

BOSTON HEART DIAGNOSTICS

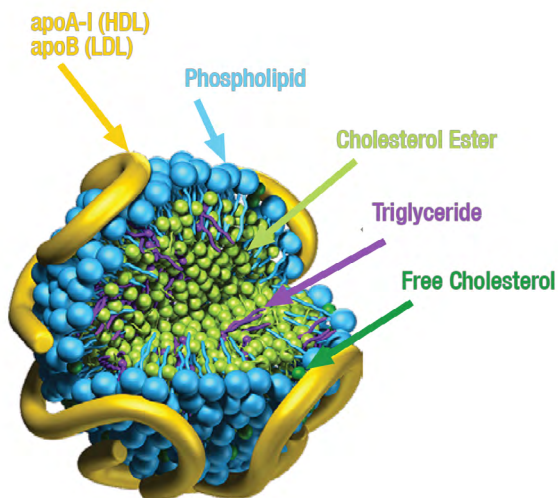
LipoMap - NMR Lipid Testing

Boston Heart is proud to offer a panel of 33 lipid tests performed by our high resolution 600 MHz NMR instruments.

This analysis provides the most complete commercially available map of lipoprotein particles for use in clinical practice. Our newer high-resolution 600 MHz NMR instruments are superior to the 400 MHz NMR used by other laboratories and now allows us to measure a large number of specific lipid, apolipoprotein and lipoprotein particle parameters.¹

Clinical Utility of LipoMap

- 50% of people who suffer a heart attack or stroke have normal LDL cholesterol^{2,3}, hinting at hidden risk factors.
- Provides a thorough tool to measure and optimize the full spectrum of lipids lipoproteins and apolipoproteins.
- Studies show that LDL Particle Number (LDL-P) and HDL Particle Number (HDL-P) are superior to LDL-C, HDL-C, and cholesterol efflux capacity measurement in CVD risk assessment.²⁻¹⁴
- Characterizes atherogenic dyslipidemia associated with metabolic syndrome and improvements resulting from treatment.
- Helps identify dysbetalipoproteinemia, familial combined hyperlipidemia, and certain genetic HDL-C deficiencies by measuring a broader array of lipoproteins such as IDL-C and particle number, VLDL-C and particle number, and the LDL-FC/LDL-C and HDL-FC/HDL-C ratios.



The most complete
assessment of lipid
metabolism
commercially
available

Tests Included with LipoMap:

Lipid, Lipoprotein, and Apolipoproteins

- Includes basic lipids, direct LDL-C, sdLDL-C, apoA-I, apoA-II, and apoB, as well as the atherogenic ratios of LDL-C/HDL-C and apoB/apoA-I.
- Greater than 96% correlation with standard chemistry tests.

Atherogenic Lipoprotein Particles

- Includes LDL, IDL, and VLDL particle numbers as well as apoB, cholesterol, and triglyceride levels in these particles.
- Provides particle number for six LDL sub-particles, with the smaller particles being the most atherogenic.
- Medications like statins lower the concentration of all LDL particles, while lifestyle changes improve the size distribution.

HDL Particles

- HDL particles protect against CVD and participate in reverse cholesterol transport to remove cholesterol from the body.
- Low values of HDL-P are associated with an increased risk of CVD.
- Lifestyle modifications improve the concentration and size distribution of HDL particles.

Lipoprotein Cholesterol Esterification

- LDL-FC/LDL-C and HDL-FC/HDL-C are the ratios of free cholesterol to esterified cholesterol within LDL and HDL.
- A high ratio indicates markedly decreased cholesterol esterification as seen in patients with liver disease or certain genetic HDL deficiency disorders.

ApoB-100 and Triglyceride in Atherogenic Lipoproteins

- Includes measurements of the amount of apoB-100 and triglycerides contained in the LDL, IDL, and VLDL particles.
- High values may be associated with an increased risk of CVD.

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ORDERING, REPORTING, AND SAMPLE INFORMATION

Ordering Information

- Order Code: **98050**







Specimen Requirements

- Specimen type: Fasting (8 hr minimum) serum collected in Greiner Bio-one Vacuette Z-serum clot activator, red/yellow top tube; or approved alternatives: NMR LipoTube (manufactured by Greiner, Inc.), or S-Monovette® Serum (Sarstedt).
- Volume: Minimum of 1mL
- Stability: 3 days at 2-8°C.

Payment Information

- A patient payment of \$99 is required.
- This test is not billed to insurance.

Lab Report of the LDL Particle Section

LDL Particles	Optimal	Borderline	Increased Risk	% of Total LDLC	LDL Particles	Interpretation	Notes	Previous Results 12.24.17
LDL1-P		157		11%		LDL1-P is Borderline, LDL2-P is Optimal, LDL3-P is Borderline, LDL4-P is Borderline, LDL5-P is Optimal and LDL6-P is high.		156
	<140	140-190	>190 nmol/L					
LDL2-P	129			9%		LDL particles range in size from very small to very large with LDL1 being the largest. Smaller particles are more atherogenic and larger particles are less atherogenic. LDL6 is the smallest and densest LDL particle and is the most atherogenic.		130
	< 150	150-200	>200 nmol/L					
LDL3-P		197		14%		Cholesterol lowering medications like statins lower the concentration of all LDL particles. Lifestyle changes like weight loss, healthy diet and exercise improve the size distribution of LDL particles resulting in a more favorable LDL particle profile.		189
	<190	190-260	>260 nmol/L					
LDL4-P		235		17%				229
	<230	230-330	>330 nmol/L					
LDL5-P	287			20%				289
	<290	290-400	> 400 nmol/L					
LDL6-P			411	29%				406
	<300	300-350	> 350 nmol/L					

For more information, contact your **Area Sales Manager** or Customer Care at **877.425.1252** or **customercare@bostonheartdx.com**

References

- Jimenez B, Holmes E, Heude C, Tolson RF, Harvey N, Lodge S, Chetwynd AJ, Cattet C, Fang F, Pearce JTM, Lewis MR, Viant MR, Lindon JC, Spraul M, Schaefer H, Nicolson JK. Quantitative lipoprotein subclass and low molecular weight metabolite analysis in human plasma and serum. *Anal Chem*. 2018 Oct 16;90(20):11962-11971. Blake GJ, Otvos JD, Rifai N, Ridker PM. Low-density lipoprotein particle concentration and size as determined by nuclear magnetic resonance spectroscopy as predictors of cardiovascular disease in women. *Circulation*. 2002; 106:1930-7.
- Otvos JD, Collins D, Freedman DS, Shalalouva I, Schaefer EJ, McNamara JR, Bloomfield HE, Robins SJ. Low density and high-density lipoprotein particle subclasses predict coronary events and are favorably changed by gemfibrozil therapy in the Veteran Affairs High Density Lipoprotein Intervention Trial. *Circulation* 2006; 113:1556-1563.
- Cromwell WC, Otvos JD, Keyes MJ, Pencina MJ, Sullivan L, Vasan RS, Wilson PW, D'Agostino RB. LDL particle number and risk of future cardiovascular disease in the Framingham Offspring Study - implications for LDL management. *J Clin Lipidol* 2007; 1:583-592.
- Mora S, Otvos JD, Rifai N, Rosenson RS, Buring JE, Ridker PM. Lipoprotein particle profiles by nuclear magnetic resonance compared with standard lipid and apolipoproteins in predicting incident cardiovascular disease in women. *Circulation* 2009; 119:931-939.
- Mackey RH, Greenland P, Goff DC Jr, Lloyd-Jones D, Sibley CT, Mora S. High-density lipoprotein cholesterol and particle concentrations, carotid atherosclerosis, and coronary events: MESA (multi-ethnic study of atherosclerosis). *J Am Coll Cardiol*. 2012; 60:508-16.
- Khera AV, Demler OV, Adelman SJ, Collins HL, Glynn RJ, Ridker PM, Rader DJ, Mora S. Cholesterol efflux capacity, high-density lipoprotein particle number, 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; 135:2494-2504.
- Ikezaki H, Lim E, Cupples LA, Liu CT, Asztalos BF, Schaefer EJ. Small dense low-density lipoprotein cholesterol is the most atherogenic lipoprotein parameter in the prospective Framingham Offspring Study. *J Am Heart Assoc*. 2021; Feb 15:e019140. Schaefer EJ, Geller AS, Endress G. The biochemical and genetic diagnosis of lipid disorders. *Curr. Opin. Lipidology* 2019; 30:56-62.
- Schaefer EJ, Tsunoda F, Diffenderfer M, Polisecki E, Thai N, Asztalos B. The Measurement of Lipids, Lipoproteins, Apolipoproteins, Fatty Acids, and Sterols, and Next Generation Sequencing for the Diagnosis and Treatment of Lipid Disorders. In: De Groot LJ, Beck-Peccoz P, Chrousos G, Dungan K, Grossman A, Hershman JM, Koch C, McLachlan R, New M, Rebar R, Singer F, Vinik A, Weickert MO, editors. *Endotext [Internet]*. South Dartmouth (MA): MDText.com, Inc;2016; Mar 29 p 1-69.
- Corral P, Geller AS, Polisecki EY, Lopez GI, Bañares VG, Cacciagu L, Berg G, Hegele RA, Schaefer EJ, Schreier LE. Unusual genetic variants associated with hypercholesterolemia in Argentina. *Atherosclerosis*. 2018;277:256-261.
- Chyzyk V, Kozmic S, Brown AS, Hudgins LC, Starc TJ, Davila AD, Blevins TC, Diffenderfer MR, He L, Geller AS, Rush C, Hegele RA, Schaefer EJ. Extreme hypertriglyceridemia: Genetic diversity, pancreatitis, pregnancy, and prevalence. *J Clin Lipidol*. 2019;13:89-99.
- Schaefer EJ, Anthonot P, Diffenderfer MR, Polisecki E, Asztalos BF. Diagnosis and treatment of high-density lipoprotein deficiency. *Prog Cardiovasc Dis*. 2016;59:97-106.
- Tani M, Horvath KV, Lamarche B, Couture P, Burnett JR, Schaefer EJ, Asztalos BF. High-density lipoprotein subpopulation profiles in lipoprotein lipase and hepatic lipase deficiency. *Atherosclerosis*. 2016;20:253:7-14.
- Geller AS, Polisecki EY, Diffenderfer MR, Asztalos BF, Karathanasis SK, Hegele RA, Schaefer EJ. Genetic and secondary causes of severe HDL deficiency and cardiovascular disease. *J Lipid Res*. 2018;59:2421-2435.

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