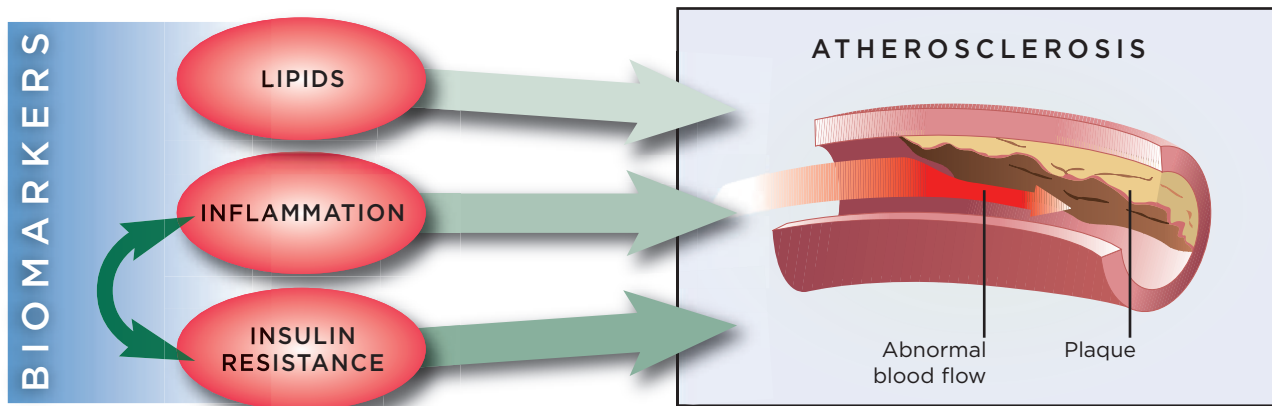


## CV Health



Heart disease is the number one cause of death of men and women in the United States and each year more than a million individuals experience a heart attack. Traditional risk factors for Coronary Artery Disease (CAD) include hypertension, obesity, cigarette smoking, diabetes, physical inactivity, family history of premature CAD, age (men >44 yrs; women >54 yrs), and abnormal serum lipids – but this only accounts for ½ of the CAD risk in the United States. Over 50% of heart attack victims and 80% of patients with CAD have normal cholesterol levels.<sup>1</sup> As little as 25% of premature CAD is attributable to elevated LDL-C.<sup>2</sup> Clearly, more comprehensive evaluation is essential for identifying the disease in its early stages.

The CV Health profile provides a combination of standard lipid measures and particle numbers, independent risk factors focused on inflammation, and lipid fractionation to identify insulin resistance risk. Together this combination of advanced biomarkers can help identify up to 84% of individuals with atherosclerosis.<sup>3</sup>

### Lipids - Know Your (Particle) Number

For the past 25 years, the emphasis on CardioVascular (CV) Risk stratification and treatment has focused on the Total Cholesterol and LDL-Cholesterol values. Recent data indicates that measurement of LDL-particle number (LDL-P) turns out to be a more accurate assessment of LDL-related

risk than LDL-C concentration. The cholesterol content of LDL particles is highly variable, but LDL-P correlates with carotid atherosclerosis, strongly predicts CAD progression and future coronary events, and is more closely associated with obesity, insulin resistance, and diabetes than LDL-C and other non-HDL markers.<sup>4,5</sup> Assessment of lipid-lowering treatment success should be based on LDL-P rather than LDL-C.

Both LDL-P & HDL are associated with CV risk. Low HDL-Particle number (HDL-P) predicts coronary events.<sup>6</sup> HDL-P is an important secondary risk factor, as it strongly relates to atherosclerosis in individuals with low (optimal) levels of LDL-P. This highlights the importance of HDL-P as a secondary treatment target (following LDL-P) – Increasing HDL-C without increasing HDL-P will offer minimal clinical benefit.

### Inflammation - JUPITER Rules!

Inflammation is pivotal in all phases of atherosclerosis, and C-reactive protein (CRP) is a robust independent risk marker in the prediction of primary and secondary adverse cardiovascular events. High-sensitivity C-Reactive Protein (hsCRP) is an independent risk marker for coronary events in individuals without overt hyperlipidemia, thus adding information to risk stratification. The JUPITER trial investigated whether statins would decrease CVD in healthy men and women

with LDL < 130 and hsCRP >2. There was a 47 percent reduction in CVD and a 20% reduction in all cause mortality achieved by lowering hs-CRP levels.<sup>7</sup> Increased levels of hsCRP are associated with increased risk of cardiac death in patients with previous MI,<sup>8</sup> CAD, and diabetes, suggesting a key role for inflammation in the pathogenesis of these conditions. Levels of hsCRP tend to be higher in hypertension, metabolic syndrome, and aging.<sup>9</sup>

Lipoprotein-associated phospholipase A2 (Lp-PLA2, also known as PLAC) is an enzyme produced by intimal-based macrophages and foam cells in the early stages of atherosclerotic plaque formation.<sup>10</sup> Lp-PLA2 activity promotes inflammation and plaque instability.<sup>11</sup> Levels of Lp-PLA2 reflect atherosclerosis disease activity as opposed to plaque burden.<sup>10</sup> This is significant because most heart attacks and sudden coronary deaths are attributable to plaque rupture at sites of only moderate stenosis.<sup>10</sup> Lp-PLA2 is also a specific marker for vascular inflammation; i.e., levels are unaffected by common infections or arthritis.<sup>12</sup>

### Insulin Resistance – Not Just about obesity!

Recent NHANES III data indicates that 20% of people with a normal Body Mass Index (BMI < 25) and 50% of men and women who are overweight (BMI 25-30) may have insulin resistance. As treatment strategies are based upon the degree of insulin resistance, the *Insulin Resistance Score* will help to delineate how best to treat these clients.

Insulin Resistance leads to increased production of VLDL in the body → higher concentrations of triglycerides → alterations in fat metabolism enzymes → an atherogenic lipoprotein profile.<sup>13</sup> The *Insulin Resistance Score* combines lipid sub-fraction particles and size to provide an overall assessment of insulin resistance and diabetes risk.<sup>14</sup>

Insulin resistance promotes the inflammation and oxidative stress that drives atherogenesis, and is the ultimate catalyst for glucose intolerance, dyslipidemia, and hypertensive damage. Successful treatment necessitates attention to each of these areas.

### The Next Step

The new and unique CV Health Profile allows the practitioner to gather all of the major risk factors for cardiovascular disease together in one place. By evaluating each and every high risk patient:

Traditional Risk Factors Require Advanced Testing	
●	Men over 44, Women over 54
●	Family history of cardiovascular disease
●	History of hypertension
●	Current obesity or overweight (BMI > 25)
●	Elevated LDL-C, elevated Triglycerides, low HDL
●	Inflammatory disease
●	Smoking
●	Sedentary lifestyle

→ *The practitioner can determine specific physiologic imbalances and personalize the treatment approach with diet, exercise, nutritional supplements and targeted pharmaceutical agents.*

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