

Cholesterol

Cholesterol is a waxy substance that's found in the fats (lipids) in your blood. While your body needs cholesterol to continue building healthy cells, having high cholesterol can increase your risk of heart disease.

There are no symptoms of high cholesterol, but elevated levels can harm your body by causing fatty deposits in your blood vessels. Eventually, these deposits make it difficult for enough blood to flow through your arteries. Your heart may not get as much oxygen-rich blood as it needs, which increases the risk of a heart attack. Decreased blood flow to your brain can cause a stroke.

High cholesterol (hypercholesterolemia) can be inherited, but it's often the result of unhealthy lifestyle choices, and thus preventable and treatable. A healthy diet, regular exercise and sometimes medication can go a long way toward reducing high cholesterol.

Causes

Cholesterol is carried through your blood, attached to proteins. This combination of proteins and cholesterol is called a lipoprotein. You may have heard of different types of cholesterol, based on what type of cholesterol the lipoprotein carries. They are:

Low-density lipoprotein (LDL). LDL, or "bad," cholesterol transports cholesterol particles throughout your body. LDL cholesterol builds up in the walls of your arteries, making them hard and narrow.

Very-low-density lipoprotein (VLDL). This type of lipoprotein contains the most triglycerides, a type of fat, attached to the proteins in your blood. VLDL cholesterol makes LDL cholesterol larger in size, causing your blood vessels to narrow. If you're taking cholesterol-lowering medication but have a high

VLDL level, you may need additional medication to lower your triglycerides.

High-density lipoprotein (HDL). HDL, or "good," cholesterol picks up excess cholesterol and takes it back to your liver.

Factors within your control — such as inactivity, obesity and an unhealthy diet — contribute to high LDL cholesterol and low HDL cholesterol. Factors beyond your control may play a role, too. For example, your genetic makeup may keep cells from removing LDL cholesterol from your blood efficiently or cause your liver to produce too much cholesterol.

Risk factors

You're more likely to have high cholesterol that can lead to heart disease if you have any of these risk factors:

- Smoking. Cigarette smoking damages the walls of your blood vessels, making them likely to accumulate fatty deposits. Smoking may also lower your level of HDL, or "good," cholesterol.
- Obesity. Having a body mass index (BMI) of 30 or greater puts you at risk of high cholesterol.
- Poor diet. Foods that are high in cholesterol, such as red meat and full-fat dairy products, will increase your total cholesterol. Eating saturated fat, found in animal products, and trans fats, found in some commercially baked cookies and crackers, also can raise your cholesterol level.
- Lack of exercise. Exercise helps boost your body's HDL "good" cholesterol while lowering your LDL "bad" cholesterol. Not getting enough exercise puts you at risk of high cholesterol.
- High blood pressure. Increased pressure on your artery walls damages your arteries, which can speed the accumulation of fatty deposits.
- Diabetes. High blood sugar contributes to higher LDL cholesterol and lower HDL

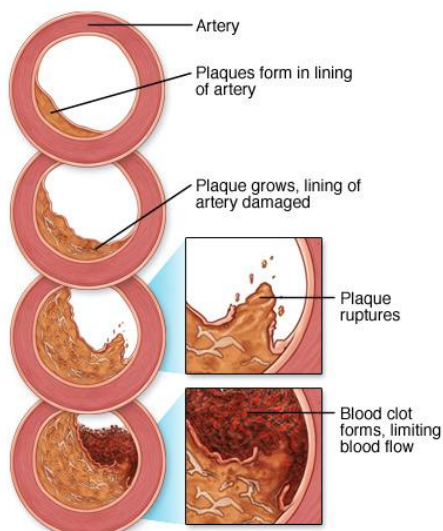
cholesterol. High blood sugar also damages the lining of your arteries.

- Family history of heart disease. If a parent or sibling developed heart disease before age 55, high cholesterol levels place you at a greater than average risk of developing heart disease.

Complications

High cholesterol can cause atherosclerosis, a dangerous accumulation of cholesterol and other deposits on the walls of your arteries. These deposits (plaques) can reduce blood flow through your arteries, which can cause complications, such as:

- Chest pain. If the arteries that supply your heart with blood (coronary arteries) are affected, you may have chest pain (angina) and other symptoms of coronary artery disease.
- Heart attack. If plaques tear or rupture, a blood clot may form at the plaque-rupture site — blocking the flow of blood or breaking free and plugging an artery downstream. If blood flow to part of your heart stops, you'll have a heart attack.
- Stroke. Similar to a heart attack, if blood flow to part of your brain is blocked by a blood clot, a stroke occurs.



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Treatments and drugs

Lifestyle changes such as exercising and eating a healthy diet are the first line of defense against high cholesterol. But, if you've made these important lifestyle changes and your total cholesterol — and particularly your LDL cholesterol — remains high, your doctor may recommend medication.

The specific choice of medication or combination of medications depends on various factors, including your individual risk factors, your age, your current health and possible side effects. Common choices include:

- Statins. These are among the most commonly prescribed medications for lowering cholesterol. They block a substance your liver needs to make cholesterol. This causes your liver to remove cholesterol from your blood. Statins may also help your body reabsorb cholesterol from built-up deposits on your artery walls, potentially reversing coronary artery disease. Choices include atorvastatin (Lipitor), fluvastatin (Lescol), lovastatin (Altoprev, Mevacor), pravastatin (Pravachol), rosuvastatin (Crestor) and simvastatin (Zocor).
- Bile-acid-binding resins. Your liver uses cholesterol to make bile acids, a substance needed for digestion. The medications cholestyramine (Prevalite), colestevlam (Welchol) and colestipol (Colestid) lower cholesterol indirectly by binding to bile acids. This prompts your liver to use excess cholesterol to make more bile acids, which reduces the level of cholesterol in your blood.
- Cholesterol absorption inhibitors. Your small intestine absorbs the cholesterol from your diet and releases it into your bloodstream. The drug ezetimibe (Zetia) helps reduce blood cholesterol by limiting the absorption of dietary cholesterol. Zetia can be used in combination with any of the statin drugs.

- Combination cholesterol absorption inhibitor and statin. The combination drug ezetimibe-simvastatin (Vytorin) decreases both absorption of dietary cholesterol in your small intestine and production of cholesterol in your liver. It's unknown whether Vytorin is more effective in reducing heart disease risk than taking simvastatin by itself.

Medications for high triglycerides. If you also have high triglycerides, your doctor may prescribe:

- Fibrates. The medications fenofibrate (TriCor) and gemfibrozil (Lopid) decrease triglycerides by reducing your liver's production of very-low-density lipoprotein (VLDL) cholesterol and by speeding up the removal of triglycerides from your blood. VLDL cholesterol contains mostly triglycerides.
- Niacin. Niacin (Niaspan) decreases triglycerides by limiting your liver's ability to produce LDL and VLDL cholesterol. Prescription and over-the-counter niacin is available, but prescription niacin is preferred as it has the least side effects. Dietary supplements containing niacin that are available over-the-counter are not effective for lowering triglycerides, and may damage your liver.
- Omega-3 fatty acid supplements. Omega-3 fatty acid supplements can help lower your cholesterol. You can take over-the-counter supplements, or your doctor may prescribe Lovaza, a prescription omega-3 fatty acid supplement, as a way to lower your triglycerides. These supplements may be taken with another cholesterol-lowering medication, such as a statin. If you choose to take over-the-counter supplements, get your doctor's OK first. Omega-3 fatty acid supplements could affect other medications you're taking.

Tolerance varies

Tolerance of medications varies from person to person. The common side effects are muscle pains, stomach pain, constipation, nausea and diarrhea. If you decide to take cholesterol medication, your doctor may recommend liver function tests to monitor the medication's effect on your liver.

Improving Cholesterol with Diet

Diet can play an important role in lowering your cholesterol. Here are five foods that can lower your cholesterol and protect your heart.

1. Oatmeal, oat bran and high-fiber foods

Oatmeal contains soluble fiber, which reduces your low-density lipoprotein (LDL), the "bad," cholesterol. Soluble fiber is also found in such foods as kidney beans, apples, pears, barley and prunes.

Soluble fiber can reduce the absorption of cholesterol into your bloodstream. Five to 10 grams or more of soluble fiber a day decreases your total and LDL cholesterol. Eating 1 1/2 cups of cooked oatmeal provides 6 grams of fiber. If you add fruit, such as bananas, you'll add about 4 more grams of fiber. To mix it up a little, try steel-cut oatmeal or cold cereal made with oatmeal or oat bran.

2. Fish and omega-3 fatty acids

Eating fatty fish can be heart healthy because of its high levels of omega-3 fatty acids, which can reduce your blood pressure and risk of developing blood clots. In people who have already had heart attacks, fish oil — or omega-3 fatty acids — reduces the risk of sudden death.

The American Heart Association recommends eating at least two servings of fish a week. The highest levels of omega-3 fatty acids are in:

Salmon, Mackerel, Lake trout, Herring, Sardines, Albacore tuna, Halibut

You should bake or grill the fish to avoid adding unhealthy fats. If you don't like fish, you can also get small amounts of omega-3 fatty acids from foods like ground flaxseed or canola oil.

You can take an omega-3 or fish oil supplement to get some of the benefits, but you won't get other nutrients in fish, such as selenium. If you decide to take a supplement, just remember to watch your diet and eat lean meat or vegetables in place of fish.

3. Walnuts, almonds and other nuts

Walnuts, almonds and other nuts can reduce blood cholesterol. Rich in polyunsaturated fatty acids, walnuts also help keep blood vessels healthy.

Eating about a handful (1.5 ounces, or 42.5 grams) a day of most nuts, such as almonds, hazelnuts, peanuts, pecans, some pine nuts, pistachio nuts and walnuts, may reduce your risk of heart disease. Just make sure the nuts you eat aren't salted or coated with sugar.

All nuts are high in calories, so a handful will do. To avoid eating too many nuts and gaining weight, replace foods high in saturated fat with nuts. For example, instead of using cheese, meat or croutons in your salad, add a handful of walnuts or almonds.

4. Olive oil

Olive oil contains a potent mix of antioxidants that can lower your "bad" (LDL) cholesterol but leave your "good" (HDL) cholesterol untouched.

Try using about 2 tablespoons (23 grams) of olive oil a day in place of other fats in your diet to get its heart-healthy benefits. To add olive oil to your diet, you can saute vegetables in it, add it to a marinade or mix it with vinegar as a salad dressing. You can also use olive oil as a substitute for butter when basting meat or as a dip for bread. Olive oil is high in calories, so don't eat more than the recommended amount.

The cholesterol-lowering effects of olive oil are even greater if you choose extra-virgin

olive oil, meaning the oil is less processed and contains more heart-healthy antioxidants. But keep in mind that "light" olive oils are usually more processed than extra-virgin or virgin olive oils and are lighter in color, not fat or calories.

5. Foods with added plant sterols or stanols

Foods are now available that have been fortified with sterols or stanols — substances found in plants that help block the absorption of cholesterol.

Margarines, orange juice and yogurt drinks with added plant sterols can help reduce LDL cholesterol by more than 10 percent. The amount of daily plant sterols needed for results is at least 2 grams — which equals about two 8-ounce (237-milliliter) servings of plant sterol-fortified orange juice a day.

Plant sterols or stanols in fortified foods don't appear to affect levels of triglycerides or of high-density lipoprotein (HDL), the "good" cholesterol.

Other changes to your diet

For any of these foods to provide their benefit, you need to make other changes to your diet and lifestyle.

Cut back on the cholesterol and total fat — especially saturated and trans fats — that you eat. Saturated fats, like those in meat, full-fat dairy products and some oils, raise your total cholesterol. Trans fats, which are sometimes found in margarines and store-bought cookies, crackers and cakes, are particularly bad for your cholesterol levels. Trans fats raise low-density lipoprotein (LDL), the "bad," cholesterol, and lower high-density lipoprotein (HDL), the "good," cholesterol.

In addition to changing your diet, keep in mind that making additional heart-healthy lifestyle changes are key to lowering your cholesterol. Talk to your doctor about exercising, quitting smoking and maintaining a healthy weight to help keep your cholesterol level low.

Lifestyle changes

Exercise regularly. Regular exercise can help improve your cholesterol levels. With your doctor's OK, work up to 30 to 60 minutes of exercise a day. Take a brisk daily walk. Ride your bike. Swim laps. To maintain your motivation, keep it fun. Find an exercise buddy or join an exercise group. And, you don't need to get all 30 to 60 minutes in one exercise session. If you can squeeze in three to six 10-minute intervals of exercise, you'll still get some cholesterol-lowering benefits.

Lose weight. Carrying some extra pounds — even just a few — contributes to high cholesterol. Losing as little as 5 to 10 percent of your body weight can help significantly reduce cholesterol levels.

Don't smoke. If you smoke, stop. Quitting can improve your HDL cholesterol level. And the benefits don't end there. Just 20 minutes after quitting, your blood pressure decreases. Within 24 hours, your risk of a heart attack decreases. Within one year, your risk of heart disease is half that of a smoker's. Within 15 years, your risk of heart disease is similar to that of someone who's never smoked.

— *Adapted from May Clinic.com*