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Cardio Metabolic Report

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Date Collected:　　8/19/2016

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CardioMetabolic Report

Patient Name:	Ö[^, R͡ n	BMI:	Batch Number:	Á
Patient DOB:	2/12/1952	Gender: M	Accession Number:	Á
Physician	Á		Date Received:	8/20/2016
			Report Date:	8/24/2016

CardioMetabolic Risk Score — 2.0

Low   Moderate   High
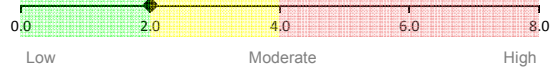
This score is a way to estimate your risk of developing diabetes and associated complications such as heart disease or stroke. It is based upon your test results in the pre-diabetes and lipoprotein profile sections of this report, which are indicators of your ability to metabolize food (glycemic control) and transport fats (lipoproteins) in your blood. The following tests have the largest impact on your pre-diabetes risk score: hemoglobin A1c, fasting blood sugar and metabolic syndrome traits. Factors that significantly affect your pre-diabetic risk but that are not included in this risk score include weight, blood pressure (hypertension), smoking, inflammation and family history.

Pre-Diabetes Risk Factors

Test			Patient Results	Reference Value
Insulin	µIU/mL		17.5	< 21.0
Glucose	mg/dL		99	70 - 105
Metabolic Syndrome Traits			3	zero
Hemoglobin A1c	%		5.1	<5.6
Adiponectin *	µg/mL	[1]	13.0	5.5 - 26.0
C-Peptide	ng/mL		3.13	0.70 - 7.10

Clinical Indications: Pre-Diabetes Biomarkers

These tests identify metabolic abnormalities that may progress into diabetes. Pre-diabetes is a condition where the body cannot efficiently metabolize foods, especially carbohydrates, resulting in impaired glycemic (blood sugar) control. Fasting glucose is a snapshot of blood sugar levels at the time your blood is collected. Hemoglobin A1C reflects your blood glucose levels over the prior three months. Prolonged elevated blood sugar will raise your hemoglobin A1C. Metabolic syndrome traits increase if you have any of the following: elevated triglycerides, low HDL or high small-dense LDL. Adiponectin is a beneficial hormone that promotes healthy metabolism of carbohydrates (sugars) and triglycerides (fats).

Lipid Panel (mg/dL)

Test			Patient Results	Reference Value
Cholesterol	mg/dL		149	<200
Triglycerides	mg/dL		315	30 - 150
HDL	mg/dL		31	>40
LDL	mg/dL		78	40 - 130
Non-HDL Cholesterol	mg/dL		118	<160

Clinical Indications: Lipid Panel

The basic Lipid Panel is a very general marker for cardiometabolic risk. This lipid panel directly measures cholesterol, not lipoproteins (which carry cholesterol.) It is now recognized that measuring lipoproteins is a more accurate and precise way to evaluate your cardiometabolic risk than measuring cholesterol since cholesterol values are normal in over 50% of people who have a heart attack or stroke. But this standard lipid panel is helpful when viewed in the context of other biomarkers, particularly your lipoprotein particle numbers. Lowering LDL-cholesterol is currently the primary target of treatment. However, elevated triglycerides and low HDL-cholesterol are highly associated with metabolic syndrome, which negatively impacts your pre-diabetic risk score.

Test			Patient Results	Reference Value
Vascular Inflammation and Biomarkers				
CRP-hs	mg/L	0.00 1.50 3.00 4.50 6.00	0.40	<3.00
Lipoprotein(a)	mg/dL	0.0 15.0 30.0 45.0 60.0	13.6	6.0 - 29.9
Apolipoprotein B	mg/dL	0 50 100 150 200	82	40 - 100
Homocysteine	µmol/L	0.0 5.5 11.0 16.5 22.0	9.4	<11.0

Clinical Indications: Vascular Inflammation and Biomarkers

These factors are important determinants of cardiometabolic risk, particularly with respect to vascular + inflammation (health of blood vessels). Apo-B (apolipoprotein B100) is a measure of all atherogenic (harmful) lipoprotein particles in the blood. Lp(a) is an extremely atherogenic lipoprotein that is strongly linked to developing thrombosis (blood clots). C-reactive protein (CRP) is an indicator of inflammation throughout the body, including the cardiovascular system. Regardless of the cause, both physical and mental stressors, infections and low grade chronic inflammation can all raise CRP, which increases cardiometabolic risk. Finally, homocysteine is a harmful protein that indicates a person's ability to methylate (detoxify) substances in the body. Elevated homocysteine is linked to thrombosis, thyroid dysfunction and Alzheimers disease (dementia).

Test			Patient Results	Reference Value
Lipoprotein Particle Numbers (nmol/L)				
VLDL Particles	nmol/L	0 43 85 128 170	119	<85
Total LDL Particles	nmol/L	0 450 900 1350 1800	609	<900
Total HDL Particles	nmol/L	14000 10500 7000 3500 0	5694	>7000
Non-HDL Particles	nmol/L	0 500 1000 1500 2000	728	<1000
Remnant Lipoprotein	nmol/L	0 75 150 225 300	99	<150
Dense LDL III	nmol/L	0 150 300 450 600	352	<300
Dense LDL IV	nmol/L	0 50 100 150 200	74	<100
Buoyant HDL 2b	nmol/L	3000 2250 1500 750 0	1339	>1500

Clinical Indications: Lipoprotein Particle Numbers

It is now recognized that measuring cholesterol, which is carried by lipoproteins, is insufficient for accurately quantifying a person's cardiometabolic risk. Lipoproteins are significant factors in causing heart disease and stroke and your lipoprotein particle numbers are clinically relevant. In particular, elevated small-dense LDL and RLP are the most strongly linked to heart attack and stroke. Conversely, large-buoyant HDL2b indicates how well HDL is clearing excess cholesterol from the body. This information reveals potential cardiovascular problems that are often missed when only using a standard lipid panel to assess risk
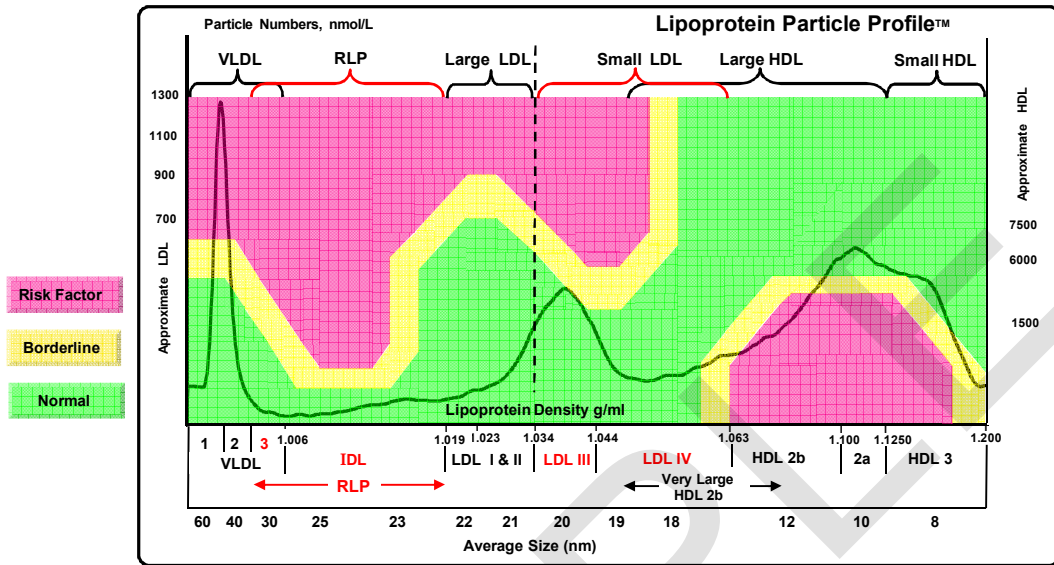
[1] The height and weight were not provided for this patient. As a result, the reference range for adiponectin could not be appropriately reported and the BMI could not be calculated.

Comments: See Micronutrient Test report for additional vitamin, mineral, antioxidant and other micronutrients contributing to pre-diabetes risk and lipid risk factors.

* For research use only

LPP Lipoprotein Particle Profile™

SpectraCell Laboratories
Science + Health + Solutions

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Laboratory Director: James W. Jacobson, Ph.D.
Lipid Science Director: Jan M. Troup, Ph.D.

Name: Doe, Jon
DOB: February 12, 1952
Physician:
Reference: SpectraCell LPP -199 7-22-2016.xls   0.0511

Batch:
Accession No:
Draw Date: August 19, 2016
Report Date: August 24, 2016

1   0.97

Lipoprotein Particle Profile™

Particle Numbers, nmol/L

VLDL   RLP   Large LDL   Small LDL   Large HDL   Small HDL

Risk Factor
Borderline
Normal

Lipoprotein Density g/ml

1 2 3 1.006   1.019 1.023 1.034 1.044   1.063   1.100 1.1250   1.200
VLDL   IDL   LDL I & II   LDL III   LDL IV   HDL 2b   2a   HDL 3
RLP   Very Large HDL 2b

Average Size (nm)
60 40 30 25 23 22 21 20 19 18 12 10 8

Lipoprotein Particle Numbers (nmol/L)

	Value	Reference Value	Alert (Notes Page 3)
VLDL Particles	119	<85	High (12)
Total LDL Particles	609	<900	
Non - HDL Particles	728	<1000	Optimal
RLP (Remnant Lipoprotein)	99	<150	
Small - Dense LDL III	352	<300	High (15)
Small - Dense LDL IV	74	<100	
Total HDL Particles	5694	>7000	Low (17)
Large - Buoyant HDL 2b	1339	>1500	Low (18)

Biomarkers and Risk Factors

	Value	Reference Value	Alert (Notes Page 3)
Apo B-100 (mg/dL)	82	40 - 100	Borderline (20)
Lp(a) (mg/dL)	13.6	6.0 - 29.9 [1]	
Metabolic Syndrome Traits	3	Zero	Probable (8)
C-Reactive Protein-hs (mg/L)	0.4	<3.0	
Insulin (uIU/mL)	17.5	< 21.0	
Homocysteine (umol/L)	9.4	<11.0	

Lipid Panel (mg/dL)

	Value	Reference Value	Alert (Notes Page 3)
Total Cholesterol	149	<200	
LDL - Cholesterol	78	40 - 130	Above Optimal
HDL - Cholesterol	31	>40	Low (3)
Triglycerides	315	30 - 150	High (4)
Non - HDL- Chol (calc)	118	<160	Above Optimal

1. Reference Value for Blacks is 50.0 mg/dL

Clinical Considerations

1	**Elevated Total Cholesterol (TC):** Borderline 200-240 mg/dL consider treatment when patient has 2 or more risk factors. High >240 mg/dL consider treatment after assessing secondary dyslipidemias. >300 mg/dL suggest higher likelihood of genetic causation.

2	**Elevated LDL-Cholesterol (LDL-C):** Follow ATPIII Guidelines for treatment goals and strategy: online at http://www.nhlbi.nih.gov/guidlines/cholesterol/atglance.htm		
	0-1 Risk Factors: Goal<160 mg/dL	2 Risk Factors: Goal<130 mg/dL	High Risk/CHD or CHD equivalent Goal: <100 mg/dL (or 70 mg/dL)

3	**Low HDL-Cholesterol (HDL-C):** Follow ATPIII Guidelines for treatment goals and strategy: See online at http://www.nhlbi.nih.gov/guidlines/cholesterol/atglance.htm	
	Males: <40 mg/dL (is 1 of 5 traits for Metabolic Syndrome)	Females: <50 mg/dL (is 1 of 5 traits for Metabolic Syndrome)

4	**Elevated Triglycerides (TG):** TG>150 mg/dL is 1 of 5 traits for Metabolic Syndrome. (Triglyceride levels can be elevated if patient is non-fasting.) Follow ATPIII Guidelines for treatment goals and strategy: See online at http://www.nhlbi.nih.gov/guidlines/cholesterol/atglance.htm		
	Borderline: 150-199 mg/dL	High: 200-499 mg/dL	Very High: 500 mg/dL Consider Genetic disorders.

5	**Non-HDL-C:** A cholesterol measurement that predicts risk better than LDL-C per the ACC & ADA consensus statement		
	Optimal:<130 mg/dL	Borderline Risk: 130-160 mg/dL	High Risk: >160 mg/dL

6	**High Lp(a). (Lp(a) >30.0):** Lp(a) is highly associated with cardiovascular disease. Lp(a) is an inherited trait and does not respond to diet, exercise, or statin drugs. Treatment for high Lp(a) is typically niacin and aggressive LDL treatment.

8	**Metabolic Syndrome Traits:** This test reports only 2 of the 5 traits associated with the ATPIII Metabolic Syndrome Definition: Elevated TG (>150 mg/dL, Low HDL-C (<40 mg/dL in men; <50 mg/dL in women). Additionally, this number adds a third feature (elevated numbers of LDLIII and LDLIV particles) which corresponds highly to metabolic syndrome/insulin resistance. Clinicians must confirm metabolic syndrome by adding values for waist circumference, fasting blood glucose and blood pressure. See ATPIII guidelines.

9	**C-Reactive Protein (hs-CRP):** Marker of Inflammation tied to increased cardiovascular risk.		
	Low Risk: 0-1 mg/L	Borderline: 1-3 mg/L	High: >3 mg/L

10	**Elevated Insulin:** (Insulin>21.0 uIU/mL): High fasting insulin is associated with increased cardiovascular risk and/or metabolic syndrome. Test units may not correlate to other labs using different methods. Insulin levels can be elevated if patient was non-fasting. Confirm that patient was properly fasted before setting goals.

11	**Elevated Homocysteine:** Intermediate in methylation pathways – risk factor for CVD, stroke, Alzheimer's and osteoporosis		
	Desirable: <11 mmol/L	Borderline: 11-15 mmol/L Consider dietary changes and/or multivitamins/ B-complex supplements.	Elevated: Above 15 mmol/L Consider dietary changes and/or multivitamins/ B-complex supplements.

12	**High VLDL Particle Number (VLDL>85 nmol/L):** No reported clinical guidance by NCEP, however this correlates to triglyceride values of over 200 mg/dL, high RLP and possible metabolic syndrome.

13	**Borderline, High to Very High LDL Particle Number (LDL>900 nmol/L):** Patients with 2 or more risk factors are recommended to initiate therapeutic lifestyle changes and/or drug therapy to lower LDL<900 nmol/L. Patients with CHD or CHD equivalents are recommended to begin LDL-lowering drug therapy to LDL<700 nmol/L. All patients with LDL particle numbers greater than 1100 nmol/L are recommended to be treated aggressively.

14	**Elevated Remnant Lipoprotein Particle Number (RLP>150 nmol/L):** This new NCEP risk factor has been shown to be highly correlated with CHD and should be monitored along with other risk factors during lifestyle, supplement and/or drug treatment. Omega-3 fatty acids have been shown to reduce triglycerides and RLP.

15	**Borderline to High LDL III Particle Number (LDL III>300 nmol/L):** Indicates and abundance of small-dense atherogenic LDL-particles. Management should be considered depending on LDL-C goals and risk factors. Reducing LDL-C and TG often will lower dense-LDL particles

16	**Elevated LDL IV (LDL IV>100 nmol/L):** Indicated abundance of very small-dense atherogenic particles. Lp(a) is found typically between d=1.05 and d=1.08 and often is located near LDL IV. Treatment for high LDL IV and Lp(a) are very similar, typically niacin and aggressive LDL-C reduction. Elevated LDL IV may also be due to high buoyant (large) HDL 2b. Very high and buoyant HDL 2b, usually seen in females, can be the result of good physical fitness or possibly a pro-inflammatory HDL enriched in Apo C-1 enriched HDL is usually also associated with low HDL 3 and low VLDL. JAMA (2005); 293: 1891-1899

17	**Low HDL particle count <7000 nmol/L, 7000 – 8000 nmol/L is Borderline for males and low for females:** Indicates potential for atherogenic dyslipidemia. Beneficial therapies similar to those which raise HDL-C and reducing elevated TG (diet, exercise, niacin, omega-3s).

18	**Risk Factor for HDL2b between 1500 and 1750 nmol/L is Borderline for males and risk factor for females. Values less than 1500 are a risk factor for males:** Indicates that the HDL reverse transport system is not working well to remove excess cholesterol.

19	**Non-HDL Particle Numbers:** Non-HDL particle numbers are the best overall indicator of CVD risk.		
	Optimal: <800 nmol/L	Borderline Risk: 800-1000 nmol/L	High Risk: >1000 nmol/L

20	**ApoB:** A measure of all non-HDL particle numbers.		
	Optimal: <80 mg/dL (goal for very high risk patients)	Borderline Risk: 80-100 mg/dL	High Risk: >100 mg/dL

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CardioMetabolic Report

Patient Name:	Doe, Jon	
Patient DOB:	2/12/1952	
Physician		

BMI:	
Gender:	M

Batch Number:	
Accession Number:	
Date Received:	8/20/2016
Report Date:	8/24/2016

CardioMetabolic Risk Score	**2.0**

0.0 2.0 4.0 6.0 8.0
Low   Moderate   High

Test Component		Flag	Result	Reference Range
Insulin	µIU/mL	B	17.5	< 21.0
Glucose	mg/dL		99	70 - 105
Metabolic Syndrome Traits		H	3	zero
Hemoglobin A1c	%		5.1	<5.6
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