



# OXIDISED LDL (serum)

*Plasma levels of Ox-LDL are a sensitive biomarker of atherosclerosis. Elevated Ox-LDL is associated with accelerated atherogenesis, CAD, acute myocardial infarction, and stable and unstable angina. High Ox-LDL has also been associated with metabolic syndrome, impaired glucose tolerance and insulin resistance, and untreated overt hypothyroidism.*

Oxidised LDL forms deposits on vascular walls. The oxidation of plasma lipoproteins, in particular of LDL cholesterol can be induced by oxygen radicals leading to arteriosclerosis. This results in an increased transformation from monocytes into macrophages that then fix oxidised LDL by scavenger receptors. Cholesterol accumulates in the macrophages and transforms into foam cells which in turn promotes connective tissue deposition and atherosclerotic plaques. Oxidative stress increases the risk of plaque rupture; the inflammatory process stimulates a thrombus which eventually can cause a myocardial infarction. Elevated oxidised LDL has also been associated with metabolic syndrome, impaired glucose tolerance and insulin resistance, and untreated overt hypothyroidism.

The 'LDL oxidation' hypothesis emphasises the significance of the oxidation of lipoprotein in the initiation and progression of atherosclerosis. Oxidised LDL, together with other oxidatively modified lipids and degradation products, can contribute to the pathophysiology of the atherosclerosis by multiple mechanisms, including its pro-inflammatory, immunogenic and cytotoxic properties.

Lipid oxidation products have been found in atheroma. It has been speculated that the oxidation of LDL may happen in the sub-endothelial space of the arterial wall, a pro-oxidative environment. Increased antioxidant protection and amelioration of oxidative stress may assist in decrease of atherogenic oxidised LDL.

In vivo, oxidation of LDL is influenced by both intrinsic and extrinsic factors, such as:

## **LDL composition (intrinsic factors)**

A high proportion of polyunsaturated fatty acids confers greater susceptibility to oxidation, while a high proportion of monounsaturated or saturated fatty acids protects against oxidation. Since the propagation phase of LDL oxidation begins after the endogenous antioxidants have been consumed, susceptibility to oxidation is also highly dependent on the antioxidant content in LDL, e.g.  $\alpha$ -tocopherol, ubiquinol-10,  $\beta$ -carotene and retinol.

LDL particle type is another factor that has been shown to modify oxidative susceptibility. The small dense LDL particles are more susceptible to oxidation than large buoyant LDL particles which may be due to differences in antioxidant content. In addition, the existence of pre-formed lipid hydroperoxides in LDL may also influence the oxidative susceptibility of the particle.

## The microenvironment in which the LDL particle is located (extrinsic factors)

LDL susceptibility to oxidation in vivo is also influenced by the particle's immediate microenvironment, including local antioxidant concentrations, transition metal availability, pH and the presence of HDL and HDL-associated enzymes. The HDL-associated enzymes, PON1, paraoxonase-3 (PON3), platelet-activating factor acetyl hydrolase (PAF-AH) and LCAT, have shown the ability to protect LDL against oxidation in vitro by preventing the generation of phospholipid hydroperoxides.

### SIGNS AND SYMPTOMS ASSOCIATED WITH CARDIOVASCULAR DISEASE

Slow heartbeat (bradycardia)	Racing heartbeat (tachycardia)
Dizziness	Chest pain or discomfort
Lightheadedness	Shortness of breath
Fatigue	Fainting (syncope) or near-fainting

## OXIDISED LDL (serum) [Test code: 4029]

### ❖ Oxidised LDL

Provides information about the progress of endothelial damage and oxidative stress on cardiovascular tissue. Test results should be interpreted in context of family history and other lipid parameters.

## Other cardiovascular and hypercholesterolemia tests available:

- **Cardiovascular Profile – Comprehensive [4001]:** Cholesterol, Triglycerides, HDL, LDL, ratios, Fasting Glucose, Homocysteine, Apolipoproteins A & B, Lipoprotein (a), Fibrinogen, hsCRP
- **Cardiovascular Profile – Comprehensive 2 [4027]:** Cholesterol, Triglycerides, HDL, LDL, ratios, Fasting Glucose, Homocysteine, Apolipoproteins A & B, Lipoprotein (a), Fibrinogen, hsCRP and LIPOSCREEN LDL subfractions (x7)
- **LIPOSCREEN LDL Subfractions [4028]:** Cholesterol, Triglycerides, HDL, LDL, VLDL, IDL, LDL subfractions (x7)
- **HDL Subfractions [4030]:** Cholesterol, Triglycerides, HDL, HDL subfractions (x3)
- **LIPOSCREEN LDL Subfractions & Oxidised LDL [4031]:** Cholesterol, Triglycerides, HDL, LDL, VLDL, IDL, LDL subfractions (x7), Oxidised LDL
- **LIPOSCREEN LDL Subfractions & Oxidised LDL & HDL Subfractions [4032]:** Cholesterol, Triglycerides, HDL, LDL, VLDL, IDL, LDL subfractions (x7), Oxidised LDL; HDL subfractions (x3)

## How to order a test kit:

To order a test kit simply request the test name and/or test code on a Well Lab request form and have the patient phone Well Lab Customer Service on 03 2727 7434.



Phone 03- 2727 7434 for further details  
[www.malaysialaboratory.com](http://www.malaysialaboratory.com)

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