Omega 3 EPA	112%	Protective
Camu Camu			Omega 6	120%	Highly Protective
Catalase	122%	Highly Protective	Omega 7		
Chlorophyll			Omega 9	111%	Protective
Coenzyme Q10			Piperine		
Delta tocotrienol			Pomegranate		
Echinacea			Pycnogenol		
Elderberry			Pyrroloquinoline		
Frankincense	125%	Highly Protective	Quercetin		
Ginkgo Biloba	120%	Highly Protective	Resveratrol		
Glutathione			Rhodiola		
Goji Berry	116%	Protective	Selenium		
Grape Seed			Shiitake		
Green Tea			SOD		
Lavender	124%	Highly Protective	Sulforaphane		
Lipoic Acid	119%	Protective	Turmeric		
Lutein			Vitamin C		
Lycopene			Wild Cherry Bark		
Maitake	114%	Protective	Zeaxanthin		
Mangosteen	123%	Highly Protective	Zinc		

APA (ANTIOXIDANT PROTECTION ASSAY)

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Beneficial Antioxidants / Anti-inflammatories

- **Frankincense** — Frankincense is the hardened gum resin extruded from the trunk of the Boswellia carteri tree. **Important for/potential beneficial properties:** • Anti-inflammatory • Anti-bacterial • Antiviral • Anti-anxiety • Antiseptic, disinfectant • Immune enhancing • Memory enhancing • Hormone balancing • Digestive aid **May be useful for the prevention/treatment of:** pain and inflammation, asthma, acne, signs of aging, Crohn's disease, IBS, diabetes, cancer, osteoarthritis, depression, anxiety, leaky gut, gas, and constipation **Sources:** topically, aromatherapy

- **Lavender** — Lavender is a perennial evergreen plant that is native to countries in the Mediterranean region. The applicable parts of lavender are the flowers, leaves, and oil. **Important for/potential beneficial properties:** • Analgesic • Antibacterial • Anticancer • Lipid reduction • Antifungal • Anti-inflammatory • Hair growth • Neurologic/CNS effects- relaxation, sedation • Wound healing **May be useful for the prevention/treatment of:** anxiety, depression, stress, psychological well-being, dysmenorrhea, pain, intestinal problems, and high cholesterol **Sources:** capsules, via aromatherapy, and topically

- **Acai Berry** — Acai berry is a palm tree widely distributed in the northern area of South America, particularly the Brazilian Amazon region. The fruit of acai is round, dark purple in color, and edible **Important for/potential beneficial properties:** • Anti-inflammatory • Antibacterial • Antioxidant • Anticancer • Blood glucose support • Cardiovascular support • Immune Support **May be useful for the prevention/treatment of:** hypercholesterolemia, metabolic syndrome/weight loss and obesity, diabetes, detoxification, aging skin, and for improving general health **Sources:** fruit can be consumbed raw or as a juice. As supplement can be found in powders, tablets, and capsules

- **Mangosteen** — Mangosteen is a tropical fruit cultivated in Southeast Asia. The fruit, fruit juice, rind, twig, and bark are used as medicine. **Important for/potential beneficial properties:** • Antioxidation • Anti-allergy • Antibacterial • Anti-inflammatory • Antiviral • Immune support • Astringent • Free radical scavenger **May be useful for the prevention/treatment of:** diarrhea, UTIs, gonorrhea, thrush, tuberculosis, cardiovascular issues, menstrual disorders, cancer, osteoarthritis, dysentery, and skin issues **Sources:** mangosteen fruit, supplemental form

- **Milk Thistle** — Milk thistle, also known as Silymarin (the main active ingredient), is a plant native to Europe and brought to North America by early colonists. It is now found throughout the US. Milk thistle gets its name from the milky sap that is released from the leaves. The applicable parts of milk thistle are the seeds and above grouind parts. **Important for/potential beneficial properties:** • Antioxidant • Anticancer • Insulin sensitivity support • Anti-inflammatory • Antilipemic • Antiviral • Hepatoprotective • Renal protective **May be useful for the prevention/treatment of:** Liver disorders, skin damage caused by radiation, diabetes, indigestion **Sources:** In foods, milk thistle leaves and flowers are eaten as a vegetable and seeds are roasted for use as a coffee substitute. May be consumed as tea and in supplemental form as well.

- **Catalase** — Catalase is a key antioxidant enzyme in the body's defense against oxidative stress. It converts free radicals into hydrogen peroxide which ultimately breaks down to stable and safe water and oxygen. **Important for/potential beneficial properties:** • Antioxidation • Anti-aging and anti-degenerative • Longevity support • Fat metabolism • Support of DNA integrity **May be useful for the prevention/treatment of:** degenerative disease, mitochondrial dysfunction, cardiac issues, and cataracts **Sources:** wheat and barley grass, alfalfa, Brussels sprouts, leeks, onions, broccoli, parsnips, zucchini, spinach, kale, radishes, carrots, red peppers, turnips, cucumbers, celery, avocado, potato, and red cabbage, kiwi, peaches, cherries, apricots, bananas, watermelon, pineapple

- **Omega 6** — Linoleic Acid, an omega-6 fatty acid, is considered an essential fatty acid because humans are not able to synthesize it. All of the other biologically active omega-6 fatty acids can be made from linoleic acid. Omega 6 fatty acids are considered by some to be pro-inflammatory. The relationship between omga-6 fatty acids and inflammation is complex as some may be metabolized to pro-inflammatory arachidonic acid but also to prostaglandin E1 which is has anti-inflammatory activity. Consumption of large amounts of linoleic acid and other polyunsaturated fatty acids increases oxidative stress. Excessive consumption of omega 6 fatty acids is best avoided **Important for/potential beneficial properties:** • Cardiovascular effects • Dermatologic effects • Maintenance of epidermal water barrier of the skin • Cell membrane fluidity, structure, and function • Anti-inflammatory, pro-inflammatory **May be useful for the prevention/treatment of:** atherosclerosis/ischemic heart disease, hypercholesterolemia, hypertension, eczema, pruritus, scleroderma, dyslexia, essential tremor, multiple sclerosis, alcohol hangover, BPH, obesity, periodontitis, rheumatoid arthritis, atopic dermatitis. **Sources:** safflower oil, sunflower oil, wheat germ oil, hempseed oil, corn oil, soybean oil, peanut oil and canola oil

- **Ginkgo Biloba** — Ginkgo biloba is a large tree with fan-shaped leaves with radiating veins . It is one of the oldest living tree species in the world. Native to temperate Asia, including China, Japan, and Korea, but is now cultivated in Europe and the United States. It is the last remaining species of a primitive family of gymnosperms called Ginkgoaceae. **Important for/potential beneficial properties:** • Anticancer • Anticoagulant/antiplatelet • Blood glucose support • Anti-inflammation • Antimicrobial • Antioxidant • Cardiovascular support • Lipid lowering • Neurological support **May be useful for the prevention/treatment of:** • Anxiety, Alzheimer's disease, mixed dementias, PMS, schizophrenia, tardive dyskinesia, vertigo, AMD, altitude sickness, metastatic colorectal cancer, depression, diabetic retinopathy, dyslexia, fibromyalgia, gastric cancer, glaucoma, hemorrhoids, ovarian cancer, PAD, Raynauds syndrome, vitiligo **Sources:** tea and extracts supplementation via tablets and capsules

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Beneficial Antioxidants / Anti-inflammatories

- **Lipoic Acid**

  Lipoic Acid is synthesized by humans and is present in a wide range of foods. **Important for/potential beneficial properties:** • Antioxidation • Anti-inflammatory • Regeneration of other antioxidants- vitamin E, vitamin C, and glutathione • Endocrine support, glucose regulation • Anti-obesity • Antiviral • Cardiovascular support • Vascular support • Neurological support • Bone support **May be useful for the prevention/treatment of:** aging skin associated with sun damage, cognitive decline, diabetes, insulin resistance, erectile dysfunction, glaucoma, NASH, peripheral neuropathy, burning mouth syndrome, obesity, hepatitis, migraines, myopathy, taste disorders, vitiligo, and wound healing **Sources:** red meat, organ meats, spinach, broccoli, potatoes, yams, carrots, beets, and yeast

- **Astragalus**

  Astragalus comes from the root of a perennial plant in the legume family that grows in the northern and eastern parts of China as well as in Mongolia and Korea. There are more than 2,000 species of astragalus but most astragalus supplements contain Astragalus membranaceus. Astragalus contains a variety of active constituents including more than 40 saponins, several flavonoids, polysaccharides, trace minerals, amino acids, and coumarins. – Astragalus is also called huang qi or milk vetch. **Important for/potential beneficial properties:** • Antibacterial • Anti-inflammatory • Antioxidant • Antiviral • Bone support • Cardiovascular support • Fertility –increase in sperm motility • Blood glucose support • Liver and kidney protective • Immune support • Vasorelaxant • Wound healing **May be useful for the prevention/treatment of:** common cold, upper respiratory infections, fibromyalgia, diabetes, blood pressure, heart disease, weakness, arthritis, hepatitis, breast and lung cancer, asthma, and anxiety **Sources:** The root of the astragalus plant is put in soups, teas, extracts, and capsules.

- **Andrographis**

  Andrographis is a plant that is native to South Asian countries such as India and Sri Lanka. Known as the "King of bitters", it is commonly used in Ayurvedic medicine. **Important for/potential beneficial properties:** • Analgesic • Antibacterial • Anti-viral • Anti-inflammatory • Antiplatelet • Anticancer • GI, cardiovascular, liver support • Blood glucose regulation • Immunomodulatory **May be useful for the prevention/treatment of:** common cold, influenza, tonsillitis, IBD- ulcerative colitis, and RA **Sources:** supplementation

- **Goji Berry**

  Goji berry, also known as wolfberry, is a nutrient rich bright orange-red berry that comes from a shrub native to China and distributed in Asia, the Mediterranean, North America, and Australia. The root bark and sweet, red fruits of goji are used in traditional Chinese medicine. **Important for/potential beneficial properties:** • Anticancer • Blood glucose support • Antifatigue • Antimicrobial • Antioxidant • Cardiovascular support • Hepatoprotective • Immune support **May be useful for the prevention/treatment of:** • Diabetes • Dry eye • Athletic performance • Sleep quality • Fatigue • Mood support • Overweight • Glaucoma • Fertility • Hyperlipidemia **Sources:** Goji berries can be eaten raw, cooked, or dried. Often found in herbal teas and wines.

- **Maitake**

  This edible and medicinal mushroom, is a perennial fungus that grows in clusters at the base of trees. The active constituents of maitake include beta-glucans, agarico glycerides, and fiber. **Important for/potential beneficial properties:** • Tumor inhibition • Immune system support • Anti-inflammatory • Antiviral • Blood glucose regulation • Cardiovascular support • Hormonal support • Blood lipid reduction **May be useful for the prevention/treatment of:** diabetes, PCOS, certain types of cancer, hypertension, and hepatitis B **Sources:** Maitake is available fresh and in powders, capsules, and extracts

- **Omega 3 EPA**

  Eicosapentaenoic acid (EPA), one of the three main omega-3 fatty acids, is a long-chain polyunsaturated fatty acid that is found in the tissues of oily fish and marine mammals. EPA is often used in conjunction with docosahexaenoic acid (DHA) for a variety of conditions. Omega 3 fatty acids are important components of cell membranes. All of these fatty acids contain "double bonds"- connections that make them flexible and interactive but also more susceptible to damage. EPA has five double bonds. **Important for/potential beneficial properties:** Cell membrane stability and fluidity • Anti-inflammatory – proper function of the body's inflammatory system depends on prostaglandins (messaging molecules). Many of the prostaglandins are made from EPA and tend to be anti-inflammatory. • Antiplatelet • Decrease in blood viscosity • Cardiovascular effects • Immunomodulatory • Reduction in serum triglycerides • Neurological effects **May be useful for the prevention/treatment of:** atherosclerosis/ischemic heart disease, cardiac arrhythmias, CHF, hypertension, hypertriglyceridemia, raynaud's disease, eczema, psoriasis, IBD-Crohn's disease, ulcerative colitis, migraines, multiple sclerosis, anxiety, ADHD, bipolar disorder, cognitive function, depression, rheumatoid arthritis, asthma, BPH, cancer, NAFLD, periodontal disease, PCOS, and more. **Sources:** The body can convert some ALA (alpha-linolenic acid) to EPA but in only very small quantities. Therefore, getting EPA from foods or dietary supplements is the only practical way to increase levels of EPA in the body. Most fish (cod, haddock, mackerel, sardines, ocean trout, whiting, tuna, salmon, halibut, flounder, grouper, red snapper, sole, rainbow trout) and sea plants are good sources. The omega-3 fatty acid content of farmed fish is generally lower than that of wild fish. Other grass fed animal sources that supply some EPA-eggs, dairy, meats .

- **Omega 9**

  Oleic acid is an omega 9 fatty acid that is considered non-essential since it can be manufactured in the body but research indicates that increasing consumption of omega 9 fatty acids may be beneficial. It is an unsaturated fatty acid that is the most widely distributed and abundant fatty acid in nature, occurring naturally in the fats and oils of both animals and vegetables. **Important for/potential beneficial properties:** • Anti-inflammatory • Cardiovascular effects • Brain function • Cholesterol, lipid, and blood pressure lowering • Dermatological effects- skin repair • Immune support • Fat metabolism • Insulin sensitivity • Cell membrane structure **May be useful for the prevention/treatment of:** Age related cognitive decline, type 2 diabetes, cardiovascular disease, hyperlipidemia, hypertension, Alzheimer's disease, ulcerative colitis, infections, skin conditions. **Sources:** Plant oils such as olive oil, almonds/almond oil, hazelnuts, avocado oil, pecans, macadamia nuts, apricot kernel oil, cashews, cheese, beef, eggs, sesame oil, sunflower oil, argan oil, grapeseed oil.

APA (ANTIOXIDANT PROTECTION ASSAY)

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.

Beneficial Antioxidants / Anti-inflammatories

- Omega 3 DHA

Docosahexaenoic acid (DHA) one of the three main omega-3 fatty acids, is a long-chain polyunsaturated fatty acid that is found in the tissues of oily fish and marine mammals. DHA is often used in conjunction with eicosapentaenoic acid (EPA) for a variety of conditions. Omega 3 fatty acids are important components of cell membranes. All of these fatty acids contain "double bonds"- connections that make them flexible and interactive but also more susceptible to damage. DHA has six double bonds. Proper function of the nervous system, including the brain, depends on the presence of DHA. **Important for/potential beneficial properties:** Cell membrane stability and fluidity • Anticancer • Anti-inflammatory • Brain/CNS development and function- DHA accounts for 9-12% of the brain's total weight. • Cardiovascular effects • Decrease in blood viscosity • Immunomodulatory • Neurologic effects • Protection of retinal function **May be useful for the prevention/treatment of:** atherosclerosis/ischemic heart disease, cardiac arrhythmias, CHF, hypertension, hypertriglyceridemia, raynaud's disease, eczema, psoriasis, IBD-Crohn's disease, ulcerative colitis, migraines, multiple sclerosis, anxiety, ADHD, slower neurological development in children. bipolar disorder, cognitive function, depression, rheumatoid arthritis, asthma, BPH, cancer, NAFLD, periodontal disease, PCOS, retinitis pigmentosa, visual acuity, and more. **Sources:** The body can convert some ALA (alpha-linolenic acid) to DHA but in only very small quantities. Therefore, getting DHA from foods or dietary supplements is the only practical way to increase levels of DHA in the body. Most fish (cod, haddock, mackerel, sardines, ocean trout, whiting, tuna, salmon, halibut, flounder, grouper, red snapper, sole, rainbow trout) and sea plants are good sources. The omega-3 fatty acid content of farmed fish is generally lower than that of wild fish. Other grass fed animal sources that supply some DHA-eggs, dairy, meats .

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 "protective". 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.