

## What Is Cholesterol?

Cholesterol is a type of lipid (or fat) that, among other important functions, builds cell membranes in the body. While some cholesterol is obtained through diet, the body synthesizes most of it.

Low-density lipoprotein (LDL), or “bad cholesterol,” can increase the risk of heart attacks, diabetes and other health problems. High-density lipoprotein (HDL) is often called “good cholesterol” because it helps move cholesterol out of the bloodstream. Triglycerides are a type of fat that can signal risks of a heart attack or a stroke. Too much “bad cholesterol” in the bloodstream increases the risk of cardiovascular disease. People with diabetes often have high levels of “bad cholesterol” and low levels of “good cholesterol.”

## How Is Cholesterol Tested — and How Often?

Cholesterol testing is usually combined with other tests, such as triglyceride testing, to develop an overall “lipoprotein profile.” It is important to fast for eight to 12 hours before the test, after which blood will be drawn and analyzed. A person with heart disease or diabetes should ideally have an LDL cholesterol level below 100 mg/dL (milligrams per deciliter). For those with no known risk factors for cardiovascular disease, it should be less than 160 mg/dL. HDL cholesterol should be more than 40 mg/dL, while triglycerides should be less than 150 mg/dL.

In general, cholesterol testing as a screening tool is recommended every five years, according to The American Academy of Family Physicians. More frequent cholesterol checks may be required for those with risk factors (such as diabetes) for heart disease.

## What Is the Treatment for Cholesterol Problems?

Lifestyle changes can go a long way in helping to control cholesterol levels. The American Diabetes Association recommends these tips:

- Eating less saturated fat, which is found in fatty meats, chicken skin, non-skim milk, ice cream, cheese and many snacks
- Eating foods high in fats that help to lower cholesterol levels, such as fish, olive oil and nuts
- Eating foods high in fiber, such as oatmeal, fruit, vegetables, dried beans and peas
- Exercising and maintaining a healthy weight
- Not smoking

There are also medications that lower “bad” cholesterol (LDL) and increase “good” cholesterol (HDL). Some researchers believe that, as a protective measure, people over the age of 40 who have diabetes should take statins (drugs that help lower cholesterol), even if their cholesterol levels are normal. People with diabetes should talk to their health care providers about the best treatment.

Sources:

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American Heart Association

## Diabetes and Cholesterol

### Getting down to the details

If you have diabetes, you're more likely to have more cholesterol abnormalities — which contributes to cardiovascular disease. Managing your cholesterol, and especially lowering LDL cholesterol, reduces your chance of cardiovascular disease and death. In fact, a person with diabetes who lowers his LDL cholesterol can reduce cardiovascular complications by 20 percent to 50 percent .

### How do I know my cholesterol numbers?

A lipid profile is a measure of different kinds of fats in your blood. Your healthcare provider determines your lipid profile based on your total cholesterol, LDL ("bad") cholesterol, HDL ("good") cholesterol and triglyceride (blood fats) levels.

### What is cholesterol?

Cholesterol is a waxy substance in your blood that your liver makes. It's also found in foods from animals, such as egg yolks, meat, fish, poultry and whole-milk dairy products. Your body uses cholesterol to make hormones and build cell membranes and other needed tissues. But if too much LDL cholesterol circulates in the bloodstream, it can build up in the inner walls of the arteries and lead to fatty deposits of plaque called atherosclerosis. [Learn more](#).

### Cholesterol goals for people with diabetes

People with diabetes have the same risk for heart disease and stroke as people who already have cardiovascular disease. So their target levels for LDL cholesterol are lower.

- Low-density-lipoprotein (LDL) cholesterol is called "bad" cholesterol. When too much LDL cholesterol is in your blood, it may be deposited in the inner walls of your arteries. Together with other substances, it can form plaque and cause your risk of heart disease to increase. **So keep your LDL cholesterol level below 100 mg/dL.** In some cases, if you have other cardiovascular risk factors, your healthcare provider may want your level to be below 70 mg/dL.
- High-density-lipoprotein (HDL) cholesterol is called "good" cholesterol. HDL cholesterol has the opposite effect of LDL cholesterol. HDL removes cholesterol from the blood. **Your HDL cholesterol levels should not be below 40 mg/dL (the higher the better).** An HDL cholesterol of 60 mg/dL and above is considered protective against heart disease.
- Triglycerides are the main form in which fats exist in the body. Triglycerides come from fats eaten in foods or are made in the body by the liver. A high triglyceride level contributes to atherosclerosis. **Ideally, you want to maintain triglycerides below 150 mg/dL.**

### How diabetes affects cholesterol

Diabetes tends to lower "good" cholesterol and raise triglyceride and "bad" cholesterol levels, which increases the risk for heart disease and stroke. This common condition is called diabetic dyslipidemia.

"Diabetic dyslipidemia means your lipid profile is going in the wrong direction. It's a deadly combination that puts patients at risk for premature coronary heart disease and atherosclerosis — where the arteries become clogged with accumulated fat and other substances," said Richard Nesto, M.D., a spokesperson for the American Heart Association.

Studies also show a link between diabetic dyslipidemia and insulin resistance, a precursor to type 2 diabetes. If you

have insulin resistance (nine out of 10 people with diabetes do), your body doesn't respond efficiently to the insulin it produces.

### **Avoiding cholesterol's bad side**

Now that you know about cholesterol, you can take steps to control it:

- Have your cholesterol checked regularly. (Ask your doctor to recommend how many times a year you should have yours checked)
- Talk to your doctor about the best plan for you.
- Eat a diet low in saturated fat, *trans* fat and cholesterol.
- Exercise regularly. (The American Heart Association recommends 30 minutes most days of the week) Physical activity helps increase your HDL "good" cholesterol.

Some people may also need to take cholesterol-lowering medications. Ask your doctor about the effects your diabetes medication may have on your cholesterol, since some may improve your lipid profile. [Learn more](#) about cholesterol medications.

## **Cholesterol Medications**

Paying close attention to what you eat and how much physical activity you get are ways to lower your high blood cholesterol. These steps are generally the first line of therapy for anyone with high cholesterol. But because you have diabetes, your risk of heart disease and stroke is much higher than for someone without diabetes. That's why your healthcare provider will encourage you to eat a healthy diet and do regular physical activity to help reach optimal values. Taking a cholesterol-lowering medication can help bring those levels to goal. Learn more about each category and the benefits, side effects and risks.

Current goal recommendations are:

- LDL — less than 100 mg/dL (an option of < 70 mg/dL in very high-risk patients)
- HDL — greater than 40 mg/dL for men and greater than 50 mg/dL for women
- triglycerides — less than 150 mg/dL

No medication should be discontinued or changed without first consulting a physician. Treatment using cholesterol-lowering medications is generally long-term. Continuing the therapy is important even when you reach a healthy cholesterol level.

### **Types of cholesterol medications**

\*Some of the major types of commonly prescribed cardiovascular medications are summarized in this section. For your information and reference, we have included generic names as well as major trade names to help you identify what you may be taking; however, the AHA is not recommending or endorsing any specific products. If your prescription medication isn't on this list, remember that your healthcare provider and pharmacist are your best sources of information. It's important to discuss all of the drugs you take with your doctor and understand their desired effects and possible side effects. Never stop taking a medication and never change your dose or frequency without first consulting your doctor.

[Statins](#)

[Fibrates](#)

[Resins](#)

[Nicotinic Acid](#)

### **Statins**

For people with diabetes, lowering LDL (bad) cholesterol is usually the first priority. Several studies indicate that lowering LDL has significant benefits, including lowering the risk for cardiovascular disease. Statins are one of the most effective drugs for reducing elevated LDL cholesterol.

Most of statins' side effects are mild and generally go away as your body adjusts. Muscle problems and liver abnormalities are rare. If you have brown urine or muscle aches and pains, contact your doctor right away.

*Side Effects:*

- Upset stomach
- Abdominal pain
- Gas
- Cramps
- Constipation
- Muscle soreness, pain and weakness
- Liver abnormalities

*Commonly prescribed statins include:*

- Atorvastatin (Lipitor)\*
- Fluvastatin (Lescol)\*
- Lovastatin (Mevacor)\*
- Pravastatin (Pravachol)\*
- Rosuvastatin Calcium (Crestor)\*
- Simvastatin (Zocor)\*

### **Fibrates**

Fibrates are best at lowering triglycerides and in some cases increasing HDL (good cholesterol) levels. These drugs are not very effective in lowering LDL (bad) cholesterol. That's why fibrates are generally used in people whose triglycerides are high or whose HDL is low, after reaching LDL goal.

For people with diabetes, it's still questionable whether increasing HDL cholesterol with fibrates in the presence of low LDL levels (lower than 3.4 mmol/L, or 130 mg/dL) will be more beneficial than statin therapy alone. Studies are ongoing.

*Side Effects:*

- Upset stomach or diarrhea
- Increased risk of gallstones
- Increased effect of blood-thinning medications
- Anemia

*Some commonly prescribed fibrates include:*

- Bezafibrate (Bezalip)\*
- Fenofibrate (Lofibra, Tricor)\*
- Gemfibrozil (Lopid)\*

### **Resins**

Resins are also called bile acid-binding drugs. Your body uses cholesterol to make bile, an acid used in the digestive process. These medicines bind to bile, so it can't be used during digestion. Your liver responds by making more bile. The more bile your liver makes, the more cholesterol it uses. That means less cholesterol is left to circulate through your bloodstream.

The effect of bile acid sequestrants is to lower LDL cholesterol by 10 to 20 percent. Sometimes these drugs are prescribed in combination with statins. When combined, they can lower LDL-cholesterol by over 40 percent.

*Side effects:*

- Constipation
- Stomach irritation or diarrhea
- Gas/Bloating/Heartburn
- Dizziness

*Some commonly prescribed medications include:*

- Cholestyramine (Questran, Prevalite, L-Cholest)\*
- Colestipol (Cholestid)\*
- Colesevalam (Welchol)\*

### **Niacin (nicotinic acid)**

This drug works in the liver by affecting the production of blood fats. Niacin is prescribed to lower triglycerides and LDL cholesterol and raise HDL ("good") cholesterol.

Niacin side effects may include flushing, itching and stomach upset. Your liver functions may be closely monitored, as niacin can cause toxicity. Nonprescription immediate release forms of niacin usually have the most side effects, especially at higher doses. Niacin is used cautiously in diabetic patients as it can raise blood sugar levels.

Niacin comes in prescription form and as "dietary supplements." Dietary supplement niacin must **not** be used as a substitute for prescription niacin. It should **not** be used for lowering cholesterol because of potential serious side effects. Dietary supplement niacin is not regulated by the U.S. Food and Drug Administration (FDA) the same way that prescription niacin is. It may contain widely variable amounts of niacin — from **none** to much more than the label states. The amount of niacin may even vary from lot to lot of the same brand. Consult your doctor before starting any niacin therapy.

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## Cholesterol & Diabetes Overview

Diabetes may be one disease, but along with it often comes many others that can put your health at risk. People with diabetes are at a significantly increased risk of cardiovascular problems like stroke and heart attack, according to the American Diabetes Association. Cholesterol management is very important for diabetics to help reduce their risk of these serious cardiovascular events. Careful monitoring, along with a healthy diet, regular exercise and medications if necessary, can help keep cholesterol under control and your health in good shape.

Read more: <http://www.livestrong.com/article/100387-cholesterol-diabetes/#ixzz0rNF40KEV>

### What Happens With Diabetes

Diabetes is a disease in which the pancreas doesn't produce enough insulin to break down the sugar in your blood from the foods that you eat, says the National Diabetes Information Clearinghouse (NDIC). In some cases, the pancreas may not produce any insulin at all. When blood sugar (glucose) levels get too high for too long, the body is significantly damaged. Diabetes damages the nerves, blood vessels and arteries, kidneys and more, says the NDIC.

### How Cholesterol Gets High

Cholesterol is a thick material that flows through the blood. It's produced by the liver, says the American Heart Association (AHA), but you also get it from the foods that you eat. Animal-based foods are major sources of dietary cholesterol, so foods like meat, chicken, whole-fat dairy (cheese, milk, yogurt, etc.) and the yolks of eggs are high in cholesterol. Diabetes actually increases cholesterol levels, but it also decreases levels of what's called "good" cholesterol, or HDL, says the AHA.

### Effects of High Cholesterol

If you eat too many foods high in cholesterol, there's more of it in your blood--and it starts to build up inside your blood vessels. Eventually, thick cholesterol buildup clogs the blood vessels so that the blood can't pass through and the blood vessels become rigid, says the NDIC. If the blood supply to the heart is restricted, a heart attack can result. If the blood supply to the brain is restricted, a stroke can result.

## Managing Diabetes

There are a number of risk factors for heart disease, and being diabetic is one. Other risk factors include being obese, having [high blood pressure](#) and high cholesterol, and smoking, says the NDIC. Good management of diabetes--which means keeping your blood sugar levels under control with medication and/or insulin (if directed by your doctor), eating a low-fat, healthy diet and getting regular exercise--can help keep cholesterol levels low and reduce the risk of heart attack and stroke.

## Managing Cholesterol

Eating a low-fat, low-cholesterol diet rich in whole grains, fruits and vegetables is a great way to lower cholesterol levels and keep them at a healthy level. The NDIC suggests eating less than 300mg of cholesterol per day, and avoid trans fats found in fast foods and many packaged desserts. It's also important to get regular exercise to lower cholesterol levels; the NDIC recommends at least 30 minutes as many days of the week as possible. If you have high cholesterol, you may also need medications to lower cholesterol levels and prevent your risk of heart attack and stroke.

Read more: <http://www.livestrong.com/article/100387-cholesterol-diabetes/#ixzz0rNFAjQYQ>

## Low Cholesterol Diet

By [The Open Source Food Team](#) on March 30th, 2010

Cholesterol is a type of waxy steroid metabolite that is found in the cell membranes and is transported within the plasma of the blood in humans. It is a vital structural component of mammalian cell membranes and are required to establish the proper membrane fluidity and permeability. Cholesterol is also an important bodily component for the construction and manufacture of steroid hormones, fat-soluble vitamins and bile acids. However, an excess of high cholesterol food consumption can result in high blood pressure, heart failure, as well as other medical maladies. It is for this reason that it is important for individuals to maintain a low cholesterol diet to reduce bad cholesterol levels.

Cholesterol diets focus on reducing cholesterol rich foods and consuming more good low and good cholesterol foods.

Read more: <http://blog.opensourcefood.com/2010/03/30/low-cholesterol-diet/?keywords=cholesterol+diet&referrer=adwords-content&adnum=3&camp=Google-Content-OSF-2&group=low+cholesterol+diets&keyword=low+cholesterol+diet&creativeid=5186979792&traffictype=content#ixzz0rNFZtuXW>

Cholesterol is found in many foods, some foods containing a much higher concentration of cholesterol than others. These foods are the ones that should be avoided or eaten only in limited, controlled quantities. Because cholesterol is not the only energy source for the body, it is a good idea to make sure it is consumed in doses to reduce harm to the circulatory system. In order to reduce cholesterol through a healthy cholesterol diet, one that does not rely on an overabundance of cholesterol, a specific set of rules and regulations must be followed to ensure overall health in the body's finer functioning.

The primary purpose of this particular cholesterol diet is to reduce the total dietary fat, more specifically, the saturated and trans fat that the body intakes on a regular basis (also known as [hydrogenated fat](#)). It is also meant to reduce the dietary cholesterol intake as well as the body's sodium intake which will effectively help reducing cholesterol build up in the body.

Cholesterol comes into the body from two primary sources. Most of the cholesterol that is in the body is produced by the liver which makes it from various nutrients such as ingested fats. Because the liver comes in contact with so much fat to be metabolized, it makes just about all cholesterol that the body needs. However, sometimes, cholesterol is included in other products that are digested by the body with the cholesterol remaining intact and adding onto the cholesterol that the body already makes. These foods include poultry, red meats, egg yolks, whole milk, dairy products, and organ meats. If one is trying to stay away from cholesterol-filled foods in a cholesterol diet, these are the big hitters of the cholesterol world. However, the sole problem with refraining from consuming any of these foods is that many of them also contain



vital proteins and calcium that the body needs for basic functioning. If one decides to not eat any of these at all, he or she would need to find an alternative source of protein and calcium to replace it in their cholesterol diet.

Just because an individual does not eat cholesterol-rich foods does not mean that he or she will not have cholesterol problems. In fact, many supplements or alternative means of protein and calcium also create an excess of sugar or fats, all of which create cholesterol when they are passed through the liver. In reality, there is no way to completely get away from cholesterol, especially if one likes meat and sugar.

Something good to do to reduce cholesterol though, is to make sure that there is ample fiber in one's diet. Fiber is known to be very important for reducing cholesterol as well as for keeping other heart diseases at bay. Around 30 grams of fiber in a day is a decent amount to go by to help reduce cholesterol. Fiber blunts hunger which gives a feeling of fullness in the stomach. In doing this, it causes individuals to not feel the need to eat in excess, which can control weight, and thus, cholesterol. Also, fiber is able to help reduce cholesterol and triglyceride levels in certain foods, sometimes even neutralizing them which allows for the body to be capable of taking more cholesterol in.

Reducing cholesterol, maintaining a good cholesterol diet and getting enough exercise is always good to keep the circulation of the blood high, thus, keeping cholesterol at bay. In doing this, one can make sure that cholesterol is never a problem

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