

# Understanding Cholesterol, ApoB and Lp(a)

Different tests. Different information. A clearer picture for a healthier you.

**Cholesterol travels in your blood inside particles called lipoproteins.**

These particles carry fats (cholesterol and triglycerides) through your bloodstream. Some lipoproteins can increase the risk of heart attacks and strokes. Others, like HDL, are protective.

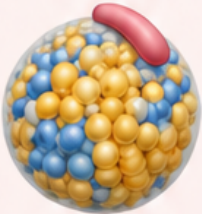
## ApoB-containing (atherogenic) lipoproteins

Contain one apoB molecule each. Can increase risk of heart disease.

## Non-apoB lipoprotein

Does not contain apoB. Generally protective.

### Chylomicron (intestinal origin)



Contains **apoB48**

Carries triglycerides dietary cholesterol from the intestine.

### VLDL (liver origin)



Contains **apoB100**

Carries triglycerides and cholesterol from the liver.

### IDL (liver origin)



Contains **apoB100**

Intermediate particle as VLDL is broken down.

### LDL (liver origin)



Contains **apoB100**

Carries cholesterol to body cells. Higher levels increase heart disease risk.

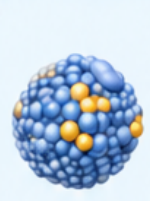
### Lp(a) (liver origin)



Contains **apoB100 plus apo(a)**

An LDL-like particle with an extra protein (apo(a)), genetically determined and independently increases heart disease risk, even when LDL-C is normal.

### HDL (liver and intestine origin)



Contains **apoA-I (no apoB)**

Helps remove excess cholesterol from the arteries. Generally protective.

**Key:** ApoB (apoB48 or apoB100) (one per particle) Apolipoprotein(a) [apo(a)] (only on Lp(a)) Cholesterol (cholesteryl esters) Triglycerides Other lipids and proteins Particle sizes are illustrative (not to scale).

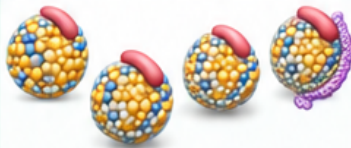
## 1. LDL-C – How much cholesterol is in LDL?



- Measures the total amount of cholesterol within all LDL particles.
- Reported in mmol/L (in Australia).
- Does not tell you how many LDL particles there are.

Think of it as: the total “cholesterol cargo” in all the LDL particles.

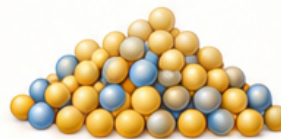
## 2. ApoB – How many atherogenic particles?



- Measures the total number of apoB-containing particles (VLDL, IDL, LDL, Lp(a) and chylomicrons).
- Each particle has one apoB molecule on its surface.
- A higher apoB means more atherogenic particles, even if each particle carries only a small amount of cholesterol.

Think of it as: the number of “cholesterol-carrying vehicles” on the road.

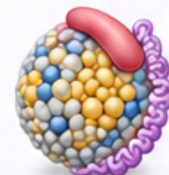
## 3. Non-HDL-C – Cholesterol in all atherogenic particles



- Calculated as: Total cholesterol minus HDL-C.
- Measures the total amount of cholesterol in all apoB-containing particles (LDL, VLDL, IDL, remnants and Lp(a)).
- Useful when triglycerides are elevated.

Think of it as: the total “cholesterol cargo” in all the atherogenic particles.

## 4. Lp(a) – A special risk factor



Lp(a) can increase the risk of heart attacks and strokes by 2-4 times independently of LDL-C.

- Lp(a) is an LDL-like particle with an extra protein called apolipoprotein(a).
- It is mainly genetically determined and not significantly lowered by diet or most cholesterol-lowering medications (except specific Lp(a)-lowering therapies).
- Contributes to LDL-C, non-HDL-C and apoB (because it contains apoB).
- Has additional harmful effects, including promoting clotting and inflammation.

Think of it as: a “double trouble” particle (atherogenic cholesterol + pro-clotting effects).

## How do these tests relate?

| Test             | What it measures                         | Main particles included              | Units (Australia)               | Key point                                      |
|------------------|------------------------------------------|--------------------------------------|---------------------------------|------------------------------------------------|
| <b>LDL-C</b>     | Cholesterol amount in LDL                | LDL (including cholesterol in Lp(a)) | mmol/L                          | Cholesterol cargo in LDL particles             |
| <b>Non-HDL-C</b> | Cholesterol amount in all apoB particles | LDL, VLDL, IDL, remnants, Lp(a)      | mmol/L                          | Cholesterol cargo in all atherogenic particles |
| <b>ApoB</b>      | Number of apoB-containing particles      | VLDL, IDL, LDL, Lp(a), chylomicrons  | g/L                             | Number of atherogenic particles                |
| <b>Lp(a)</b>     | Amount of Lp(a) particles                | Lp(a) (a type of LDL)                | nmol/L or mg/dL (lab dependent) | Independent genetic risk factor                |

## Why it matters



More atherogenic particles and higher cholesterol increase the chance of fatty build-up in your arteries (atherosclerosis), which can lead to heart attacks and strokes.



Lowering apoB-containing particles (through lifestyle and, when needed, medication) helps reduce this risk.