

SgxHD® Advanced Testing and Wellness Education

Benefits of Singulex Advanced CVD Testing:

- Proprietary high precision single-molecule counting technology provides an unprecedented level of insight to assess patient risk.
- Stable biomarkers allow for targeted and accurate monitoring of therapies.
- Broad coverage of available biomarkers provides comprehensive and functional assessment of patient cardiovascular health.
- Commitment to cutting edge research promises clinically valuable additions to our test menu.
- Ongoing physician and patient support.

Enhanced Cardiovascular Test Menu: Exclusive to Singulex

CARDIAC DYSFUNCTION	VASCULAR INFLAMMATION AND DYSFUNCTION	DYSLIPIDEMIA	CARDIOMETABOLIC STATUS	
<ul style="list-style-type: none">• SgxHD® cTnI*• NT-proBNP	<ul style="list-style-type: none">• SgxHD® Endothelin*• SgxHD® IL-6*• SgxHD® IL-17A*• SgxHD® TNF-α*• PLAC® Test for Lp-PLA₂• hs-CRP• Homocysteine• Vitamin B12• Folate	<ul style="list-style-type: none">• Cholesterol (total)• LDL-C (direct)• HDL-C (direct)• Triglycerides• ApoB• sd-LDL*• ApoA-1• HDL2b*• Lp(a)	<ul style="list-style-type: none">• PTH• Vitamin D• Calcium• Magnesium• Leptin*• Adiponectin*• Ferritin• Cortisol• Testosterone	<ul style="list-style-type: none">• Cystatin C• HbA1c• Glucose• Insulin• TSH, T3 (Free), T4 (Free)• Uric Acid• Sex Hormone Binding Globulin

CVMedHome

The CVMedHome Personalized Wellness Program empowers physicians and patients to better manage heart health by offering one-on-one clinical health education with a licensed RN and online interactive tools in addition to our enhanced CVD testing services, providing a personalized wellness management solution.

For more information, visit us at www.singulex.com, or call 1-800-400-4344.



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Singulex
Advanced CVD
Testing Services



Singulex Testing Services for Cardiovascular Wellness

Our advanced cardiovascular disease (CVD) test menu features proprietary high precision, high sensitivity **SgxHD®** tests, allowing for the measurement of biomarker concentrations at previously undetectable levels. This insight provides physicians with a valuable monitoring tool that can facilitate earlier diagnosis and more effective management of chronic disease progression prior to the onset of acute clinical symptoms.^{1, 2}

DYSLIPIDEMIA

The dyslipidemia markers provide greater detail by identifying the quantity and quality of the cholesterol particles.

- **Lipids** – Group of blood tests that includes total cholesterol, HDL-cholesterol, LDL-cholesterol (direct measure), and triglycerides.
- **ApoB** – Apolipoprotein found on pro-atherogenic particles. Elevated ApoB carries a 2–3X increased risk of CVD.³
- **sd-LDL*** – Small dense LDL particles are considered highly atherogenic because they are able to enter into the endothelial lining and are easily oxidized. An elevated sd-LDL carries a 3X increased risk of heart disease.⁴
- **ApoA-1** – Apolipoprotein is primarily found on HDL cholesterol particles and is involved in reverse cholesterol transport. Elevated levels of ApoA-1 are indicative of lower CVD risk.⁵
- **HDL2b*** – Largest and most cardioprotective HDL particle. Low HDL2b is associated with increased CVD risk and progression of CVD.⁶
- **Lp(a)** – Elevated Lp(a) is inherited and carries up to a 3.7X increase in CVD risk.⁷

VASCULAR INFLAMMATION AND DYSFUNCTION

The inflammation and dysfunction markers are designed to assess risk for developing atherosclerosis, progression of atherosclerosis, or the possibility of plaque rupture.

- **SgxHD® Endothelin*** – Proinflammatory peptide that is the most potent vasoconstrictor known. Elevations are associated with kidney dysfunction, sleep apnea, and a 6X increased risk of rapid coronary artery disease (CAD) progression.^{8, 9, 10, 11}
- **SgxHD® IL-6*** – Proinflammatory cytokine produced by immune cells that may be found within arterial plaque lesions, which are associated with clinical and subclinical CAD.¹²
- **SgxHD® IL-17A*** – Proinflammatory cytokine that plays an important role in vascular remodeling and dysfunction. Elevated values may be associated with the development and progression of CVD.¹³

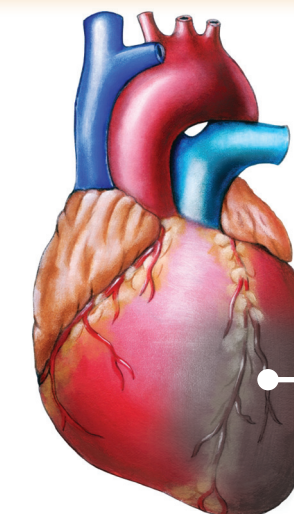
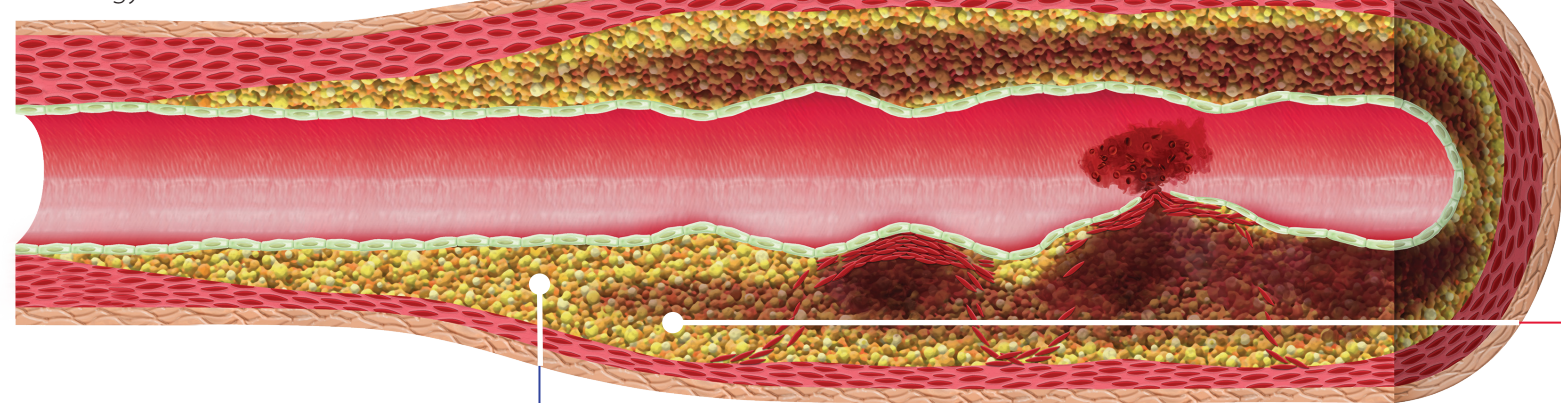
- **SgxHD® TNF-α*** – Acute phase reactant released by macrophages, resulting in stimulation of the inflammatory cascade, plaque development, and endothelial dysfunction.¹⁴
- **PLAC® Test for Lp-PLA₂** – Vascular-specific inflammatory enzyme implicated in the formation of rupture-prone plaque. Elevated Lp-PLA₂ and hs-CRP together carry an 11X increase in risk of ischemic stroke.¹⁵
- **hs-CRP** – Generalized inflammatory marker associated with increased risk of CVD and stroke.¹⁶
- **Homocysteine** – Elevated levels may be related to (or are often associated with) vitamin B12 and folate deficiencies, and are a risk markers for heart disease.¹⁷

CARDIAC DYSFUNCTION

The cardiac dysfunction markers are used to assess the function of the heart.

- **SgxHD® Cardiac Troponin I (cTnI)*** – Released as a result of cardiac muscle injury. Sgx HD® cTnI can measure concentrations in healthy individuals that are far below the lower limit of quantification of hospital-based cTnI assays. Elevations above physiological healthy levels carry up to an 8.5X increased risk of CVD death.^{18, 19}
- **NT-proBNP** – A prognostic marker of cardiac dysfunction and disease. Elevated levels imply cardiac wall stretching, and have a 4–6X increased risk of mortality and cardiovascular hospitalization in the primary prevention population.²⁰

Pathology of Atherosclerosis



CARDIOMETABOLIC STATUS

Metabolic disorders, including diabetes and metabolic syndrome, increase the risk of CVD. The cardiometabolic markers are used to assess a patient's risk of developing diabetes and future cardiovascular disease.

- **Parathyroid Hormone (PTH)** – Chronic elevations of PTH are an independent risk factor for the development of CAD, and when combined with a low Vitamin D, carries a 2X increased risk of sudden cardiac death.²¹
- **Vitamin D** – Low Vitamin D levels may lead to chronic inflammation with increased cardiovascular risk.²²
- **Leptin*** – High levels of leptin, which are a marker of leptin resistance, have been associated with an increased risk of developing diabetes and CVD.^{23, 24}

- **Adiponectin*** – Low levels of adiponectin are associated with increased inflammation, which may contribute to developing diabetes and CVD.²⁵
- **Ferritin** – Levels of ferritin reflect iron stores in the body. Elevated ferritin levels carry a 2–3X increased risk of diabetes as a result of iron deposits in the liver.²⁶
- **Cortisol** – A hormone involved in the regulation of blood sugar, energy production, inflammation, and immune response. Elevated levels carry a 5X increased risk of CVD death.²⁷
- **Hemoglobin A1c (HbA1c)** – A 1% increase in HbA1c concentrations is associated with a 20–30% increase in cardiovascular events and all-cause mortality.²⁸

- **Testosterone** – Low testosterone levels in men, and elevated levels in women, carry an increased risk of CVD.^{29, 30}
- **Cystatin C** – An ideal marker for estimated GFR, preferable to creatinine and creatinine clearance. Studies have shown that using Cystatin C enhances utility for early detection of kidney disease and prognosis in patients with CVD.³¹
- **Glucose** – Elevated fasting levels above 100 mg/dL are associated with increased risk of developing diabetes and future CVD.³²
- **Insulin** – Elevated fasting insulin levels are associated with pre-diabetes and future CVD events. Ischemic heart disease risk increases 11X when insulin and Apo B are elevated. Generally, elevated insulin levels are detected before changes in glucose levels.³³

- **TSH, T3 (Free), T4 (Free)** – Thyroid dysfunction may alter cholesterol and protein metabolism, leading to elevations in cholesterol and CVD risk.³⁴
- **Uric Acid** – Mediates oxidative stress, and elevated levels are associated with increases in inflammatory markers, leading to increased CVD risk.³⁵
- **Sex Hormone Binding Globulin** – Sex Hormone Binding Globulin (SHBG) is a testosterone transport protein that affects the circulating levels of free testosterone. Knowledge of free testosterone status can aid in the decision to initiate testosterone therapy in men, and to better assess androgen status in women.^{36, 37}