



Nutritional Supplements 2016

The best source of vitamins and minerals is your diet. The multivitamin you select should minimally contain the amounts listed by the FDA (RDA Daily). The FDA daily amounts are often less than what many experienced nutritionists and physicians recommend, including myself. My recommended doses are listed after the RDA dose for each supplement.

I recommend for patients at risk for cardiovascular disease (CVD) & metabolic syndrome (MS):

- **Omega-3 Fatty Acids:** 1200-2400 mg./day. (1-2 capsules twice daily) (See p. 4-5 & references)
- **Co-enzyme Q10:** 100 mg./day. If taking a “statin” drug to lower cholesterol or if over 40 yrs of age, (See p.4 & references).
- **Calcium (Women):** 500-600 mg with vitamin D supplement, once daily + dietary calcium
- **Vitamin D3:** 2000-5000 I.U. daily, depending on your Vit. D3 blood test
- **Basic One Vitamin (without Iron)** from Cooper Complete (See Ref. #2) – contains 2000 IU of Vit D3
- **BergaMet Pro+** – 1 tablet before breakfast and dinner (See p. 5 and reference list)

Vitamin A

RDA: 5,000 I.U.

Recommended: 5000 I.U.

Vitamin A occurs in two forms: retinol and provitamin A (carotene). Vitamin A is essential for an efficient immune system and is important in maintaining the quality of health of your eyesight, skin, teeth, bones, and mucous membranes. Vitamin A is a fat-soluble vitamin and can be stored in the body, which can become toxic. Most people get enough of this vitamin through food; therefore, the preferred form of this vitamin is beta-carotene or the natural mixed carotenoids. Beta-Carotene and other members of the carotenoid family (lycopene & lutein) are precursors to Vitamin A (they are transformed into the vitamin A after entering the body). Natural carotenoids, including beta-carotene, have been linked to a lower risk of cataracts, heart disease and cancers, such as rectal cancer, melanoma and bladder cancer (*Journal of the American Medical Association*, November 4,1994).

Vitamin C

(Ascorbic acid)

RDA: 60 mg

Recommended: 1000 mg

The water-soluble Vitamin C plays an important role in the formation of collagen, which is important for the growth and repair of body tissue cells, gums, blood vessels, bones and teeth. Vitamin C is also an antioxidant that has been proven to reduce early cataracts by 77% and to lower the rate of moderate cataracts by 83% in women between 56 to 71 years of age. These women took 1000 mg daily for a period of 10 years (*American Journal of Clinical Nutrition*, Oct. 1997). Another study in the *Journal of the American Medical Association* (Nov 26, 1997) stated that Vitamin C (1000 mg) coupled with vitamin E taken in conjunction with a 900-calorie meal containing 50 grams of fat, blocked the detrimental effects of a fatty meal on blood circulation. More recently a study published in the December issue of the *Lancet* showed that 500 mg of Vitamin C taken for 1 month could reduce blood pressure.

Vitamin D3

(Cholecalciferol)

RDA 400 I.U.

Recommended: 2,000 – 5,000 I.U.

Vitamin D is the principle regulator of calcium metabolism in the body. It is essential for **bone growth** in children and to **remineralize bone** in adults to prevent osteoporosis. Vitamin D is not biologically active. The active form is Vitamin D3. Ten minutes of summer sun may provide the required amount of this vitamin, but often individuals who do spend time in the sun are still Vit D3 deficient. Vit. D3 deficiency leads to an increase in the production of parathyroid hormone (regulates calcium and phosphorus) and increases bone resorption (loss), leading to osteopenia and osteoporosis (an imbalance between bone resorption and bone formation). There is increasing evidence that Vit D acts an **antioxidant in lipid** metabolism, is needed for **adequate blood levels of insulin**, and has **anticancer cell activity**, including breast, colon and prostate cancers. Note: Excessive Vit. D can cause an increase in blood calcium levels contributing to calcium deposits in soft tissues, including kidney, blood vessels and lungs.

Vitamin E

(d-alpha tocopherol succinate)

RDA: 30 I.U.

Recommended: 800 I.U.

Vitamin E is an **anticoagulant** (blood thinner) as well as a powerful antioxidant that fights the destructive effects of free radicals (unstable oxygen molecules) in the body. According to a new federal survey, 30 percent of U.S. adults are Vitamin E deficient, a condition that can raise heart disease and cancer risks, according to the Center for Disease Control. Vitamin E is available in two forms: d-alpha tocopherol and dl-alpha-tocopherol. D-alpha tocopherol is the natural form of vitamin E and is three to five times more potent than the synthetic form, dl-alpha tocopherol (*American Journal of Clinical Nutrition* 65: 1997). Vitamin E has been linked to a reduced risk of cardiovascular disease because of its ability to neutralize the oxidation of "bad" LDL cholesterol. Oxidation of LDL is a primary factor in the buildup of plaque in the blood vessel, which leads to atherosclerosis and heart attacks. Other studies link Vitamin E to a lower risk of cancer, cataracts and increased immunity. Vitamin E has also been shown to prevent exercise induced DNA damage (*Mutation Research* 346:1995).

Vitamin B1

(thiamin)

RDA: 1.5 mg

Recommended: 3 mg

Vitamin B1 or thiamine is a water-soluble vitamin that aids in metabolism of carbohydrates, helps maintain the nervous system, skin health and is involved with overall growth.

Vitamin B2

(riboflavin)

RDA: 1.7 mg

Recommended: 10 mg

Vitamin B2 or riboflavin is water soluble and important for the maintenance of healthy, supple skin and good vision. Riboflavin is one of the essential B vitamins necessary for all sorts of chemical processes inside the body, such as converting food into energy.

Vitamin B3, Niacin (Niacinamide form is found in vitamins)

RDA: 20 mg

Recommended: 20 mg

Vitamin B3 is found in many foods including yeast, meat, fish, milk, eggs, green vegetables, beans, and cereal grains. Niacin is a potent antioxidant and anti-inflammatory vitamin and is beneficial in raising HDL (good) cholesterol and adiponectin (a protein involved in regulating glucose levels and fatty acid breakdown) and lowering Lp(a) cholesterol.

Niacinamide is an amine form of niacin and is important in promoting a healthy nervous, skin, and diabetes. Niacinamide lacks the side effects associated with niacin or nicotinic acid such as flushing. Niacinamide does **not** have the ability to lower cholesterol, as does niacin.

Vitamin B6

(Pyridoxine hydrochloride)

RDA: 2 mg

Recommended: 25 mg

Vitamin B6 serves a very important role of ensuring that biological processes, including fat and protein metabolism take place, as they should. Vitamin B6, in conjunction with Vitamin B12 and folic acid, have been shown to lower homocysteine (*American Journal of Clinical Nutrition*, 1998:68) and (*Lancet* 346; 1995). **Homocysteine** is an amino acid in your blood that has been associated with damage to cells lining the vessel walls and plays a significant role in the development of atherosclerosis. Subsequently, lower levels of Vitamin B6 and Folate (Folic acid) produce an increased risk for atherosclerosis (*Circulation* 97, Feb.10, 1998).

Folic Acid

RDA: 400 mcg

Recommended: 800 mcg

Folic acid or Folate is one of the B-complex vitamins and is water-soluble. Folic acid is essential to the formation of red blood cells and aids in protein metabolism. Women of childbearing age should be sure to ingest at least 400 mcg of Folic acid daily to prevent neural-tube defects. Many studies are also showing the necessity of folic acid in **lowering Homocysteine**. Higher folic acid intake (at least 400mcg) promises to prevent atherosclerotic vascular disease by reducing total homocysteine levels (*Journal of the American Medical Association* 274, no 13; Oct. 4, 1995).

Individuals who carry the genes that regulate **MTHFR** (an enzyme involved in the metabolism of Folic Acid) can cause elevated Homocysteine levels, which is a known independent risk factor for cardiovascular disease and venous thrombosis (blood clots). Carriers may also have increased sensitivity to **methotrexate**, requiring lower dosages to avoid toxicity.

Vitamin B12

(Cyanocobalamin)

RDA: 6 mcg

Recommended: 400 mcg

Vitamin B12, another member of the B-complex family, plays a major role in the metabolism of proteins, fats, and sugars, including the absorption and conversion of folic acid into its active form. Vit. B12 is required to form healthy blood and immune cells. One of most important functions of this vitamin is that it helps to maintain the fatty sheath (myelin) that protects the nerves. Therefore, a deficiency

can result in memory loss, confusion, and decreased reflexes among other nervous disorders. It is important to always take vitamin B12 and folic acid together (as in a multivitamin). Vit. B12 is necessary to prevent increased Homocysteine levels. Studies have shown that a significant decrease in homocysteine levels occurs when all three B vitamins (folic acid, Vit. B6 and Vit. B12 were supplemented together (Folgard is a prescription drug used for this condition). (*American Journal of Clinical Nutrition*, 1998:68). Note: Vit B12 is ONLY found in animal foods. It is not present in plant foods.

Biotin

(d-biotin)

RDA: 300 mcg

Recommended: 300 mcg

Biotin is a component of the B2 complex and is involved in various bodily functions, including the breakdown of proteins, the metabolism of carbohydrates and the formation of fats. Biotin is synergistic with Vitamin B2 (Riboflavin), B6, niacin, and Vitamin A to maintain healthy skin. Deficiency of biotin is rare because it can be manufactured in the intestines from other food.

Pantothenic Acid (Pantothenate)

(d-Ca pantothenate)

RDA: 10 mg

Recommended: 10 mg

Pantothenic acid (referred to as Vitamin B5) is important for cell building, maintaining normal growth, development of the nervous system, and synthesis of antibodies. Pantothenic acid is vital to the proper functioning of the adrenal glands and is essential for conversion of fat and sugar to energy. **Pantethine** is a derivative of pantothenic acid. Both are also sold as dietary supplements. Pantothenic acid is a component of coenzyme A, which is involved in the release of energy from the foods you eat (CHO, proteins and fats). Pantethine isn't a vitamin, but it has proven useful in lowering blood lipids (cholesterol).

Iron

(Iron carbonyl)

RDA: 18 mg

Recommended: 18 mg

Iron plays an integral role in the formation of hemoglobin, the substance that helps red blood cells transport oxygen from the lungs to the rest of the body. Women in childbearing years are commonly deficient in this mineral and should include it in their diet.

Iodine

(Potassium iodide)

RDA 150 mcg

Recommended: 150 mcg

Iodine is used by the thyroid gland to produce the hormone called thyroxine. This hormone helps to regulate energy production, body temperature, breathing, muscle tone, and the manufacture and breakdown of tissues. Adequate intake is usually obtained through the use of the iodized salt that we have today.

Magnesium

(Mg Oxide)

RDA: 400 mg

Recommended: 400 mg

Magnesium is a mineral that serves several crucial roles such as assisting in the nerve and muscular impulses as well as muscular contraction. Magnesium is necessary for the metabolism of calcium, Vitamin C, phosphorus, sodium, and potassium.

Zinc

(Zinc oxide)

RDA: 15 mg

Recommended: 15 mg

Zinc is a trace mineral present in and indispensable to all forms of life. It is essential for normal growth, pregnancies, and transmission of our genetic material. Zinc is required as an enzyme component in the eyes, liver, kidneys, muscles, skin, testes, and other organs. The highest concentrations of zinc are in bones, the prostate gland, and the eyes. Some evidence suggests that zinc, when taken at the onset of illness, may reduce the duration and severity of an upper-respiratory infection. However, mega doses of zinc are suspected of inhibiting immune response, according to research done at the USDA Nutrition Center at Tufts University. Vegetarians may be low on Zinc. Some studies support taking 80mg daily for to slow the progression of macular degeneration.

Selenium

(Rice bran chelate)

RDA: 70 mcg

Recommended: 100 mcg

Selenium is a trace mineral that is a structural element of the enzyme that protects glutathione, which serves as part of the body's internal defense against free radical damage. Selenium works hand in hand with Vitamins C, E, and beta-carotene as an antioxidant defense. Selenium supplementation was shown to reduce the frequency of lung, colon, rectal, and prostate cancer in older men followed for 6.4 years (*Journal of the American Medical Association* 276, no.24: Dec.25, 1996).

Copper

(Copper gluconate)

RDA: 2 mg

Recommended: 2 mg

Copper plays a major role in the metabolism and conversion of iron into hemoglobin that is found in red blood cells. Copper also protects the bones against deterioration and osteoporosis, and it functions as a good antioxidant. Adequate copper supplies in the body have been linked to lower levels of total cholesterol and higher amounts of HDL or "good" cholesterol.

Chromium

(Chromium amino acid chelate)

RDA: 120 mcg

Recommended: 100 mcg

Chromium is a trace mineral that is necessary for the proper functioning of insulin. Insulin plays a major role in the metabolism of sugar and is involved in the body's use of protein and fat. Studies suggest that high doses of chromium picolinate can accumulate in the tissues to the point that damage occurs to chromosomes, including DNA and has been associated with the development of cancer. Thus, Cooper Complete includes the amino acid chelate form.

Potassium

(Potassium phosphate)

RDA: 3,500 mg

Recommended: 400 mg

Potassium works with sodium to regulate the body's water balance and normalize heart rhythms. Potassium is also necessary for good muscle contraction and rapid transmission of nerve impulses throughout the body. Low potassium intake may play a role in causing high blood pressure; therefore, people who are unable to reduce their sodium intake may help prevent and treat hypertension by increasing the potassium in their diets (*Journal of the American Medical Association*, May 28, 1997).

Choline

(Choline bitartrate)

RDA 70-80 mcg men; 60-65 mcg women

Recommended: 500 mg

Choline is an essential nutrient and is a member of the B-complex family. Choline works with the B-complex vitamins to help the body utilize fats and cholesterol. Choline is also involved with producing a chemical involved in aiding memory.

Coenzyme Q10

(Ubiquinone)

RDA Daily Value: Not established

Recommended: 100 mg

Coenzyme Q10 or Ubiquinone is found in every cell in the body. Its main function is to serve as a catalyst to convert the food we eat into energy. Coenzyme Q10 has attracted interest for its potential as an antioxidant. Various studies have suggested that this coenzyme could play a role in protecting the body against tissue damage from heart attacks, heart disease, retina deterioration, breast cancer, as well as a number of other diseases. Over 400 patients with various forms of cardiovascular disease (enlarged heart, hypertension, mitral valve prolapse, and heart valve disease) were treated with coenzyme Q10 at the University of Texas Medical Branch, Galveston between 1985 and 1993. Patients in the disease category showed a significant improvement in heart function, and the overall medication requirements dropped considerably. Researchers concluded that coenzyme Q10 is a safe and effective treatment for a broad range of cardiovascular diseases (*Molecular Aspects of Medicine*, 1994, 15 Supplement). Another study in Napoli, Italy showed that patients with chronic heart failure had improved heart responses during exercise when given coenzyme Q10 (*Molecular Aspects of Medicine*, 1994, 15 Supplement). Studies show that people taking cholesterol-lowering drugs (statins) may experience a significant decrease in coenzyme Q10 (*Clinical Investigation* 71, 1993) & (*Molecular Aspects of Medicine*, 1997, 18 Supplement). Conclusion: It would be advisable for these individuals to supplement with coenzyme Q10.

Omega-3 fatty acids

RDA Daily Value: Not established

Recommended: 2,000 – 4,000 mg

Research articles touting the benefits of omega-3 fatty acids have appeared in the prestigious medical journals of *Circulation*, *New England Journal of Medicine* and *Journal of the American Medical Association*. It has long been hypothesized that the low rates of cardiovascular disease found in Alaskan natives is due to their high intake of omega-3 fatty acids through their fish based diet. While the idea that omega-3 fatty acids provide health benefits is not new, the accumulation of solid research studies supporting the importance of them is exciting. Be sure to learn about the source of your supple as not all products can be verified. I purchase from Cooper Complete, Dallas, Texas (see References below).

Omega-3 fatty acids are essential fatty acids, meaning your body cannot produce them and they must come from the diet. They are also often referred to as n-3 PUFAs (polyunsaturated fatty acids). There are three important omega-3 fatty acids:

- **Eicosapentaenoic acid (EPA)** -- found in seafood, especially cold-water fish
- **Docosahexaenoic acid (DHA)** -- found in seafood, especially cold-water fish
- **Alpha Linolenic Acid (ALA)** -- found in plant based oils, walnuts, chia seeds, flaxseeds

The most common source of omega-3 fatty acids is fatty fish like mackerel, lake trout, herring, sardines, Alaskan char, albacore tuna and salmon. Different types of fish contain different amounts of these fats and as a general rule the colder the water the fish lives in the higher the concentration of omega-3 fatty acids. There have been a number of studies, which show that men and women who eat fish on a regular basis have substantially lower risk for heart disease than individuals who do not eat fish. Based on these and other studies, the American Heart Association recommends eating fish two times per week. There is compelling evidence that increasing omega-3 fatty acid intake is particularly important in individuals who already have cardiovascular disease.

For those people who do not eat fish, there is evidence that fish oil pills containing omega-3 fatty acids produce similar benefits to eating fish. In the GISSI trial from Italy, which was composed of 11,323 individuals who have had a heart attack, a 20 percent reduction in overall mortality and a 45 percent reduction in sudden death was found in participants who took fish oil capsules compared to individuals who did not. The capsules consisted of 850 mg of omega-3 fatty acid ethyl esters (as EPA and DHA).

A number of mechanisms have been proposed as to how all the omega-3 fatty acids provide protection against heart disease. These include reducing blood triglycerides, reducing the clotting ability of platelets and improving the function of the blood vessels. Interestingly, omega-3 fatty acids appear to be particularly protective against deadly heart rhythm disturbances (arrhythmias), which are the principle cause of sudden cardiac death. There is data to suggest that omega-3 fatty acids protect the heart from arrhythmias by stabilizing the electrical activity of the heart muscle cells.

In addition to providing protection against cardiovascular disease, there is preliminary evidence that omega-3 fatty acids may be important in the treatment of arthritis, Alzheimer's disease, depression and cancer. While there is still more work to be done, it is clear that eating fish high in omega-3 fatty acids provides substantial health benefits particularly if you have a history of cardiovascular disease. And, if you do not eat fish, taking an omega-3 fatty acid supplement is a good alternative.

Berberine

RDA Daily Value: Not established

Recommended for patients at risk for heart disease, diabetes and metabolic syndrome: 500 mg with Breakfast & Dinner

Source: Amazon.com (Brand: Thorne)

Berberine is a natural herb and is extracted from Coptis Root and Phellodendron. Berberine has been frequently used for the adjuvant treatment of type 2 diabetes mellitus, hyperlipidemia (cholesterol), and hypertension (BP) in China. In double blind research studies Berberine has been shown to be as effective as Metformin in lowering Hgb A1c, fasting blood sugar and improving insulin resistance, and lowering blood triglycerides, total cholesterol and LDL-cholesterol. (See Ref. 4 & 5)

BergaMet Pro+

RDA Daily Value: Not established

Recommended for patients at risk for heart disease, diabetes and metabolic syndrome: 675 mg before Breakfast and before Dinner

Source: **Call (855) 556-2131**

Citrus bergamia (Bergamot) is an endemic citrus plant of the Calabrian coastal region of Southern Italy that contains a unique composition and high concentration of polyphenols, particularly flavonoids. **Bergamot polyphenol fractions (BPF)** of this citrus fruit have been shown to lower the risk of heart disease, metabolic syndrome and diabetes.

Metabolic Syndrome (MS) is cluster of age-related risk factors directly related to an increased incidence of cardiovascular disease and type 2 diabetes. MS is diagnosed when a person has 3 of 5 abnormal findings: Elevated blood pressure, elevated fasting blood glucose, elevated blood triglycerides, abdominal obesity and low HDL-cholesterol.

Clinical studies have clearly demonstrated the BPF benefit by significantly lowering the small atherogenic particles of LDL-cholesterol (LDLps & sdLDL), similar to statin drugs. BPF also lowers triglycerides and raises HDL-cholesterol. Another fraction of BPF blocks the gut absorption of cholesterol and fats, similar to the prescription drug Zetia. BPF improves blood sugar, insulin resistance and HgbA1c. BPF is currently under review by the FDA for approval in the treatment of **Non-Alcoholic Fatty Liver Disease (NAFLD)**, as studies have demonstrated a decrease in both liver and visceral (belly) fat. BPF has other additional beneficial properties including, anti-inflammatory, anti-oxidant, reduced blood pressure (by improving endothelial function and reducing stiffness of arteries). As a natural citrus product BPF has essentially no side effects. Studies have shown that the concentration of BPF in directly related to its cardiovascular and metabolic benefits. **BergaMet Pro+** is the only BPF product with a 47% concentration of citrus bergamot. NOTE: For maximal benefit take one tablet BEFORE breakfast and evening meal.

A Comment about Adiponectin

Adipocytes (fat cells) are a storage depot for fat calories with each pound of fat representing 3,500 stored calories that was ingested when the body did not require additional calories. Adiponectin is a circulating protein synthesized solely in adipose (fat) tissue and appears to play a very important role in carbohydrate and lipid metabolism and vascular biology. Adiponectin appears to be a major modulator of insulin action and its levels are reduced in type 2 diabetes, which may contribute to peripheral insulin resistance. It has significant insulin-sensitizing as well as anti-inflammatory properties. Interestingly, the leaner your body mass, the more adiponectin your fat cells will release! Adiponectin enhances your muscle's ability to use carbohydrates for energy, boosts your metabolism, increases the rate in which your body breaks down fat, and curbs your appetite. You can maximize your adiponectin levels by moving more during the day (exercise), lose belly fat with proper nutrition and replacing carbohydrates in your diet with monounsaturated fats (olives, avocados, olive oil, etc.).

References:

1. Encyclopedia of Nutritional Supplements by Michael T. Murray, N.D. 1996
2. **Cooper Complete** is a vitamin and mineral supplement line formulated by Dr. Kenneth H. Cooper, the "Father of Aerobics" and the founder of the Cooper Institute, www.cooperinstitute.org, located in Dallas, Texas.
3. **Omega-3 Fatty Acid & Co-Enzyme Q10** supplements can be obtained @ www.coopercomplete.com or dial 800.393.2221 for information.
4. **Meta-analysis of the effect and safety of berberine in the treatment of type 2 diabetes mellitus, hyperlipemia and hypertension.** Journal of Ethnopharmacology 161 (2015) 69–81.
5. **Efficacy of Berberine in Patients with Type 2 Diabetes.** Metabolism. 2008 May; 57(5): 712–717
6. **Bergamot Polyphenols: Pleiotropic Players in the Treatment of Metabolic Syndrome.** M.Gliozzi, et al. J. Metabolic Synd. 2014, 3.2. (This is an Open Access article and has 52 references.)

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