

Cardiovascular Supplement Info:

CoQ10

“Despite its name, Coenzyme Q10 (CoQ10) counts as a member of the vitamin group. In fact, biochemically speaking, all enzymes are coenzymes, and vice versa. Practically speaking, however, some years ago scientists decided to stop admitting new vitamins such as CoQ10 to what seemed to be a never-ending list.

CoQ10 is of most value in heart disease and congestive heart failure, where it has been found to be more heart-protective than the pharmaceutical drug Captopril. (Micromedex.com, under AltMeDex Protocols. 10/2002.) Captopril falls in the ACE-inhibitor class of drugs commonly used in congestive heart failure. Doctors often prescribe ACE-inhibitors for their diabetic patients because the drugs seem both to delay the onset and to slow the progression of kidney disease. Marked improvement has been seen in the heart conditions of patients taking CoQ10 each day. (Micromedex.com, under AltMeDex Protocols. 10/2002.) Again, the substance’s benefits are so well-documented –with a noted lack of side effects – that every patient walking in or out of a cardiologist’s office should be taking it.” (Kaufmann, D. and Holland, David, M.D., Infectious Diabetes. 2003.)

“CoQ10 boosts energy, enhances the immune system, and acts as an antioxidant...

Research suggests that the beneficial effect of CoQ10 in the prevention and treatment of heart disease is due to its ability to improve energy production in cells and inhibit blood clot formation. One important study found that people who received daily CoQ10 supplements within 3 days of a heart attack were significantly less likely to experience subsequent heart attacks and chest pain...

Levels of CoQ10 are low in people with Congestive Heart Failure (CHF), a debilitating disease that occurs when the heart is not able to pump blood effectively. This can cause blood to pool in parts of the body such as the lungs and legs. Research suggests that CoQ10 supplementation helps reduce swelling in the legs, enhance breathing by reducing fluid in the lungs, and increase exercise capacity in people with CHF...

Several studies involving small numbers of people suggest that CoQ10 may lower blood pressure...

Levels of CoQ10 tend to be lower in people with high cholesterol. In addition, certain cholesterol-lowering drugs called “statins” appear to deplete natural levels of CoQ10 in the body...

Several studies suggest that CoQ10 may help prevent heart damage caused by certain chemotherapy drugs.” (University of Maryland Medical Center, 2004. www.umm.edu)

Always discuss supplementation with your healthcare provider. Do not use CoQ10 without consulting your healthcare provider if you are taking the following medications:

Daunorubicin and Doxorubicin

Blood Pressure Medications

Warfarin (Coumadin)

Timolol or other Beta-Blockers

Statins (Lovastatin, Pravastatin, etc.)
Tricyclic Antidepressant Medications

Supporting Research:

Aberg F, Appelkvist EL, Broijersen A, et al. Gemfibrozil-induced decrease in serum ubiquinone and alpha- and gamma-tocopherol levels in men with combined hyperlipidaemia. *Eur J Clin Invest.* 1998;28:235-242.

Al-Hasso. Coenzyme Q10: a review. *Hosp Pharm.* 2001;36(1):51-66.

Baggio E, Gandini R, Plancher AC, Passeri M, Carmosino G. Italian multicenter study on the safety and efficacy of coenzyme Q10 as adjunctive therapy in heart failure. CoQ10 Drug Surveillance Investigators. *Mol Aspects Med.* 1994;15(Suppl):s287-294.

Chello M, Mastroberto P, Romano R, et al. Protection by coenzyme Q10 from myocardial reperfusion injury during coronary artery bypass grafting. *Ann Thorac Surg.* 1994;58(5):1427-1432.

Chopra RK, Goldman R, Sinatra ST, Bhagavan HN. Relative bioavailability of coenzyme Q10 formulations in human subjects. *Int J Vitam Nutr Res.* 1998;68:109-113.

Eriksson JG. The effects of coenzyme Q10 administration on metabolic control in patients with type 2 diabetes mellitus. *Biofactors.* 1999;9(2-4):315-318.

Heck AM, DeWitt BA, Lukes AL. Potential interactions between alternative therapies and warfarin. *Am J Health-System Pharm.* 2000;57(13):1221-1227.

Henriksen J, Andersen CB, Hother-Nielsen O, Vaag A, Mortensen SA, Beck-Nielsen H. Impact of ubiquinone (coenzyme Q10) treatment on glycaemic control, insulin requirement and well-being in patients with type 1 diabetes mellitus. *Diabet Med.* 1999; 16:312-8.

Human JA, Ubbink JB, Jerling JJ, et al. The effect of simvastatin on the plasma antioxidant concentrations in patients with hypercholesterolemia. *Clin Chim Acta.* 1997;263(1):67-77.

Judy WV, Hall JH, Dugan W, et al. Coenzyme Q10 reduction of adriamycin cardiotoxicity. In: Folkes K, Yamamura Y, Eds. *Biomedical and clinical aspects of coenzyme Q10*, Vol. 4. Amsterdam: Elsevier. 1984:231-241.

Kendler BS. Recent nutritional approaches to prevention and therapy of cardiovascular disease. *Prog Cardiovasc Nurs.* 1997;12(3):3-23.

Khatta M, Alexander BS, Krichten CM, Fisher ML, Freudenberger R, Robinson SW et al. The effect of coenzyme Q10 in patients with congestive heart failure. *Ann Int Med.* 2000;132(8):636-640.

Landbo C, Almdal TP. Drug interaction between warfarin and coenzyme Q10. *Ugeskrift for Laeger.* 1998;160(22):3226-3227.

Langsjoen P, Langsjoen A. Overview of the use of CoQ10 in cardiovascular disease. *BioFactors*. 1999;9:273-284.

Langsjoen P, Langsjoen A, Willis R, Folkers K. Treatment of Essential Hypertension with Coenzyme Q10. *Molec Aspects Med*. 1994;15:s265-s272.

Marz W, Wieland H. HMG-CoA reductase inhibition: anti-inflammatory effects beyond lipid lowering. *Herz*. 2000;25(6):117-25.

Miyake Y, Shouza A, Nishikawa M, Yonemoto T, Shimizu H, Omoto S, Hayakawa T, Inada M. Effect of treatment with 3-hydroxy-3methylglutaryl coenzyme A reductase inhibitors on serum coenzyme Q10 in diabetic patients. *Arzneimittelforschung*. 1999;49(4):324-329.

Mortensen SA, Leth A, Agner E, Rohde M. Dose-related decrease of serum coenzyme Q10 during treatment with HMG-CoA reductase inhibitors. *Mol Aspects Med*. 1997;18Suppl:S137-S144.

Musumeci O, Naini A, Slonim AE, Skavin N, Hadjigeorgiou GL, Krawiecki N, et al. Familial cerebellar ataxia with muscle coenzyme Q10 deficiency. *Neurol*. 2001;56(7):849-855.

Nilbori K, Yokoyama H, Crestanello JA, Whitman GJ. Acute administration of liposomal coenzyme Q10 increases myocardial tissue levels and improves tolerance to ischemia reperfusion injury. *J Surg Res*. 1998;79:141-145.

Overvad K, Diamant B, Holm L, Holmer G, Mortensen SA, Stender S. Review coenzyme Q10 in health and disease. *Eur J Clin Nut*. 1999;53:764-770.

Raitakari OT, McCredie RJ, Witting P, Griffiths KA, Letter J, Sullivan D, Stocker R, Celermajer DS. Coenzyme Q improves LDL resistance to ex vivo oxidation but does not enhance endothelial function in hypercholesterolemic young adults. *Free Radic Biol Med*. 2000;28(7):1100-1105.

Serebruany VL, Ordonez JV, Herzog WR, et al. Dietary coenzyme Q10 supplementation alters platelet size and inhibits human vitronectin (CD51/CD61) receptor expression. *J Cardiovasc Pharmacol*. 1997;29:16-22.

Shils ME, Olson JA, Shike M, Ross AC. *Modern Nutrition in Health and Disease*. 9th ed. Baltimore, Md: Williams & Wilkins; 1999:90-92: 1377-1378.

Shinozawa S, Kawasaki H, Gomita Y. [Effect of biological membrane stabilizing drugs (coenzyme Q10, dextran sulfate and reduced glutathione) on adriamycin (doxorubicin)-induced toxicity and microsomal lipid peroxidation in mice]. *Gan To Kagaku Ryoho*. 1996;23(1):93-98.

Singh RB, Niaz MA, Rastogi SS, Shukla PK, Thakur AS. Effect of hydrosoluble coenzyme Q10 on blood pressures and insulin resistance in hypertensive patients with coronary artery disease. *J Hum Hypertens*. 1999;13(3):203-208.

Singh RB, Wander GS, Rastogi A, et al. Randomized, double-blind placebo-controlled trial of coenzyme Q10 in patients with acute myocardial infarction. *Cardiovasc Drugs Ther.* 1998;12: 347-353.

Spigset O. Reduced effect of warfarin caused by ubidecarenone. *Lancet.* 1994;344: 1372-1373.

Takahashi N, Iwasaka T, Sugiura T, et al. Effect of coenzyme Q10 on hemodynamic response to ocular timolol. *J Cardiovasc Pharmacol.* 1989;14: 462-468.

Torkos S. Drug-nutrient interactions: A focus on cholesterol-lowering agents. *Int J Integrative Med.* 2000;2(3): 9-13.

Witte KK, Clark AL, Cleland JG. Chronic heart failure and micronutrients. *J Am Coll Cardiol.* 2001;37(7): 1765-1774.

Zhou Q, Chan E. Accuracy of repeated blood sampling in rats: A new technique applied in pharmacokinetic/pharmacodynamic studies of the interaction between warfarin and Co-enzyme Q10. *J Pharmacol Toxicol Methods.* 1998;40(4): 191-199.

Ginger

Ginger inhibits synthesis of thromboxane A₂, a promoter of platelet aggregation and increases prostacyclin, an inhibitor of such activity. (Medical Hypothesis 20:271, 1986.) Platelet aggregation can lead to diminished blood flow and reduced delivery of oxygen to the body, which can put a person at risk for heart disease and/or stroke. Research shows that ginger inhibits platelet aggregation in vitro. (*Prostaglandins Medicine.* 1984;13(277)) Scientists call ginger a "cardiotonic agent" because of its ability to increase ATP energy production in the heart and to enhance the calcium pumping within heart cells that is required for greater cardiac contractile strength and output.

"Studies suggest that ginger may also lower cholesterol." (University of Maryland Medical Center, 2004. www.umm.edu)

Always discuss supplementation with your healthcare provider. Do not use ginger without consulting your healthcare provider if you are taking the following medications:

**Blood Thinning Medications (Warfarin, etc.)
Cyclophosphamide (Cytosin)**

Supporting Research:

Awang DVC. Ginger. *Can Pharma J.* 1992: 309–311.

Bhandari U, Sharma JN, Zafar R. The protective action of ethanolic ginger (*Zingiber officinale*) extract in cholesterol fed rabbits. *J Ethnopharm.* 1998;61(2): 167-171.

Bordia A, Verma SK, Srivastava KC. Effect of ginger (*Zingiber officinale* Rosc.) and fenugreek (*Trigonella foenumgraecum* L.) on blood lipids, blood sugar, and platelet

aggregation in patients with coronary heart disease. *Prostaglandins Leukot Essent Fatty Acids*. 1997;56(5): 379-384.

Brinker F. *Herb Contraindications and Drug Interactions*. 2nd ed. Sandy, OR: Eclectic Medical Publications; 1998:75-76.

Fuhrman B, Rosenblat M, Hayek T, Coleman R, Aviram M. Ginger extract consumption reduces plasma cholesterol, inhibits LDL oxidation, and attenuates development of atherosclerosis in atherosclerotic, apolipoprotein E-deficient mice. *J Nutr*. 2000;130(5):1124-1131.

Heck AM, DeWitt BA, Lukes AL. Potential interactions between alternative therapies and warfarin. *Am J Health Syst Pharm*. 2000;57(13):1221-1227.

McGuffin M, Hobbs C, Upton R, Goldberg A, eds. *American Herbal Products Association's Botanical Safety Handbook*. Boca Raton, Fla: CRC Press; 1997.

Miller LG. Herbal medicinals: selected clinical considerations focusing on known or potential drug-herb interactions. *Arch Intern Med*. 1998;158(20):2200-2211.

Phillips S, Ruggier R, Hutchinson SE. *Zingiber officinale* (ginger)--an antiemetic for day case surgery. *Anaesthesia*. 1993;48(8):715-717.

Vaes LP, Chyka PA. Interactions of warfarin with garlic, ginger, ginkgo, or ginseng: nature of the evidence. *Ann Pharmacother*. 2000;34(12):1478-1482.

Vitamin B1 (Folate/Folic Acid)

"Folate is available in both over-the-counter and prescription forms. Folate is sold as a prescription mainly because of its ability to lower homocysteine levels in our bloodstreams. Elevated levels of homocysteine have frequently been found in people with heart disease. Folate seemed to help decrease these levels. Patients with the lowest folate levels have demonstrated a 69% higher risk of dying from heart disease, when compared with those with the highest levels. (Modica, P. Folate linked to risk reduction in heart disease. *Medical Tribune*, Vol.37, No 13., July 18, 1996.)" (Kaufmann, D. and Holland, David, M.D., Infectious Diabetes. 2003.)

Too much of homocysteine is related to a higher risk of coronary heart disease, stroke and peripheral vascular disease (fatty deposits in peripheral arteries). Evidence suggests that homocysteine may promote atherosclerosis (fatty deposits in blood vessels) by damaging the inner lining of arteries and promoting blood clots. Folic acid helps break down homocysteine in the body. Several studies found that higher blood levels of B vitamins are related, at least in part, to lower concentrations of homocysteine. Other evidence shows that low blood levels of folic acid are linked with a higher risk of fatal coronary heart disease and stroke. (American Heart Association)

Always discuss supplementation with your healthcare provider. Do not take folic acid without consulting your healthcare provider if you are taking the following medications:

Certain Antibiotics (chloramphenicol, nitrofurantoin, sulfasalazine)

Certain Anti-seizure drugs (phenytoin, lamotrigine, primidone)

Methotrexate

Pyrimethamine

Supporting Research:

Chao, Chia-Lun, et al. Effect of short-term vitamin (folic acid, vitamins B6 and B12) administration on endothelial dysfunction induced by post-methionine load hyperhomocysteinemia. *American Journal of Cardiology*, Vol. 84, December 1, 1999, pp. 1359-61

Lawrence M., et al. Effect of folic acid and antioxidant vitamins on endothelial dysfunction in patients with coronary artery disease. *Journal of the American College of Cardiology*, Vol. 36, September 2000, pp. 758-65

Lobo, Arlene, et al. Reduction of homocysteine levels in coronary artery disease by low-dose folic acid combined with vitamins B6 and B12. *American Journal of Cardiology*, Vol. 83, March 15, 1999, pp. 821-25

Loria, Catherine M., et al. Serum folate and cardiovascular disease mortality among US men and women. *Archives of Internal Medicine*, Vol. 160, November 27, 2000, pp. 3258-62

McCully, Kilmer S. Homocysteine, folate, vitamin B-6, and cardiovascular disease. *Journal of the American Medical Association*, Vol. 279, February 4, 1998, pp. 392-93 (editorial)

Morrison, Howard I., et al. Serum folate and risk of fatal coronary heart disease. *Journal of the American Medical Association*, Vol. 275, No. 24, June 26, 1996, pp. 1893-96

Quinlivan, E.P., et al. Importance of both folic acid and vitamin B12 in reduction of risk of vascular disease. *The Lancet*, Vol. 359, January 19, 2002, pp. 227-28 (research letter)

Schnyder, Guido, et al. Effect of homocysteine-lowering therapy on restenosis after percutaneous coronary intervention for narrowing in small coronary arteries. *American Journal of Cardiology*, Vol. 91, May 15, 2003, pp. 1265-69

Van Oort, Floor VA, et al. Folic acid and reduction of plasma homocysteine concentrations in older adults: a dose-response study. *American Journal of Clinical Nutrition*, Vol. 77, May 2003, pp. 1318-23

Vasan, Ramachandran S., et al. Plasma homocysteine and risk for congestive heart failure in adults without prior myocardial infarction. *Journal of the American Medical Association*, Vol. 289, March 12, 2003, pp. 1251-57

Verhoef, Petra, et al. Homocysteine metabolism and risk of myocardial infarction: relation with vitamins B-6, B-12, and folate. *American Journal of Epidemiology*, Vol. 143, No. 9, May 1, 1996, pp. 845-59

Vermeulen, E.G.J., et al. Effect of homocysteine-lowering treatment with folic acid plus vitamin B6 on progression of subclinical atherosclerosis: a randomized, placebo-controlled trial. *The Lancet*, Vol. 355, February 12, 2000, pp. 517-22

Hawthorn Berry

"Hawthorn berry is a supplement used primarily for conditions such as congestive heart failure. It has been recognized by many countries, including the United States, in being able to: dilate the peripheral arteries (in the arms and legs, thereby reducing the stress on the heart); increase oxygen utilization by the heart; mildly dilate the heart blood vessels (improving oxygen flow to the organ); and increase enzyme metabolism in heart tissue. (Mowrey, D. The Scientific Validation of Herbal Medicine. Keats Publishing, Inc. New Canaan, Connecticut.) In patients with Class II NYHA heart failure (New York's Heart Association assigns a classification of between I-IV to the severity of heart failure patients have suffered), hawthorn berry produced a marked decrease of heart rate, blood pressure, and other parameters used in studying and monitoring heart failure." (Kaufmann, D. and Holland, David, M.D., Infectious Diabetes. 2003.)

"Hawthorn has primarily been studied in people with congestive heart failure (a health condition in which the heart is unable to pump adequate amounts of blood to other organs in the body). Of six well-designed trials, four studies concluded that hawthorn significantly improved heart function and three found that the herb improved patients' ability to exercise. Patients in five of the six studies reported that hawthorn significantly improved symptoms of the disease (such as shortness of breath and fatigue)...

Animal and laboratory studies demonstrate that this herb has antioxidant properties that help protect against the formation of plaques, which leads to a health problem known as atherosclerosis. Plaque buildup in the vessels that supply the heart with oxygen-rich blood may cause chest pain (angina) and heart attacks while plaque buildup in the arteries that supply blood to the brain may result in stroke...

Hawthorn berry preparations have been shown to combat chest pain (angina), a health problem caused by insufficient blood flow to the heart...

Studies using rats suggest that a hawthorn tincture (made from the berries) may be a powerful agent for the removal of LDL ("bad") cholesterol from the bloodstream. The tincture of hawthorn berries also reduced the production of cholesterol in the liver of rats who were being fed a high-cholesterol diet...

Hawthorn contains many substances that may benefit the heart. However, it appears that two substances in particular -- flavonoids and oligomeric procyanidins (OPCs) -- are most likely to contribute to hawthorn's beneficial effects on the heart. Flavonoids help dilate blood vessels, improve blood flow, and increase heart rate. Both flavonoids and OPCs have potent antioxidant effects." (University of Maryland Medical Center, 2004. www.umm.edu)

Always discuss supplementation with your healthcare provider. Do not use hawthorn berry without consulting your healthcare provider if you are taking the following medications:

Digoxin

Phenylephrine

Supporting Research:

Bahorun T, Troitin F, Pommery J, Vasseur J, Pinkas M. Antioxidant activities of *Crataegus monogyna* extracts. *Planta Med*. 1994;60:323-328.

Brinker F. *Herb Contraindications and Drug Interactions*. 2nd ed. Sandy, Ore: Eclectic Medical; 1998:82-83.

Fugh-Berman A. Herbs and dietary supplements in the prevention and treatment of cardiovascular disease. *Prev Cardiol*. 2000;3(1):24-32.

Holubarsch CJ, Colucci WS, Meinertz T, Gaus W, Tendera M. Survival and prognosis: investigation of Crataegus extract WS 1442 in congestive heart failure (SPICE)--rationale, study design and study protocol. *Eur J Heart Fail*. 2000;2(4):431-437.

Mashour NH, Lin GI, Frishman WH. Herbal medicine for the treatment of cardiovascular disease. *Arch Intern Med*. 1998;158:2225-2234.

Miller AL. Botanical influences on cardiovascular disease. *Altern Med Review*. 1998;3(6):422-431.

Miller L. Herbal medicinals: selected clinical considerations focusing on known or potential drug-herb interactions. *Arch Intern Med*. 1998;158(20):2200-2211.

Morelli V, Zoorob RJ. Alternative therapies: Part II. Congestive heart failure and hypercholesterolemia. [Review]. *Am Fam Physician*. 2000;62(6):1325-1330.

Rajendran S, Deepalakshmi PD, Parasakthy K, Devaraj H., Devaraj SN. Effect of tincture of Crataegus on the LDL-receptor activity of hepatic plasma membrane of rats fed an atherogenic diet. *Atherosclerosis*. 1996;123:235-241.

Rotblatt M, Ziment I. *Evidence-Based Herbal Medicine*. Philadelphia, PA: Hanley & Belfus, Inc; 2002:231-235.

Rigelsky JM, Sweet BV. Hawthorn: pharmacology and therapeutic uses. *Am J Health Syst Pharm*. 2002;59(5):417-422.

Schultz V, Hansel R, Tyler V. *Rational Phytotherapy: A Physician's Guide to Herbal Medicine*. Heidelberg: Springer; 1998.

Schussler M, Holz J, Fricke U. Myocardial effects of flavonoids from crataegus species. *Arzneimittelforschung*. 1995;45:842-845.

Garlic

"Daniel Mowrey, Ph.D. tells us that research on both animal and human subjects has irrefutably proved garlic's ability to lower cholesterol. (Mowrey, D. *The Scientific Validation of Herbal Medicine*. Keats Publishing, Inc. New Canaan, Connecticut.) Garlic's ability to lower blood pressure is also well-documented." (Kaufmann, D. and Holland, David, M.D., [Infectious Diabetes](#). 2003.)

"Studies suggest that fresh garlic and garlic supplements may prevent blood clots and destroy plaque. Blood clots and plaque block blood flow and contribute to the development of atherosclerosis. Blockage of blood flow to the heart, brain, and legs, can lead to heart attack, stroke, or peripheral vascular disease (PVD). People with

PVD experience pain in the legs when they walk and move. Since garlic does reduce the build up of plaque, then stroke, heart attacks, and PVD may be less likely to occur in people who eat garlic or take garlic supplements...

Garlic may also be beneficial for risk factors for heart disease, including high blood pressure, high cholesterol, and diabetes. An animal study suggests that garlic may help lower homocysteine levels as well. Homocysteine, similar to cholesterol, may contribute to increasing amounts of blood clots and plaque in blood vessels...

Long hailed for its beneficial effects, a number of studies have found that garlic reduces elevated total cholesterol levels more effectively than placebo...

Studies suggest that raw garlic may lower blood pressure...

There are several important components of garlic that have been identified, and many more that have not. Alliin is an odorless sulfur-containing chemical derived from the amino acid cysteine. When garlic bulbs are crushed, alliin is converted into another compound called allicin. Allicin appears to be at least one of the primary active compounds that gives garlic its characteristic odor and many of its healing benefits...

Allicin appears to have infection-fighting action as well as potential cardiovascular effects including, possibly, the ability to lower blood pressure and cholesterol. In addition, test tubes have shown that allicin has anti-cancer activities...

Allicin is further broken down to a compound called ajoene, which may be the substance that inhibits blockage in blood vessels from clots and atherosclerosis." (University of Maryland Medical Center, 2004. www.umm.edu)

Always discuss supplementation with your healthcare provider. Do not use garlic without consulting your healthcare provider if you are taking the following medications:

Antiplatelet Medications (Indomethacin, Dipyridamole, Aspirin)

Blood-Thinning Medications (Warfarin)

Diabetes Medications (Sulfonylureas, Chlorpropamide, Glimepiride, Glyburide)

Protease Inhibitors (Indinavir, Ritonavir, Saquinavir)

Statins (Atorvastatin, Pravastatin, Lovastatin)

ACE Inhibitors (Enalapril, Captopril, Lisinopril)

Supporting Research:

Ackermann RT, Mulrow CD, Ramirez G, Gardner CD, Morbidoni L, Lawrence VA. Garlic shows promise for improving some cardiovascular risk factors. *Arch Intern Med.* 2001;161:813-824.

Apitz-Castro R, Escalante J, Vargas R, et al. Ajoene, the antiplatelet principle of garlic, synergistically potentiates the antiaggregatory action of prostacyclin,

- forskolin, indomethacin, and dipyridamole on human platelets. *Thromb Res.* 1986;42(3):303-311.
- Bailey C, Day C. Traditional plants medicine as treatments for diabetes. *Diabetes Care.* 1989;12:553-564.
- Berthold HK, Sudhop T. Galic preparation for prevention of atherosclerosis. *Curr Opin Lipidol.* 1998;9(6):565-569.
- Berthold HK, Sudhop T, von Bergmann K. Effect of a garlic oil preparation on serum lipoproteins and cholesterol metabolism. *JAMA.* 1998;279.
- Caron MF, White CM. Evaluation of the antihyperlipidemic properties of dietary supplements. *Pharmacotherapy.* 2001;21(4):481-487.
- Fleischauer AT, Arab L. Garlic and cancer: a critical review of the epidemiologic literature. *J Nutr.* 2001;131:1032S-1040S.
- Fugh-Berman A. Herb-drug interactions [review]. *Lancet.* 2000;355:134-138.
- Fugh-Berman A. Herbs and dietary supplements in the prevention and treatment of cardiovascular disease. *Prev Cardiol.* 2000;3:24-32.
- Garlic supplements can impede HIV medication. *J Am Coll Surg.* 2002;194(2):251.
- Gruenwald J, Brendler T, Jaenicke C et al, eds. *PDR for Herbal Medicines.* 2nd ed. Montvale, NJ: Medical Economics Company 2000:327-331.
- Heck AM, DeWitt BA, Lukes AL. Potential interactions between alternative therapies and warfarin. *Am J Health Syst Pharm.* 2000;57(13):1221-1227.
- Izzo AA, Ernst E. Interactions between herbal medicines and prescribed drugs: a systematic review. *Drugs.* 2001;61(15):2163-2175.
- James JS. Garlic reduces squinavir blood levels 50%; may affect other drugs. *AIDS Treat News.* 2001;375:2-3.
- Kannar D, Wattanapenpaiboon N, Savige GS, Wahlqvist ML. Hypocholesterolemic effect of an enteric coated garlic supplement. *J Am Coll Nutr.* 2001;20(3):225-231.
- Kendler BS. Recent nutritional approaches to the prevention and therapy of cardiovascular disease. *Prog Cardiovasc Nurs.* 1997;12(3):3-23.
- Koscielny J, Klubendorf D, Latza R, Schmitt R, Radtke H, Siegel G, Kiesewetter H. The antiatherosclerotic effect of *Allium sativum*. *Atherosclerosis.* 1999;144:237-249.
- Loy MH, Rivlin RS. Garlic and cardiovascular disease. *Nutr Clin Care.* 2000;3(3):146-151.

- Mashour NH, Lin GI, Frishman WH. Herbal medicine for the treatment of cardiovascular disease. *Arch Intern Med.* 1998;158:2225–2234.
- Miller LG. Herbal medicinals: selected clinical considerations focusing on known or potential drug-herb interactions [review]. *Arch Intern Med.* 1998;158:2200-2211.
- Munday JS, James KA, Fray LM, Kirkwood SW, Thompson KG. Daily supplementation with aged garlic extract, but not raw garlic, protects low density lipoprotein against in vitro oxidation. *Atherosclerosis.* 1999;143(2):399-404.
- Pinto JT, Rivlin RS. Antiproliferative effects of allium derivatives from garlic. *J Nutr.* 2001;131(3S):1058S-1060S.
- Rahman K. Historical perspective on garlic and cardiovascular disease. *J Nutr.* 2001;131(3s):977S-979S.
- Schulz V, Hansel R, Tyler V. *Rational Phytotherapy: A Physician's Guide to Herbal Medicine.* 3rd ed. Berlin, Germany: Springer-Verlag; 1998:107–123.
- Siegers CP, Steffen B, Robke A, Pentz R. The effects of garlic preparations against human tumor cell proliferation. *Phytomedicine.* 1999;6(1):7-11.
- Silagy CA, Neil AW. A meta-analysis of the effect of garlic on blood pressure. *J Hypertens* 1994;12:463-468.
- Spigelski D, Jones PJ. Efficacy of garlic supplementation in lowering serum cholesterol levels. *Nutr Rev.* 2001;59(7):236-241.
- Steiner M, Khan AH, Holbert D, Lin RI. A double-blind crossover study in moderately hypercholesterolemic men that compared the effect of aged garlic extract and placebo administration on blood lipids. *Am J Clin Nutr.* 1996;64:866–870.
- Steinmetz KA, Kushi LH, Bostick RM, Folsom AR, Potter JD. Vegetables, fruit, and colon cancer in the Iowa Women's Health Study. *Am J Epidemiol.* 1994;139(1):1-15.
- Stevinson C, Pittler MH, Ernst E. Garlic for treating hypercholesterolemia. *Ann Intern Med.* 2000;133(6):420-429.
- Stockley IH. *Drug Interactions*, 5th ed. London, England: Pharmaceutical Press; 1999:240-241.
- Superko HR, Krauss RM. Garlic powder, effect on plasma lipids, postprandial lipemia, low-density lipoprotein particle size, high-density lipoprotein subclass distribution and lipoprotein(a). *J Am Coll Cardiol.* 2000;35(2):321-326.
- Wang HX, NG TB. Natural products with hypoglycemic, hypotensive, hypocholesterolemic, antiatherosclerotic and antithrombotic activities. *Life Sci.* 1999;65(25):2663-2677.

Zhang XH, Lowe D, Giles P, Fell S, Connock MJ, Maslin DJ. Gender may affect the action of garlic oil on plasma cholesterol and glucose levels of normal subjects. *J Nutr.* 2001;131:1471-1478.

Grape Skin Extract

"Grape products, rich in polyphenolics, inhibits platelet aggregation, a risk factor for coronary artery diseases." (*J. Nutr.* 2002 Dec;132(12):3592-8.)

"In one animal study, a proprietary grape extract substantially reduced systolic blood pressure in healthy mice..."

Professional herbalists may also recommend grape extract for a variety of circulatory ailments (including varicose veins and chronic venous insufficiency) and other diseases related to free radical damage." (University of Maryland Medical Center, 2004. www.umm.edu)

"Researchers at Northwestern University Medical School found that a chemical found in highly concentrated levels in the skin of grapes reduces the risk for heart disease. Moderate consumption of red wine has been widely reported to reduce risk for cardiovascular disease. Some researchers have attributed this cardioprotective quality to the significant amounts of resveratrol naturally present in grape skin..."

Resveratrol protects grapes and some other plants against fungal infections. It has been shown previously to have a number of potentially beneficial properties, including anti-coagulant and anti-inflammatory. Some researchers have previously suggested that it would be beneficial to supplement people's diets with resveratrol because of its anticarcinogenic and anti-arteriosclerotic properties." (Northwestern University, 1997-12-19.)

Always discuss supplementation with your healthcare provider. Do not use grape skin extract without consulting your healthcare provider if you are taking the following medications:

**Antiplatelet Medications (Indomethacin, Dipyridamole, Aspirin)
Blood-Thinning Medications (Warfarin)
Statins (Atorvastatin, Pravastatin, Lovastatin)**

Supporting Research:

Bagchi D, Bagchi M, Stohs SJ, et al. Free radicals and grape seed proanthocyanidin extract: importance in human health and disease prevention. *Toxicology.* 2000;148(2-3):187-197.

Blumenthal M, Riggins C. *Popular Herbs in the U.S. Market: Therapeutic Monographs.* Austin, Tex: American Botanical Council; 1997.

Chou EJ, Keevil JG, Aeschlimann S, Wiebe DA, Folts JD, Stein JH. Effect of ingestion of purple grape juice on endothelial function in patients with coronary heart disease. *Am J Cardiol.* 2001;88(5):553-555.

Ernst E, ed. *The Desktop Guide to Complementary and Alternative Medicine: An Evidence-Based Approach*. Mosby, Edinburgh; 2001:118-119.

Foster S, Tyler VE. *Tyler's Honest Herbal*. 4th ed. New York: The Haworth Herbal Press; 1999:201-203.

Freedman JE, Parker C 3rd, Li L, et al. Select flavonoids and whole juice from purple grapes inhibit platelet function and enhance nitric oxide release. *Circulation*. 2001;103(23):2792-2798.

Gruenwald J, Brendler T, Jaenicke C, scientific eds; Fleming T, chief ed. *PDR for Herbal Medicines*. Montvale, NJ: Medical Economics Company; 1998:1224.

Hung LM, Chen JK, Huang SS, Lee RS, Su MJ. Cardioprotective effect of resveratrol, a natural antioxidant derived from grapes. *Cardiovasc Res*. 2000;47(3):549-555.

Joshi SS, Kuszynski CA, Bagchi D. The cellular and molecular basis of health benefits of grape proanthocyanidin extract. *Curr Pharm Biotechnol*. 2001;2(2):187-200.

Karch SB. *The Consumer's Guide to Herbal Medicine*. Hauppauge, New York: Advanced Research Press; 1999:104-105.

Preuss HG, Wallerstedt D, Talpur N, et al. Effects of niacin-bound chromium and grape seed proanthocyanidin extract on the lipid profile of hypercholesterolemic subjects: a pilot study. *J Med*. 2000;31(5-6):227-246.

Stein JH, Keevil JG, Wiebe DA, Aeschlimann S, Folts JD. Purple grape juice improves endothelial function and reduces the susceptibility of LDL cholesterol to oxidation in patients with coronary artery disease. *Circulation*. 1999;100(10):1050-1055.

Yamakoshi J, Kataoka S, Koga T. Proanthocyanidin-rich extract from grape attenuates the development of aortic atherosclerosis in cholesterol-fed rabbits. *Atherosclerosis*. 1999;142(1):139-149.

Yamakoshi J, Saito M, Kataoka S, Kikuchi M. Safety evaluation of proanthocyanidin-rich extract. *Food Chem Toxicol*. 2002;40(5):599-607

Magnesium

"Magnesium deficiencies have been reported in heart disease patients, especially those with atherosclerosis. (Costantini, A.V. Fungalbionics Series: Etiology and Prevention of Atherosclerosis. Johann Freidrich Oberlin Verlag. Freiburg, Germany. 1998/99.) Certainly, cardiologists and electrophysiologists are sold on the benefits of magnesium in preventing sudden death due to irregular heartbeat, or arrhythmia. Although magnesium is a mineral, there do seem to be more benefits to taking it than just electricity...

Specifically because magnesium can also directly relax blood vessels, which in turn lowers blood pressure, the mineral is ideal for treating hypertension. At the very least, the water pills often prescribed in order to lower blood pressure can deplete our bodies of magnesium (Micromedex.com, under AltMeDex protocols. 10/2002.),

so it would be wise to take a magnesium supplement to offset this loss, providing that kidney function is normal." (Kaufmann, D. and Holland, David, M.D., Infectious Diabetes. 2003.)

"Magnesium is essential to heart health. This mineral is particularly important for maintaining a normal heart rhythm and is often used by physicians to treat irregular heartbeat (arrhythmia). People with congestive heart failure (CHF) are often at particular risk for developing an arrhythmia. For this reason, your doctor may determine that magnesium should be a part of the treatment of CHF...

Population based information suggests that people with low magnesium in their diet may be at greater risk for stroke. Some preliminary scientific evidence suggests that magnesium may be helpful in the treatment of a stroke or transient ischemic attack (TIA; a temporary disturbance of blood supply to an area of the brain)." (University of Maryland Medical Center, 2004. www.umm.edu)

Always discuss supplementation with your healthcare provider. Do not use magnesium without consulting your healthcare provider if you are taking the following medications:

Quinolone Antibiotics (Ciprofloxacin, Moxifloxacin)

Tetracycline Antibiotics (Tetracycline, Doxycycline, Minocycline)

Nitrofurantoin

Blood Pressure Medications, Calcium Channel Blockers

Diabetic Medications (Glipzide, Glyburide, Insulin)

Digoxin

Diuretics

Hormone Replacement Therapy

Levothyroxine

Penicillamine

Tiludronate and Alendronate

Aminoglycoside Antibiotics (Gentamicin, Tobramycin)

Amphotericin B

Corticosteroids

Antacids

Supporting Research:

Altura BM, Altura BT. New perspectives on the role of magnesium in the pathophysiology of the cardiovascular system. *Magnesium*. 1985;4(5-6):226-244.

American Diabetes Association. Magnesium supplementation in the treatment of diabetes. *Diabetes Care*. 1992;15:1065-1067.

Appel LJ. Nonpharmacologic therapies that reduce blood pressure: a fresh perspective. *Clin Cardiol*. 1999;22(Suppl. III):III1-III5.

Brouwers JR. Drug interactions with quinolone antibacterials. *Drug Saf*. 1992;7:268-281.

Chiladakis JA, Stathopoulos C, Davlouros P, Manolis AS. Intravenous magnesium sulfate versus diltiazem in paroxysmal atrial fibrillation. *Int J Cardiol.* 2001;79(2-3):287-291.

Crippa G, Sverzellati E, Girogi Pierfranceschi M, Carrara GC. Magnesium and cardiovascular drugs: interactions and therapeutic role. *Ann Ital Med Int.* 1999;14(1):40-45.

Dacey MJ. Hypomagnesemic disorders. *Crit Care Clin.* 2001;17(1):155-173.

Dyckner T. Relation of cardiovascular disease to potassium and magnesium deficiencies. *Am J Cardiol.* 1990;65(23):44K-46K.

Fox C, Ramsomair D, Carter C. Magnesium: its proven and potential clinical significance. [Review]. *South Med J.* 2001;94(12):1195-1201.

Hassan TB, Jagger C, Barnett DB. A randomised trial to investigate the efficacy of magnesium sulphate for refractory ventricular fibrillation. *Emerg Med J.* 2002;19(1):57-62.

Heyka R. Lifestyle management and prevention of hypertension. In: Rippe J, ed. *Lifestyle Medicine.* 1st ed. Malden, Mass: Blackwell Science; 1999:109-119.

Hornyak M, Voderholzer U, Hohagen F, Berger M, Riemann D. Magnesium therapy for periodic leg movements-related insomnia and restless legs syndrome: an open pilot study. *Sleep.* 1998;21(5):501-505.

Ince C, Schulman SP, Quigley JF, et al. Usefulness of magnesium sulfate in stabilizing cardiac repolarization in heart failure secondary to ischemic cardiomyopathy. *Am J Cardiol.* 2001;88(3):224-229.

ISIS-4 (Fourth International Study of Infarct Survival) Collaborative Group. ISIS-4: a randomized factorial trial assessing early oral captopril, oral mononitrate, and intravenous magnesium sulfate in 58,050 patients with suspected acute myocardial infarction. *Lancet.* 1995;345(8951):669-685.

Iso H, Stampfer MJ, Manson JE, et al. Prospective study of calcium, potassium, and magnesium intake and risk of stroke in women. *Stroke.* 1999;30:1772-1779.

Johnson S. The multifaceted and widespread pathology of magnesium deficiency. *Med Hypotheses.* 2001;56(2):163-170.

Kao WH, Folsom AR, Nieto FJ, Mo JP, Watson RL, Brancati FL. Serum and dietary magnesium and the risk for type 2 diabetes mellitus: the Atherosclerosis Risk in Communities Study. *Arch Intern Med.* 1999;159:2151-2159.

Kendler BS. Recent nutritional approaches to the prevention and therapy of cardiovascular disease. *Prog Cardiovasc Nurs.* 1997;12(3):3-23.

Kinlay S, Buckley NA. Magnesium sulfate in the treatment of ventricular arrhythmias due to digoxin toxicity. *J Toxicol Clin Toxicol.* 1995;33:55-59.

Kirschmann GJ, Kirschmann JD. *Nutrition Almanac*. 4th ed. New York: McGraw-Hill; 1996: 120-123.

Kivisto KT, Neuvonen PJ. Enhancement of absorption and effect of glipizide by magnesium hydroxide. *Clin Pharmacol Ther*. 1991;49(1):39-43.

Lambs L, Brion M, Berthon G. Metal ion-tetracycline interactions in biological fluids. Part 3. Formation of mixed-metal ternary complexes of tetracycline, oxytetracycline, doxycycline and minocycline with calcium and magnesium, and their involvement in the bioavailability of these antibiotics in blood plasma. *Agents Actions*. 1984;14: 743-750.

Lehto P, Laine K, Kivisto KT, et al. The effect of pH on the in-vitro dissolution of three second-generation sulphoylurea preparations: mechanism of antacid-sulphonylurea interaction. *J Pharm Pharmacol*. 1996;48(9):899-901.

Li RC, Lo KN, Lam JS, et al. Effects of order of magnesium exposure on the postantibiotic effect and bactericidal activity of ciprofloxacin. *J Chemother*. 1999;11(4):24324-24327.

Mersebach H, Rasmussen AK, Kirkegaard L, Feldt-Rasmussen U. Intestinal absorption of levothyroxine by antacids and laxatives: case stories and in vitro experiments. *Pharmacol Toxicol*. 1999;84(3):107-109.

Mervaala EM, Malmberg L, Teravainen TL, Laakso J, Vapaatalo H, Karppanen H. Influence of dietary salts on the cardiovascular effects of low-dose combination of ramipril and felodipine in spontaneously hypertensive rats. *Br J Pharmacol*. 1998;123(2):195-204.

Muir KW. Magnesium for neuroprotection in ischaemic stroke: rationale for use and evidence of effectiveness. *CNS Drugs*. 2001;15(12):921-930.

Muneyyirci-Delale O, Nacharaju VL, Dalloul M, Altura BM, Altura BT. Serum ionized magnesium and calcium in women after menopause: Inverse relation of estrogen with ionized magnesium. *Fertil Steril*. 1999;71:869-872.

Naggar VF, Khalil SA. Effect of magnesium trisilicate on nitrofurantoin absorption. *Clin Pharmacol Ther*. 1979;25(6):857-863.

Neuvonen PJ, Kivisto KT. Enhancement of drug absorption by antacids. An unrecognized drug interaction. *Clin Pharmacokinet*. 1994;27(2):120-128.

Neuvonen PJ. Interactions with the absorption of tetracyclines. *Drugs*. 1976;11(1):45-54.

Sacks FM, Willett WC, Smith A, Brown LB, Rosner B, Moore TJ. Effect on blood pressure of potassium, calcium, and magnesium in women with low habitual intake. *Hypertension*. 1998;31:131-138.

Seelig MS. Auto-immune complications of D-penicillamine – a possible result of zinc and magnesium depletion and of pyridoxine inactivation. *J Am Coll Nutr.* 1982;1(2):207-214.

Seelig MS. ISIS 4: clinical controversy regarding magnesium infusion, thromolytic therapy, and acute myocardial infarction. *Nutr Rev.* 1995;53(9):261-264.

Shils ME. Magnesium. In: Shils ME, Olson JA, Shike M, Ross AC, eds. *Modern Nutrition in Health and Disease.* 9th ed. Baltimore, Md: Williams & Wilkins; 1999:169–192, A127–A128.

Toraman F, Karabulut EH, Alhan HC, Dagdelen S, Tarcan S. Magnesium infusion dramatically decreases the incidence of atrial fibrillation after coronary artery bypass grafting. *Ann Thorac Surg.* 2001;72(4):1256-1261.

Tramer MR, Schneider J, Marti RA, Rifat K. Role of magnesium sulfate in postoperative analgesia. *Anesthesiology.* 1996;84(2):340-347.

Whang R, Oei TO, Watanabe A. Frequency of hypomagnesemia in hospitalized patients receiving digitalis. *Arch Intern Med.* 1985;145(4):655-656.