

INTEGRATIVE MEN'S NUTRITION

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Diet can be a powerful force for health as well as for disease in everyone, and men have specific health concerns that can be addressed through diet. This article will review some of the ways in which nutrition can impact risk and assist with treatment of diseases that are the leading causes of morbidity and mortality in men, such as cardiovascular disease (CVD) and cancers of the colon and prostate, as well as hyperlipidemia, hypogonadism, and osteoporosis. In fact, four of the leading causes of death and disease in men have clear associations with diet: heart disease, cancer, stroke, and diabetes. Alcohol is a separate concern that will not be discussed in detail in this article; however, alcohol abuse is twice as common in men as in women and is associated with several of the other leading causes of death in men: suicide, homicide, and unintentional accidents/injuries.¹

CARDIOVASCULAR DISEASE

Heart disease is the number one killer in men. This has been perhaps the most strongly investigated area of nutrition as it relates to men's health. In terms of broad dietary recommendations, the antiinflammatory diet has been shown to be cancer protective as well as cardioprotective.^{2,3} Such a diet (eg, the Mediterranean or Okinawan diets) includes low glycemic-load carbohydrates; a healthy ratio of omega-3:omega-6 fatty acids; a high amount of antioxidants in the form of a widely varied mix of fruits and vegetables; and whole, minimally processed foods and legumes, nuts, and lean proteins, especially fish.

Major cardiovascular events such as acute myocardial infarction and thrombotic stroke are due as much to inflammation and instability of arterial plaque as to the buildup of plaque itself. Inflammatory foods promote oxidative stress in the body and in arterial walls, causing endothelial dysfunction, increased risk of plaque instability, and thrombus formation and

stimulation of the sympathetic nervous system. Therefore, the mechanism of benefit from an antiinflammatory diet in relation to primary and secondary prevention of CVD is thought to be especially due to the decrease in general inflammation in the body as a result of such a diet. Antiinflammatory-type diets, specifically the Mediterranean diet, has been shown to lower inflammation levels as measured by C-reactive protein (CRP) and five other markers of inflammation in a cross-sectional study involving 2,282 people presented at the American Heart Association Scientific Sessions in 2003.⁴ Increased inflammatory markers, such as hs-CRP, have been linked to increased risk of CVD; therefore, such dietary components that lower inflammation, as measured by CRP, may be expected to lower risk for heart disease.⁵

Another important mechanism of benefit from an antiinflammatory-type diet is through decreases in postprandial elevation of blood sugar and serum lipids.⁶ In fact, associations have been found between higher risk of CVD and intake of trans-fatty acids and foods with a high glycemic index.⁷ Glycosylated proteins are proinflammatory in and of themselves.

Aside from such an antiinflammatory diet, several popular diets have been touted as lowering risk for heart disease; however, a comparison of the Atkins (very high protein and very low carbohydrate), Ornish (low fat), Zone (low carbohydrate), and Weight-Watchers (calorie restrictive) diets showed that all of these diets reduced CVD risk, but there was no significant difference between any of them.⁸

More specifically, certain foods have been associated with decreased risk of heart disease. Consumption of fish, down to as little as one fish meal per week, has been associated with decreased risk of CVD. Specifically, dietary omega-3 fatty acids are the most likely active ingredient here, as strong associations have been found between increased omega-3 intake and many CVD end points, including all coronary artery disease, fatal and nonfatal

myocardial infarction, and stroke.^{9,10} The mechanism of reduced risk from eicosapentaenoic acid and docosahexaenoic acid (EPA and DHA) specifically is thought to be due to a beneficial effect on serum lipids, an antiarrhythmic effect, antiinflammatory effect of these fatty acids, and/or antithrombotic effects. Reductions in risk with the use of EPA and DHA at treatment doses ($\geq 2,000$ mg per day) are comparable to those found with lipid-lowering pharmaceutical agents.¹¹

Recently, vitamin D deficiency has been identified as a potential risk factor for many diseases not traditionally associated with vitamin D, such as cancer and CVD. In part, this may be explained by the link between vitamin D deficiency and hypertension and diabetes; however, recent literature has implicated vitamin D as having direct effects on the cardiovascular system and has shown a relationship between low vitamin D levels and major events such as myocardial infarction and stroke. Vitamin D receptors have been found on cardiac muscle cells and on vascular smooth muscle cells, and vitamin D has been shown to affect inflammation, known to be the key process leading to such significant cardiovascular clinical events (mentioned above).¹² Furthermore, low levels of vitamin D have been shown to activate the rennin-angiotensin-aldosterone system, thereby contributing to hypertension and left ventricular hypertrophy.¹³ Vitamin D levels should be checked, as 25 hydroxy-vitamin D and supplementation, if needed, should be done with vitamin D₃ (cholecalciferol) at 1000 to 5000 IU per day. Because vitamin D is fat soluble, food sources include foods high in fats, such as cod liver oil, salmon, mackerel, tuna, eggs, and fortified breakfast cereals.

Magnesium is also an important mineral for cardiovascular health. Increasingly, men are found to have low magnesium levels, which have been found to be correlated with ventricular arrhythmias and increased risk of ischemic stroke.¹⁴

This increased risk may have been due to a higher risk of hypertension and diabetes magnesium levels are chronically low. Magnesium is found in higher levels in green, leafy vegetables, grains, nuts, milk, and meats.

Elevated levels of the amino acid homocysteine have been shown to be a strong risk factor for heart disease, stroke, and peripheral vascular disease. It is thought that homocysteine may damage arterial epithelium, predisposing the arteries to unstable plaque buildup or thrombus formation. The B vitamin folate, found especially in beans, legumes, green, leafy vegetables, and enriched grain products, directly lowers homocysteine levels and therefore decreases the associated increase in CVD risk.¹⁵

Elevated serum lipids has long been known as a strong risk factor for CVD. Hyperlipidemia treatment has also been studied extensively in terms of nutritional, nonpharmacological approaches. The most effective of these approaches include omega-3 fatty acids (EPA and DHA), red yeast rice supplements, garlic, niacin, and plant sterols and stanols. In fact, a "portfolio" diet consisting of combinations of these nutritional approaches was found to be as effective as statin therapy at lowering LDL and CRP levels in a randomized controlled trial published in the *Journal of the American Medical Association* in 2003.¹⁶

Fish oils have been shown to lower plasma triglyceride concentrations. Red yeast rice is a fermented rice product that has active ingredients that are identical to the active ingredient in the statin drug, Lovastatin. David Heber et al showed that red yeast rice lowers LDL in a randomized controlled trial.¹⁷ Doses used are generally 1,200 mg twice a day. Although side effects are less than those found with the prescription statin drugs, the use of coenzyme Q₁₀ in addition to the red yeast rice can further minimize risk of mitochondrial toxicity.

Policosanols, derived from sugar cane wax, has shown some potential to lower LDL levels, but results have been mixed. More favorable results have been found with garlic; however, the doses needed are likely to cause gastrointestinal irritation in most men. Plant sterols and stanols are found naturally in plants and are used in margarine and yogurt products because

they have been shown to lower serum cholesterol.¹⁸ They have similar chemical structure as cholesterol and compete with cholesterol for absorption, thereby lowering the amount of cholesterol absorbed from the intestines. Lastly, the B vitamin niacin has been shown to not only decrease LDL but is also one of the few supplements with evidence for raising beneficial HDL levels.¹⁹ However, the dose required (approximately three grams per day) is difficult to tolerate by most men due to flushing, pruritus, and/or nausea.

PROSTATE DISEASE

Prostate cancer is the number one solid tumor found in men and is the second leading cause of cancer death in men. There is significant overlap between what seems to be beneficial for prostate health and for cardiovascular health. Cardiovascular disease kills far more men per year; therefore, if some nutritional therapies can ameliorate risk from both prostate cancer and CVD, then such treatment should be considered highly recommended. For example, it is known that obesity is a risk factor for CVD, but a large Swedish study also found that obesity correlated with higher mortality from prostate cancer.²⁰ Even the famous ATBC trial, investigating the use of supplementary vitamin E and/or beta carotene in the prevention of lung cancer, showed that men in the highest weight categories had an increased risk of prostate cancer, by secondary analysis.²¹ Another finding that is common to both reducing CVD as well as prostate cancer risk is that intake of trans-fats and saturated fats increase risk for both.²² Lastly, intake of omega-3 fatty acids and increased intake of fruits and vegetables, as well as increased exercise, have all been associated not only with lower CVD risk but also lower risk of prostate cancer.

Evidence exists to suggest a role for certain micronutrients, such as zinc, selenium, vitamin E, lycopene, phytoestrogens, and phytosterols, in the risk of prostate disease in general.²³ In terms of prostate cancer prevention specifically, many dietary supplements have been studied for their efficacy at prevention. Selenium and vitamin E supplementation had been thought to be useful for prevention of prostate cancer based on epidemiologic data and secondary analyses of clinical

trials. However, in the SELECT trial, a randomized controlled trial involving over 35,000 men, selenium and vitamin E had no effect on prevention of the disease.²⁴

Lycopene, a carotenoid found in red-colored fruits and vegetables such as tomatoes and watermelon, has been shown to be protective against prostate cancer in some studies and to have had no effect in other studies. More definitively, eating a variety of fruits and vegetables (not only those with lycopene) has also been associated with reduced risk of prostate cancer.²⁵ Pomegranate use is still being studied as a treatment for prostate cancer, having been shown to slow the rate of prostate-specific antigen (PSA) rise.²⁶

A link between high intake of calcium and prostate cancer has been suggested by many studies. The health professionals follow-up study showed that men who had higher intakes of dairy products were three times as likely to develop metastatic prostate cancer as men with lower intake of dairy products. Analysis separated out contribution from milk fat and focused on calcium levels as the risky constituent.²⁷ Another study looked at data from the National Health and Nutrition Examination Survey and found a correlation between high levels of total calcium and risk of fatal prostate cancer.²⁸ One meta-analysis confirmed these risks, looking at 12 trials that investigated this link between calcium or dairy intake and prostate cancer risk. The analysis showed a relative risk of 1.11 (95% confidence interval, 1.0-1.22) for men with the highest dairy intake and a relative risk of 1.39 (95% confidence interval, 1.09-1.77) for men with the highest levels of calcium intake.²⁹

The role of omega-3 polyunsaturated fatty acids in prostate cancer prevention is unclear. Although EPA and DHA may be protective, the fatty acid alpha-linolenic acid, found in flaxseed oil, has been correlated with increased risk of the disease in some studies. No firm conclusion has been reached as it relates to alpha-linolenic acid and prostate cancer.³⁰ Lastly, green tea has been found to be protective against the development of prostate cancer with intake of several cups per day.³¹

Increased soy intake may be associated with lower risk of prostate cancer and of benign prostatic hypertrophy (BPH) based on epidemiologic studies. Asian men, who

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