

# Biomarker Laboratory Testing Services

**Supporting Clinical Trials**

**Biomarker Menu - Categories**

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## INFLAMMATION AND IMMUNITY

Adipsin (Complement Factor D)  
 Ang-2 (Angiopoietin-2)  
 BAFF (B-cell Activating Factor)  
 BCA-1 (CXCL-13) (B Cell-attracting Chemokine)  
 BMP-9 (Bone Morphogenic Protein-9) (sCD105)  
 Calprotectin\* (S100A8/S100A9) (MRP8/14)  
 C1Q Complement Complex  
 CK-18/M30 Fragment Asp 396  
 CK-18/M65 (Cytokeratin 18/M65)  
 Complement Factor C3c (C-Factor C3c)  
 Complement Factor C4 (C-Factor C4)  
 CRP-HS (C-Reactive Protein – Highly Sensitive)  
 CTGF (Connective Tissue Growth Factor), Serum  
 E-Selectin  
 Endoglin  
 Endothelin-1\*  
 Eotaxin  
 Eotaxin-3  
 Fas (APO-1) (CD95)  
 Fibrinogen  
 Haptoglobin  
 HMGB-1 (High Mobility Group Box1 Protein)  
 HSP72 (Heat Sensitive Protein 72)\*  
 I-CAM (Intracellular Adhesion Molecule-1)  
 I-CAM-1/V-CAM-1 Multiplex  
 IFN $\alpha$  (Interferon alpha)\*  
 IFN $\beta$  (Interferon beta)\*  
 IFN $\gamma$  (Interferon gamma)  
 IL-1 $\beta$  (Interleukin-1 beta)  
 IL-1 $\beta$ /IL Ra ratio  
 IL-1 Ra (Interleukin 1 Receptor Antagonist)  
 IL-1 R $\alpha$  (Interleukin-1 Receptor alpha)\*  
 IL-1R-ST2 (Interleukin-1 Receptor ST2)  
 IL-2 R $\alpha$  (Interleukin-2 Soluble Receptor alpha)  
 IL-4 (Interleukin-4)  
 IL-6 (Interleukin-6)  
 IL-6 HS (Interleukin 6, High Sensitive)  
 IL-6 sR (Interleukin 6 Soluble Receptor)  
 IL-6 Ultrasensitive  
 IL-8 (Interleukin-8)  
 IL-8, HA (Interleukin-8, High Abundance)  
 IL-10 (Interleukin-10)  
 IL-12p70 (Interleukin-12p70)  
 IL-17 (Interleukin-17)  
 IL-17A (Interleukin-17A)  
 IL-17A/F Heterodimer (Interleukin-17A/F)  
 IL-17F (Interleukin-17F)  
 IL-18 (Interleukin-18), Serum, Urine  
 ITAC (Interferon-inducible T-cell Chemoattractant) (CXCL-11)  
 Mac2BP (Mac-2 Binding Protein)\*  
 MCP-1 (Monocyte Chemotactic Protein-1) (CCL2)  
 MCP-4 (Monocyte Chemotactic Protein-4) (CCL13)  
 MDC (Monocyte Derived Cytokine)  
 MIG (Monokine Induced  $\gamma$  Interferon)  
 MIP-1 $\alpha$  (Macrophage Inflammatory Protein-1 alpha) (CCL26)  
 MIP-1 $\beta$  (Macrophage Inflammatory Protein-1 beta) (CCL4)  
 MIP-3 $\beta$  (Macrophage Inflammatory Protein-3 beta) (CCL19)  
 MMP-1 (Matrix Metalloproteinase-1)  
 MMP-2 (Matrix Metalloproteinase-2)\*  
 MMP-3 (Matrix Metalloproteinase-3)

MMP-7 (Matrix Metalloproteinase-7)  
 MMP-8 (Matrix Metalloproteinase-8)\*  
 MMP-9 (Matrix Metalloproteinase-9)  
 MPO (Myeloperoxidase)  
 Neopterin\*  
 P-Selectin  
 PAI-1 (Plasminogen Activator Inhibitor-1)  
 PARC (Pulmonary and Activation-Regulated Cytokine) (CCL-18) (MIP-4)  
 PIGF (Placental Growth Factor)  
 PMN Elastase  
 Procalcitonin  
 Prolactin\*  
 S100A12 (S100 Calcium Binding A12)\*  
 SAA (Serum Amyloid A)  
 SC5b-9 (Serum Complement Membrane Attack Complex)  
 SDF-1  $\alpha$  (Stromal Cell Derived Factor-1) (CXCL-12)  
 sgp130 (Soluble Glycoprotein 130)  
 TARC (Thymus and Activation Regulated Chemokine)  
 TGF  $\beta$ -1 (Transforming Growth Factor beta-1), Plasma\*, Serum, Urine  
 TIMP-1 (Tissue Inhibitor of Metalloproteinase-1)  
 TNF $\alpha$  (Tissue Necrosis Factor alpha)  
 VCAM-1 (Vascular Adhesion Molecule-1)  
 VEGF-A (Vascular Endothelial Growth Factor-A)  
 VEGF-C (Vascular Endothelial Growth Factor-C)  
 VEGF-D (Vascular Endothelial Growth Factor-D)  
 VEGF-R1 (Vascular Endothelial Growth Factor-R1)  
 VEGF-R2 (Vascular Endothelial Growth Factor-R2)  
 VEGF-R3 (Vascular Endothelial Growth Factor-R3)

## ONCOLOGY

Ang-2 (Angiopoietin-2)  
 Anti-PTH (1-34) (Anti-Parathyroid Hormone)  
 Anti-PTHrp (1-34) (Anti-Parathyroid Hormone Related Protein)  
 APRIL (A Proliferation-inducing Ligand)  
 BCA-1 (CXCL-13) (B Cell-attracting Chemokine)  
 BCMA (B-cell Maturation Antigen)  
 BMP-9 (Bone Morphogenic Protein-9) (sCD105)  
 c-Met (aka Hepatic Growth Factor Receptor: HGFR)  
 CA-3 (Cancer Antigen 3)  
 CA 15-3 (Cancer Antigen 15-3)\*  
 CA 19-9 (Cancer Antigen 19-9)  
 CA-125 (Cancer Antigen 125)\*  
 CA-IX (Carbonic Anhydrase-IX) (CA-9)  
 CEA (Cancer Embryonic Antigen)\*  
 Endoglin  
 FGF-19 (Fibroblast Growth Factor 19)  
 FGF-21 (Fibroblast Growth Factor 21)\*  
 GDF-15 (Growth Differentiation Factor-15)\*  
 HE-4 (Human Epididymis Protein 4)  
 HGF (Hepatocyte Growth Factor)  
 HMGB-1 (High Mobility Group Box-1 Protein)  
 I-CAM (Intracellular Adhesion Molecule-1)  
 IL-8 (Interleukin-8)  
 M-CSF (Macrophage Colony Stimulating Factor) (CSF-1)  
 MCP-1 (Monocyte Chemotactic Protein-1) (CCL2)  
 MIG (Monokine Induced  $\gamma$  Interferon)  
 PIGF (Placental Growth Factor)  
 TGF  $\beta$ -1 (Transforming Growth Factor  $\beta$ -1), Plasma\*, Serum,

## Urine

VCAM-1 (Vascular Adhesion Molecule-1)  
 VEGF-A (Vascular Endothelial Growth Factor-A)  
 VEGF-C (Vascular Endothelial Growth Factor-C)  
 VEGF-D (Vascular Endothelial Growth Factor-D)  
 VEGF-R1 (Vascular Endothelial Growth Factor-R1)  
 VEGF-R2 (Vascular Endothelial Growth Factor-R2)  
 VEGF-R3 (Vascular Endothelial Growth Factor-R3)

## LIPIDS

Cholesterol, Esterified  
 Cholesterol, Free  
 Cholesterol, Total<sup>†</sup>  
 Free Fatty Acids (FFA) (NEFA)  
 Glycerol, Free  
 Phospholipids, Total  
 Triglycerides, Net (Glycerol-blanked)<sup>†</sup>  
 Triglycerides, Total<sup>†</sup>

## LIPOPROTEIN COMPONENTS

Apolipoprotein A-I, Serum<sup>†</sup>, Urine  
 Apolipoprotein A-II  
 Apolipoprotein B, Total<sup>†</sup>  
 Apolipoprotein B-100  
 Apolipoprotein B-48  
 Apolipoprotein C-I  
 Apolipoprotein C-II  
 Apolipoprotein C-III  
 Apolipoprotein E  
 Apolipoprotein J (Clusterin), Urine  
 Chylomicron – Component Apolipoprotein B  
 Chylomicron – Component Cholesterol  
 Chylomicron – Component Triglycerides  
 Chylomicrons, Total (B-48)  
 HDL A-I: All Particles\*  
 HDL – Apolipoproteins A I  
 HDL – Apolipoproteins A II  
 HDL – Apolipoproteins C II  
 HDL – Apolipoproteins C III  
 HDL – Apolipoproteins E  
 HDL – Phospholipids  
 HDL-C (Cholesterol)<sup>†</sup>  
 HDL-C Direct (Homogeneous)  
 HDL-C Precipitation by Polyethylene Glycol (PEG)  
 HDL-C Precipitation Heparin/Manganese  
 HDL-C Precipitation, Dextran Sulfate/ Magnesium (DS/Mg)  
 HDL-C Subclasses by Precipitation (HDL2/HDL3)  
 HDL-C Ultracentrifugation  
 HDL-SAA (HDL Serum Amyloid A)  
 HDL-Triglycerides  
 Hepatic Lipase Activity\*  
 LDL – Apolipoprotein B  
 LDL – Triglycerides  
 LDL-C (Cholesterol)<sup>†</sup>  
 LDL-C Direct (Homogeneous)  
 LDL-C Friedewald Equation  
 LDL-C Ultracentrifugation ( $\beta$ -Quantification)  
 Lipid Profile with  $\beta$ -Quantification  
 Lipoprotein (a) [Lp(a)]

Lipoprotein CIII:B and CIII:Non-B Particles\*  
Lipoprotein Lipase Activity (LPL)  
Lipoprotein Subclasses by NMR<sup>††</sup>  
Pre-β1 HDL  
Remnant Lipoprotein – Apolipoprotein B (RLP-ApoB)  
Remnant Lipoprotein – Apolipoprotein B-48 (RLP-ApoB48)  
Remnant Lipoprotein – Cholesterol (RLP-C)  
Remnant Lipoprotein – Triglycerides (RLP-TG)  
sdLDL (small, dense LDL)  
sdLDL-C (small, dense LDL Cholesterol)  
VLDL – Apolipoprotein B  
VLDL – Apolipoprotein C-II  
VLDL – Apolipoprotein C-III  
VLDL – Apolipoprotein E  
VLDL – Triglycerides  
VLDL-C (Cholesterol)  
VLDL-C (Cholesterol) by Friedewald Equation  
VLDL-C (Cholesterol) by Ultracentrifugation

#### LIPID METABOLISM

CETP Activity (Cholesteryl Ester Transfer Protein)  
CETP Mass (Cholesteryl Ester Transfer Protein)  
Cholesterol Efflux<sup>††</sup>  
LCAT Activity (Lecithin-Cholesterol Acyltransferase)  
LCAT Mass (Lecithin-Cholesterol Acyltransferase)  
Lp-PLA2 Activity (Lipoprotein-associated Phospholipase A2)  
Lp-PLA2 Mass (Lipoprotein-associated Phospholipase A2)  
PCSK-9 (Proprotein Convertase Subtilisin Kexin Type 9)  
Pre-β1 HDL  
sPLA2 Activity (Secretory Phospholipase Type A-II)\*  
sPLA2 Mass (Secretory Phospholipase Type A-II)\*

#### HDL FUNCTIONALITY

CETP Activity (Cholesteryl Ester Transfer Protein)  
CETP Mass (Cholesteryl Ester Transfer Protein)  
Cholesterol Efflux<sup>††</sup>  
HDL-SAA (HDL Serum Amyloid A)  
LCAT Activity (Lecithin-Cholesterol Acyltransferase)  
LCAT Mass (Lecithin-Cholesterol Acyltransferase)  
Lp-PLA2 Activity (Lipoprotein-associated Phospholipase A2)  
Lp-PLA2 Mass (Lipoprotein-associated Phospholipase A2)  
Paraoxonase-1 Activity (PON-1 Activity)  
Paraoxonase-1 Mass (PON-1 Mass)\*  
Pre-β1 HDL  
sPLA2 Activity (Secretory Phospholipase Type A-II)\*  
sPLA2 Mass (Secretory Phospholipase Type A-II)\*

#### CARDIOVASCULAR RISK

ADMA (Asymmetric Dimethylarginine)  
CRP-HS (C-Reactive Protein - Highly Sensitive)  
Galectin-3  
HMGB-1 (High Mobility Group Box-1 Protein)  
IL-1β (Interleukin-1 beta)  
IL-1β/IL Ra ratio  
IL-1 Ra (Interleukin 1 Receptor Antagonist)

IL-2 Rα (Interleukin-2 Soluble Receptor alpha)  
IL-6 (Interleukin-6)  
MCP-1 (Monocyte Chemotactic Protein-1) (CCL2)  
Myoglobin\*  
NT-ProBNP (N-Terminal Pro B-type Natriuretic Peptide)  
SDF-1 α (Stromal Cell Derived Factor-1) (CXCL-12)  
sgp130 (Soluble Glycoprotein 130)  
Troponin I\*  
Troponin T

#### OXIDATIVE STRESS

ADMA (Asymmetric Dimethylarginine)  
Apolipoprotein A-I, Serum<sup>†</sup>, Urine  
Ascorbic Acid (Vitamin C)\*  
MPO (Myeloperoxidase)  
Oxidized LDL (Oxidized Low Density Lipoprotein)  
Paraoxonase-1 Activity (PON-1 Activity)  
Paraoxonase-1 Mass (PON-1 Mass)\*  
Thioredoxin

#### COAGULATION

D-Dimer, Sensitive  
FDP (Fibrinogen Degradation Products)\*  
Fibrinogen  
PAI-1 (Plasminogen Activator Inhibitor-1)  
PAP (Plasmin-alpha2-antiplasmin Complex)  
TAT (Thrombin-antithrombin Complex)\*

#### KIDNEY INJURY

α-1-Microglobulin (Alpha-1-Microglobulin)  
α-GST (Alpha Glutathione S-Transferase)  
β2M (Beta-2-Microglobulin), Serum, Urine  
ADMA (Asymmetric Dimethylarginine)  
BUN (Blood Urea Nitrogen)  
Clusterin, Urine  
Creatinine, Serum, Urine  
CTGF (Connective Tissue Growth Factor), Serum  
Cystatin C, Serum, Urine  
HGF (Hepatocyte Growth Factor)  
IL-18 (Interleukin-18), Serum, Urine  
KIM-1 (Kidney Injury Molecule-1), Urine  
Microalbumin (Urine Albumin)  
NAG (N-acetyl-β-D Glucosaminidase), Urine  
NGAL (Neutrophil Gelatinase-associated Lipocalin), Plasma\*, Urine  
OPN (Osteopontin), Plasma, Urine  
Osteoactivin\*  
RBP-4 (Retinol Binding Protein 4), Serum\*, Urine  
Total Protein, Serum, Urine  
Type IV Collagen (CT4)

#### LIVER INJURY

α-GST (Alpha Glutathione S-Transferase)  
Adiponectin, Total  
Albumin, Serum  
Bile Acids, Total

CICP (C-Propeptide of Type I Procollagen) (PICP)  
CK-18/M65 (Cytokeratin 18/M65)  
CRP-HS (C-Reactive Protein, Highly Sensitive)  
CTGF (Connective Tissue Growth Factor), Serum  
Fas (APO-1) (CD95)  
GLDH (Glutamate Dehydrogenase)\*  
HA (Hyaluronic Acid)  
HMGB-1 (High Mobility Group Box-1 Protein)  
OPN (Osteopontin), Plasma, Urine  
Paraoxonase-1 Activity (PON-1 Activity)  
PIIINP (N-Terminal Propeptide of Type III Collagen)  
TIMP-1 (Tissue Inhibitor of Metalloproteinase-1)  
TTGF β-1 (Transforming Growth Factor beta-1), Plasma\*, Serum, Urine  
Type IV Collagen (CT4)

#### ENDOCRINE FUNCTION

ACTH (Adrenocorticotropic Hormone)\*  
Calcium, Serum, Urine  
Cortisol  
DHEA-S (Dehydroepiandrosterone Sulfate)  
EPO (Erythropoietin)  
Estradiol  
FSH (Follicle Stimulating Hormone)\*  
HGH (Human Growth Hormone)  
IGF-1 (Insulin-like Growth Factor-1)  
IGFB-3 (Insulin-like Growth Factor Binding Protein-3)  
iPTH (Intact Parathyroid Hormone - 2nd Generation)  
LH (Luteinizing Hormone)  
Progesterone\*  
Prolactin\*  
SHBG (Sex Hormone-Binding Globulin)  
T3 (Triiodothyronine)<sup>††</sup>  
T4 (Thyroxine)\*  
Testosterone, Total  
TGF β-1 (Transforming Growth Factor beta-1), Plasma\*, Serum, Urine  
TSH (Thyroid Stimulating Hormone)\*  
WPTH – Whole PTH (3rd Generation Whole Parathyroid Hormone)

#### METABOLIC DISEASE, DIABETES, OBESITY

1,5 Anhydroglucitol (Glycomark™)  
3-BH (Beta 3-hydroxybutyrate)  
Adiponectin, HMW (High Molecular Weight)  
Adiponectin, Total  
Adipsin (Complement Factor D)  
ADMA (Asymmetric Dimethylarginine)  
Amylase  
Bile Acids, Total  
CCK (Cholecystokinin)  
C-Peptide (C-Peptide of Insulin)  
DPP-IV Activity (Dipeptidyl Peptidase-4)  
Fructosamine  
Ghrelin, Acylated  
Ghrelin, Total  
GIP, Total (Gastric Inhibitory Polypeptide)

GLDH (Glutamate Dehydrogenase)\*  
 GLP-1, Active (Glucagon-like Peptide-1)  
 GLP-1, Total (Glucagon-like Peptide-1)  
 GLP-2 (Glucagon-like Peptide-2)  
 Glucagon  
 Glucose, Plasma, Serum, Urine  
 Glycated Albumin (GA)  
 HbA1c (Hemoglobin A1c)  
 Insulin  
 Lactate\*  
 Leptin  
 Lipase  
 MDA (Malondialdehyde)  
 Oxyntomodulin  
 Proinsulin\*  
 PYY, 3-36 (Peptide YY, 3-36)  
 PYY, Total (Peptide YY, Total)  
 RBP-4 (Retinol Binding Protein 4), Serum\*, Urine  
 Resistin  
 Sucrose, Serum\*, Urine  
 Total Protein, Serum, Urine

## BONE FORMATION

BAP (Bone Alkaline Phosphatase)  
 BMP-9 (Bone Morphogenic Protein-9) (sCD105)  
 Calcium, Serum, Urine  
 C1CP (C-Propeptide of Type I Procollagen) (PICP)  
 iPTH (Intact Parathyroid Hormone - 2nd Generation)  
 OC (Osteocalcin)  
 OPG (Osteoprotegerin)  
 OPN (Osteopontin), Plasma, Urine  
 PINP (N-Terminal Propeptide of Type I Collagen)  
 Sclerostin (SOST)  
 Vitamin D 1,25 (Dihydroxyvitamin D)  
 Vitamin D 25 (Hydroxyvitamin D2 + D3)  
 WPTH – Whole PTH (3rd Generation Whole Parathyroid Hormone)

## BONE RESORPTION

Calcitonin\*  
 CTX-I (C-Terminal Telopeptides of Type I Collagen), Serum, Urine  
 DKK-1 (Dickkopf-related Protein-1)  
 DPD Free (Deoxypyridinoline), Urine  
 DPD Total (Deoxypyridinoline), Serum, Urine  
 ICTP (CTX-MMP) (C-terminal Telopeptide of Type I Collagen)  
 NTX (N-Telopeptides of Type I Collagen), Serum, Urine  
 OC (Osteocalcin)

Phosphorus, Inorganic  
 PYD, Total (Pyridinoline)  
 RANK-L (Receptor Activator for Nuclear Factor B Ligand)  
 TRAcP-5b (Tartrate-resistant Acid Phosphatase-5b)

## CARTILAGE DISEASES AND ARTHRITIS

Anti-CCP (Anti-Cyclic Citrullinated Peptide)  
 C1C2 (C1C2 Neopeptide)\*  
 C2C (Collagen Type II Cleavage), Serum, Urine\*  
 COMP (Cartilage Oligomeric Matrix Protein)  
 CS-846 (Aggrecan)\*  
 CTX-II (C-Terminal Telopeptides of Type II Collagen), Serum\*, Urine  
 HA (Hyaluronic Acid)  
 HMGB-1 (High Mobility Group Box-1 Protein)  
 PIINP (N-Terminal Propeptide of Type III Collagen)  
 Rheumatoid Factor Isotypes (IgA, IgG & IgM)  
 YKL-40\*

## NUTRITION

Albumin, Serum  
 Ferritin  
 Folate  
 Homocysteine, Total\*  
 Vitamin D 1,25 (Dihydroxyvitamin D)  
 Vitamin D 25 (Hydroxyvitamin D2 + D3)

## PULMONARY DISEASE\*\*

Adiponectin, HMW (High Molecular Weight)  
 Adiponectin, Total  
 CRP-HS (C-Reactive Protein, Highly Sensitive)  
 CTGF (Connective Tissue Growth Factor), Serum  
 Fas (APO-1) (CD95)  
 Fibrinogen  
 IL-6 (Interleukin-6)  
 KL-6 (Krebs von den Lungen-6)  
 MMP-8 (Matrix Metalloproteinase-8)\*  
 PARC (Pulmonary and Activation-Regulated Cytokine) (CCL-18) (MIP-4)  
 Surfactant Protein A  
 Surfactant Protein D  
 Tenascin C  
 TGF β-1 (Transforming Growth Factor beta-1), Plasma\*, Serum, Urine

## MULTIPLEX PANELS

### Aushon 2-Plex Panels

ICAM-1/VCAM-1 (Intracellular Adhesion Molecule-1/Vascular Adhesion Molecule-1)  
 PlGF/VEGF-R2 (Placental Growth Factor/Vascular Endothelial Growth Factor-R2)

### Aushon Multiplex 9 Cytokine Panel

IFNγ (Interferon gamma)  
 IL-1α (Interleukin-1 Receptor alpha)\*  
 IL-1β (Interleukin-1 beta)  
 IL-4 (Interleukin-4)  
 IL-6 (Interleukin-6)  
 IL-8 (Interleukin-8)  
 IL-10 (Interleukin-10)  
 IL-12p70 (Interleukin-12p70)  
 TNFα (Tissue Necrosis Factor alpha)

### Aushon Chemokine 2 Array (4-Plex)

IP-10 (IFN-γ Induced Protein 10) (CXCL-10)  
 ITAC (Interferon-induced T-cell alpha Chemoattractant) (CXCL 11)  
 MCP-1 (Monocyte Chemoattractant Protein-1) (CCL 2)  
 MIP-3β (Macrophage Inflammatory Protein-3 beta) (CCL19)

### MSD Multiplex 10 Chemokine Panel

Eotaxin (Eosinophil Chemotaxis Protein) (CCL 11)  
 Eotaxin-3 (Eosinophil Chemotaxis Protein-3) (CCL 26)  
 IL-8 HA (Interleukin 8, High Abundance) (CXCL 8)  
 IP-10 (IFN-γ Induced Protein 10) (CXCL 10)  
 MCP-1 (Monocyte Chemoattractant Protein 1) (CCL 2)  
 MCP-4 (Monocyte Chemoattractant Protein 4) (CCL 13)  
 MDC (Monocyte Derived Chemokine) (CCL 22)  
 MIP-1α (Macrophage Inflammatory Protein 1 alpha) (CCL 3)  
 MIP-1β (Macrophage Inflammatory Protein 1 beta) (CCL 4)  
 TARC (Thymus and Activation Regulated Chemokine) (CCL 17)

### MSD 2-Plex Panel

IL-10/IL-17

\*Inquire †CDC-Certified Assays ††Partner Lab \*\*See menu for Oxidative Stress, Coagulation and Inflammation for other potential biomarkers for Pulmonary Disease