CV Advance Cardiac Assessment Panel
Superior Cardiovascular Disease Detection and Monitoring

Taking Preventive Cardiology to a Higher Level
CV Advance Cardiac Assessment Panel

Shiel Medical Laboratory’s CV Advance Cardiac Assessment Panel contains key biomarkers recognized as clinically relevant in identifying cardiovascular disease and CVD risk. With Shiel’s exclusive Oxidized LDL Triple Market Test as the CV Advance Panel’s core component, this panel of blood tests offers a comprehensive assessment of a patient’s cardiac health. In conjunction with the traditional lipid panel, Oxidized LDL, Oxidized LDL/HDL Ratio, hsCRP, LpPla2, Lp(a), and LipoNMR enhance blood testing protocols for the diagnosis and treatment of cardiovascular disease.

A major study, published in 2009, of 136,905 hospital admissions for CAD determined that almost half the admissions had LDL levels of <100 mg/dl. This finding makes it apparent that additional biomarkers are required to identify asymptomatic CAD before life threatening or deadly events occur. The CV Advance Cardiac Assessment Panel will identify sub-clinical CAD, stratify cardiovascular risk, foster patient compliance, and improve patient outcomes.

Oxidized LDL Triple Marker Test

- The Oxidized LDL Triple Marker Test combines three pathophysiological components of the Atherosclerotic Disease process with three corresponding biomarkers. A risk stratification is presented with a calculation of OxLDL to HDL. hsCRP is provided separately as an independent risk factor for CVD.

- Identifies significantly more patients with Coronary Artery Disease than all other currently available biomarker tests.

- Enhancement to traditional lipid testing yielding increased detection of sub-clinical coronary artery disease.

- Oxidized LDL is the only blood test that reflects Atherosclerotic Disease activity in the artery wall.

- Easy to understand test results aid in patient compliance to physician recommendations for improved cardiovascular health.

<table>
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<th>Pathophysiological Component</th>
<th>Corresponding Biomarker</th>
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<tr>
<td>1. Atherogenesis</td>
<td>1. Oxidized LDL (OxLDL)</td>
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<tr>
<td>2. Anti-Atherogenesis</td>
<td>2. High-Density Lipoprotein (HDL)</td>
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<td>3. Inflammation</td>
<td>3. High-Sensitivity CRP (hs-CRP)</td>
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Combines three pathophysiological components of the Atherosclerotic Disease process with three corresponding biomarkers. Risk stratification presented with a calculation of OxLDL to HDL. hsCRP is provided separately as an independent risk factor for CVD.
Patient compliance is improved when patients understand the test being performed. Lowering the Triple Marker Test result, and thus lowering CAD risk, is attainable through conventional treatments (dietary/lifestyle changes plus statins, if required). As shown in Fig. 1 the Oxidized LDL Triple Marker Test is significantly more effective than other currently available laboratory tests in identifying patients with CAD. Thus, the Oxidized LDL Triple Marker Test result should be especially useful in monitoring patients who modify their diet and lifestyle and/or receive therapeutic lipid-lowering medications.
• Oxidized LDL is atherogenic and directly involved in the initiation and progression of the atherosclerotic disease process.

• Oxidized LDL is a predictive biomarker for the subclinical development of atherosclerosis and subsequent events.

• The Oxidized LDL Triple Marker Test is more accurate than other laboratory tests for measuring blood lipid levels as risk factors for developing atherosclerosis.

• The Oxidized LDL Triple Marker Test measurement is independent of patient fasting.

**CV Advance - Shiel Test # 5086**

**Specimen Requirements:** One Spun SST, One Spun LipoNMR Tube (Black Top with Yellow Ring).
Oxidized LDL – Oxidized LDL is the atherogenic form of LDL. It is a plaque-specific lipoprotein that plays a key role in the atherosclerotic disease process, particularly in the deposition of cholesterol in the artery wall plaque. Found primarily in the atherosclerotic plaque and NOT in normal arteries, Oxidized LDL is directly involved in the initiation and progression of atherosclerosis: from the early-stage conversion of monocyte/macrophages into cholesterol-laden foam cells, to the late-stage development of plaque instability and rupture.

HDL – High-density-lipoprotein inhibits the pathophysiological action of Oxidized LDL. In this regard, HDL should be viewed as an oxidized LDL antagonist. HDL is also involved in the removal (reverse transport) of cholesterol from the artery walls to the blood stream, and then to the liver where cholesterol is converted to bile acids and then excreted in the bile. High HDL cholesterol levels (above 60 mg/dL) are anti-atherogenic and atheroprotective, and are associated with low risk of coronary artery disease. In contrast, low HDL cholesterol levels (less than 40 mg/dL) are associated with a high risk of coronary artery disease.

Oxidized LDL/HDL Ratio – A risk assessment that considers the atherogenesis of oxidized LDL versus the anti-atherogenesis of HDL to provide a more accurate CAD risk assessment of these two important lipid biomarkers.

hs-CRP – High-Sensitivity CRP is an independent, non-specific biomarker of inflammation and tissue injury. Chronically elevated levels of hs-CRP are associated with high cardiovascular disease (CVD) risk, whereas persistently low hs-CRP levels are associated with low CVD risk and even longevity. Very high (acute) hs-CRP levels (greater than 10.0 mg/L) are associated with infection and acute inflammation, arthritis, lupus, and other non-cardiovascular diseases. Shiel Medical Laboratory will not calculate Triple Marker Test results when the hs-CRP results are greater than 7.0 mg/L, consistent with acute inflammation.

CV Advance Cardiac Assessment Panel’s other Components

Lp(a) – The Lp(a) is a genetically inherited biomarker and elevated Lp(a) can be found in patients with normal Lipid Panel results. Excess Lp(a) is the most common disorder in patients with premature coronary artery disease and elevated levels are associated with an increased risk for development of coronary artery disease and cerebral vascular disease. Lp(a) remains relatively constant over an individual’s lifetime and is not easily modified by lifestyle changes or drugs. When Lp(a) is high it may suggest the need for more aggressive treatment of other, more treatable risk factors and goals should be to lower elevated LDL Cholesterol and/or increase HDL Cholesterol. Conditions which may contribute to an elevated level of Lp(a) include estrogen depletion, severe hypothyroidism, uncontrolled diabetes, chronic renal failure, and nephrotic syndrome. There are no known problems associated with low Lp(a).

Lp-PLA₂ – Lp-PLA₂ is a significant predictor of patients at risk for CV events and ischemic stroke and a complement to the other tests in the CV Advance Panel. Patients with elevated Lp-PLA₂ levels are at a 2-fold increase in risk for CV events and both first and recurrent strokes. Lp-PLA₂ predicts risk independent of, and complementary to, hs-CRP when evaluating a person’s level of underlying inflammation, independent of systemic inflammation, and when both Lp-PLA₂ and CRP results are elevated, risk for CHD events and stroke increase 4-fold and 11-fold. Lp-PLA₂ levels have been identified in early atherosclerosis and are associated with endothelial dysfunction.

NMR LipoProfile – NMR LipoProfile test provides a patient’s LDL particle (LDL-P) number. The higher the number of LDL particles, the greater the likelihood for them to enter the arterial wall and to form atherosclerotic plaque. LDL-P, along with LDL-C, offers a more complete picture of CVD risk for personalized LDL management. For individuals with discordant LDL-C and LDL-P levels, the LDL-attributable atherosclerotic risk is better indicated by LDL-P.
REFERENCES:


7. McConnell, Rihal, Prasad, Mathew, Lerman LO, Lerman A. Local production of Lp-PLA2...Circulation 2007;115:2715-2721