GENETRACKDiagnostics

Low-Density Lipoprotein (LDL) Cholesterol

WHAT IS LDL CHOLESTEROL?

Cholesterol is a waxy type of fat (lipid), which travels around the body in the blood. It is an essential molecule, as it is required for building cells, producing bile for digestion, and making vitamins and hormones. Cholesterol is produced in adequate quantities in the liver, but can also be obtained from foods from animals (1).

Cholesterol carried by low-density lipoproteins (LDL) is often called "bad" cholesterol. LDL deposits excess cholesterol in blood vessel walls, where it accumulates, leading to hardening of the arteries, atherosclerosis, and blood clots. LDL cholesterol levels are often considered to be the best predictor of the risk of heart disease (2).

PURPOSE OF AN LDL CHOLESTEROL TEST

Elevated cholesterol levels (particularly high LDL cholesterol) usually does not cause any symptoms until serious complications occur, such as a heart attack or stroke. This simple blood test can accurately measure cholesterol levels, allowing patients to be proactive in improving cardiovascular health before a serious health issue occurs.

LDL CHOLESTEROL REFERENCE RANGES

LDL cholesterol levels below 100 mg/dL are considered optimal for adults. Individuals at a very high risk of heart disease due to other risk factors (e.g. obesity, family history, smoking) should keep their LDL cholesterol levels below 70 mg/dL. LDL cholesterol levels above 160 mg/dL in adults are considered high and contribute to an increased risk of cardiovascular disease (3).

TESTING RECOMMENDATIONS

The Adult Treatment Panel of the National Cholesterol Education Program (NCEP) recommends that all adults 20 years of age and over should have a fasting lipoprotein profile (total cholesterol, LDL cholesterol, HDL cholesterol, and triglyceride) once every five years to screen for coronary heart disease risk (3).

ELEVATED LDL CHOLESTEROL

High levels of LDL cholesterol can result in an accumulation in the arteries and plaque formation. This significantly increases the risk of a heart attack, stroke, and peripheral artery disease (4).

Various factors can contribute to elevated LDL cholesterol, including a high intake of saturated fats (from red meat and dairy) and refined sugars, high alcohol consumption, physical inactivity, smoking, and being overweight or obese. Each of these risk factors can be modified by dietary and lifestyle changes (5). There are also risk factors that cannot be changed, including a genetic risk and other medical conditions (6).

LOWERING LDL CHOLESTEROL

A combination of losing weight, diet, and exercise are beneficial for reducing high LDL cholesterol. Specific changes include increasing fiber intake, limiting carbohydrate, alcohol, and fat intake, and choosing healthier unsaturated fats instead of saturated and trans fats. Abstaining from smoking and exercising for at least 30 minutes each day are also beneficial (7).

TEST PROCEDURE

Correct specimen collection and handling is required for optimal assay performance.

This test requires a blood sample from a finger prick. All supplies for sample collection are provided in this kit. First wash and dry hands. Warm hands aid in blood collection. Clean the finger prick site with the alcohol swab and allow to air dry. Use the provided lancet to puncture the skin in one quick, continuous and deliberate stroke. Wipe away the first drop of blood (as it may be contaminated with tissue fluid or skin debris). Massage finger to increase blood flow at the puncture site and hold in a position that gravity facilitates the collection of blood on the fingertip. Transfer the blood to the blood collection card or blood collection tube (microtainer).

Avoid squeezing or 'milking' the finger excessively. If blood flow stops, perform a second skin puncture on another finger, if more blood is required.

Dispose of all sharps safely and return sample to the laboratory in the provided prepaid return shipping envelope.

Upon receipt at the laboratory, the blood sample is analyzed by the fully automated Alinity c Direct LDL assay on the Alinity ci series analyzer. This assay determines total cholesterol levels using liquid selective detergent methodology, where the concentration of LDL cholesterol in the blood sample is proportional to the absorbance of a specific dye produced in the final step of a complex multi-step analysis.

TEST INTERPRETATION

This assay will provide an accurate LDL cholesterol level for the tested blood specimen. Optimal LDL cholesterol levels in adult serum are < 100 mg/dL, near or above optimal levels are 100 – 129 mg/dL, borderline high levels are 130 – 159 mg/dL, high levels are 160 – 189 mg/dL, and very high levels are ≥ 190 mg/dL. These values were obtained from the Alinity c Direct LDL package insert (8), which follows recommendations from the National Cholesterol Education Program (NCEP) Adult Treatment Panel III Report (3).

DISCLAIMERS/LIMITATIONS

Infections, stress, pregnancy, and certain medications can all affect cholesterol results. In addition, abnormal results may be due to other factors other than cardiovascular disease, such as disrupted liver or thyroid function.

These results should be interpreted in conjunction with other laboratory and clinical information.

Additional testing is recommended if LDL cholesterol levels are inconsistent with clinical evidence.

Correct specimen collection and handling is required for optimal assay performance.

Interferences from medication or endogenous substances may affect results.

Abnormal liver function can affect lipid metabolism and LDL cholesterol levels.

REFERENCES

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