

Overview**Useful For**

Diagnosing dyslipoproteinemia

Quantitation of cholesterol and triglycerides in very-low-density lipoprotein (VLDL), LDL, HDL, and chylomicrons

Identification of LpX

Classifying hyperlipoproteinemias (lipoprotein phenotyping)

Evaluating patients with abnormal lipid values (cholesterol, triglyceride, HDL, LDL)

Quantifying lipoprotein a (Lp[a]) cholesterol

Profile Information

Test ID	Reporting Name	Available Separately	Always Performed
TCS	Cholesterol, Total, CDC, S	No	Yes
TRIGC	Triglycerides, CDC, S	No	Yes
APLBS	Apolipoprotein B, S	No	Yes
HDLS	HDL Cholesterol, CDC, S	No	Yes
LMPP1	Lipoprotein Metabolism Profile 1	No	Yes

Special Instructions

- [Lipids and Lipoproteins in Blood Plasma \(Serum\)](#)

Method Name

Ultracentrifugation/Electrophoresis/Automated Enzymatic/Colorimetric Analysis

NY State Available

Yes

Specimen**Specimen Type**

Serum

Necessary Information

Patient's age and sex are required.

Specimen Required

Patient Preparation:

1. Fasting-overnight (12-14 hours)
2. Patient must not consume any alcohol for 24 hours before the specimen is drawn.

Collection Container/Tube:**Preferred:** Serum gel**Acceptable:** Red top**Submission Container/Tube:** Plastic vial**Specimen Volume:** 5 mL**Forms**

If not ordering electronically, complete, print, and send a [Cardiovascular Test Request](#) (T724) with the specimen.

Specimen Minimum Volume

2 mL

Reject Due To

Gross hemolysis	Reject
Gross lipemia	OK
Gross icterus	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	7 days	
	Frozen	60 days	

Clinical and Interpretive**Clinical Information**

Lipoprotein metabolism profile analysis adds practical information about the etiology of cholesterol and/or triglyceride elevation. In some patients, increased serum lipids reflect elevated levels of intermediate-density lipoprotein (IDL), very-low-density lipoprotein (VLDL), lipoprotein a (Lp[a]), or even the abnormal lipoprotein complex-LpX. These elevations can be indicative of a genetic deficiency in lipid metabolism or transport, nephrotic syndrome, endocrine dysfunction or even cholestasis. Identification of the lipoprotein associated with lipid elevation is achieved using the gold-standard methods, which include ultracentrifugation, selective precipitation, electrophoresis, and direct measurement of cholesterol and triglycerides in isolated lipoprotein fractions. Proper characterization of a patient's dyslipidemic phenotype aids clinical decisions and guides appropriate therapy.

Classifying the hyperlipoproteinemias into phenotypes places disorders that affect plasma lipid and lipoprotein concentrations into convenient groups for evaluation and treatment. A clear distinction must be made between primary (inherited) and secondary (liver disease, alcoholism, metabolic diseases) causes of dyslipoproteinemia.

Lipoprotein profiling will identify the presence of Lp(a) and LpX and distinguish between the following dyslipidemias:

- Exogenous hyperlipemia (Type I)
- Familial hypercholesterolemia (Type IIa)
- Familial combined hyperlipidemia (Type IIb)
- Familial dysbetalipoproteinemia (Type III)
- Endogenous hyperlipemia (Type IV)
- Mixed hyperlipemia (Type V)

Reference Values

Age	2-9 years	10-17 years	>18 years
Total Cholesterol (mg/dL)	* Acceptable: <170 Borderline high: 170-199 High: > or =200		** Desirable: <200 Borderline high: 200-239 High: > or = 240
Triglycerides (mg/dL)	* Acceptable: <75 Borderline high: 75-99 High: > or =100	* Acceptable: <90 Borderline high: 90-129 High: > or =130	** Normal: <150 Borderline high: 150-199 High: 200-499 Very high: > or =500
LDL Cholesterol (mg/dL)	* Acceptable: <110 Borderline high: 110-129 High: > or =130		*** Desirable: <100 Above Desirable: 100-129 Borderline high: 130-159 High: 160-189 Very high: > or =190

LDL Triglycerides (mg/dL)	< or = 50	< or = 50
Apolipoprotein B (mg/dL)	* Acceptable: <90 Borderline high: 90-109 High: > or =110	*** Desirable: <90 Above Desirable: 90-99 Borderline high: 100-119 High: 120-139 Very high: > or =140
HDL Cholesterol (mg/dL)	* Low: <40 Borderline low: 40-45 Acceptable: > 45	*** Males: > or =40 Females: > or =50
VLDL Cholesterol (mg/dL)	<30	<30
VLDL Triglycerides (mg/dL)	<90	<120
Beta VLDL Cholesterol (mg/dL)	<15	<15
Beta VLDL Triglycerides (mg/dL)	<15	<15
Chylomicron Cholesterol	Undetectable	Undetectable
Chylomicron Triglycerides	Undetectable	Undetectable
Lp(a) cholesterol	<5	<5
LpX	Undetectable	Undetectable

Reference values have not been established for patients that are <2 years of age.

* Expert Panel on Integrated Guidelines for Cardiovascular Health and Risk Reduction in Children and Adolescents

** National Cholesterol Education Program (NCEP)

***National Lipid Association

Interpretation

For discussion of primary disorders associated with dyslipidemias see [Lipids and Lipoproteins in Blood Plasma \(Serum\)](#) in Special Instructions.

Patients with increased Lp(a) cholesterol values have been associated with increased risk for the development of atherothrombotic disease. Aggressive LDL reduction is the recommended treatment approach in most patients with increased Lp(a).

Lipoprotein-X (LpX) is an abnormal lipoprotein that appears in the sera of patients with obstructive jaundice, and is an indicator of cholestasis. The presence of LpX will be reported if noted during Lp(a) cholesterol analysis.

Cautions

Reference values are based on fasting collections; it is essential that the patient fasts for 12 to 14 hours before the specimen collection.

Cholesterol results can be falsely decreased in patients with elevated levels of N-acetyl-p-benzoquinone imine (NAPQI), a metabolite of acetaminophen, N-acetylcysteine (NAC), and metamizole.

Clinical Reference

1. Grundy SM, Stone NJ, Bailey AL, et al: 2018 AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA Guideline on the Management of Blood Cholesterol: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Circulation* 2019 Jun 18;139(25):e1082-e1143
2. Expert panel on integrated guidelines for cardiovascular health and risk reduction in children and adolescents: summary report. *Pediatrics*. 2011 Dec;128 Suppl 5:S213-S256
3. Rosenson RS, Najera SD, Hegele RA: Heterozygous familial hypercholesterolemia presenting as chylomicronemia syndrome. *J Clin Lipidol*. 2017 Jan - Feb;11(1):294-296. doi: 10.1016/j.jacl.2016.12.005
4. Hopkins PN, Brinton EA, Nanjee MN: Hyperlipoproteinemia type 3: the forgotten phenotype. *Curr Atheroscler Rep*. 2014 Sep;16(9):440. doi: 10.1007/s11883-014-0440-2
5. Gotoda T, Shirai K, Ohta T, Kobayashi J, Yokoyama S, Oikawa S, et al: Diagnosis and management of type I and type V hyperlipoproteinemia. *J Atheroscler J Atheroscler Thromb*. 2012;19(1):1-12

Performance

Method Description

Serum lipoproteins are measured by a combination of electrophoresis, ultracentrifugation, enzymatic quantitation of cholesterol and triglycerides, and immunotubidometric measurement of apolipoprotein B;

Electrophoretic separation of lipoproteins followed by lipid staining and densitometry measurement: (Package insert: SPIFE Vis Cholesterol Reagent, Helena Laboratories; 09/2015)

Cholesterol: (Package insert: Roche Cholesterol Reagent, c501, Roche Diagnostics Corp; 02/2019)

Triglyceride: (Package insert: Roche Triglycerides Reagent, Roche Diagnostics Corp; 11/2017)

Apolipoprotein B: (Package insert: Tina-quant Apolipoprotein B, Roche Diagnostics Corp; 05/2019)

PDF Report

No

Day(s) and Time(s) Test Performed

Monday through Saturday; 4 p.m.

Analytic Time

3 days (not reported on Saturday or Sunday)

Maximum Laboratory Time

4 days

Specimen Retention Time

14 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 has been modified from the manufacturer's instructions. Its performance characteristics were 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

80061-Lipid panel (includes: HDL [CPT Code 83718], total cholesterol [CPT Code 82465], and triglycerides [CPT Code 84478])

82172-Apolipoprotein B

83700-Lp(a) cholesterol electrophoresis

LOINC® Information

Test ID	Test Order Name	Order LOINC Value
LMPP	Lipoprotein Metabolism Profile	In Process

Result ID	Test Result Name	Result LOINC Value
TCS	Cholesterol, Total, CDC, S	2093-3
HDLS	HDL Cholesterol, CDC, S	2085-9



Result ID	Test Result Name	Result LOINC Value
TRIGC	Triglycerides, CDC, S	2571-8
APLBS	Apolipoprotein B, S	1884-6
2839	LDL Cholesterol	2089-1
2840	LDL Triglycerides	3046-0
2844	VLDL cholesterol	2091-7
2847	VLDL triglycerides	3047-8
2842	Beta VLDL Cholesterol	66499-5
2843	Beta VLDL triglycerides	3045-2
2855	Chylomicron cholesterol	34467-1
2856	Chylomicron triglycerides	35363-1
2849	Lp(a) Cholesterol	35388-8
23924	LpX	42178-4
23937	Interpretation	59462-2