

Fish Oils and Atherosclerosis

Summaries of the latest research concerning fish oils and atherosclerosis

Omega-3 fatty acids may reduce mortality from heart disease

BASEL, SWITZERLAND. Hyperlipidemia, or excess levels of fats in the blood, is associated with increased risk of cardiovascular disease. Many lipid-lowering agents exist for both primary and secondary prevention of cardiovascular disease. To determine the overall benefit of these agents on mortality, a group of researchers at the University Hospital Basel reviewed the most reliable published studies. They searched for good-quality randomized, controlled trials between 1965 and 2003, comparing lipid-lowering drugs or dietary interventions against placebo. This process left them with 35 trials on statins, 17 on fibrates, 8 on resins, 2 on niacin, 14 on omega-3 fatty acids, and 17 on other dietary interventions. This produced a total of 137,140 participants in treatment groups and 138,976 in control groups. A combined analysis showed that treatment with omega-3 fatty acids (fish and flaxseed oils) reduced overall risk of death by 23 per cent as compared to placebo. Treatment with statin drugs, on the other hand, only reduced overall mortality by 13 per cent as compared to placebo. Fibrates (gemfibrozil, fenofibrates), bile acid resins (cholestyramine, colestipol), niacin and dietary interventions showed no statistically significant differences from results obtained in the control groups. Deaths from cardiovascular causes were 32 per cent lower in the omega-3 fatty acid groups than in control (placebo) groups. Statin drugs reduced cardiovascular mortality by 22 per cent and the use of bile acid resins were associated with a 30 per cent decline in cardiovascular mortality. When death from non-cardiovascular causes was considered, none of the interventions were significantly linked to reduced mortality. However, fibrates were linked to a 13 per cent increased risk of death. The effects on mortality tended to be more pronounced in longer studies and those with patients whose cardiovascular disease was well established, say the authors. Regarding n-3 fatty acids, they speculate that the reduction in mortality risk does not occur through a reduction in cholesterol but by other means, possibly antiarrhythmic, antithrombotic or anti-inflammatory effects. The trials of n-3 fatty acids used different dietary and supplement sources; nevertheless, the authors conclude that this study adds to the positive evidence for n-3 fatty acids. They suggest that further trials be carried out to examine the effects of combined treatment with n-3 fatty acids and statins. *Studer, M., et al. Effect of different antilipidemic agents and diets on mortality. Archives of Internal Medicine, Vol. 165, April 2005, pp. 725-30/*

Fish oils recommended for heart disease prevention

DALLAS, TEXAS. The American Heart Association has reviewed the benefits of regular consumption of fish and fish oils. The review concludes that fish and fish oils help prevent cardiovascular disease including fatal and non-fatal heart attacks, strokes, sudden cardiac death, and coronary artery disease (angina). The reviewers believe that the mechanisms by which fish oils exert their protective effect include: * Reduction in susceptibility to ventricular arrhythmia * Decrease in platelet aggregation * Reduction in triglyceride levels * Retardation of atherosclerosis * Lowering of blood pressure * Promotion of nitric oxide induced endothelial relaxation * Anti-inflammatory effects. Fish and fish oils contain long-chain polyunsaturated omega-3 fatty acids, more specifically, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). The average American diet contains only about 100-200 mg/day of EPA and DHA. The diet also contains about 1.4 grams/day of alpha-linolenic acid mainly from canola and soybean oils. Alpha-linolenic acid can be converted in the body to EPA and DHA, but not in amounts sufficient to make a significant impact. Some studies have shown that alpha-linolenic acid, on its own, may have heart-protective effects, but other studies have failed to confirm this. NOTE: Flax seed oil is a

particularly rich source of alpha-linolenic acid. The American Heart Association recommends that people increase their intake of long-chain polyunsaturated omega-3 oils from fish or directly from fish oil supplements. Healthy people should consume oily fish at least twice a week. Patients with heart disease should eat enough oily fish on a daily basis to obtain about 1 gram per day of EPA and DHA combined or take a fish oil supplement providing 1 gram per day of EPA + DHA. Patients with high triglyceride levels should receive 2-4 grams/day of EPA+DHA under the care of a physician. The reviewers point out that many fish species contain significant amounts of methylmercury, polychlorinated biphenyls (PCBs), dioxins, and other environmental contaminants and therefore must be consumed in moderation, if at all, especially by children and pregnant and lactating women. Poorer quality fish oils may also contain these contaminants, so it is important to only supplement with highly purified, pharmaceutical grade oils. *Kris-Etherton, PM, et al. Fish consumption, fish oil, omega-3 fatty acids, and cardiovascular disease. Circulation, Vol. 106, November 19, 2002, pp. 2747-57/*

Fish oils benefit the heart

SOUTHAMPTON, UNITED KINGDOM. It is well established that populations with a high consumption of oily fish have a lower incidence of heart disease and several studies have confirmed that fish oils (eicosapentaenoic acid [EPA] and docosahexaenoic acid [DHA]) are the protective components. There is also impressive evidence that they help prevent atherosclerosis, lower blood pressure, reduce triglyceride levels, and are highly protective against both fatal and non-fatal heart attacks. Fish oils also have antiarrhythmic effects and help prevent blood clotting. Recent research concludes that perhaps the most important effect of fish oils, when it comes to preventing cardiovascular disease, is their ability to stabilize atherosclerotic plaque by reducing the infiltration of inflammatory and immune cells (lymphocytes and macrophages) into the plaque. Heart attacks are now believed to involve the rupture of an atherosclerotic plaque. These plaques come in two main varieties, those with a thin, unstable fibrous cap and those with a thick, stable fibrous cap. A recent study showed that supplementation with 1.4 grams/day of fish oil significantly reduced macrophage infiltration and resulted in a substantial shift towards a preponderance of stable, thick-capped plaques. At least two studies have shown that the beneficial effects of fish oils on heart health become clear after about 2 months. *Calder, Philip C. New evidence in support of the cardiovascular benefit of long-chain n-3 fatty acids. Italian Heart Journal, Vol. 4, July 2003, pp. 427-29 /*

Fish oils help prevent stroke and heart attacks

SOUTHAMPTON, UNITED KINGDOM. Atherosclerosis increases the risk of stroke and heart attack because part of the atherosclerotic buildup (plaque) on the inner wall of arteries may dislodge and block smaller arteries in the brain and heart respectively and thus cut off the vital supply of oxygenated blood. Depending on its tendency to break loose from the artery wall plaque is classified as either stable or unstable with the stable form being the least likely to cause problems. Researchers at the University of Southampton have just completed a clinical trial to see if fish oil supplementation would improve plaque stability and thus help prevent heart attack and stroke. Their study involved 162 patients who were awaiting carotid endarterectomy (an operation involving the removal of atherosclerotic deposits from the carotid artery feeding the brain). The patients were randomly allocated to receive a placebo, fish oil (omega-3 polyunsaturated fatty acid) or sunflower oil (omega-6 polyunsaturated fatty acid) daily from the time they entered the study until the endarterectomy during which atherosclerotic plaque was removed for analysis. The placebo capsules contained an 80:20 blend of palm and soybean oils (a composition which closely matches that of the average UK diet); the sunflower oil capsules contained 1 gram of sunflower oil plus 1 mg of vitamin E (alpha-tocopherol); the fish oil capsules contained 1 gram of fish oil and 1 mg of vitamin E. The participants took 6 capsules daily providing a total to 3.6 grams linoleic acid (in the sunflower oil capsules) or 850 mg EPA (eicosapentaenoic acid) + 500 mg of DHA (docosahexaenoic acid) in the fish oil capsules. The

duration of supplementation varied between 7 and 189 days with the median being 42 days. Upon analysis of the removed plaque the researchers found that the supplemented fish oil (EPA and DHA) had been readily incorporated into the plaques and had resulted in favourable changes. Plaque from fish oil treated patients tended to have thick fibrous caps and no signs of inflammation indicating more stability. Plaques from the control and sunflower oil groups, on the other hand, tended to have thin fibrous caps and signs of inflammation indicating less stability. The number of macrophages (large scavenger cells) in the plaque of fish oil treated patients was also significantly less than the number observed in the control and sunflower oil groups. The researchers conclude that the increased plaque stability observed in the fish oil treated patients could explain the reduction in fatal and non-fatal heart attacks and strokes associated with an increased intake of fish oils. *Thies, Frank, et al. Association of n-3 polyunsaturated fatty acids with stability of atherosclerotic plaques: a randomised controlled trial. The Lancet, Vol. 361, February 8, 2003, pp. 477-85/*

Older people benefit from fish oils

SEATTLE, WASHINGTON. There is abundant evidence that a diet rich in fatty fish is highly protective against death from heart disease in people 65 years of age and younger. Now researchers at the University of Washington and the Fred Hutchinson Cancer Research Center have extended the evidence to include people with an average age of 78 years. Their study included 54 men and women who had suffered a fatal heart attack or other fatal ischemic heart disease event, 125 people who had suffered a non-fatal heart attack, and 179 matched controls. All study subjects had blood samples drawn about 2 years prior to the cardiovascular event. The phospholipid phase of the blood plasma was isolated and analyzed for its contents of the fatty acids eicosapentaenoic acid (EPA), docosahexaenoic acid (DHA), alpha-linolenic acid (ALA), and linoleic acid (LA). EPA and DHA are the main constituents of fish oil, ALA is found in canola, flax and soybean oils, and LA is a main constituent of safflower and cottonseed oils. The researchers found that subjects with a high phospholipid content of EPA + DHA had a 70% lower incidence of fatal heart disease than did those with a lower level (4.1% versus 3.3% of total fatty acids). Participants with a high level of ALA had a 50% reduced risk of fatal heart disease. Subjects with a high level of LA, on the other hand, had a 2.4 times higher incidence of fatal heart disease than did those with a lower level. There was no association between the levels of the fatty acids and the incidence of non-fatal heart attacks. The researchers ascribe this to the fact that EPA and DHA (and perhaps ALA) are known to prevent ventricular arrhythmias ? the main factor in sudden cardiac death. Ventricular arrhythmias are not involved in non-fatal heart attacks. The researchers conclude that their findings lend further support to the recommendation from the American Heart Association to consume 2 fish meals (preferably fatty fish) per week. Dr. William Harris of the University of Missouri, in commenting on the results, suggests that a combined daily intake of 1 gram of EPA + DHA is both safe and prudent, but that supplementation with fish oil capsules may be required to achieve this goal. *Lemaitre, RN, et al. n-3 polyunsaturated fatty acids, fatal ischemic heart disease, and nonfatal myocardial infarction in older adults: the Cardiovascular Health Study. American Journal of Clinical Nutrition, Vol. 77, February 2003, pp. 319-25 Harris, WS. n-3 long-chain polyunsaturated fatty acids reduce risk of coronary heart disease death: extending the evidence to the elderly. American Journal of Clinical Nutrition, Vol. 77, February 2003, pp. 279-80 (editorial)/*

Fish oils and heart disease

AALBORG, DENMARK. It is increasingly clear that atherosclerosis is, at least partially, an inflammatory disease. There is also growing evidence that high blood levels of C-reactive protein (CRP) are associated with an increased risk of coronary heart disease and heart attacks. Danish researchers now report a direct correlation between CRP levels and severity of atherosclerosis. They also suggest that CRP levels can be kept in check by frequent consumption of fish or fish oils. Their study involved 269 patients referred for angiography because of suspected coronary

artery disease. Besides undergoing angiography the patients had their CRP levels measured and were also tested for the level of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) in their granulocytes (a type of white blood cell). They also filled out a questionnaire about their fish consumption. The researchers found that patients with one or more coronary arteries blocked by 50 per cent or more had significantly higher CRP levels in their blood than had patients with no significant blockages. They also observed an inverse correlation between CRP levels and the level of DHA in granulocytes. The level of DHA in granulocytes, in turn, was closely related to fish consumption. The researchers conclude that DHA has an anti-inflammatory effect which results in lower CRP levels and suggest that fish consumption may decrease the risk of coronary artery disease. *Madsen, Trine, et al. C-reactive protein, dietary n-3 fatty acids, and the extent of coronary artery disease. American Journal of Cardiology, Vol. 88, November 15, 2001, pp. 1139-42/*

Bypass patients may benefit from fish oils

MUNICH, GERMANY. There is considerable evidence that supplementation with fish oils helps prevent or slow down atherosclerosis. Some studies have shown that fish oil supplementation may help prevent restenosis (reclosing) of the arteries after angioplasty, but more recent studies have found no such effect. A recent study found that coronary bypass patients who supplemented their diet with 4 grams/day of an 83% fish oil concentrate had less reclosings (distal anastomosis occlusions) of their bypass grafts than did the controls. After one year the patients taking fish oils had a reclosing (occlusion) rate of 27% while the control patients had a reclosing rate of 33% (a 23% relative improvement). Eating fatty fish once or more each week or supplementing with fish oils (0.5 g/day) has been found to increase the survival of heart attack patients by 29%. A recent experiment showed that cardiac transplant patients who supplemented with 5 grams/day of fish oils after their operation had normal endothelium-dependent coronary vasodilation when tested after three weeks whereas it was abnormal in matched control patients. It is not known whether fish oil supplementation will increase the survival time for heart transplant patients. [34 references] *von Schacky, Clemens. n-3 fatty acids and the prevention of coronary atherosclerosis. American Journal of Clinical Nutrition, Vol. 71 (suppl), January 2000, pp. S224-27S/*

Fish oils reverse atherosclerosis

MUNICH, GERMANY. German medical researchers have just released the results of a major study which proves that fish oil supplementation is highly beneficial to patients suffering from atherosclerosis. Their randomized, double-blind, placebo-controlled clinical trial involved 162 patients with confirmed atherosclerosis. Half the patients were given six grams of fish oils per day for three months while the other half were given six grams per day of placebo capsules containing a fatty acid composition resembling that of the average European diet. After three months the dosages were reduced to three grams/day for a further 21 months. Angiograms were taken at the start of the trial and at the end of the two-year study period. At the end of the treatment twice as many of the patients in the fish oil group (16) showed regression of their atherosclerotic deposits when compared to the placebo group. Three patients in the placebo group suffered a non-fatal heart attack during the 2-year period as compared to only one in the fish oil group. All told there were seven patients in the placebo group who had a cardiovascular event (heart attack or stroke) as compared to only two in the fish oil group. The researchers conclude that fish oil supplementation is beneficial for atherosclerosis patients and is safe and well-tolerated. NOTE: This study was partially funded by Pronova A.S., a Norwegian fish oil producer. *von Schacky, Clemens, et al. The effect of dietary omega-3 fatty acids on coronary atherosclerosis. Annals of Internal Medicine, Vol. 130, April 6, 1999, pp. 554-62/*

Garlic and fish oils lower cholesterol

GUELPH, CANADA. Elevated levels of total cholesterol and low-density-lipoprotein (LDL) cholesterol are well established risk factors for coronary heart disease. It is also clear that people with accompanying high levels of triglycerides (triacylglycerol) face an even higher risk of heart disease. Very recent work has shown that high triglyceride levels alone are powerful risk factors for atherosclerosis and heart disease especially among women. Supplementation with garlic has been shown to lower overall cholesterol levels and LDL levels significantly while fish oil supplementation is known to lower triglyceride levels. Unfortunately, fish oil supplementation has also been found to increase LDL levels, a highly undesirable effect. Now researchers at the University of Guelph report that a combination of garlic and fish oil is highly effective in lowering the levels of total cholesterol, LDL cholesterol, and triglycerides. Their study involved 50 men with a total cholesterol level in excess of 5.2 mmol/L (200 mg/dL). The men were randomly allocated into four groups for the 12-week long experiment. Group 1 was given a daily supplement of 900 mg garlic placebo and 12 g oil placebo, Group 2 took 900 mg garlic (Kwai) and 12 g oil placebo, Group 3 took 900 mg garlic placebo and 12 g fish oil [12 1-gram capsules each containing 180 mg EPA (eicosapentaenoic acid) and 120 mg DHA (docosahexaenoic acid)] while Group 4 took 900 mg garlic and 12 g fish oil per day. All supplements were taken in three divided doses with meals. At the end of the 12-week study period significant reductions were observed for total cholesterol (12.2 per cent), LDL cholesterol (9.5 per cent), and triacylglycerol (34.3 per cent) in the group taking both garlic and fish oil supplements. A significant, reduction (beneficial) in the ratios of total cholesterol to high-density-lipoprotein (HDL) cholesterol and LDL to HDL was also observed for both the garlic groups (with and without fish oil). Garlic by itself did not lower triglyceride concentrations while fish oils by themselves actually increased LDL concentrations significantly (by 8.5 per cent). The researchers conclude that supplementing with garlic pills and fish oils in combination is effective in lowering blood levels of total cholesterol, LDL cholesterol, and triglycerides while at the same time providing a beneficial decrease in the ratios of total cholesterol to HDL cholesterol and in LDL to HDL cholesterol. *Adler, Adam J. and Holub, Bruce J. Effect of garlic and fish-oil supplementation on serum lipid and lipoprotein concentrations in hypercholesterolemic men. American Journal of Clinical Nutrition, Vol. 65, February 1997, pp. 445-50* *Kris-Etherton, Penny M., et al. Efficacy of multiple dietary therapies in reducing cardiovascular disease risk factors. American Journal of Clinical Nutrition, Vol. 65, February 1997, pp. 560-1 (editorial)/*

Fish oils fight atherosclerosis

COPENHAGEN, DENMARK. Medical doctors at two Copenhagen hospitals have confirmed that regular consumption of fish prevents narrowing of the arteries due to atherosclerosis. The doctors performed 40 autopsies and determined that the degree of atherosclerosis present in the coronary arteries was inversely proportional to the amount of docosahexaenoic acid found in the adipose (fatty) tissue. They conclude that fish consumption reduces the risk of coronary heart disease. *Seidelin, Kaj N., et al. n-3 fatty acids in adipose tissue and coronary artery disease are inversely related. American Journal of Clinical Nutrition, Vol. 55, June 1992, pp. 1117-19/*

Fish oil supplementation and risk of atherosclerosis

KANSAS CITY, KANSAS. Short-term trials have concluded that fish oil supplementation has a favourable effect on several risk factors for atherosclerosis. Researchers at the University of Kansas Medical Center report the results of a 6-month study designed to determine the effect of fish oil supplementation at various dosages on cholesterol levels, triglyceride levels, bleeding time, and blood (plasma phospholipids) levels of fatty acids. The trial involved 28 patients who had high (average 275 mg/dL) cholesterol levels and high (average 337 mg/dL) triglyceride levels. The patients were randomly assigned to receive 3, 6, 9 or 12 fish oil capsules daily for six months. Three capsules provided 1.25 grams of long-chain (20-22 carbon) omega-3 fatty acids.

All trial variables were measured twice before supplementation began and then at the end of 1, 5, and 6 months of supplementation as well as after one month of washout at the conclusion of the trial. There was no statistically significant changes in total cholesterol level among any of the groups. Triglyceride levels decreased by an overall 30% with higher fish oil intakes providing greater decreases. Low-density cholesterol (LDL) levels and high-density cholesterol (HDL) levels both increased by an overall 7% during the six-month supplementation period thus maintaining the important LDL/HDL ratio. There was no clear overall correlation between fish oil doses and bleeding time, but patients taking 6 or 12 capsules did appear to have significantly longer bleeding times. Both linoleic and arachidonic acid levels in phospholipids were reduced by all doses of fish oil. Levels of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) rose significantly as dosages increased. All measured variables tended to converge towards baseline values after the final one-month washout period. The researchers conclude that fish oil supplementation produces physiologically important changes which may lower the risk of cardiovascular disease. NOTE: This study was supported in part by Warner-Lambert a manufacturer of pharmaceuticals. / Harris, William S., et al. Effects of four doses of n-3 fatty acids given to hyperlipidemic patients for six months. *Journal of the American College of Nutrition*, Vol. 10, No. 3, 1991, pp. 220-27 / Coromega *Additional References* 1. Singer, P., et al. Clinical studies on lipid and blood pressure lowering effect of eicosapentaenoic acid- rich diet. **Biomed Biochim Acta**, Vol. 43 (8-9), 1984, pp. S421-25 *Conclusion:* A diet rich in mackerel reduces risk factors for atherosclerosis. *OILOFPISCES.COM* *INTERNATIONAL HEALTH NEWS* Copyright © 2006 by Hans R. Larsen Oilofpisces.com does not provide medical advice. Do not attempt self-diagnosis or self-medication based on our reports.

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