Beyond Statins: Nutrition Strategies to Get Your Cholesterol to Your Goal*
Karen Ross MA RD

Functional Foods or Nutraceuticals are defined by The American Dietetic Association (now known as the Academy of Nutrition and Dietetics) as “whole, fortified, enriched, or enhanced foods that have a potentially beneficial effect on health when consumed as part of a varied diet on a regular basis, at effective levels”.

Plant Sterols and Stanols
Plant sterols and stanols are known as phytoesters and are natural components of plants. They include vegetable oils and nuts. Plant sterols have chemical structures similar to cholesterol with the differences being in their side chains. (Cholesterol is more absorbed than plant sterols) Plant stanols are produced by the hydrogenation of plant sterols. (Plant stanols are virtually not absorbed in the intestine) Esterification of plant sterols and stanols increases their solubility in foods. Once in the small intestine, esters are readily cleaved by esterases to yield free sterol or stanol.

Both plant sterols and stanols compete with the absorption of dietary and biliary cholesterol in the intestinal lumen. By competing with cholesterol and replacing it in the mixed micelles, sterols and stanols reduce cholesterol absorption. Studies have shown that a minimum amount of 800 to 1000 mg/day of esterified forms of plant stanols or sterols must be added to the diet to produce a significant reduction in cholesterol absorption and LDL levels. (Delivering less cholesterol to the liver leads to increased cholesterol synthesis and increased LDL receptor activity which results in a reduction of serum LDL cholesterol). The AHA (American Heart Association) and ADA (American Diabetes Association) recommend a level of 2 grams/day of sterols or stanols as adjuncts to LDL cholesterol lowering strategies for CVD risk reduction. This is higher than the 800 mg/day that the FDA (Food and Drug Administration) says is permissible in its health claim.

There are 2 cholesterol lowering spreads on the market that have either plant stanols or sterol esters. Both come in regular or light spreads, and can also be used in place of butter or margarine in baking, cooking and frying. All products begin to work after 2 weeks of consuming 2 to 3 servings a day with meals. 1) Benecol has plant stanol esters (www.benecol.com). Benecol also has yoghurt drinks that contain the recommended daily intake. Plant stanols are practically unabsorbed and are efficiently excreted from the body. 2) Take Control has plant sterol esters (www.takecontrol.com).

Soluble Fiber
Dietary fiber is composed of both soluble fiber (viscous fiber) and insoluble fiber such as the cellulose and hemicellulose containing products such as wheat. (Insoluble fiber does not significantly affect cholesterol levels.) Soluble fiber has been shown to reduce LDL cholesterol by modest amounts ranging from 3% to 10%. The viscous component of the soluble fiber is believed to interfere with dietary absorption of both cholesterol and fat. Some of the other mechanisms of action of soluble fiber include enhanced gastric
emptying, altered transit time, and increased excretion of bile acids. Bile acids are made from cholesterol so when the body has to use more of its cholesterol to help replace the eliminated bile acids, there is less cholesterol in the blood. A soluble fiber rich diet can also reduce cholesterol levels by substituting low fat foods high in soluble fiber for dietary sources of saturated fat and cholesterol.

Soluble fiber is found in fruits and vegetables including legumes, beans, and some grains such as oat bran, oatmeal, and barley, and in several functional foods such as psyllium, partially hydrolyzed guar gum, fenugreek, flaxseed, and pectins. They all have a mild hypocholesterolemic effect. It is recommended for those at risk for CHD increase their intake of dietary fiber to reduce cholesterol and postprandial glucose absorption. 10 to 25 grams of soluble fiber is recommended per day by increasing fresh fruits and vegetables, and whole grains.

To increase fiber in the diet: Choose fresh fruits instead of canned fruits or juices. Leave the edible skins on fruits and vegetables. Choose raw vegetables and fresh fruits as snacks. Have a salad every day. Choose whole grain breads. Use brown rice instead of white rice. Use whole grain flours for baking. Use oat bran in cooking and baking. Eat foods in their most naturally occurring state.

Soy Protein
The beneficial effects of soy protein intake on CV risk have been described for years. After a number of animal and human studies, it has been concluded that isoflavones in soy do not act alone, but work in concert with other components in soy or with soy protein to reduce cholesterol. In 1999, the FDA authorized food labeling regarding soy protein and CHD, because clinically significant reductions of total and LDL cholesterol levels have been seen in people who ingest 25 grams of soy protein per day -- as a substitute for animal protein, and included as part of a diet low in saturated fat and cholesterol. For foods to bear this claim, they must have 6.25 grams of soy protein per serving, contain less than 3 grams of fat with less than 1 gram of saturated fat, and have less than 20 mg of cholesterol.

Soy products include tofu, edamame (green soybeans), soy milk, miso, and tempeh. Many other functional foods containing soy protein include soy-based breakfast cereals, meat analogues, and meal-replacement bars. For more information, go to www.soybean.org.

N-3 Fatty Acids
There is increasing evidence that n-3 polyunsaturated fatty acids (N-3 PUFA) play an important role in primary and secondary prevention of CHD. N-3 PUFAs include both marine-derived eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), and plant derived alpha-linolenic acid (ALA). EPA and DHA are found in high concentrations in fish oil primarily from fatty, cold-water fish such as salmon, mackerel, sardines, herring, and trout, or dietary supplements. EPA and DHA appear to have multiple cardioprotective mechanisms of action including reducing TG (triglyceride)
levels, decreasing platelet adhesion, decreasing vasoconstriction, reducing inflammation, and decreasing ventricular arrhythmias. ALA is found in plant sources such as flax, canola, walnuts, and soy products. The protective effects of ALA are less clear.

Fish should be baked, broiled, or sautéed, and eaten at least twice weekly. People with heart disease are advised to get twice as much. Commercially prepared fish such as fish sticks should be avoided due to low n-3 PUFA content and trans fatty acids. For those who do not eat fish, dietary supplements are an attractive option. Most fish oil supplements provide 180 mg of EPA and 120 mg of DHA per 1000 mg capsule though you need to check the label. Those with CHD typically need three fish oils capsules to meet the AHA recommendations. There are no specific recommendations for ALA and CHD prevention though 1.5 to 3.0 grams /day may be helpful. Replace low ALA oils such as corn and safflower oil with canola, soybean, or flaxseed oil. Consider using ground flaxseed, flaxseed oil, or walnuts, but we aware that these are high in calories.

Nuts
Nuts have lipid lowering effects. Almonds, hazelnuts, pecans, pistachio nuts, and walnuts have been found to modestly reduce serum cholesterol. Peanuts have been shown to be cardioprotective. Nuts are a rich source of fiber, vitamin E, magnesium, and both poly and monounsaturated fats. Their effectiveness comes from replacing saturated fats and carbohydrates with monounsaturated fats. This positive effect on serum cholesterol may also come from the increased intake of ALA (walnuts are a good source), the high arginine content (precursor to nitric oxide), and the antithrombotic and the antioxidant effects of nuts. Nuts also can reduce insulin resistance which is helpful to those who have diabetes.

You can eat up to 1 to 2 ounces of nuts a day to replace other sources of energy but it is best to use unsalted, roasted, or raw nuts. Nuts are high in calories, but in the appropriate quantity (¼ cup or less), they can be a very satisfying snack.

Being Practical with Functional Foods
Each of these food categories reduces cardiovascular risk factors, but a prudent approach is to combine smaller amounts of a wide variety of functional foods (because this mimics typical eating patterns) while also achieving or maintaining a reasonable body weight. Following a traditional Mediterranean diet (a diet low in saturated fat, high in monounsaturated fats from nuts and olive oil, and high in fiber from fruits and vegetables) utilizes many of these functional foods. Research has shown that eating a combination of functional foods can reduce LDL cholesterol levels, and, therefore, can be expected to reduce CHD risk.