Podcast: How to Lower Your LDL Cholesterol Transcript

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Introduction to NutritionFacts and LDL Cholesterol

Doesn't it seem like when it comes to nutrition, there are more opinions than facts to go around? Every day we hear new [music] theories about diets and supplements and best foods to eat. Well, my role is to take the mystery out of good nutrition and look at the science. Welcome to the NutritionFacts podcast. I'm your host, Dr. [music] Michael Greger.

Today we take a deep dive on lowering cholesterol, LDL cholesterol, through diet, um which was turned down [music] into a book that came out last October, I believe. And we start with a story from our former senior research scientist, Dr. Christine Dennis.

Of the top 10 take-home messages for the primary prevention of cardiovascular disease, take-home number nine is that cholesterol-lowering statin drugs are considered the first-choice drug treatment for preventing heart disease in those with sufficiently elevated LDL cholesterol. Though side effects, like muscle pain or weakness, may impact up to a quarter of users. Regardless whether you and your doctor decide to start drugs, the number one take-home message is that the most important way to prevent heart disease, the number one killer of men and women, is to promote a healthy lifestyle throughout life. Enter the portfolio diet for the maximal reduction of LDL cholesterol. There are three main added factors in our diet that raise LDL cholesterol: trans fat, saturated fat, and dietary cholesterol.

What the Portfolio Diet Includes

Therefore, the tolerable upper intake levels of these three factors are essentially zero, since any intake above zero increases LDL cholesterol concentration and therefore increases risk of coronary heart disease. So, trans fat, saturated fat, and cholesterol intake should be as low as possible.

That means cutting back as much as possible on meat, dairy, eggs, and junk. And since partially hydrogenated oils must be removed from the US food supply by law, all these other uses have been banned.

So, animal products are now the leading source of trans fat in the US diet, as well. Those eating a Western diet have circulating LDL levels around 120 mg per deciliter.

No surprise then, those eating plant-based tend to have lower LDL, with lower levels the longer they have been eating a whole foods plant-based diet. As low as 70. But even though that's an excellent number compared to most people, there really isn't a safe cutoff. When it comes to LDL, the lower the longer the better, even if you're at low risk.

That's where the portfolio diet can come in. By eating a healthy plant-based diet, you've already subtracted all the major foods that increase your cholesterol. The portfolio diet is a plant-based diet with a bonus, a portfolio of foods. Four food types you can add to your diet to pull cholesterol out of your system. The food components include 1 and 1/2 oz of nuts a day, good sources of plant protein, in other words, legumes like soy, other beans, split peas, chickpeas, or lentils, lots of food with viscous fiber. That's the kind of slimy fiber found in oats, okra, eggplant, barley, and ground flax seeds. And finally, 2 g a day of plant sterols from fortified foods or supplements.

Dr. Greger's going to take a deep dive into phytosterols, but first, let's just see what this diet can do. The portfolio diet was tested head-to-head against statin treatment plus a very low saturated fat diet in a 4-week randomized controlled trial among people with high cholesterol.

And incredibly, those in the portfolio diet group had nearly a 30% drop in LDL cholesterol, similar to the 33% drop observed in the statins plus low saturated fat group. Simply by emphasizing the addition of four dietary components that are each likely to contribute 4 to 7% to overall cholesterol reduction, you have a diet that reduces LDL

cholesterol with drug-like potency.

Portfolio Diet Results and Sample Foods

In a systematic review and meta-analysis of controlled trials of the portfolio diet, we still see consistent LDL lowering benefits, about a 17% drop above and beyond the currently recommended relatively strict National Cholesterol Education Program Step Two diet, along with lowering of systemic inflammation and an estimated 13% decrease in 10-year heart disease risk.

And these results weren't even in individuals who all actually went on a portfolio diet. They were merely told to eat that way. Even just two educational sessions over 6 months telling people to adopt it can have a significant effect. I mentioned the four food components, but what does a sample menu look like? Nuts for snacks, soy foods and beans for plant protein, oats, barley, okra, eggplant, Metamucil, and oranges for soluble fiber. They were using plant sterol fortified margarine, like Benecol and Promise Active, formerly known as Take Control.

Yes, they have added plant sterols, but they're also chock-full of salt, saturated fat, and artificial flavors. I mean, if you're going to use some sort of spread, this would be better than non-sterol fortified margarine or butter, but seems like a strange way to prevent heart disease. Plant sterols are naturally concentrated in sesame seeds and wheat germ, and also found in a variety of grains and legumes. To get that recommended 2 or 3 g a day though, you may have to take plant sterol supplements.

In fact, should we all be doing that? That's what Dr. Greger will tackle next, and then see if there's any other cholesterol-lowering supplements that might be worth taking. Finally, what about all the other foods that lower cholesterol? What about expanding our portfolio to make some kind of portfolio plus diet with as many different cholesterol-lowering foods and herbs and spices as we can?

Again, not as a replacement for drugs, but as a way to drive our LDL as low as possible with our fridge and pantry in addition to anything we might have in our medicine cabinet.

How Phytosterols Block Cholesterol Absorption

Did you know that even if we eat little or no cholesterol, phytosterols can block the reabsorption of the excess cholesterol our liver dumps into our intestines?

Here's our next story. The dietary guidelines cite the National Academies in recommending that dietary cholesterol consumption be as low as possible. While eggs are the most concentrated source of cholesterol gram for gram, the greatest contribution to the American diet is meat, including poultry and fish.

But even if our cholesterol intake is zero, our liver dumps excess cholesterol into our digestive tract through the bile, expecting there to be about a hundred grams of fiber in there every day to trap and flush it out of the body. But when people are getting five to ten times less fiber than nature intended, much of that cholesterol gets reabsorbed and can circulate back through our system. That's why one of the components of the cholesterol-lowering portfolio diet are foods like oatmeal that are high in sticky fiber that traps cholesterol. But the diet also includes phytosterols, plant sterols. It's almost identical, and the receptor in the lining of our intestines can't tell the difference. So, the phytosterols compete with cholesterol to squeeze in through this receptor. So, if there's lots of phytosterols in the gut, some of the cholesterol can't get in or back in and ends up in the toilet instead of our bloodstream.

With more and more phytosterol consumption, more and more cholesterol is being flushed out of the body. Now, even if you eat a strictly plant-based diet without any dietary cholesterol, you'd still be getting rid of more cholesterol by eating more phytosterol.

Unfortunately, like fiber intake, plant sterol intake is way down in modern diets. We probably evolved getting about a thousand milligrams a day, but these days, we may only be getting about 300 mg a day, though those eating more plant foods may be getting twice that. Little bits are found throughout the plant kingdom in vegetables, grains, legumes, and fruits, but the highest whole food sources tend to be nuts and seeds. Phytosterols may help explain

the cholesterol-lowering effects of nuts, but nuts are already a part of the portfolio diet. Why add phytosterols, too?

Well, people may only be getting a few hundred milligrams a day from nuts. It turns out there's a continuous dose-response relationship between phytosterol intake and LDL cholesterol lowering. Yeah, going from very few plant foods to lots of plant foods can draw more cholesterol out of the body, but 2 g a day can draw [clears throat] out even more, and that translates into lower LDL cholesterol in the blood. So, a really healthy diet is worth me drop our LDL by about 6%, but 2 or 3 g a day can drop our LDL more like 10%, and that alone could reduce our risk of heart disease by about 10% over a decade or 20% over a lifetime.

Phytosterol Benefits, Limits, and Safety

That's why we see heart health guidelines recommending the use of phytosterols as a supplementary strategy alongside lifestyle modifications to decrease blood cholesterol levels.

Okay, so phytosterols are effective, but are they safe? I'll address that next. Despite the vast literature on phytosterols lowering blood cholesterol levels, there's to date no study investigating the ultimate proof of efficacy, the lowering of the incidence of coronary heart disease.

Uh this is probably the strongest argument against them. There are no studies with hard endpoints to confirm that the drop in LDL cholesterol from plant sterols translates to a drop in heart attacks.

The reason is that even if people start out with a 10-year cardiovascular disease risk of 10%, you'd have to randomize about 30,000 people to phytosterols for a decade to detect such an effect. And at a more reasonable 10-year risk of 5%, you might have to enroll more than 300,000.

Now, one could argue that the cholesterol-lowering is all we need to know, since basically lowering LDL cholesterol by any means appears to lower cardiovascular risk, whether by statins, other kinds of drugs, diet, or surgery. However, there was a big trial of extended-release niacin in a group of patients with LDLs starting down in the low 60s, and researchers saw further 10-point drop after a few years that should have dropped their risk by at least 5 or 6% but failed to offer a statistically significant benefit in the end, so there's at least one example of that line of argument failing. There is that ezetimibe that does have a similar mechanism of action as phytosterols, that is, blocking cholesterol absorption. It partially blocks the cholesterol absorption receptor, so cholesterol absorption is reduced by about 50%. When it was put to the test, it did indeed significantly improve cardiovascular outcomes. And the 13-point drop in LDL achieved by blocking cholesterol absorption with the drug is almost the exact same drop in LDL we'd expect from blocking cholesterol absorption with phytosterols based on more than a hundred randomized controlled trials. Does blocking cholesterol absorption work even if you don't eat any cholesterol? Yes, because the bulk of the cholesterol flowing through our digestive tract is dumped there from our liver's own production. It also works for those on statin drugs.

In fact, adding 2 g of phytosterols a day to your routine may be equivalent to like quadrupling your statin dose. So, if you are going to try phytosterols to lower your LDL level, what's the best dose? And what's the best source?

The recommended daily dosing is between 2 to 3 g a day based on dose-response curves where the benefit appears to plateau at about those two or three daily grams. There's a comparable benefit curve with plant stanols, which are similar molecules. Plant sterols and stanols are absorbed better if taken with meals because the maximum cholesterol load to the intestine occurs after gallbladder contraction and delivery of cholesterol-rich bile to the intestine. Indeed, the same dose of phytosterols may have more than double the LDL-lowering effect when taken with meals rather than between them on an empty stomach.

Choosing and Using Phytosterol Supplements

The full LDL cholesterol-lowering effect can be detected after just 2 weeks and may last as long as you take them, but as soon as you stop, the cholesterol-lowering effect will be lost within a week or two.

Phytosterols in those kinds of doses are available in supplements and in fortified foods, which lower LDL

equivalently. As I talked about before, the margarines are total non-starters.

Are there any healthy phytosterol-fortified foods? Not any that I could tell where I live. In Australia, there's a plant sterol-fortified shredded wheat, but I don't know if you can get it anywhere else. That leaves us with supplements.

So, it's good to have third-party certification of authenticity, though I think there's only one USP-certified brand at the moment, but ConsumerLab also tested and approved three others. They're also pretty expensive, so I was excited to see that you can get it in bulk, and you could presumably just sprinkle a bit on your food, but that presumption may be wrong. As a crystalline powder, the free phytosterols are much less efficient at inhibiting cholesterol. That's why the initial studies a half century ago were using doses of like 10 to 20 g a day.

Then researchers figured out how to make them more soluble by making fatty phytosterol esters, which is what you see in the capsules. There are studies suggesting that free sterols block cholesterol absorption as much as esterified sterols, but they included equal parts of an emulsifier to improve absorption. A study showing free sterols could lower LDL similarly relied on some proprietary means for solubilizing it.

Just for fun, I tried taking the bulk powder for a month, and indeed, sadly, saw a zero effect, whereas I got a nice 17-point drop in LDL taking the exact same dose in encapsulated ester form. Normally, I'm not a big fan of lab tests, but if you do start phytosterol supplements, I would get your cholesterol tested before and after a month or so on them. You should be able to get your cholesterol tested for free through your doctor, but these days, you can get your cholesterol tested at low cost or free even without insurance or a doctor visit. While some individuals respond immediately and get a major shift in lipid profiles, others are more resistant or even completely insensitive to plant sterols or do even worse. Just because the average response is around a 10% drop in LDL cholesterol, maybe you'll be lucky and respond even better.

These are all individual patients, and this first person saw a 38% drop. But it's also possible you won't respond as well, or your cholesterol may actually go up.

Closing Remarks and Resources

That unfortunate person at the end had a 33% increase in LDL, so even though the average effect is good, you want [music] to make sure it's actually working for you. Visit nutritionfacts.org/audio to see all the podcast episodes with descriptions that include links to the associated videos. Sources cited and other details are available on each video's page. Information about my books, How Not to Die, How Not to Diet, and How Not to Age, is at nutritionfacts.org/books.

All proceeds [music] which I get are donated directly to charity, and I've got a new book in the publication pipeline, the manuscript for How Not to Hurt on diet and lifestyle approaches to pain management. It's been handed in and will be published December 15th.

>> [music] >> I'm going to be doing a series of webinars to feature some of the new research I discovered. Sign up for our free newsletter at nutritionfacts.org/subscribe to stay updated on when those will be. Nutritionfacts.org is a science-based nonprofit, and everything on the website is free. There are no ads, no corporate sponsorships, no kickbacks. We're strictly noncommercial, not selling anything, just put up as a public service as a labor of love as a tribute to my grandmother, whose own life was saved with evidence-based nutrition. We just have like a a Wikipedia-type nonprofit model where everything's free, and we just hope maybe, >> [music] >> you know, one in a thousand people will find it so valuable that they'll kick in a few bucks so we can continue to churn out new content to help you and your family be healthier. Thanks for listening.