

What is Cholesterol?

Cholesterol is a fat-like substance that is a part of cell membranes. Your body makes most of your cholesterol in the liver. For this reason, cholesterol levels are largely determined by genetics, and high cholesterol can be an inherited trait. Eating foods high in cholesterol, saturated fats, trans fats and total fat in the diet may also affect your cholesterol levels. Most of the cholesterol in your diet comes from animal products like meats, dairy fats, and egg yolks.

High cholesterol levels contribute to plaque formation in your blood vessels, a process called *atherosclerosis*. Cholesterol plaque inside the walls of your blood vessels causes blood vessels to narrow (coronary artery disease) and increases your risk of heart attack and stroke. It is important to have your cholesterol levels (lipid profile or panel) checked routinely.

How is Cholesterol Checked?

A blood test is taken to measure the level of cholesterol in your blood. It may be done after fasting or not fasting. If it is done after not fasting, the results will be accurate for total cholesterol and HDL, but not LDL or triglyceride levels.

A fasting lipid profile measures or calculates several of the lipid parameters in your blood. It is important to measure a full lipid profile rather than just a total cholesterol level because each of the different lipid parameters is clinically important. A lipid profile gives your doctor a large amount of information about your risk for heart disease, and points to the best treatment strategies for you.

What are the Components of a Lipid Profile?

Total Cholesterol is the total level of cholesterol in your blood. A level above 200 mg/dL is considered high.

What are the Components of a Lipid Profile? *(continued)*

LDL Cholesterol, or low-density lipoprotein, is also known as “bad” cholesterol due to the proven relationship between high LDL levels and heart disease. The main goal of any cholesterol treatment program is to lower the LDL cholesterol. How much your LDL should be lowered is based on your other risk factors for heart disease. For example, an LDL level of 130 mg/dL is acceptable for a healthy person with no risk factors for heart disease. However, if you already have heart disease or other significant risk factors like diabetes or chronic kidney disease, your LDL should be lowered as much as possible. Patients in this high-risk group should have an LDL of 70 mg/dL or below.

HDL Cholesterol, or high-density lipoprotein, is also known as “good” cholesterol. Higher levels of HDL cholesterol have been shown to lower the risk of heart disease. HDL helps to clear some of the cholesterol from the bloodstream and return it to the liver. HDL goals are above 40 mg/dL for men and above 50 mg/dL for women. For patients with heart disease, HDL cholesterol should be as high as possible.

Triglycerides are fatty particles whose levels increase in conditions such as uncontrolled diabetes and obesity. Drinking too much alcohol and taking some medications may also raise triglyceride levels. High triglyceride levels (above 150 mg/dL) mean greater risk for heart disease.

The **Total Cholesterol to HDL Ratio** is an important marker of your risk for heart disease. Ideally, this number should be 3 or below.

Use the table below to compare your LDL and HDL levels:

LDL Cholesterol Levels (mg/dL)		HDL Cholesterol Levels (mg/dL)	
70 or below	lowest risk	60 or above	lower risk
100 or below	lower risk	41 to 59	moderate risk
101 to 129	moderate risk	40 or below	high risk
130 or above	high risk		

There are several common patterns of cholesterol abnormality, or *dyslipidemia*. Often, patients will have a high LDL level with the other lipid parameters at normal levels. Another common pattern is associated with the "**metabolic syndrome**." This syndrome includes a combination of features such as too much body weight, high blood pressure, diabetes and mixed dyslipidemia. Patients with metabolic syndrome may have a normal LDL level but high triglycerides and low HDL. The metabolic syndrome is an important marker of the risk of heart disease.

How Can I Improve my Cholesterol Profile?

Dietary Changes

- **Choose foods low in total fat:** Keep your fat intake to 30% or less of your total calories.
- **Choose foods low in saturated fat and cholesterol:** Monounsaturated and omega-3 fats are preferred, such as fish, soy, olive and canola oils. Limit the amount of red meat in your diet.
- **Choose dairy products that are low fat:** 1% or non-fat milk, cottage cheese, or yogurt.
- **Choose foods high in complex carbohydrates and fiber:** Whole grain breads and cereals, fresh fruits, leafy vegetables, beans and lentils.
- **Choose more plant proteins instead of animal proteins:** Lentils, soy and tofu, and beans are good alternatives 2-3 times a week or more.

Other Lifestyle Changes

- **Maintain a weight that is right for you:** Ask your health care provider about your Body Mass Index (BMI). BMI measures the relationship of your height to your weight.
- **Regular exercise:** Do aerobic exercise, like brisk walking, for at least 20-40 minutes, 3-4 times a week.

Medications for Cholesterol

Medications are used for patients who have not improved their cholesterol levels with dietary and lifestyle changes. They are also used for patients with heart disease or those at high risk for it. Your health care provider can determine whether you need prescription medication.

"Statin" drugs are the mainstay of cholesterol treatment for most patients. These medications block an enzyme in the liver that makes LDL cholesterol. They work to lower total cholesterol and LDL and have relatively little effect on other parts of the lipid profile. Statins have been proven to lower the risk of death from heart disease and are considered essential for patients who already have heart disease or who are at very high risk. These medications are widely prescribed as they are safe, effective, and well tolerated in most patients.

Medications for Cholesterol *(continued)*

Other medications for lowering LDL cholesterol are available and may be indicated in certain patients. Medications specifically designed to lower triglycerides or raise HDL cholesterol are also available and are often prescribed along with statins for these indications.

“Alternative” treatments for lowering LDL cholesterol, such as red rice yeast extract, may contain the same active ingredients that are in statins. Please tell your health care provider if you are taking any alternative medications, herbal medications or supplements.

More Ways to Learn

- Go to www.cpmc.org/learning for more information about your health.
- Visit the American Heart Association Web site at www.americanheart.org.
- Visit the National Heart, Lung and Blood Institute Web site at www.nhlbi.nih.gov, click on [Information and Publications](#) under "Patients and the Public," and then click on [Cholesterol](#) under "Heart and Vascular Diseases."

Notes and Questions to Ask My Doctor

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Note: This information is not meant to replace any information or personal medical advice which you get directly from your doctor(s). If you have any questions about this information, such as the risks or benefits of the treatment listed, please ask your doctor(s).