Walnuts, Fish Oil, and Coronary Heart Disease

Current dietary advice for preventing cardiovascular disease urges people to eat nuts. Walnuts, like other nuts, contain the amino acid L-arginine, a substrate for endothelium-derived NO (nitric oxide). In addition, the walnut has the highest content of vitamin E in the form gamma-tocopherol. Walnuts are also the richest nut source of plant omega-3 fatty acids. Does that mean that people can eat walnuts instead of fish to get omega-3 benefits?

It turns out that plant omega-3, found in walnuts, and marine omega-3, found in fish, produce different effects on blood lipids associated with cardiovascular disease, according to a small 2008 study conducted by researchers at Loma Linda University. In this randomized crossover feeding trial, 25 normal to mildly hyperlipidemic adults followed one of three isoenergetic diets (30% total fat and <10% saturated fat) for four weeks: a walnut diet (42.5 g walnuts/10.1 mJ), a fish diet (113 g salmon, twice/wk), or a control diet (no nuts or fish). Researchers analyzed fasting blood samples at baseline and at the end of each four-week diet period for serum lipids. The fish diet lowered serum triglyceride levels the most: 1.0 ± 0.11 mmol/L, compared with the walnut diet (1.11 ± 0.11 mmol/L) and the control diet (1.12 ± 0.11 mmol/L; P<0.05). Also, the fish diet increased beneficial HDL-cholesterol concentration: 1.23 ± 0.05 mmol/L, compared with the control diet (1.19 ± 0.05 mmol/L) and the walnut diet (1.18 ± 0.05 mmol/L P<0.001). In contrast, the walnut diet had a greater effect on total cholesterol than the fish or the control diets: 4.87 ± 0.18 mmol/L compared to control (5.14 ± 0.18 mmol/L) and fish (5.33 ± 0.18; P<0.0001). The walnut diet also lowered “bad” LDL-cholesterol concentrations: 2.77 ± 0.15 mmol/L compared with the control (3.06 ± 0.15 mmol/L), and fish (3.2 ± 0.15 mmol/L; P<0.0001). “The ratios of total cholesterol:HDL-cholesterol, LDL cholesterol:HDL cholesterol, and apolipoprotein B:apolipoprotein A-I were lower (P<0.05) in those who followed the walnut diet compared with those who followed the control and fish diets,” say the authors. From this study, it looks as if both walnuts and fish have a place in the cardioprotective diet. This study does not, however, test for a combined effect of the two foods, nor does it look for difference in gender response to the foods.

Serum lipid values are not the only effect produced by walnut consumption. Researchers in Spain performed a randomized crossover study involving 21 hypercholesterolemic men and women that looked at the effect of walnuts on endothelial function. Coronary endothelial dysfunction is considered a predictor of heart attacks. In their article, the researchers state that “[x]ascular reactivity may be improved by dietary factors such as marine n-3 fatty acids, antioxidants, and L-arginine, but whole foods rich in these compounds have not been investigated.” For four weeks, participants ate a cholesterol-lowering Mediterranean diet. For the next four weeks, they ate a diet of similar energy and fat content in which walnuts replaced about 32% of the energy from monounsaturated fat (8 to 13 walnuts per day). At the end of each four-week period, researchers took fasting blood samples and performed ultrasound measurements of brachial artery vasomotor function to assess endothelial function. (Only eighteen subjects completing the protocol had suitable ultrasound studies.) “Endothelium-independent vasodilation and levels of intercellular adhesion molecule-1, C-reactive protein, homocysteine, and oxidation biomarkers were similar after each diet.” The walnut diet, however, produced “improved endothelium-dependent vasodilation and reduced levels of vascular cell adhesion molecule-1.”

