LPP Lipoprotein Particle Profile™

SPECTRACELL LABORATORIES
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Name: Doe, John
DOB: February 23, 1946
Physician: Dr. Joe E. Lewis
Reference: Data\b32.2\K22060.8602.5.Rpt 0.150

Batch: B4452
Accession No: K10133
Draw Date: October 16, 2010
Report Date: March 14, 2011

Lipoprotein Particle Numbers

Green - Normal | Yellow - Borderline | Red - Abnormal

Reference Value

	Patient Results (Values in nmol/L)
VLDL Particles (0 / 42.5 / 85 / 127.5 / 170)	112
Total LDL Particles (0 / 450 / 900 / 1350 / 1800)	1031
Non - HDL Particles (0 / 500 / 1000 / 1500 / 2000)	1143
RLP (Remnant Lipoprotein) (0 / 75 / 150 / 225 / 300)	230
Small - Dense LDL III (0 / 150 / 300 / 450 / 600)	339
Small - Dense LDL IV (0 / 50 / 100 / 150 / 200)	126
Total HDL Particles (14000 / 10500 / 7000 / 3500 / 0)	7148
Large - Buoyant HDL 2b (2800 / 2100 / 1400 / 700 / 0)	1268

Biomarkers and Risk Factors

	Patient Results
Apo B-100 (mg/dL) (0 / 50 / 100 / 150 / 200)	115
Lp(a) (mg/dL) [1] (0 / 15 / 30 / 45 / 60)	42.5
Metabolic Syndrome Traits (0 / 0.75 / 1.5 / 2.25 / 3)	1
Lp-PLA2 (ng/mL) (0 / 100 / 200 / 300 / 400)	225
C-Reactive Protein-hs (mg/L) (0 / 1.5 / 3 / 4.5 / 6)	3.2
Insulin (µIU/mL) (0 / 17.5 / 35 / 52.5 / 70)	15.5
Homocysteine (µmol/L) (0 / 5.5 / 11 / 16.5 / 22)	10.2

Lipid Panel

	Values in (mg/dL)
Total Cholesterol (0 / 100 / 200 / 300 / 400)	193
LDL - Cholesterol (0 / 65 / 130 / 195 / 260)	121
HDL - Cholesterol (80 / 60 / 40 / 20 / 0)	40
Triglycerides (0 / 75 / 150 / 225 / 300)	217
Non - HDL - Cholesterol (0 / 80 / 160 / 240 / 320)	153

Comments:

1. Reference Value for Blacks is 50.0 mg/dL

Clinical Interpretation Guide to the LPP™ Test

Step 1. Primary Risk Assessment

- Lipoprotein non-HDL particle numbers and other lipid and non-lipid risk factors may show a greater patient risk than a standard lipid panel and therefore, a greater LDL reduction than indicated by a standard lipid panel. Non-HDL lipoprotein particle numbers and/or Apo B-100 are measures of the number of atherogenic lipoprotein particles and are compliant with the recent consensus statement from the American Diabetes Association and the American College of Cardiology[1] stating that lipoprotein particle numbers are more predictive of CVD risk than cholesterol.
- Moderate to elevated triglycerides can cause the lipoproteins to be cholesterol depleted or triglyceride enriched and these patients will show a greater CVD risk from non-HDL particle numbers or Apo B-100 than from a standard lipid panel. This occurs in about 30% of the population.

Step 2. Modify Risk Using Metabolic Syndrome Traits, Lp(a) and Inflammation Risk Markers

- Evaluate possible Metabolic Syndrome by combining the lipid traits from the LPP™ test with possible hypertension, obesity and high glucose. Three total traits is a diagnosis of Metabolic Syndrome and raises the CVD risk to the next level. Also check for insulin resistance using the LPP™ fasting insulin value.
- Take into account additional risk from elevated Lp(a) or inflammation markers such as hs-CRP or Lp-PLA2 if ordered, in determining the final treatment goals. Also consider non-lipid risk factors such as hypertension, obesity, high glucose, smoking, family history and other medical history.
- The risk assessment and treatment goal from **Step 1** should be adjusted in light of the presence of these additional Biomarkers and Risk Factors.
- A standard directly measured cholesterol **Lipid Panel** is presented at the bottom of the report for comparison to previously determined lipid results.

Step 3. Determine Therapeutic Approach Based On the Lipid Subgroup Distribution, Lp(a) and Therapeutic Guidelines

- Using the risk level established in **Step 2** and treatment goals from the NCEP guidelines, determine if VLDL, LDL subgroups, HDL subgroups and/or Lp(a) should be therapeutic targets.
- The LPP™ particle numbers by subgroup and Lp(a) each have a specific therapeutic approach that is most effective. Often, combination therapy is needed to address the different risk areas.
- A special HDL species enriched in Apo C-1 is atherogenic but displays health attributes[2]. It is generally identified by high HDL>70mg/dL, high HDL 2b > 4000 nmol/L with a high HDL peak or hump extending into LDL IV region and low TG's < 70 mg/dL. Check for CVD development with a CIMT, a Coronary Calcium Score or other method to confirm.
- Refer to the **LPP™ Therapeutic Guidelines** for lipoprotein subgroup specific information.

1. Diabetes Care, Volume 31, Number 4, April 2008
2. Kwiterovich P., et al. JAMA 2005; 293(15): 1891

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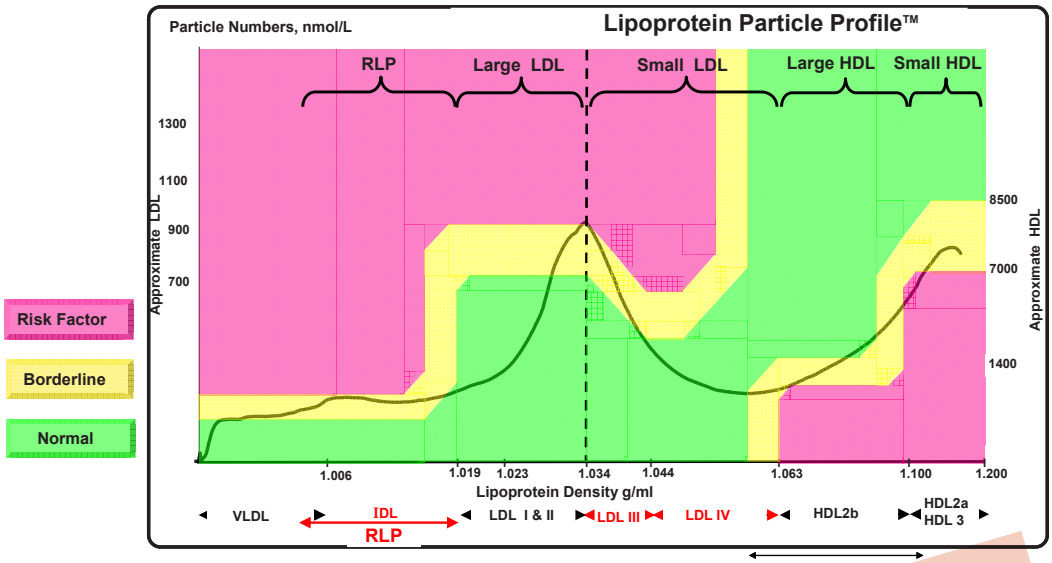

Lipoprotein Particle Numbers (nmol/L)

	Value	Reference Value	Alert (Notes Page 3)
VLDL Particles	112	<85	Borderline High (12)
Total LDL Particles	1031	<900	High (13)
Non - HDL Particles	1143	<1000	High (19)
RLP (Remnant Lipoprotein)	230	<150	High (14)
Small - Dense LDL III	339	<300	Borderline High (15)
Small - Dense LDL IV	126	<100	High (16)
Total HDL Particles	7148	>7000	Borderline-M, Low-F (17)
Large - Buoyant HDL 2b	1268	>1400	Low (18)

Biomarkers and Risk Factors

	Value	Reference Value	Alert (Notes Page 3)
Apo B-100 (mg/dL)	115	<100	High (20)
Lp(a) (mg/dL)	42.5	<30.0 [1]	High (6)
Metabolic Syndrome Traits	1	0	Possible (8)
Lp-PLA2 (ng/mL)	225	<200	Borderline (7)
C-Reactive Protein-hs (mg/L)	3.2	<3.0	High (9)
Insulin (ulU/mL)	15.5	<35.0	
Homocysteine (umol/L)	10.2	<11.0	

Lipid Panel (mg/dL)

	Value	Reference Value	Alert (Notes Page 3)
Total Cholesterol	193	<200	
LDL - Cholesterol	121	<130	Borderline High (2)
HDL - Cholesterol	40	>40	Borderline (3)
Triglycerides	217	<150	High (4)
Non - HDL- Cholesterol	153	<160	Borderline (5)

1. Reference Value for Blacks is 50.0 mg/dL

SpectraCell Clinical Suggestions for Alert References

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: See online at http://www.nhlbi.nih.gov/guidelines/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/guidelines/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 Sydnrome		
	Borderline: 150-199 mg/dl	High: 200-499 mg/dl	Very High: 500 mg/dl Consider Genetic disorders.
	Follow ATPIII Guidelines for treatment goals and strategy: See online at http://www.nhlbi.nih.gov/guidelines/cholesterol/atglance.htm *Triglyceride levels can be elevated if patient was not fasted- confirm that patient was properly fasted before setting goals.		
5	**Non-HDL-C:** A cholesterol measurement that predicts risk better than LDL-C		
	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.		
7	**High Lp-PLA2. (200 to 235 borderline, > 235 high):** Is associated with a two fold increased cardiovascular risk.		
8	**Metabolic Syndrome Traits:** This test reports only 2 of the 5 traits associated with the ATPIII Metabolic Sydrome Definition: Elevated TG (>150 mg/dl), Low HDL-C (<50 mg/dl in men; <40 mg/dl in women). Additionally, this number adds a third feature (elevat		
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 > 35.0 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 not fasted- confirm that patient was properly fasted before setting goals.		
11	**Elevated Homocysteine:** Intermediate in methylation pathways- risk factor for CVD, stroke, Alzheimers and osteoporosis		
	Ideal: <11 µmol/L	Borderline: 11-15 µmol/L: Consider dietary changes and/or multivitamins/B-complex supplements.	High: Above 15 µmol/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 > 700, 900, 1100 nmol/L):** Patients with 2 or more risk factors are recommended to initiate therapeutic lifestyle changes and/or drug therapy to lower LDL < 900nmol/L. Patients with CHD or CHD equi		
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 fa		
15	**Borderline to High LDL III Particle Number (LDL III>300 nmol/L):** Indicates an 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		
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 in the range for LDL IV. Treatment for high LDL IV and Lp(a) are very similar,		
17	**Low HDL particle count <7000 nmol/L, 7000 - 8500 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, Niaci		
18	**Risk Factor for HDL2b between 1400 and 1800 nmol/L is borderline for males and risk factor for females. Values less than 1400 is 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 is 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