LDL-C Ultracentrifugation (β-Quantification)

Analyte: LDL Cholesterol

Specimen Type: Serum, Inquire for additional option(s)

Optimum Volume: 2.5 mL*

2-8°C	-20°C	-70°C
5 days	2 months	2 years

Reporting units: mg/dL

Method: Ultracentrifugation

Biological or Clinical Significance:

Plasma lipoproteins are spherical particles that contain varying amounts of cholesterol, triglycerides, phospholipids and proteins. The phospholipid, free cholesterol and protein constitute the outer surface of the lipoprotein particle; the inner core contains mostly esterified cholesterol and triglycerides. These particles serve to solubilize and transport cholesterol and triglycerides in the bloodstream.

The relative proportions of protein and lipid determine the density of these plasma lipoproteins and provide a basis on which to begin their classification. The classes are: chylomicrons, very low density lipoproteins (VLDL), low density lipoproteins (LDL), and high density lipoproteins (HDL). Numerous clinical studies have shown that the different lipoprotein classes have very distinct and varied effects. The studies all point to LDL cholesterol as a key factor in the pathogenesis of atherosclerosis and coronary artery disease (CAD), while HDL cholesterol has often been observed to have a protective effect. Even within the normal range of total cholesterol concentrations, an increase in LDL cholesterol can occur with an associated increased risk for CAD.

Principle of Test Method:

The lipoprotein fractions (VLDL, IDL, LDL, and HDL) may be separated by preparative ultracentrifugation of plasma or serum. Isolation and quantification of the fractions are performed, along with measurement of total plasma cholesterol, triglycerides, or other analytes, such as apolipoprotein B, to provide a complete assessment of coronary disease risk. Using the ultracentrifuge, the lipoproteins may be separated on the basis of particle density.

The most common procedure involves flotation of VLDL at the usual non-protein solvent density of plasma, d = 1.006, with LDL, IDL, and HDL remaining in the infranate or bottom fraction. The “bottom” containing IDL, LDL, and HDL is recovered for lipid quantification. The difference between the “bottom” cholesterol and the total cholesterol represents the VLDL and chylomicrons, if present. When LDL is removed from the “bottom” (i.e. by chemical precipitation), HDL can be quantified, and LDL lipid values may be determined by the difference, i.e., LDL cholesterol equals “bottom” cholesterol minus HDL cholesterol.

* Minimum volume is 1.2 mL; 2.5 mL allows for a repeat if needed. Inquire for lower volume option (microspin) if limited volume is available.