

nt	Gender: M Fasting: Yes BMI: 31.7	P d	Specimen	Accession No: C0292661 Requisition No: Report Date & Time: 10.26.2020 1:26 PM Received Date & Time: 10.20.2020 3:05 PM Collection Date & Time: 10.19.2020 11:10 AM
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Test Name	Optimal	Borderline	Increased Risk	Footnotes	Previous Results 10.20.20
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Inflammation and Oxidation Tests

hs-CRP		1.6			1.4
	<1.0	1.0-3.0	>3.0 mg/L		
OxPL-apoB¹	2.0				3.8
	<5.0	5.0-7.5	>7.5 nmol/L		

Interpretation: BORDERLINE hs-CRP may indicate inflammation and may be associated with increased CVD risk.

Consideration: Consider evaluating potential contributing CVD risk factors. If indicated, control blood pressure, encourage smoking cessation and weight reduction.

Test Name	Optimal	Borderline	Increased Risk	HDL Particles	Footnotes	Previous Results 10.20.20
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Boston Heart HDL Map® Test^{1,6}

α-1	39.0				28.7
	>35	25-35	<25 mg/dL		
α-2	60.6				61.8
	>55	45-55	<45 mg/dL		
α-3	13.8				20.4
	<20	20-25	>25 mg/dL		
α-4	11.1				14.2
	<20	20-25	>25 mg/dL		
preβ-1	15.4				7.4
	<20	20-25	>25 mg/dL		

Interpretation: This HDL map is **OPTIMAL** and is associated with a lower risk of CVD.

Boston Heart Cholesterol Balance® Test¹

	Normalized Value (μmol x 100/mmol of Total Cholesterol)	Normalized Value	Absolute Value	Footnotes
Production Markers: BORDERLINE				
Lathosterol		116	2.3	11
Desmosterol		81	1.6	11
Absorption Markers: LOW				
Beta-sitosterol		37	0.8	11
Campesterol		39	0.8	11
Cholesterol Balance Score (Production/Absorption)		2.9		11
Over Absorber				Over Producer

Interpretation: Elevated levels of Lathosterol and Desmosterol indicate an increased cellular production of cholesterol. Desmosterol accounts for a minor portion (20%) of overall cholesterol production. Cholesterol Balance Score is very HIGH and consistent with markedly increased cholesterol production.

Consideration: Consider lifestyle modification and statin therapy if cholesterol lowering is indicated.

Metabolic Tests

Glucose²	84			74
	70-99	100-125	<70 or >125 mg/dL	
Adiponectin¹	11.5			13.4
	>10	7-10	<7 μg/mL	

Notes Specimen: Red/yellow Z clot SST received unspun

Patie	Patient ID:	Gender: M	P	Specimen	Accession No: C0292661
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Test Name	Optimal	Borderline	Increased Risk	Interpretation	Footnotes	Previous Results 10.20.20
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Boston Heart Fatty Acid Balance™ Test¹

Saturated Fatty Acid Index			34.0	Saturated FA Index is HIGH. Higher levels of plasma saturated fatty acids are associated with an increased risk of CVD. Consider restricting dietary intake of saturated fat by choosing poultry without skin, fish, low fat dairy products, and lean cuts of meat, and replacing butter with plant based oils. Consider reducing endogenous (internal) production of saturated fat by losing weight if appropriate, limiting added sugars, refined starches, and alcohol.	30.1
	<30.0	30.0-33.0	>33.0 %		
Trans Fatty Acid Index	0.43			Trans FA Index is OPTIMAL.	0.31
	<0.50	0.50-0.70	>0.70 %		
Unsaturated/Saturated Ratio			1.90	Unsaturated/Saturated Ratio is LOW. A lower Unsaturated/Saturated Ratio Index is associated with a higher LDL-C and increased risk of CVD. Consider increasing intake of plant based fats from nuts, seeds, and their oils along with fatty fish and restrict intake of animal fats like red meat, fatty processed meats, and full fat dairy.	2.29
	>2.25	2.00-2.25	<2.00		
Omega-3 Fatty Acid Index		4.40		Omega-3 FA Index is BORDERLINE. A lower Omega-3 FA index is associated with an increased risk for CVD. Eicosapentaenoic Acid (EPA) level is BORDERLINE. Increased EPA levels have been associated with lower risk of heart disease. Docosahexaenoic Acid (DHA) level is OPTIMAL. The Omega-3 FA Index is the amount of EPA and DHA divided by total fatty acids. Consider recommending consumption of at least 2-3 meals of oily fish such as salmon, sardines, herring, tuna, and mackerel weekly or a fish oil or EPA supplement.	3.54
	>4.50	2.50-4.50	<2.50 %		
EPA		36.5			
DHA	105.1				
ALA	>100.0	60.0-100.0	<60.0 µg/mL		
ALA			10.1	Alpha Linolenic Acid (ALA) level is LOW. High levels of ALA have been associated with a lower risk of CVD. Consider recommending increasing intake of walnuts, chia seeds, ground flaxseeds, or flaxseed oil.	8.0
	>30.0	14.0-30.0	<14.0 µg/mL		
EPA/AA Ratio		0.12		EPA/AA Ratio is BORDERLINE. Some authorities indicate that an EPA/AA ratio of >0.75 is optimal, usually only achieved with supplementation.	0.09
AA/EPA Ratio	>0.17	0.07-0.17	<0.07		
		8.15		AA/EPA Ratio is BORDERLINE. Some authorities indicate that an AA/EPA ratio of <1.33 is optimal, usually only achieved with supplementation.	11.64
	<5.88	5.88-14.29	>14.29		
	Low	Mid	High		
Monounsaturated Fatty Acid Index			26.0	Values are reported according to the lowest, middle and highest thirds of our reference population. Dietary monounsaturated fats from plant sources reduce heart disease risk; however, blood levels of monounsaturated fats do not necessarily correlate closely with dietary intake. More data are needed on the complex effects of omega-6 fatty acids on cardiovascular risk.	31.2
	<20.0	20.0-23.0	>23.0 %		
Omega-6 Fatty Acid Index	34.3				34.3
	<39.0	39.0-43.0	>43.0 %		
Linoleic Acid (LA)	774.8				874.6
	<930.0	930.0-1150.0	>1150.0 µg/mL		
Arachidonic Acid (AA)		297.6			331.1
	<250.0	250.0-320.0	>320.0 µg/mL		
Omega-3/Omega-6 Ratio			0.14		0.11
	<0.07	0.07-0.10	>0.10		

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Test Name	Low	Normal	High	Footnotes	Previous Results 10.20.20
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Chemistry Tests

BUN		16.0			16.9
	<3.0	3.0-25.0	>25.0 mg/dL		
Creatinine		1.15			1.17
	<0.67	0.67-1.17	>1.17 mg/dL		
Sodium		139			140
	<135	135-146	>146 mmol/L		
Potassium		4.3			4.5
	<3.5	3.5-5.3	>5.3 mmol/L		
Chloride		101			102
	<98	98-110	>110 mmol/L		
CO ₂		23			23
	<20	20-31	>31 mmol/L		
Anion Gap		15			15
	<3	3-16	>16 mmol/L		
Total Protein		7.2			7.3
	<6.3	6.3-7.7	>7.7 g/dL		
Albumin		4.8			4.8
	<3.5	3.5-5.2	>5.2 g/dL		
Calcium		9.7			9.8
	<8.6	8.6-10.4	>10.4 mg/dL		
Total Bilirubin		0.7			0.7
		0.0-1.2	>1.2 mg/dL		
Direct Bilirubin		0.1			0.2
		0.0-0.3	>0.3 mg/dL		

Test Name	Optimal	Borderline	Increased Risk	Footnotes	Previous Results 10.20.20
Glucose ²	84				74
	70-99	100-125	<70 or >125 mg/dL		
AST	24				22
	<40	40-120	>120 U/L		
ALT	25				22
	<40	40-120	>120 U/L		
Alkaline Phosphatase	57				56
	<130	130-200	>200 U/L		

Test Name	Low	Normal	High	Footnotes	Previous Results 10.20.20
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Other Kidney Tests

Phosphorus		3.3			3.4
	<2.5	2.5-4.5	>4.5 mg/dL		
Test Name	Optimal	Borderline	Increased Risk	Footnotes	Previous Results 10.20.20
BUN/Creatinine	13.9				14.4
	<=23		>23		
eGFR / Non-African American	78				76
	>60	30-60	<30 mL/min/1.73 m ²		
eGFR / African American	90				88
	>60	30-60	<30 mL/min/1.73 m ²		

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Test Name	Low	Optimal	High	Footnotes	Previous Results
					10.20.20

Thyroid Tests

TSH		2.78		9	2.44
	<0.27	0.27-4.2	>4.2 µIU/mL		
Total T4		6.5		10	6.5
	<4.5	4.5-11.7	>11.7 ug/dL		
Free T4		1.54		10	1.39
	<0.93	0.93-1.70	>1.70 ng/dL		
Total T3		0.8		10	0.9
	<0.8	0.8-2.0	>2.0 ng/mL		
Free T3		2.6		10	2.6
	<2.0	2.0-4.4	>4.4 pg/mL		

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Specimen

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For comparison purposes only. Refer to the previous reports for complete results.*

Test Name	10.12.2020	10.20.2020	10.26.2020 (Current)
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Boston Heart HDL Map® Test^{1,6}

α-1	28.1	28.7	39.0
α-2	61.9	61.8	60.6
α-3	18.9	20.4	13.8
α-4	15.8	14.2	11.1
preβ-1	11.4	7.4	15.4

Boston Heart Cholesterol Balance® Test¹

Lathosterol	86	108	116
Desmosterol	87	98	81
Beta-sitosterol	70	62	37
Campesterol	122	55	39

Inflammation and Oxidation Tests

hs-CRP	4.2	1.4	1.6
OxPL-apoB ¹	1.4	3.8	2.0

Metabolic Tests

Glucose ²	93	74	84
Adiponectin ¹	14.0	13.4	11.5

Boston Heart Fatty Acid Balance™ Test¹

Saturated Fatty Acid Index	27.6	30.1	34.0
Trans Fatty Acid Index	0.55	0.31	0.43
Unsaturated/Saturated Ratio	2.55	2.29	1.90
Omega-3 Fatty Acid Index	1.73	3.54	4.40
EPA	<15.6	28.4	36.5
DHA	39.8	98.3	105.1
ALA	8.4	8.0	10.1
EPA/AA Ratio	0.03	0.09	0.12
AA/EPA Ratio	30.79	11.64	8.15
Monounsaturated Fatty Acid Index	24.0	31.2	26.0
Omega-6 Fatty Acid Index	45.5	34.3	34.3
Linoleic Acid (LA)	964.2	874.6	774.8
Arachidonic Acid (AA)	340.2	331.1	297.6
Omega-3/Omega-6 Ratio	0.04	0.11	0.14

Test Name	10.12.2020	10.20.2020	10.26.2020 (Current)
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Chemistry Tests

BUN	18.4	16.9	16.0
Creatinine	1.14	1.17	1.15
Sodium	142	140	139
Potassium	4.3	4.5	4.3
Chloride	106	102	101
CO ₂	24	23	23
Anion Gap	12	15	15
Total Protein	7.0	7.3	7.2
Albumin	4.5	4.8	4.8
Calcium	9.3	9.8	9.7
Total Bilirubin	0.5	0.7	0.7
Direct Bilirubin	0.1	0.2	0.1
Glucose ²	93	74	84
AST	23	22	24
ALT	24	22	25
Alkaline Phosphatase	53	56	57

Other Kidney Tests

Phosphorus	3.4	3.4	3.3
BUN/Creatinine	16.1	14.4	13.9
eGFR / Non-African American	78	76	78
eGFR / African American	91	88	90

Thyroid Tests

TSH	2.04	2.44	2.78
Total T4	6.4	6.5	6.5
Free T4	1.57	1.39	1.54
Total T3	1.1	0.9	0.8
Free T3	3.4	2.6	2.6

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Treatment Consideration Summary

The intended use of this report is to provide an aid in the physician's treatment decisions. This report is intended for a physician or other qualified health care provider. Please consult with your physician regarding any questions.

	Lifestyle and Dietary Modification	Statins	Niacin	Omega-3 Fatty Acids
Inflammation Tests				
hs-CRP	●	●	●	●
Fatty Acid Balance Test				
Unsat/Sat Ratio	●			●
Omega-3 FA Index	●			●
EPA	●			●

Lifestyle and Dietary Modification

Therapeutic lifestyle change is the cornerstone for reducing risk for Cardiovascular Disease (CVD) and diabetes.

The following recommendations are based on the American Heart Association's dietary and lifestyle guidelines. Consume a dietary pattern that achieves ≤6% of calories from saturated fat and emphasizes intake of vegetables, fruits and whole grains; includes low-fat dairy products, poultry, fatty fish, legumes, non-tropical vegetable oils and nuts; and limits intake of refined grains, sweets, sugar-sweetened beverages and red meats. Eliminate foods high in trans fat.

If indicated: control blood pressure, reduce weight, engage in smoking cessation and be physically active — work up to getting at least 30 minutes of a moderate intensity physical activity, at least 5 days per week.

- To improve Fatty Acid Balance results refer to the dietary changes provided in the Fatty Acid Balance interpretation section of this report.

Statins

According to studies, statins have been shown to reduce cholesterol production, increase LDL clearance and lower the risk of CVD and its progression. Statins can lower CoQ10 levels.

- Statins:
- lowering CRP with statin therapy has been shown to lower CVD events. Elevated CRP may indicate inflammation and CVD risk.

Niacin

Consensus guidelines recommend monitoring glycemic control after initiating niacin (nicotinic acid) treatment or increasing its dosage.

- Niacin:
- may decrease CRP by 15-24% in patients with stable coronary artery disease and metabolic syndrome.

Omega-3 Fatty Acids

Studies have shown that Omega-3 Fatty Acids are essential to heart health. Their benefits may include improved cholesterol balance, improved immune system function, reduced inflammation and reduced rates of heart disease.

- Omega-3 Fatty Acids:
- Omega-3 fatty acids may lower CRP.

To improve Fatty Acid Balance results focus on the dietary changes provided in the Fatty Acid Balance interpretation section of this report. Consuming 1-2 grams of concentrated fish oil daily or 1800 mg of EPA per day has been shown to decrease heart disease morbidity and mortality.

Notes

The following testing was not completed as it is not performed at BHDx: Leptin, Interleukin-6

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Footnotes

The intended use of this report is to provide an aid in the physician's treatment decisions. This report is intended for a physician or other qualified health care provider. Please consult with your physician regarding any questions.

¹ This test was developed and its performance characteristics determined by Boston Heart Diagnostics. It has not been cleared or approved by the U.S. Food and Drug Administration (FDA). The FDA has determined that such clearance is not necessary. This test is used for clinical purposes. It should not be regarded as investigational or for research. Methods: HDL Map: Gel electrophoresis; Cholesterol Balance and Fatty Acid Balance: GC/MS; MPO: Immunoturbidometric; CoQ10: UPLC; Adiponectin: Latex turbidimetric immunoassay; OxPL-apoB: Chemiluminescent immunoassay; LDL-P: NMR. TMAO, Cortisol, DHEA-S, DHT, Estradiol, Estrone, Progesterone, Total Testosterone, Estriol, 17OH Progesterone, Androstenedione: LC/MS/MS.

² A fasting glucose level of >125 mg/dL indicates the presence of diabetes mellitus, and a fasting glucose level of <70 mg/dL indicates hypoglycemia.

³ A test result in the low range is normal in a non-diabetic, but low if a patient has diabetes (consistent with diabetes).

⁴ Genetic analysis is performed by real time Polymerase Chain Reaction (PCR) using TaqMan® probes. Amplified gene nucleotide sites: APOE - Apolipoprotein E, T471 C rs429358, C609T rs7412; F5 - Coagulation Factor V, G1746A rs6025; F2 - Coagulation Factor 2, G20210A rs1799963; CYP2C19 (Clopidogrel response) - Cytochrome P450 2C19, G681A rs4244275, G636A rs4986893, C-806T rs12248560; SLC01B1 (Statin Myopathy) - Solute Carrier Organic Anion Transporter Family, Member 1B1, T625C rs4149056. MTHFR - Methylene tetrahydrofolate reductase, C677T rs1801133, A1298C rs1801131. Limitations: Other rare mutations not detected by these assays may be present in some individuals.

⁶ Test performed at 200 Crossing Boulevard, Framingham, MA 01702. CLIA#: 22D2100622. NYSDOH: 9021.

⁹ Biotin concentrations of up to 1200 ng/mL in patient serum have been shown to have no impact on assay results.

¹⁰ High doses of biotin (>5mg/day) may interfere with assay results. Patient assumed to be refraining from biotin supplementation for at least 3 days prior to blood draw.

¹¹ Our Cholesterol Balance Test was modified on April 1, 2019. This modification has resulted in new reference ranges. Results reported prior to April 1, 2019 should not be compared with results from this date forward.

* Tests performed with alternative methodologies are not displayed for comparative purposes.

▲ = Critical Value, ▲ = Alert Value, TNP = Test Not Performed, PEND = Test Result Pending, GSP = Glycated Serum Protein, ADA = American Diabetes Association

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