Overview

Useful For
Assessment and management of a patient's risk for atherosclerotic cardiovascular disease
Identifying residual risk that may be present in some patients on cholesterol targeting treatment

Method Name
Nuclear Magnetic Resonance (NMR)

NY State Available
Yes

Specimen

Specimen Type
Serum Red

Specimen Required

Patient Preparation:
1. Fasting overnight (12-14 hours) is required. On night before examination, evening meal should be eaten before 6 p.m. and should contain no fatty foods.
2. Patient must not consume any alcohol for 24 hours before the specimen is collected.

Collection Container/Tube: Red top
Submission Container/Tube: Plastic vial

Specimen Volume: 1.5 mL

Collection Instructions:
1. Allow isopropyl alcohol (from phlebotomy site prep) to dry thoroughly before venipuncture.
2. Centrifuge and aliquot serum.

Specimen Minimum Volume
1 mL

Reject Due To

<table>
<thead>
<tr>
<th>Condition</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross hemolysis</td>
<td>Reject</td>
</tr>
<tr>
<td>Gross lipemia</td>
<td>Reject</td>
</tr>
<tr>
<td>Gross icterus</td>
<td>Reject</td>
</tr>
</tbody>
</table>

Specimen Stability Information
Test Definition: NMRLP
NMR Lipoprotein Profile, S

<table>
<thead>
<tr>
<th>Specimen Type</th>
<th>Temperature</th>
<th>Time</th>
<th>Special Container</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum Red</td>
<td>Refrigerated (preferred)</td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frozen</td>
<td>14 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ambient</td>
<td>8 hours</td>
<td></td>
</tr>
</tbody>
</table>

Clinical and Interpretive

Clinical Information

Low-density lipoprotein particle (LDL-P) concentration is positively associated with increased risk of atherosclerotic cardiovascular disease (ASCVD). LDL-P is heterogeneous and contains many lipids and proteins including phospholipids, triglycerides and cholesterol. LDL cholesterol is a surrogate biomarker of LDL-P.

LDL cholesterol (LDL-C) is the historical measure of atherogenic lipid burden. There is a large variance in the relative amount of cholesterol carried by each LDL-P. Consequently, subjects with similar LDL cholesterol values can have markedly different serum concentrations of LDL-P. Multiple studies have shown that serum concentrations of LDL-P more accurately reflect actual risk of ASCVD when LDL cholesterol values are discrepant.

High-density lipoprotein particle (HDL-P) concentration is inversely associated with risk of ASCVD. HDL cholesterol is also inversely associated with ASCVD since it is a surrogate marker for HDL-P. Like other lipoproteins, HDL-P is heterogeneous and particles contain highly variable proportions of proteins and lipids including phospholipids, sphingolipids and cholesterol.

Several large clinical studies have shown that HDL-P is more significantly associated with ASCVD risk than HDL cholesterol. Furthermore, HDL-P remains significantly associated with ASCVD even among subjects taking cholesterol-lowering medications. HDL-P more accurately reflects actual risk of ASCVD when HDL cholesterol values are discrepant.

Reference Values

> or =18 years:

LDL Particles:

Desirable: <1,000 nmol/L

Above Desirable: 1,000-1,299 nmol/L

Borderline high: 1,300-1,599 nmol/L

High: 1,600-2,000 nmol/L

Very high: > or =2,000 nmol/L

HDL Particles:

Male: >30 mcml/L

Female: >35 mcml/L
Test Definition: NMRLP
NMR Lipoprotein Profile, S

LDL Cholesterol (NMR):

Desirable: <100 mg/dL

Above Desirable: 100-129 mg/dL

Borderline high: 130-159 mg/dL

High: 160-189 mg/dL

Very high: > or =190 mg/dL

Reference values have not been established for patients who are <18 years of age.

**Interpretation**

Elevated concentrations of low-density lipoprotein particle (LDL-P) are associated with increased risk of atherosclerotic cardiovascular disease.

LDL-P is a more accurate indicator of risk when LDL cholesterol (LDL-C) is discordantly low.

Lower concentrations of high-density lipoprotein particle (HDL-P) are associated with increased risk of atherosclerotic cardiovascular disease.

**Cautions**

Failure to follow specimen collection requirements may prevent measurable results.

**Clinical Reference**


Test Definition: NMRLP
NMR Lipoprotein Profile, S

and Incident Cardiovascular Events: An Analysis From the JUPITER Trial (Justification for the Use of Statins in Prevention: An Intervention Trial Evaluating Rosuvastatin). Circulation 2017;Jun 20;135(25):2494-2504. doi: 10.1161/CIRCULATIONAHA.116.025678

Performance

Method Description
Lipoprotein particles are quantified in serum by nuclear magnetic resonance (NMR). The deconvoluting algorithm used is the AXINON Mayo LP Profiler software. (Instruction manual: AXINON System User Manual Version 1.3.2, 3/2018)

PDF Report
No

Day(s) and Time(s) Test Performed
Tuesday and Friday; 7 a.m.

Analytic Time
2 days

Maximum Laboratory Time
7 days

Specimen Retention Time
7 days

Performing Laboratory Location
Rochester

Fees and Codes

Fees
- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their Regional Manager. For assistance, contact Customer Service.

Test Classification
This test was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the U.S. Food and Drug Administration.

CPT Code Information
83704

LOINC® Information

<table>
<thead>
<tr>
<th>Test ID</th>
<th>Test Order Name</th>
<th>Order LOINC Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>NMRLP</td>
<td>NMR Lipoprotein Profile, S</td>
<td>In Process</td>
</tr>
<tr>
<td>Result ID</td>
<td>Test Result Name</td>
<td>Result LOINC Value</td>
</tr>
<tr>
<td>-----------</td>
<td>--------------------------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>606167</td>
<td>LDL Particles, S</td>
<td>54434-6</td>
</tr>
<tr>
<td>606168</td>
<td>HDL Particles, S</td>
<td>49748-7</td>
</tr>
<tr>
<td>606169</td>
<td>LDL Cholesterol (NMR), S</td>
<td>2089-1</td>
</tr>
</tbody>
</table>