

What is cholesterol?

Cholesterol is a type of waxy, fatty substance known as a *lipid*. It is made in the liver, and is also acquired through diet by eating animal products such as meat, eggs, and whole milk. Your body requires cholesterol to make hormones, cellular structures, vitamin D, and the bile acids that help to digest food. It takes only a small amount of cholesterol to meet these needs and your liver makes all that is necessary, so you do not have to acquire cholesterol through diet like other nutrients.

What are the different types of cholesterol and lipids?

Total cholesterol refers to all of the cholesterol in the blood. Because cholesterol is fatty and blood is watery, the two don't mix. Cholesterol is carried in the blood by ball-shaped shells called *lipoproteins*. There are two main types of lipoproteins that carry cholesterol.

High-density lipoprotein, or HDL cholesterol, is the "good" kind. It moves easily through the blood and does not stick to the artery walls. HDL helps prevent cardiovascular disease by carrying cholesterol away from the arteries to the liver where it can be removed from the body. Think "H" for healthy—with HDL cholesterol, a high level is good.

Low-density lipoprotein or LDL cholesterol is the "bad" kind. It tends to stick to the lining of the artery walls, leading to fatty plaque buildup. With LDL cholesterol, a high level increases your risk for cardiovascular disease.

Does high cholesterol increase my risk of stroke?

There is a lot of research confirming the connection between high cholesterol levels and heart disease. The American Heart Association also cites high cholesterol as a stroke risk factor, but

the relationship between high cholesterol and stroke is a little less clear than that for heart disease and may be more complex. Lowering cholesterol, especially with medication, reduces both heart disease and stroke risk, so there is no question that maintaining or aiming for healthy cholesterol levels is a good idea.

An 11-year study of almost 30,000 women aged 45 and older found that those with the highest total cholesterol levels were nearly 2.5 times more likely to have a blocked-vessel (ischemic) stroke than women with the lowest total cholesterol levels.¹ The Women's Pooling Project, a similarly sized study, found that high cholesterol was a significant risk factor for stroke in women aged 30 to 55—especially African-American women, who had a 76% higher risk of dying of stroke. Average total cholesterol levels for this group of women ranged from a low of about 162 mg/dL to a high of 290 mg/dL. White women with the highest cholesterol had a slightly increased risk of dying from a stroke compared with those with the lowest cholesterol, but high cholesterol increased the risk 2.5-fold in African-American women.

This study also found that for all women younger than 55 at the start of the study, risk of blocked-vessel stroke increased by 23% for every 1 mmol/L (39 mg/dL) increase in total cholesterol. Stroke risk was not significantly associated with increasing cholesterol for women older than 55 at the start of the study, but the reason could be that many older women have additional stroke risk factors that reduce the impact of cholesterol by itself. For younger women, high cholesterol may indicate the future development of other risk factors, making it more likely that stroke will occur. For younger women, especially African Americans, it is crucial to monitor and manage cholesterol levels.²

Recently, an analysis of 61 studies involving about 900,000 people aged 40 to 89 found that total cholesterol was not associated with higher stroke risk in older people (over 70), and was only weakly associated with stroke in middle-aged people and people with below-average blood pressure. Given the large number of patients in this analysis, the findings are noteworthy and have been reported extensively in the media. These results don't mean that cholesterol doesn't matter if you are trying to prevent stroke—there is a large amount of evidence that cholesterol-lowering drugs reduce stroke risk just as well as they lower heart disease risk.³ In this study, the researchers looked at the effects of

total

cholesterol on stroke risk, and there is some evidence that a ratio of total cholesterol to HDL might be more accurate at predicting stroke. Total cholesterol takes into account both LDL and HDL, but in people with high levels of HDL (good) cholesterol, cholesterol could contribute to

preventing

, not causing, stroke.

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