



TRACK YOUR PLAQUE SPECIAL REPORT



Unique nutritional strategies to reduce cholesterol naturally

Tired of the media onslaught promoting statin drugs? What happened to a conversation about nutritional strategies that reduce cholesterol?

There are indeed ways to significantly reduce cholesterol using common foods and nutritional supplements. Reductions in LDL cholesterol of 25, 30, 50, even 100 mg/dl are possible—if you know what and how. Here's the Track Your Plaque guide to natural strategies to reduce LDL that supplement, sometimes replace, your need for prescription medication.

In an age when statins dominate conventional heart disease prevention, an important role remains for nutritional approaches. Because statin drugs are principally LDL-reducing agents and do not address other causes of heart disease, nutritional strategies add real advantage. Nutritional approaches can be used to minimize and sometimes eliminate use of statin drugs altogether. Perhaps it'd be better to regard statin therapy as a solution only when natural, nutritional means have been exhausted.

In the Track Your Plaque program, we aim to reduce LDL cholesterol to ≤ 60 mg/dl (though not below 50 mg/dl, since the long-term implications of cholesterol this low remain unexplored). Even better, we aim for an apoprotein B < 70 mg/dl or LDL particle number < 700 nmol/l, improvements over the conventionally calculated LDL cholesterol. (Of course, always discuss these issues with your doctor.)

Just adhering to a healthy diet is not enough in the majority of cases. The American Heart Association's diet, for instance, yields a 7% drop in cholesterol. That's too small to make any real difference (Pearson TA et al 2002) and, by itself, virtually guarantees a future of heart disease! The formerly popular ultra low-fat diets ($\leq 10\%$ of calories from fat) yield variable drops in cholesterol, but HDL is also substantially reduced and triglycerides increased (Krauss RM et al 1995). Our experience with the ultra low-fat

diets is that they yield disastrous changes in lipoproteins. The net effect can be increased risk of heart disease and diabetes.

While dietary restriction of total fat intake has only limited power to reduce cholesterol, avoidance of saturated fat (e.g., in butter, greasy meats, cured meats, fried foods) and hydrogenated fat (“trans fats” in margarine, shortening, and many processed foods) remains a well-proven means of reducing LDL cholesterol modestly. Replacing saturated fat sources with healthy monounsaturated oils (olive, canola, flaxseed) provides even greater benefits for cholesterol reduction, as well as reduced triglycerides and VLDL (Gulesserian T et al 2002; Williams CM et al 1999).

Weight loss (if you’re overweight) has broad effects on risk reduction: reduction of cholesterol levels (total and LDL), increased HDL, reduced triglycerides, and correction of small LDL, VLDL, and abnormal postprandial (after-eating) fat clearance (Miller WM, 2005). Restriction of processed carbohydrates is an effective way to lose weight and thereby reduce cholesterol, particularly for people starting with lower HDL and higher triglycerides. Reducing intake of flour products (pasta, breads, bagels, pastries, cookies, cakes, pretzels, and other processed foods) may, in fact, yields larger drops in cholesterol than now outdated low-fat diets (Krauss RM et al 2006).

Beyond diet, nutritional supplements and foods (“functional foods”, or foods that can be used to specific achieve specific goals) can pack real power to reduce cholesterol (total and LDL). For most people, no one supplement or food by itself will reduce LDL to your target. A combination of several strategies usually yields the large drops that we need to achieve dramatic LDL reduction.

Soluble Fibers

Fiber has the power to reduce LDL 20 mg or more. Many people say, “But I already eat whole wheat bread and Fiber One cereal!” upon hearing this. However, wheat-fiber based products like whole wheat bread and bran cereals have essentially no effect whatsoever on cholesterol reduction—though they’re good for bowel health.

Soluble, or viscous, fibers, on the other hand, that become gel-like on contact with water are natural cholesterol-reducing agents.

Beta-glucan is a soluble fiber that avidly absorbs water and transforms into a gooey gel. This gel, as it traverses the twenty-some feet of intestine, is an efficient absorber of cholesterol. Beta-glucan is responsible for the cholesterol-lowering properties of oatmeal. You know what’s even better than oatmeal? Oat bran. You can buy oat bran in bags and boxes in most grocery stores. Oat bran is also more versatile. You can use it as a hot cereal microwaved in skim milk or soy milk (add raw sunflower or pumpkin seeds, fresh berries, or sliced fruit), or you can add it to yogurt, fruit smoothies, or protein drinks. One ounce of uncooked oat bran (1/4 cup) contains 4 grams of fiber, of which 3 grams are soluble. Including 1/4 cup of oat bran a day in your diet can powerfully reduce cholesterol.

Flaxseed is another source of soluble fiber. When the seeds are ground, the fibers

become exposed and available. (Flaxseed also contains lignans, which are under intensive investigation for cancer-preventing properties.) Flaxseed is available both as whole seeds and already-ground. Whole seeds need to be ground (e.g., in your coffee-grinder) to release the fibers. Don't confuse flaxseed oil with the seed itself. When the oil is extracted from flaxseed to produce flaxseed oil, it can be a source of linolenic acid, which in turn is converted by your body to a small quantity of omega-3 fatty acids (as in fish). But the cholesterol-reducing benefit from flaxseed is found in the fiber content, and the ground seeds are therefore required, not the oil. Use flaxseed just as you would oat bran: mix with skim or soy milk, raw seeds, and berries to make a warm cereal; mix with yogurt, fruit smoothies, protein drinks. Two tablespoons a day provides an extraordinary 17 grams of fiber, of which 6 grams are soluble.

Pectin is another soluble fiber found in apples and the rinds of citrus fruits, especially grapefruit; it's also available in capsule form. In citrus, the pectin is most concentrated in the white rinds, not the pulp, so don't do such a good job when you peel. The quantity of pectin in a single piece of fruit is relatively modest (around 1.5 grams), but when reaching for a piece of fruit, an apple or citrus fruit can be one way to add modestly to your net daily soluble fiber intake (Jensen CD et al 1997; Sheehan JP et al 1997; Kerckhoffs DA et al 2003). If you choose to take a pectin supplement, the dose that yields significant LDL-reducing effect is around 3000 mg twice per day.

Beans are an excellent source of soluble fibers and an easy addition to most dinner menus. A ½ cup serving of starchy beans—pinto, Spanish, black, red, white—provides around 2 grams of soluble fiber and 4 grams total fiber. (Green beans are great for many reasons but are not a significant source of soluble fiber.) Vegetarian chilis and bean soups are among the many ways you can use these tremendous sources of fiber. Although beans are a carbohydrate source, the glycemic index (sugar-raising effect) is relatively low.

Psyllium seed is the main ingredient in the familiar stool bulk-forming product, Metamucil®, as this seed has the capacity to absorb many times its weight in water, making intestinal contents bulkier and softer. But it also reduces cholesterol 7–10%, just like oat bran and flaxseed. Psyllium is useful for its convenience: dissolve a teaspoon in 8–12 oz of water and drink. However, it is much less versatile than oat bran and flaxseed in that you really can't conceal it in yogurt or fruit smoothies or protein drinks. A teaspoon of psyllium (containing 2.4 grams of soluble fiber, 3 grams total fiber) is most useful when you are unable for one reason or another to use another soluble fiber source (e.g., when you're traveling). Taken 30 minutes prior to meals, you can also use it to produce satiety, or the feeling of fullness that discourages you from overeating. Many people use this as a helpful weight-loss strategy.

But beware. . .

Start with too much fiber all at once and you may—paradoxically—end up with constipation. The safest way to proceed if you begin with an average low-fiber American diet is to add one or two fiber sources at a time, and add another form only after two weeks. This permits your intestines to accommodate to the increased bulk. Also be sure to take in plenty of water, as these fibers will draw water into the intestine and can actually cause you to be dehydrated if you fail to drink enough. If the fiber cannot draw enough water into the intestine, you can end up with a very nasty case of constipation. Not pretty! (Consult your doctor if you have a history of congestive heart failure, kidney

or liver disease, edema, or have been advised to follow a fluid restriction before you embark on a program that requires greater fluid intake.)

Flavonoids and polyphenols

A fascinating family of substances, flavonoids and polyphenols are diverse naturally-occurring compounds believed to be responsible for the health benefits of deeply-pigmented fruits and vegetables. They reduce cholesterol, provide anti-oxidant benefits, reduce blood pressure, are anti-inflammatory, and prevent cancer. Individual flavonoids/polyphenols that hold promise for cardiovascular benefits are theaflavin and catechins in green tea; pine bark extract, a popular anti-oxidant supplement; and resveratrol and other polyphenols in grapes and wine (Zern TL et al 2005).

Tea drinkers enjoy less heart attack than non-drinkers and emerging evidence suggests that green tea flavonoids reduce blood pressure, accelerate weight loss, and beneficially modify lipid values. Theaflavin and green tea (richer in epigallocatechin than oolong or black tea) hold some of the most exciting potential. A 240 participant study of theaflavin-enriched green tea, 375 mg per day, demonstrated LDL reduction of 16% compared to placebo (Maron DJ et al 2003). Theaflavin is also available as a supplement, usually taken in doses of 600–900 mg per day.

Garlic comes in many forms: fresh garlic cloves, dried garlic powder, an oil-based extract of garlic, or as an aqueous aged garlic extract. Garlic achieves a smorgasbord of beneficial cardiovascular effects: inhibition of enzymes involved in lipid synthesis, inhibition of platelet aggregation, anti-oxidation of LDL, and blocking angiotensin-converting enzyme (that raises blood pressure). Dried garlic powder is the best studied, with over 20 studies demonstrating reduction in total cholesterol of between 10 and 20mg/dl (Stevinson C et al 2000). Doses of garlic powder used in these studies ranged from 600–900 mg, the approximate equivalent of ½–1 garlic clove per day.

It had been previously thought that the ingredient, allicin, was responsible for garlic's benefits. However, more recent investigations have shown that allicin is degraded upon digestion and never gains entry to the bloodstream (Kerckhoffs AJM et al 2002). S-allylcysteine (SAC) is more likely to be among the truly active ingredients in garlic. Aged garlic extract (AGE), which contains the aqueous compounds of garlic that are aged for several months, is a source of abundant SAC and, in one study, reduced total and LDL cholesterol by 20 mg/dl (Yeh Y et al 2001). Another study examined the effects AGE vs. placebo on the rate of growth of coronary atherosclerotic plaque using CT heart scans. Coronary plaque increased by 22% in one year in participants taking placebo, while AGE-treated participants showed only 7.5% per year (Budoff M et al, 2004).

In our real world experience, the LDL-reducing effects of garlic preparations are modest. Our preferred route is simply to use garlic cloves generously in food. If a supplement is desired, AGE is the preparation that appears to be the most promising.

Niacin is vitamin B3, an effective method to reduce LDL cholesterol by 15–20%. Niacin also raises HDL, reduces small LDL, reduces triglycerides, and is first choice for reduction of lipoprotein(a) (Carlson LA 2005). Because of its broad and powerful

benefits, niacin is part of the Track Your Plaque program for most people. Doses of up to 500 mg can be taken safely on your own; higher doses should be taken under medical supervision, as doses of 1000 mg or greater occasionally result in liver dysfunction, elevation of blood sugar, stomach intolerance, and gout. Niacin typically causes a “hot flush” feeling involving the chest, neck, and face that is usually harmless, though annoying. Substantial LDL reduction begins at a dose of 750 mg per day; the higher the dose, the greater the reduction of LDL. (Doses should rarely exceed 2000 mg per day and only with medical supervision.)

The warm flush can usually be inhibited by drinking plenty of water (2 8–12 oz. glasses usually do it), taking niacin with solid food, and avoiding spices and alcohol when you take the tablet. Many people also take a 325 mg uncoated aspirin when just beginning niacin, or with any increase in niacin dose, and this can also help block the hot flush. Though a nutritional agent, the benefits of niacin substantially exceed the effects of the common prescription fibrate agents, Lopid® and Tricor® (Vasudevan AR 2006). (For a more detailed discussion of how to use niacin, see our Special Report, [Niacin: Ins and outs, ups and downs](#))

Nuts (especially almonds and walnuts) are little powerhouses of beneficial nutrients. Unfortunately, manufacturers roast them in oil (often hydrogenated), add salt, or coat them in sugar and other unhealthy additives (“honey-roasted”, “party mix”, etc.). Stick with the raw variety for greatest benefit. In particular, raw almonds and walnuts pack the greatest punch for reducing cholesterol. A ¼–½ cup serving per day reduces cholesterol by 10 mg/dl, sometimes 20 mg/dl or more (Sabate J et al 2003; Spiller GA et al 2003; Feldman EB et al 2002). The fiber content of nuts, along with monounsaturated oils (similar to that in olive oil), yield the cholesterol-reducing effect. The generous fiber content of nuts has been shown to reduce blood sugar and can even lower the effective glycemic index of carbohydrate foods (slows sugar release into the blood). The wonderful satiety effect (feeling full) of raw nuts will permit you to eat a handful of nuts and feel satisfied.

Our favorite starting combination of strategies to dramatically reduce LDL cholesterol is to combine the use of oat bran or flaxseed and raw almonds. This easy-to-use combination included in your diet every day commonly yields 30 mg/dl or more drops in LDL.

Phytosterols (also known as stanol and sterol esters) are found naturally in plants and closely resemble human cholesterol in structure. Phytosterols need to be “esterified”, or bound, to a chemical side-group that gives them an oily consistency in order to exert full cholesterol-reducing effect in the intestine. This is the reason that phytosterols come in oil-based forms like butter substitutes and more recently as a mayonnaise-substitute. You can find the two butter substitute products, Take Control® and Benecol®, in the dairy aisle of the grocery store. Two tablespoons per day is the recommended “dose” to reduce cholesterol 12–15%. Also, preliminary evidence suggests that sterols (the variety in Take Control®), but not stanols (in Benecol®), may enter the blood stream. This may not be a desirable effect, though the implications are presently debatable (Katan MB et al 2003; Hallikainen MA et al 1999; Assman G et al 2006). This also means that the expanding list of sterol-containing products is of questionable safety. For this reason, Benecol® is our preferred product, though it tends to be around a dollar more expensive per tub. (See the Track Your Plaque Newsletter, January 2006: Phytosterols: Protection or Poison? at <http://www.trackyourplaque.com/newsletters/newsletter0106.asp>)

Red yeast rice: Initial trials of this interesting collection of monacolins, or naturally-occurring statin agents, yielded LDL reductions of 20% (about 40 mg/dl) using 2400 mg/day (Heber D et al 1999). However, the FDA stepped in because red yeast rice originally contained lovastatin, a prescription statin drug, the same as that in Mevacor®. As a result of FDA-mandated removal of lovastatin, along with the lack of standardization, the available preparations have suffered from significant variation in monacolin content and cholesterol-reducing effect (Heber D et al 2001). Until red yeast rice preparations are standardized, LDL cholesterol level should be promptly reassessed on treatment to ensure effect since, in our experience, some preparations yield significant LDL-reducing effects, others yield none. Reliable preparations can indeed exert LDL-reducing effects similar to prescription statins, though with about half the LDL-reducing power. Also, be aware that red yeast rice can yield similar side-effects like muscle aches, though less commonly.

Soy beans and soy protein have many beneficial nutrients. Among them are isoflavones, which are believed by many to help relieve menopausal symptoms in women, as isoflavones resemble estrogen. However, it is the protein we're interested in for cholesterol-lowering properties. The protein has been shown to reduce cholesterol 15–20% by shutting off liver production of cholesterol. Soy protein, in fact, is one of the foods endorsed by the FDA to reduce cholesterol.

25 grams of soy protein per day yields maximum LDL-reducing effect (Jenkins DJ et al 2003; Tonstad S et al 2002). The easiest way to get 25 grams (3 tablespoons) of soy protein is with soy protein powders that are available in canisters at grocery and health food stores. Use the powder in health shakes made in your blender (with yogurt or kefir, strawberries or blueberries, oat bran, skim milk, soy milk, etc.). Other sources of soy protein include soy milk, textured-vegetable protein used as a meat substitute, soy nuts, soy cheese, low-carb pasta, and soy butter (like peanut butter). A diet rich in soy protein may also contribute to modest weight loss. (Also see our Special Report, [25 ways to get 25 grams of soy protein](#))

Tocotrienols: Isolated vitamin E, or d-alpha tocopherol, has proved disappointing in reducing heart attack risk. But the broader family of vitamin E, or tocotrienols, containing four tocopherols and four tocotrienols, may prove an entirely different story. Tocotrienols have shown blocking effects on the mevalonate pathway, the same means by which statin drugs reduce cholesterol. Several studies have shown that tocotrienols reduce total cholesterol by 10–30%, LDL by a similar amount, with no effects on HDL or triglycerides, and without significant side-effects (Sen CK et al 2006). One trial in diabetics showed an impressive 75 mg/dl drop in LDL cholesterol (Baliarsingh S et al 2005). We do not presently advocate taking tocotrienols since the experience is too preliminary in humans. But given their fabulous potential, we're going to keep an eye on the developing experience.

Create a smorgasbord of cholesterol-reducing foods and supplements

Including just a little of one or two of these strategies will help reduce your cholesterol. But if you're looking for super-charged LDL cholesterol reduction, combine several of these functional foods and supplements. It is entirely possible to reduce LDL cholesterol 30% or more when you put several together each and every day. Here's a sample

approach:

- Raw almonds— $\frac{1}{2}$ cup per day (total fiber 5.8 g; soluble 0.6 g)
- Oat bran— $\frac{1}{4}$ cup per day (total fiber 4 g, 3 g soluble)
- Psyllium seed—2 tsp per day (6 g total fiber; 4.8 g soluble)
- Citrus fruit—e.g., 1 orange (around 1 g soluble fiber)
- Beans— $\frac{1}{2}$ cup per day, cooked (4 g total fiber; 1 g soluble)
- Soy protein powder—3 tbsp in protein shake (25 grams protein)
- Theaflavin—600–900 mg/day; or 6–7 cups green tea per day

The fiber content of this regimen alone—over 20 grams added—packs a powerful effect on cholesterol. Most people lose a modest quantity of weight, as well, because of the feeling of fullness that fiber-rich foods provide and the weight loss effect of green tea. If you are diabetic or have “borderline” or “pre-” diabetes, blood sugars are often lower on this regimen. (Discuss this with your doctor to avoid excessively low blood sugars if you take oral diabetic medications or insulin.)

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