



What is Cholesterol? How It Works, Foods to Avoid, and the Truth About HDL

By Courtney Davison
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Cholesterol is a little molecule with huge implications for human health. Read on for a breakdown of how cholesterol works—including why HDL (“good”) cholesterol might not be as good as you think—and learn the most important steps you can take right now if you’re among the 38% of Americans who have high cholesterol.

Topics covered in this article:

- [What Is Cholesterol?](#)
- [Good Cholesterol vs. Bad Cholesterol](#)
- [Triglycerides](#)
- [Causes of High Cholesterol](#)
- [Does Eating Cholesterol Raise Blood Cholesterol Levels?](#)
- [Normal Cholesterol Ranges](#)
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What Is Cholesterol?

Cholesterol is a waxy type of lipid found in almost every cell of the body. A building block of animal life, cholesterol helps form cell membranes and plays a key role in the production of hormones, vitamin D, skin oils, and digestive acids.

The liver makes all the cholesterol that the body needs. Some factors can cause excessive levels of cholesterol to enter the bloodstream; over time, this can seriously impair our cardiovascular systems.

‘Good’ Cholesterol vs. ‘Bad’ Cholesterol

Cholesterol is not water-soluble, meaning it can’t travel through the bloodstream on its own. For transport, it gets bundled with particles called [lipoproteins](#). The main types of lipoproteins that carry cholesterol are low-density lipoproteins (LDL) and high-density lipoproteins (HDL).

LDL (‘Bad’) Cholesterol

Low-density lipoproteins carry cholesterol produced by the liver to the rest of the body, allowing cells to extract the fat and protein content for various uses. LDL cholesterol constitutes most of the cholesterol in your body.

Some factors (discussed below) can lead to excess LDL cholesterol in the blood, a condition called hypercholesterolemia. Over time, excess LDL adheres to artery walls, building up fatty deposits that harden into plaques. Atherosclerosis, as this process is known, restricts the amount of blood that can flow through the arteries.

Coronary artery disease [develops](#) when atherosclerosis restricts blood flow through arteries that supply blood to the heart. CAD is the leading cause of death worldwide.

Fatty streaks, the first stage of atherosclerosis, can [begin to form in childhood](#).

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HDL Cholesterol: Is More Always Better?

If LDL are cholesterol delivery trucks, high-density lipoproteins are the garbage trucks. HDL absorbs excess cholesterol and carries it to the liver to be flushed out of the body. When functioning properly, HDL helps keep LDL levels in check, which is why it's commonly referred to as "good" cholesterol.

But a growing body of [research](#) suggests that more HDL cholesterol [isn't always better](#), and that the quality of our HDL particles may matter more than the quantity. "Once your HDL cholesterol gets ... to around 60 or 70 milligrams per deciliter, it looks like there's a plateau effect," says [Nicole Harkin, MD, FACC](#). After that point, additional HDL is not associated with cardiovascular benefits and in fact [may increase the risk](#) of cardiovascular disease. "Research has started to uncover that it really is much more about the HDL functionality, how well those particles are extracting that [excess] cholesterol that's been deposited," Harkin says.

Certain stressors prevent HDL from carrying out its task of purging excess cholesterol from the body. "HDL can become dysfunctional and pro-inflammatory in situations of oxidative (cellular) stress," says [Michelle McMacken, MD, FACP, DipABLM](#), executive director of Nutrition and Lifestyle Medicine at NYC Health + Hospitals. McMacken notes that saturated fats raise HDL levels but have also been shown to [render HDL more inflammatory](#) and likely to promote plaque buildup.

The takeaway: "Just because your HDL cholesterol is high, that does not protect you from cardiovascular disease," says Harkin. "It's not as meaningful of a number as we once thought."

What About Triglycerides?

Like cholesterol, triglycerides are a type of fatty acid that come from our liver and from the foods we eat. They, too, get bundled with lipoproteins and carried through the body so cells can extract the fat and protein for use. When we consume more calories than we need, we take in excess triglycerides, which our body stores as fat. Because elevated triglycerides can contribute to atherosclerosis, triglyceride levels are typically measured alongside LDL and HDL cholesterol. Lifestyle measures aimed at reducing LDL cholesterol can also bring down triglycerides.

What Causes High Cholesterol?

For most people, high cholesterol is primarily lifestyle-related, the [American Heart Association](#) notes. Lifestyle factors that drive up LDL cholesterol (or decrease HDL cholesterol) include:

- Unhealthy diet
- Being overweight or obese
- Sedentary lifestyle
- Cigarette smoking

Genes play a role in the amount of cholesterol that your liver produces. [Familial hypercholesterolemia](#), an inherited genetic condition, impacts an estimated .05% of the population. Genetics can also influence cholesterol levels in indirect ways, such as by predisposing someone to be overweight.

Having Type 2 diabetes [is a risk factor](#) for high cholesterol, though more research is needed to understand the connection.

Diet

Among the lifestyle factors that can influence LDL cholesterol levels, diet plays a major role.

"Studies have shown that one of the strongest contributors to our blood levels of cholesterol, from a dietary standpoint, is our

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intake of saturated fat, which is found predominantly in animal products, particularly red meat (processed and unprocessed) and dairy.” Harkin adds that palm oil and coconut oil, which are found in many highly processed foods, are also high in saturated fat.

Trans fats also drive up cholesterol levels. Historically, these fats could be found in the form of partially hydrogenated oils in margarine, shortening, butter, cakes, cookies, and salty snack foods. In 2018, the [Food and Drug Administration](#) banned manufacturers from using trans fats, but these fats may still occur in deep-fried foods due to the extreme temperature at which oils are heated.

Does Eating Cholesterol Raise Cholesterol Levels?

There’s been [some debate](#) about the degree to which dietary cholesterol raises blood cholesterol levels. Because foods high in cholesterol are also typically high in saturated fat, it’s difficult to tease apart the effects of each.

However, a [large 2019 study](#) looked for associations between the consumption of cholesterol and rates of cardiovascular disease in 29,615 participants over a median of 17.5 years. They found that, independent of fat and overall diet quality, higher cholesterol intake was in fact associated with a higher risk of CVD. They identified a dose-response relationship: For every additional 300 milligrams of cholesterol consumed daily, there was a 17% increase in the risk of CVD and 18% increase in the risk of death from all causes. (For reference, a single egg contains around 180 milligrams of cholesterol.)

The easiest way to keep cholesterol out of your diet is to steer clear of animal products. All animals produce cholesterol in their livers, so when we eat other animals or animal-based products, we consume their cholesterol. (This is why, when [checking nutrition labels](#), the presence of any cholesterol is a telltale sign that an item isn’t vegan—though the absence of it doesn’t guarantee that a product *is* vegan.)

What Are Normal Cholesterol Levels?

Ranges for “normal” cholesterol levels vary based on age, sex, and medical history, but according to the Mayo Clinic, adults age 20 and older should aim for the following numbers.

Interpreting Total Cholesterol Numbers

Total Cholesterol (mg/dL)	Results
Below 200	Desirable
200–239	Borderline high
240 and above	High

Source: Mayo Clinic

Interpreting LDL Cholesterol Numbers

LDL Cholesterol (mg/dL)	Results
Below 70	Optimal for people who have coronary artery disease (CAD)
Below 100	Optimal for people who have diabetes or other risk factors
100–129	Near optimal if there is no CAD; high if there is CAD
130–159	Borderline high if there is no CAD; high if there is CAD
160–189	High if there is no CAD; very high if there is CAD
190 and above	Very high, likely representing a genetic condition

Source: Mayo Clinic

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Interpreting HDL Cholesterol Numbers

HDL Cholesterol (mg/dL)	Poor	Better	Optimal
Men	Below 40	40–59	60 and above*
Women	Below 50	50–59	60 and above*

Source: Mayo Clinic

**Note: There is some debate about whether HDL cholesterol in excess of 60 mg/dL is truly beneficial. LDL cholesterol levels may be a more reliable indicator of cardiovascular health. Learn more here.*

For more detailed information about normal cholesterol levels, see the American Heart Association and American College of Cardiology [guidelines for clinicians](#).

Testing

If diagnosed early, high cholesterol can be resolved before doing any damage to the cardiovascular system.

Cholesterol screening should start early in life. Children should be screened at least once between ages 9 and 11, according to the [Centers for Disease Control](#).

For adults at low risk of cardiovascular disease, the CDC recommends cholesterol testing every five years, starting at age 20. Those who have a family history of heart disease or other risk factors (such as a previous cardiac event, high blood pressure, diabetes, and prediabetes) should be tested more frequently.

Symptoms of High Cholesterol

High cholesterol doesn't typically present any noticeable symptoms until it's developed into atherosclerosis, and even then, it often goes unnoticed.

Some people with advanced atherosclerosis may experience chest pain, shortness of breath, and feelings of fatigue, especially during exercise, when the heart demands more oxygen but is unable to get it because the artery is so diseased it can't dilate to provide adequate blood flow. [Erectile dysfunction](#) can also be a sign of cardiovascular disease. In rare cases, elevated blood cholesterol can cause fatty, yellowish bumps on or around the eyelids, a condition known as [xanthelasma palpebrarum](#).

But for many, a heart attack or stroke is the first noticeable symptom of high cholesterol and cardiovascular disease, which is why regular screening is so important.

Complications of High Cholesterol

The [primary complication](#) arising from high cholesterol is cardiovascular disease, including coronary artery disease, stroke, and myocardial infarction (heart attack). Strokes and heart attacks follow a similar chain of events: An arterial plaque ruptures. A blood clot forms on the ruptured plaque. The blood clot completely blocks blood from flowing through the artery, preventing blood from getting to the brain (in the case of stroke) or the heart (in the case of heart attack).

High cholesterol and resulting atherosclerosis may contribute to high blood pressure, as the heart has to work harder to pump blood through constricted, plaque-laden blood vessels.

In addition to cardiovascular complications, a [number of studies](#) suggest that high cholesterol may impair [insulin sensitivity](#),

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leading to insulin resistance. Insulin resistance significantly increases the risk of several chronic diseases including Type 2 diabetes, fatty liver disease, chronic kidney disease, and Alzheimer's disease.

How to Lower Cholesterol

For patients with extremely high cholesterol and/or established cardiovascular disease, lipid-lowering medications, such as [statins](#), may be necessary. For many people, lifestyle modifications alone may be enough to bring cholesterol down into the healthy range.

“For the vast majority of patients who have elevated cholesterol and who do not yet have heart disease, the first-line therapy is lifestyle modifications,” says Harkin. “That involves changes in diet, exercise, and all the other lifestyle factors, but diet [is] one of the biggest levers that we can pull.”

Foods to Avoid

To lower your cholesterol, steer clear of the following foods, which are high in trans fats, saturated fats, and/or cholesterol.

- Red meat (processed and unprocessed)
- Dairy products (milk, cheese, butter)
- Palm oil
- Coconut oil
- Lard
- Highly processed foods

Excessive alcohol use and consumption of refined sugars has been strongly tied to elevated triglycerides.

Best Foods to Eat to Lower Your Cholesterol

The [AHA recommends](#) eating a diet rich in whole plant foods to improve cardiovascular health. These include:

- Whole grains
- Legumes
- Fruits
- Starchy vegetables
- Non-starchy vegetables
- Nuts
- Seeds

Plant foods can lower cholesterol in two key ways: by crowding out unhealthy foods, and by providing the body with ample soluble fiber, which binds to excess cholesterol so that it's excreted as waste. Most plant foods contain soluble fiber, but especially good sources include beans, lentils, chia seeds, oats, barley, and berries.

Harkin recommends a whole-food, plant-based diet for its ability to promote heart health and metabolic health overall. “A [WFPB diet] is by definition very low in saturated fat, and it's very high in that soluble fiber,” says Harkin. “It's also obviously great for regulating blood sugar levels, blood pressure—all these things that help us lower our overall risk of cardiovascular disease.”

Success Stories

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Forks Over Knives has heard from many readers over the years who have reduced their cholesterol after adopting a whole-food, plant-based lifestyle.

- [I Put High Cholesterol, Severe Arthritis Behind Me by Changing My Diet](#)
- [LDL Cholesterol Cut in Half on a Plant-Based Diet](#)
- [What Giving Up Meat, Dairy, and Processed Foods Did for My BMI, Blood Pressure, and Cholesterol](#)
- [Since Going Plant-Based, I've Lost 45 Pounds, Lowered My Cholesterol, and Stopped Getting Uterine Fibroids](#)
- [How I Curbed High Cholesterol, Fibroids, Heartburn, and Anemia](#)
- [I Suffered a Widower Heart Attack at 45. Today I'm Thriving on a Plant-Based Diet](#)

To learn more about a whole-food, plant-based diet, visit our [Plant-Based Primer](#). For meal-planning support, check out [Forks Meal Planner](#), FOK's easy weekly meal-planning tool to keep you on a healthy plant-based path.