



CELLULAR MICRONUTRIENT ASSAY

Lab Director
Dr. Jennifer Spiegel, M.D.

Patient Information		Name: 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: 09/24/2019	
Physician: Sample Physician		Clinic ID: 10804	



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 AMA 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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Physician:	Sample Physician	Lab ID:	68220
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Significant Micronutrients

- **L-Tyrosine** Tyrosine is a non-essential amino acid that is synthesized in the body from an essential amino acid, phenylalanine. **Important for:** • Building block for protein synthesis • Synthesis of the brain chemicals, dopamine, norepinephrine, and epinephrine • Regulation of mood, appetite, pain sensitivity • Thyroid, adrenal, and pituitary function **May be useful for the prevention/treatment of:** depression, ADHD, cognitive performance and memory, narcolepsy, acute stress, alcohol, heroine, and cocaine withdrawal **Good food sources:** poultry, fish, avocados, almonds, cheese, milk, yogurt, bananas, soybean, legumes, nuts, seeds, and some grains
- **Vitamin B6** Pyridoxine helps convert food into fuel and is a cofactor for more than 50 different enzymes. **Important for:** • Metabolism of fats and proteins • Nerve function • Steroid hormone function • Arterial integrity • Immune function • Synthesis of niacin from tryptophan • Breakdown of homocysteine **May be useful for the prevention/treatment of:** atherosclerosis, hair loss, acne, Meniere's disease, taste disorders, vertigo, neurological conditions, gestational diabetes, premenstrual syndrome, anxiety, ADHD cognitive decline, depression, and possibly some protection from certain toxin induced issues **Good food sources:** Poultry, fish, organ meats, potatoes, banana, seeds, soybeans, spinach, whole grains, legumes
- **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
- **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, cardiovascular issues, sinusitis, GI issues- constipation, gallstones, gastritis, cold and flu, UTIs, muscle cramps, dysfunctional uterine bleeding, glaucoma, depression, asthma, certain types of cancer, diabetes, obesity, and post exercise muscle soreness **Good food sources:** citrus fruits, raspberries, strawberries pineapple, kiwi, cantaloupe, greens, cruciferous vegetables- Brussels sprouts, broccoli, squash, green beans, carrots, potatoes, tomatoes, peppers
- **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
- **Iron** Iron is a mineral found in trace amounts in every cell in the body. Most of the iron in the body is found in the hemoglobin of red blood cells that carries oxygen from the lungs to the tissues of the body and in myoglobin, a protein providing oxygen to muscles. It also functions in several key enzymes in energy production and metabolism, including DNA synthesis. **Important for:** • Oxygen transport • Growth and development • Immune activity • Energy production and metabolism • Hormone, neurotransmitter, and DNA synthesis **May be useful for the prevention/treatment of:** ADHD, cognitive decline/dementia, fatigue, infertility, and restless leg syndrome. **Good food sources:** Iron exists in foods in two forms, heme iron and nonheme iron. The richest sources of heme iron are oysters, liver, lean red beef, poultry, tuna, and salmon. Non-heme iron is harder for the body to absorb. Sources of non-heme iron are legumes, whole grains, nuts, dried fruit, and greens. Consuming these foods with vitamin C rich foods and/or heme sources of iron, enhances the absorption of nonheme iron.
- **Vitamin B2** Vitamin B2, or riboflavin, is an essential vitamin involved in vital metabolic processes. It is a component of two major coenzymes flavin mononucleotide (FMN-aka riboflavin-5-phosphate) and flavin adenine dinucleotide (FAD). **Important for:** • Normal cell function, growth and development • Metabolism of carbohydrate, protein, and fat for energy production. • Cofactor needed to produce glutathione, a very important antioxidant • Homocysteine metabolism • Promotes iron metabolism • Metabolism of steroids and certain drugs **May be useful for the prevention/treatment of:** migraines, Parkinson's disease, hyperhomocysteinemia, and psoriasis **Good food sources:** turkey, sardines, eggs, legumes, soybeans, broccoli, cauliflower, Brussels sprouts, peppers, root vegetables, and squash
- **Vitamin K1** 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 K1 is the primary source of vitamin K that humans obtain through foods. **Important for:** • Regulation of blood clotting • Transport of calcium and bone metabolism • Potential antioxidant protection, and insulin sensitivity support, protection of cells lining blood vessels **May be useful for the prevention/treatment of:** atherosclerosis/ischemic heart disease, nausea hemorrhagic disease of newborns, vomiting of pregnancy, and osteoporosis **Good food sources:** green tea, leafy greens such as kale, turnip greens, and spinach, broccoli, Brussels sprouts, asparagus, cabbage, other vegetables.

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● **High γ - δ Tocopherol**

Vitamin E is a group of eight fat soluble compounds that have varying levels of biological activity. They include four tocopherols (alpha, beta, gamma and delta) and four tocotrienols (alpha, beta, gamma, and delta). Gamma-delta tocopherol comprises about 70% of the vitamin E in a typical American eating pattern. It has very low vitamin E activity but some of its biological effects may be more pronounced than the effects of alpha-tocopherol, the only isomer of vitamin E officially recognized as capable of meeting human requirements. Although gamma tocopherol is not capable of preventing manifestations of vitamin E deficiency, it does appear to have beneficial properties. There is some concern that high doses of vitamin E might have a pro-oxidant rather than an antioxidant effect. High doses of alpha-tocopherol alone might disrupt the normal antioxidant balance and decrease the effect of gamma tocopherol and other vitamin E isomers. No major roles for delta and beta tocopherol have been defined although mixed tocopherols including all tocopherols have been used and have shown benefit. **Important for:** • Antioxidation, prevention of free radical damage • Immune support • Regulation of gene expression • Heart and blood vessel protection, dilation, and inhibits platelet aggregation (gamma and delta tocopherol) • Anti-inflammation **May be useful for the prevention/treatment of:** And more effective than alpha tocopherol in... prostate cancer inhibition, oxidative DNA damage reduction, increase in superoxide dismutase activity, inhibition of platelet aggregation, scavenging of peroxynitrate, a powerful oxidative agent believed to play a role in CVD, cancer, and neurodegenerative diseases, regulation of extracellular fluid volume and blood pressure. **Good food sources:** walnuts, corn oil, soybean oil, flaxseed oil. Some research suggests gamma tocopherol might be transformed to alpha-tocopherol by intestinal microflora

● **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.

● **Vitamin D**

Vitamin D, known as the "sunshine" vitamin, is a fat soluble vitamin produced by the body in response to sun exposure; it is naturally present in few foods. It functions as a prohormone. **Important for:** • Calcium absorption in the gut • Bone development, bone mineralization, bone health • Regulation of serum calcium and phosphorous levels • Neuromuscular and immune function and maturation of white blood cells • Cell growth • Enhancement of insulin secretion/action • Reduction of inflammation **May be useful for the prevention/treatment of:** eczema, colds, hepatitis C, osteomalacia/osteoporosis, asthma, burns, cancer, CHF, Crohn's disease, depression, diabetes, fatigue, Parkinson's disease, PCOS, lupus, and more **Good food sources:** oily fish -salmon, sardines, herring, mackerel, and tuna, cod liver oil, fortified milk, eggs, liver

● **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

● **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.

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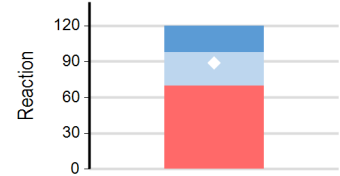
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REDOX SCORE

89

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.



ANTIOXIDANT PROTECTION ASSAY (APA)

Antioxidants / Anti-inflammatories

Acai Berry		115% Protective	Lycopene	
Andrographis		119% Protective	Maitake	
Astaxanthin		110% Protective	Mangosteen	
Astragalus			Melatonin	
Beta-Carotene			Milk Thistle	
Bilberry			Moringa	
Boswellia		114% Protective	NADH	
Camu Camu			Noni Berry	
Catalase		119% Protective	Piperine	
Chlorophyll		111% Protective	Pomegranate	
Cinnamon		111% Protective	Pycnogenol	
Coenzyme Q10			Pyroloquinoline	
Delta tocotrienol		110% Protective	Quercetin	
Echinacea		122% Highly Protective	Resveratrol	
Elderberry			Rhodiola	
Garlic			Selenium	
Ginger		111% Protective	Shiitake	
Ginkgo Biloba		117% Protective	SOD	
Glutathione			Sulforaphane	
Goji Berry		110% Protective	Turmeric	
Grape Seed			Vitamin C	
Green Tea		110% Protective	Wild Cherry Bark	
Lavender		113% Protective	Zeaxanthin	
Lipoic Acid		113% Protective	Zinc	
Lutein				

	≥ 120%	▶ provides high protection against oxidative stress
	110% - 119%	▶ some protective effect against oxidative stress
	100% - 109%	▶ no significant protective effect

*The term **protective** describes the cell protection effect, i.e. the individual benefit of a specific nutrient to increase the antioxidative capacity

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ANTIOXIDANT PROTECTION ASSAY (APA)

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Beneficial Antioxidants

- ▶ **Echinacea** Echinacea is a perennial wildflower native to North America and is closely related to sunflowers, daisies, and ragweed. **Important for/potential beneficial properties:** • Antibacterial • Antifungal • Anti-inflammatory • Antioxidant • Anti-vital • Immune stimulating • Wound healing **May be useful for the prevention/treatment of:** infections, common cold, herpes simplex infection (topical), psoriasis(topical), gum inflammation, upper respiratory tract infections (viral), tonsillitis, urinary tract infections, vaginal yeast infection, skin wounds/ulcers (topical), and leukopenia from chemotherapy. **Sources:** Echinacea is often sold as an herbal supplement.
- ▶ **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
- ▶ **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
- ▶ **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
- ▶ **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 consumed raw or as a juice. As supplement can be found in powders, tablets, and capsules
- ▶ **Boswellia** Boswellia (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

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Beneficial Antioxidants

- ▶ **Turmeric** Turmeric, a plant related to ginger, has been used in Ayurvedic medicine for many conditions including breathing problems, pain, and fatigue. It is a common spice and a major ingredient in curry powder. **Important for/potential beneficial properties:** • Anti-inflammatory • Antioxidation • Antibacterial • Antiseptic • Interference with cancer cell signaling • Blood glucose regulation • Fat metabolism • Wound healing **May be useful for the prevention/treatment of:** arthritis, joint pain, diabetes, digestive conditions- IBS, IBD, obesity, age-related cognitive decline, depression, high triglyceride blood levels, rheumatoid arthritis, and certain types of cancer **Sources:** Turmeric is a common spice and a major ingredient in curry powder. Turmeric's underground stems are dried and made into capsules, tablets, teas, powders, and extracts. Turmeric powder can also be made into a paste for skin issues.
- ▶ **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
- ▶ **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
- ▶ **Melatonin** Melatonin is a hormone produced from tryptophan in the brain by the pineal gland and the gastrointestinal tract. It regulates the body's circadian rhythm, endocrine secretions, and sleep patterns. **Important for/potential beneficial properties:** Analgesic, Antiaging, Antiarthritis, Anticancer, Anticonvulsant (controversial), Anti-inflammatory, Antioxidant, Antiparasitic, Antiviral, Blood glucose support, Bone support, Blood pressure support, Gastrointestinal protection, Hormonal support, Immune support, Hypolipidemic, Hepatoprotective, Neuroprotective, Weight loss effects **May be useful for the prevention/treatment of:** Age-related macular degeneration, Anesthesia premedication, Cancer, Eczema, Endometriosis, Headache disorders, Insomnia, IBS, Non-ulcer dyspepsia, Sarcoidosis, Schizophrenia, Seasonal affective disorder, Tardive dyskinesia, Thrombocytopenia, Tinnitus **Sources:** Supplementation
NOTE: Because of the potential for daytime sleepiness, driving or operating machinery should be avoided 4-5 hours after taking melatonin.
- ▶ **Ginger** Ginger is a flowering plant native to parts of Asia and cultivated in South America, Africa, and the Middle East. It is used worldwide for culinary and medicinal purposes. **Important for/potential beneficial properties:** Antinausea and vomiting, Arthritis pain relief, Dysmenorrhea pain relief, Gastrointestinal support, Respiratory support, Anti-inflammation, Antibacterial, anti-fungal, Anti-platelet, Blood glucose support, blood lipid support, Anti-oxidation, Blood pressure support, Immune support **May be useful for the prevention/treatment of:** Motion sickness, Nausea and vomiting of pregnancy, Nausea and vomiting-chemotherapy-induced, post-anesthesia, Rheumatoid arthritis, osteoarthritis, Dysmenorrhea, Hyperlipidemia, Diabetes, Hypothyroidism, Irritable bowel syndrome, Migraine pain **Sources:** Fresh, dried Tea Supplementation

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Beneficial Antioxidants

- ▶ **Chlorophyll** Chlorophyll is a pigment that gives plants their green color. **Important for/potential beneficial properties:** • Anti-aging • Anti-cancer • Antiviral • Deodorant • Wound healing **May be useful for the prevention/treatment of:** acne, herpes simplex virus and shingles, lung and other types of cancer, pancreatitis, skin cancer, fatigue, arthritis, and fibromyalgia **Sources:** greens, chlorella, spirulina, alfalfa, parsley, broccoli, green cabbage, asparagus, green beans and peas, matcha green tea, wheat grass, algae and supplemental form.
- ▶ **Cinnamon** Ceylon "true" cinnamon is the bark of a tropical evergreen tree grown in Sri Lanka, India, and Madagascar. The volatile oils of Ceylon cinnamon are thought to contain the active constituents. One active constituent, cinnamaldehyde makes up 60-80 % of the volatile oil from the bark. Cinnamaldehyde is thought to be responsible for most of cinnamon's health benefits. NOTE: Cassia cinnamon contains coumarin in significant amounts which may be harmful in high doses. Ceylon cinnamon, the preferred source, is much lower in coumarin. **Important for/potential beneficial properties:** Antiallergy, Anti-inflammatory, Antibacterial, Antifungal, antiparasite, Antioxidant, Antiviral, Blood glucose support, Bone support, Weight management, Collagen support, Gastrointestinal support, Neuroprotection, Cognitive support, **May be useful for the prevention/treatment of:** Type 2 diabetes, Insulin resistance, Osteopenia, Hyperlipidemia, Cardiovascular disease, Bacterial, fungal, yeast, parasitic infections **Sources:** Ceylon is the preferred cinnamon. Ceylon cinnamon can be found in powder, sticks, and supplements from health food stores and other specialty providers. (Most cinnamon in supermarkets is the Cassia variety.)
- ▶ **NADH** NADH is the reduced form of nicotinamide adenine dinucleotide (NAD), a coenzyme involved in a variety of reactions within the body. NADH is synthesized in the body from vitamin B3 and is involved in mitochondrial energy production. **Important for/potential beneficial properties:** • Energy generation • Antioxidation • Cardiovascular support • Lipid lowering • Antihypertensive • Dopaminergic **May be useful for the prevention/treatment of:** CVD, Parkinson's disease, Chronic Fatigue Syndrome **Sources:** Supplemental from- capsules, tablets.
- ▶ **Resveratrol** Resveratrol is a naturally occurring polyphenol produced by plants to protect from threats to plants' survival- fungus, drought, inflammation, UV irradiation. **Important for/potential beneficial properties:** • Antioxidation • Anti-aging • Anti-cancer • Anti-inflammatory • Anti-coagulant • Antiviral • Cardioprotective • Liver protection • Immune support • Neuroprotective • Pulmonary protection • Fat metabolism **May be useful for the prevention/treatment of:** Alzheimer's, cardiovascular disease, metabolic syndrome/obesity, diabetes, insulin resistance, cognitive decline, allergic rhinitis, certain types of cancer, and ulcerative colitis **Sources:** red wine, red grape skins, purple grape juice, mulberries, peanuts, mulberries, blueberries and bilberries, eucalyptus, and spruce
- ▶ **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 ground 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.
- ▶ **SOD** Superoxide Dismutase (SOD) is an essential enzyme found in all living cells. SOD catalyzes the conversion of superoxide to oxygen and hydrogen peroxide, reducing damage from ROS, harmful oxygen molecules. **Important for/potential beneficial properties:** • Antioxidation • Anti-inflammatory **May be useful for the prevention/treatment of:** bronchopulmonary dysplasia, interstitial cystitis, gout, osteoarthritis, RA, familial ALS, Parkinson's disease, Alzheimer's disease, heart damage after MI, dengue fever, cancer, Down's syndrome, sports injuries, cataracts, radiation therapy, neurological disorders, and corneal ulcers **Sources:** yeast, spinach, chicken liver, broccoli, Brussels sprouts

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Beneficial Antioxidants

- ▶ **Quercetin** Quercetin is an antioxidant that belongs to a class of water-soluble plant substances called flavonoids, which are present in certain fruits and vegetables **Important for/potential beneficial properties:** • Antioxidation • Inhibition of histamine release, anti-allergy • Enhancement of capillary and tissue integrity • Certain cancer risk reduction • Anti-inflammatory • Antiviral • Immune support • Glucose regulation • Inhibition of AGE formation **May be useful for the prevention/treatment of:** obesity, CVD, allergic rhinitis, Meniere's disease, diabetes, interstitial cystitis, prostatitis **Sources:** capers, onions, elderberries, kale, okra, radicchio, watercress, carob fiber, dill weed, radish leaves, apple peel, asparagus, goji berries
- ▶ **Delta tocotrienol** Delta tocotrienol is a natural form of vitamin E. Vitamin E is a group of eight fat soluble compounds that include four tocopherols (alpha, beta, gamma and delta) and four tocotrienols (alpha, beta, gamma, and delta). Studies suggest that tocotrienols can provide health benefits distinct from alpha-tocopherol, the most well known form of vitamin E. Tocotrienols have greater fluidity which makes it easier for the body to incorporate them into cell membranes, especially delta-tocotrienol. **Important for/potential beneficial properties:** • Antioxidation • Antiaging • Anti-inflammatory • Anticancer • Brain health • Bone health • Cardiovascular effects • Prevention of platelet aggregation • Hypolipidemic effects • Neuroprotective effects **May be useful for the prevention/treatment of:** hyperlipidemia, certain types of cancer, atherosclerotic heart disease, metabolic syndrome. NAFLD, Parkinson's disease, osteopenia/osteoporosis **Sources:** palm oil, rice bran, annatto bean- the most potent source
- ▶ **Astaxanthin** Astaxanthin is a naturally occurring carotenoid pigment found in nature primarily in salmon, trout, shrimp, and lobster. It is similar to beta-carotene in structure. It gives salmon, shrimp, and lobster their pink-red color. **Important for/potential beneficial properties:** • Antioxidation • Anti-asthmatic • Anti-cancer • Anti-inflammation • Cardiovascular protection • GI and liver protection • Immune support • Fat metabolism **May be useful for the prevention/treatment of:** Alzheimer's disease, dementia, Parkinson's disease, CVD, obesity, certain types of cancer, sunburn, fatty liver, reflux due to H. pylori, hyperlipidemia, RA, and wrinkled skin **Sources:** Salmon, trout, shrimp, lobster
- ▶ **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.
- ▶ **Green Tea** Green tea is derived from the plant, Camellia sinensis. Green tea extract is simply green tea leaves prepared as a supplement. Green tea and its extracts, such as ECGC (Epigallocatechin gallate), a polyphenol, have been studied for their antioxidant effects and possible protective impact against heart disease and cancer. **Important for/potential beneficial properties:** • Immune support • Anti-inflammatory • Antioxidant • Anticoagulant/antiplatelet • Blood glucose regulation • Antilipemic • Antiviral • Bone support • Regulation of blood pressure • Protective against certain types of cancer • Stimulation of CNS • Improved cognitive performance • Reduction in dental plaque • Diuretic • Enhancement of muscular endurance in exercise • Increase in calorie and fat metabolism **May be useful for the prevention/treatment of:** elevated blood pressure, high cholesterol, heart disease, Insulin resistance, obesity, Alzheimer's disease, Parkinson's disease, cancer, inattentiveness, genital warts, and inflammation **Sources:** tea, supplemental form, capsules

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.

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.

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