HEALTH BASICS

LDL cholesterol

LDL cholesterol is the cholesterol carried through your blood in low-density lipoprotein particles.

WHAT IT IS
Cholesterol carried in low-density lipoprotein particles

WHERE IT COMES UP
Lipid panel results and cardiovascular risk reviews

WHY IT MATTERS
Higher levels can increase artery plaque over time

WHAT IT IS NOT
Not a disease or diagnosis

WHO TO ASK
Primary care clinician or lipid specialist

HOW IT IS CHECKED
Blood lipid panel with calculated or directly measured LDL cholesterol

Overview

LDL stands for low-density lipoprotein. Lipoproteins are particles that transport fats and cholesterol through your blood. LDL cholesterol, often written as LDL-C, is the amount of cholesterol carried inside LDL particles.

LDL is sometimes called "bad cholesterol," but that description is incomplete. Your body needs cholesterol to make cell membranes, hormones and bile acids used in digestion. The concern is having more LDL particles and cholesterol in the bloodstream than your body can clear effectively.

LDL cholesterol is not a disease or a diagnosis. It is one part of a blood test called a lipid panel. The panel usually also reports total cholesterol, HDL cholesterol and triglycerides, which are another type of blood fat.

Results may be shown in milligrams per decilitre, written as mg/dL, or millimoles per litre, written as mmol/L. Do not compare numbers that use different units without converting them.

There is no single LDL result that has the same meaning for everyone. A clinician interprets it alongside your age, blood pressure, smoking history, diabetes status, family history and whether you already have cardiovascular disease.

How it works

Your liver makes cholesterol and also receives cholesterol from food and other tissues. Because cholesterol does not dissolve in blood, it travels inside lipoprotein particles.

The liver releases particles that carry triglycerides and cholesterol to the body. As triglycerides are removed, some of these particles become LDL. Cells take up LDL through structures called LDL receptors. The liver also uses these receptors to remove LDL from the bloodstream.

An LDL-C result measures the cholesterol carried inside LDL particles. It does not directly count the particles. Two people can have similar LDL-C results but different numbers of LDL particles.

Other tests can add information in selected situations. Non-HDL cholesterol includes cholesterol carried by LDL and other particles linked with artery plaque. Apolipoprotein B, or apoB, estimates the number of these particles because each usually carries one apoB protein. These tests are not needed for every person.

Most laboratories calculate LDL-C from other lipid panel results. Some use newer equations that improve accuracy in certain ranges. A laboratory may measure LDL-C directly when calculation is less reliable, such as when triglycerides are high.

Many lipid panels can be done without fasting. However, you may be asked not to eat for a set period if triglycerides were high, a previous result was difficult to interpret or the laboratory uses a test that requires fasting. Follow the instructions provided for your test.

Why it matters for your health

LDL-containing particles can pass into artery walls. Over time, retained particles can contribute to inflammation and a fatty deposit called plaque. This process is called atherosclerosis.

Atherosclerosis can narrow arteries or make a blood clot more likely. It is involved in coronary artery disease, heart attack, ischemic stroke and peripheral artery disease. Research from genetic studies, clinical trials and other evidence supports LDL as a cause of atherosclerotic cardiovascular disease.

Risk reflects both the LDL level and how long the arteries are exposed to it. Other factors can raise or lower a person's overall cardiovascular risk. This is why an LDL result should not be interpreted by itself.

Treatment decisions also use more than one cutoff. For some people, lifestyle changes and routine monitoring may be appropriate. Others may be offered cholesterol-lowering medication because they have cardiovascular disease, diabetes, a very high LDL result or a

high overall risk. Treatment goals can include reaching a particular level, reducing LDL by a percentage, or both.

What can go wrong

LDL cholesterol can be higher because of a combination of genes, diet and health conditions. Diets high in saturated fat can raise LDL in many people. Saturated fat is found in foods such as fatty meat, butter, full-fat dairy products, coconut oil and palm oil.

Some medical conditions can affect cholesterol handling. These include an underactive thyroid, kidney disease, diabetes and certain liver or bile duct disorders. Some medicines can also change lipid results. A clinician can review whether another condition or medicine may be contributing.

Familial hypercholesterolaemia is an inherited condition that causes very high LDL from an early age. It may be considered when an LDL result is markedly high or when close relatives developed coronary artery disease at a young age. A lipid result alone does not confirm the condition; assessment may include family history, examination and sometimes genetic testing.

A calculated LDL result can be misleading when triglycerides are very high or when the sample or calculation method is unsuitable. LDL-C may also underestimate the number of harmful particles in some people, including some people with diabetes or high triglycerides. Non-HDL cholesterol or apoB may help clarify this.

An LDL result itself is not an emergency. Arrange routine follow-up to discuss a new or unexpected result, especially if it is much higher than previous results or close relatives have had early cardiovascular disease.

Call emergency services for possible heart attack or stroke signs, such as new chest pressure, sudden weakness on one side, facial drooping, severe breathing difficulty or sudden trouble speaking. These signs require emergency assessment regardless of your cholesterol results.

What you can do

Keep a copy of your full lipid panel rather than recording only LDL-C. Note the date, units, whether you were fasting and whether you were taking cholesterol-lowering medication. Comparing results from the same laboratory can sometimes make trends easier to understand.

Useful questions to ask include:

You can support cardiovascular health by replacing some saturated fats with unsaturated fats found in foods such as nuts, seeds, fish and vegetable oils. Foods rich in soluble fibre, including oats, beans and lentils, can also help lower LDL. Regular physical activity, avoiding tobacco and addressing high blood pressure or diabetes affect overall risk even when their effect on LDL is modest.

Do not start supplements or stop prescribed medication because of one result. Some supplements have uncertain benefits, can cause side effects and may interact with medicines. If medication has been recommended, ask what benefit is expected, what follow-up testing is planned and what side effects should be reported.

There is usually nothing useful to check at home: consumer devices do not replace a laboratory lipid panel. Repeat testing should follow the plan made with your healthcare service rather than being done repeatedly over a short period.

- Was my LDL calculated or measured directly?
- What is my overall cardiovascular risk?
- Could a health condition or medicine be affecting the result?
- Would non-HDL cholesterol, apoB or another test add useful information?
- When should the lipid panel be repeated?
- Does my family history suggest inherited high cholesterol?

Common questions

Is LDL the cholesterol in food?

No. LDL is a particle in your blood, while dietary cholesterol is found in food. Food labels generally list cholesterol, saturated fat and trans fat; they do not list LDL. Saturated fat often has a larger effect on blood LDL than dietary cholesterol does.

Is HDL the opposite of LDL?

Not exactly. HDL particles help transport cholesterol, but a high HDL result does not cancel out a high LDL result. Both results are interpreted as part of your wider cardiovascular risk.

Can LDL change between tests?

Yes. Results can shift because of recent illness, weight change, dietary changes, pregnancy, medicines, laboratory variation or whether the sample was fasting. A clinician may repeat an unexpected result before making a long-term decision.

Does a lower LDL always mean medication is needed?

No. The need for medication is based on overall cardiovascular risk, existing medical conditions and the expected benefit of treatment. Lifestyle measures may be enough for some people, while others benefit from both lifestyle changes and medication.

Why might my laboratory flag a result differently from another laboratory?

Laboratories may use different units, calculation methods and reference ranges. Clinical treatment goals may also differ from the laboratory's displayed range because goals are based on personal risk rather than the reference range alone.

Sources

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