

Patient: **SAMPLE**  
**PATIENT**  
DOB: November 25, 1962  
Sex: F  
MRN:

**Order Number:**  
Completed: October 14, 2009  
Received: October 9, 2009  
Collected: October 8, 2009

**Lipid Markers**

Cholesterol			Particle Concentration & Size by NMR		
	Result	Reference Range		Result	Reference Range
LDL- Cholesterol	95	< 100 mg/dL	LDL-Particle # (LDL-P)	1,050 H	< 1,000 nmol/L
HDL- Cholesterol	48 L	> 49 mg/dL	HDL-Particle # (HDL-P)	2.5 L	> 34.9 µmol/L *
Triglycerides	147	< 150 mg/dL	LDL-Size	Large (Pattern A) 23.0-20.6 * Small (Pattern B) 20.5-19.0 *	
Total Cholesterol	158	< 200 mg/dL	Lp(a)	11	< 30 mg/dL

**Independent Risk Factors**

hs-CRP	Result	Reference Range	hs-CRP	Relative Risk for Cardiovascular Disease
hs-CRP	0.89	< 1.00 mg/L	hs-CRP	1.0
Lp-PLA <sub>2</sub> (PLAC)	220 H	< 200 ng/mL	Lp-PLA <sub>2</sub>	1.75
Fibrinogen	343	168-358 mg/dL	Fibrinogen	1.2
Homocysteine	8.81	3.00 - 10.00 µmol/L	Homocysteine	1.0

**Insulin Resistance Score by Lipid Fractionation**

Insulin Resistance Score	0	100	HDL <sub>L</sub>	LDL <sub>s</sub>	VLDL <sub>L</sub>	HDL Size	LDL Size	VLDL Size
	73		2.5	255	4.5	8.4	20.0	47.6
	< 27 IR-Score *		>7.3 µmol/L *	<117.0 nmol/L *	<0.9 nmol/L *	>9.6 nm *	>21.2 nm *	<42.4 nm *

The Insulin Resistance Score combines Small LDL-Particle #, LDL Size, Large VLDL-Particle #, VLDL Size, Large HDL-Particle # and HDL Size to assess insulin resistance and diabetes risk.

 
 
 

Optimal      Borderline      Abnormal

**Percentiles Apply to Biomarkers indicated with \* and are performed using NMR technology.**

Optimal    Either 0-25th or 75-100th percentile based on reference population.

Borderline    25-75th Percentile

Abnormal    Inverse of Optimal (0-25th or 75-100th percentile distribution)

The LP(a), hs-CRP, Homocysteine, and Fibrinogen analytes have been approved by the U.S. Food and Drug Administration, and are performed by Genova Diagnostics, Inc. All other assays are performed by LipoScience, Inc. 2500 Sumner Blvd Raleigh, NC 27616

<i>Apo E</i> <span style="float: right;"><i>Apolipoprotein E : CHOLESTEROL REGULATION</i></span>	
<p><b>Location:</b> Chromosome 19 <b>APOE</b> APO E2: cys / cys APO E3: cys / arg APO E4: arg / arg <b>Your Genotype:</b></p>	<p>Apolipoprotein E (Apo E) plays a key role in lipid metabolism by helping to remove dietary cholesterol (chylomicrons and VLDL) from the bloodstream.</p>
<div style="display: flex; justify-content: space-around;"> <div style="background-color: yellow; border: 1px solid black; padding: 2px 5px; font-weight: bold;">3</div> <div style="background-color: pink; border: 1px solid black; padding: 2px 5px; font-weight: bold;">4</div> </div>	<p><b>Health Implications</b></p> <ul style="list-style-type: none"> <li>· The APO E3/4 genotype is the second most prevalent after E3/3 and accounts for &gt;25% in most populations</li> <li>· APO E4 confers a tendency toward higher total- and LDL-cholesterol and lower HDL-C</li> <li>· Risk is also increased for atherosclerosis, myocardial infarction, stroke, and osteoporosis, as well as toxicity by heavy metals such as lead and mercury</li> </ul> <p><b>Treatment Options</b></p> <ul style="list-style-type: none"> <li>· Restriction of saturated fat and cholesterol lowers total- and LDL cholesterol the most effectively in E4 individuals</li> <li>· Avoid smoking and minimize high-glycemic index foods, both of which augment E4-associated risk of coronary heart disease</li> <li>· Reduce excess weight, which synergizes with effects of E4 on insulin and lipids</li> <li>· Fish oils and exercise should improve the lipid profile, dietary fiber only moderately so</li> <li>· Alcohol may raise LDL-C in men (neutral effect in women)</li> <li>· Cholesterol responds only slightly to statin drugs in E4 carriers (especially in men)</li> <li>· Estrogen therapy is particularly efficacious for both cholesterol and bone in postmenopausal E4 carriers</li> <li>· Consider vitamin K supplementation for bone protection</li> </ul>
<p>The two SNPs lead to 3 possible variants for each chromosome, known as ApoE2, E3, &amp; E4.</p>	

<b>MTHFR</b> <span style="float: right;"><b>5,10-methyltetrahydrofolate reductase : METHYLATION</b></span>	
<p><b>Location:</b> Chromosome 1 <b>C677T</b> <b>Your Genotype:</b></p>	<p>5,10-methylenetetrahydrofolate reductase (MTHFR) is a key enzyme in folate metabolism, facilitating the formation of methyltetrahydrofolate, a required cofactor in the remethylation of homocysteine (Hcy) to methionine.</p>
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <span style="color: red; font-size: 2em;">+</span>  <span style="color: blue; font-size: 2em;">↓</span> </div> <div style="text-align: center;"> <span style="color: red; font-size: 2em;">+</span>  <span style="color: blue; font-size: 2em;">↓</span> </div> </div>	<p><b>Health Implications</b></p> <ul style="list-style-type: none"> <li>· Homozygosity for 677 (+/+) results in 60-70% reduction in MTHFR enzyme activity</li> <li>· Increased risk of high homocysteine, esp. if low levels of B2, B6, B12, or folate</li> <li>· Possible methylation impairment, including disrupted neurotransmitter metabolism and synthesis of DNA, carnitine and coenzyme Q10</li> <li>· Increased risk of autism, depression, bipolar disorder, schizophrenia, neural tube defects, congenital heart defects, cardiovascular disease, essential hypertension, atherosclerosis, diabetic retinopathy, osteoporosis</li> <li>· Increased risk of cancers of the breast (esp. if prolonged estrogen exposure and/or low folic acid intake), stomach, pancreas (esp. if smoke or drink)</li> <li>· Possibly decreased risk of colorectal cancer and lung cancer only when high folate status; otherwise increased risk</li> <li>· Low levels of vitamins B2, B6, B12, and/or folate often determines the risk of these associated disorders</li> </ul> <p><b>Treatment Options</b></p> <ul style="list-style-type: none"> <li>· Ensure adequate intake of folate-rich green vegetables; folate levels tend to be lower</li> <li>· Consider supplementation with folic acid (or folinic acid or 5-methyltetrahydrofolate), riboflavin, B6 (pyridoxal 5-phosphate), B12 (or methylcobalamin), and betaine (trimethylglycine); individuals with this genotype show the best homocysteine response to B-vitamin supplementation</li> <li>· Easier toxicity and less clinical efficacy with methotrexate chemotherapy</li> </ul>
<p><b>A1298C</b> <b>Your Genotype:</b></p>	
<div style="display: flex; justify-content: space-around;"> <div style="width: 20px; height: 10px; background-color: green; border: 1px solid black;"></div> <div style="width: 20px; height: 10px; background-color: green; border: 1px solid black;"></div> </div>	

Key on following page

FACTOR II		Factor II (Prothrombin) : COAGULATION	
<p><b>Location:</b> Chromosome 11 <b>G20210A</b> <b>Your Genotype:</b></p>		<p>Factor II is also known as prothrombin, which is converted to its active form, thrombin, and forms the essential part of a blood clot.</p>	
		<p><b>Health Implications</b></p> <ul style="list-style-type: none"> <li>· Elevated levels of prothrombin, with 3.8-fold increased risk of venous thrombosis; risk increases 20-fold if coexisting Factor V Leiden SNP</li> <li>· Increased chance of atherosclerosis, atrial fibrillation, and heart attack</li> <li>· Slightly increased risk of pre-eclampsia during pregnancy</li> </ul>	
<div style="display: flex; align-items: center; gap: 10px;"> <span style="color: red; font-size: 24px;">+</span> <span style="color: blue; font-size: 24px;">↑</span> <span style="color: green; font-size: 24px;">-</span> </div>		<p><b>Treatment Options</b></p> <ul style="list-style-type: none"> <li>· Avoid oral contraceptives, HRT, and smoking</li> <li>· Platelet activation inhibitors include: fish oils, garlic, onions, ginger, ginkgo biloba, thyme, rosemary, genistein, and aspirin</li> <li>· Glycyrrhizin (licorice) inhibits conversion of prothrombin to thrombin</li> </ul>	

FACTOR V		Factor V (Leiden) : COAGULATION	
<p><b>Location:</b> Chromosome 1 <b>R506Q</b> <b>Your Genotype:</b></p>		<p>Factor V combines with Factor X to convert prothrombin to thrombin, the essential part of a blood clot. Factor Va is held in check by Protein C.</p>	
		<p><b>Health Implications</b></p> <ul style="list-style-type: none"> <li>· Elevated levels of thrombin; 7-fold increased risk of clot formation</li> <li>· Increased chance of heart attack and atherosclerosis</li> <li>· Increased risk of miscarriage, pre-eclampsia, and placental abruption</li> </ul>	
<div style="display: flex; align-items: center; gap: 10px;"> <span style="color: red; font-size: 24px;">+</span> <span style="color: blue; font-size: 24px;">↑</span> <span style="color: green; font-size: 24px;">-</span> </div>		<p><b>Treatment Options</b></p> <ul style="list-style-type: none"> <li>· Avoid oral contraceptives; risk of DVT increases 35-fold</li> <li>· Avoid oral HRT, smoking, high homocysteine</li> <li>· Platelet activation inhibitors include: fish oils, garlic, onions, ginger, ginkgo biloba, thyme, rosemary, genistein, and aspirin</li> <li>· Glycyrrhizin (licorice) inhibits conversion of prothrombin to thrombin</li> <li>· Exercise caution with hypertension</li> </ul>	

<p><b>Key</b></p>	<p>- - Neither chromosome carries the genetic variation.</p> <p>+ - One chromosome (of two) carries the genetic variation.</p> <p>+ + Both chromosomes carry the genetic variation. <i>(You inherit one chromosome from each parent)</i></p>	<p>+ ↑ Gene activity increased</p> <p>+ ↓ Gene activity decreased</p>
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