CELL BIOLABS, INC.
Creating Solutions for Life Science Research

Metabolism Research

- ☑ **Lipoprotein Metabolism**
- ☑ **Cellular Metabolism**
- ☑ **Renal Funcrion Assays**
- ☑ **Alcohol Assays**

Biogenuix®

Lipoprotein Metabolism Research

Lipoproteins are important assemblies of proteins and lipids that have implications in cardiovascular and related diseases. Our kits and reagents can help streamline the study of various members of lipoprotein metabolism pathways:

- Cholesterol / Lipoproteins
- Apolipoproteins
- Oxidized LDL & HDL
- Lipoprotein Receptors
- Cholesteryl Ester Pathway
- Lipoprotein Lipase
- Triglycerides
- Free Fatty Acids
- Bile Acids
- Phospholipids

Total Cholesterol Assay Kits

Our Total Cholesterol Assay Kits provide a simple plate-based format that measures the amount of cholesterol in serum, plasma, cell lysates or tissue homogenates.

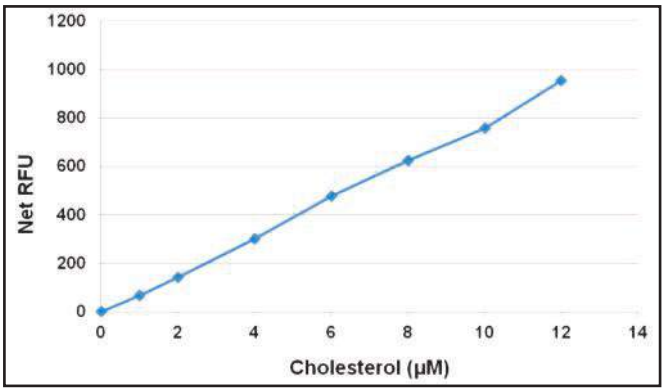
In the presence of cholesterol esterase, the assay will measure total cholesterol in both forms. In the absence of the esterase, the assay will measure only free cholesterol.

Quantitation is performed in a 96-well plate reader with your choice of colorimetric or fluorescence-based detection.

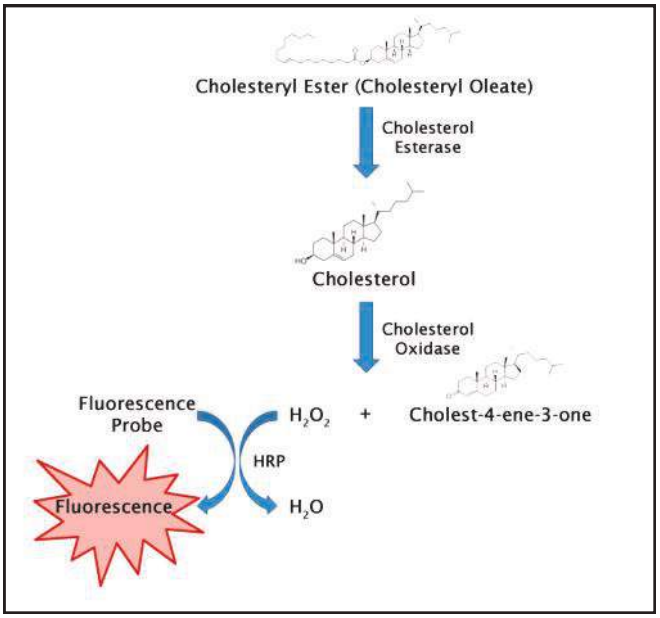
- **Sensitive**: Detect as little as 100 nM
- **Fast**: Simple 30 minute protocol
- **Easy-to-use**: Detect in a 96-well plate reader; colorimetric and fluorometric formats available

Recent Product Citations

1. Marino, A. et al. (2014). ITCH deficiency protects from diet-induced obesity. *Diabetes* **63**:550-561. (STA-384)
2. Mathews, E. et al. (2014). Mutation of 3-hydroxy-3-methylglutaryl CoA synthase I reveals requirements for isoprenoid and cholesterol synthesis in oligodendrocyte migration arrest, axon wrapping, and myelin gene expression. *J. Neurosci.* **34**:3402-3412. (STA-384)
3. Joseph, B.K. et al. (2015). Inhibition of AMP kinase by the protein phosphatase 2A heterotrimer, PP2APpp2r2d. *J. Biol. Chem.* 10.1074/jbc.M114.626259. (STA-390)
4. Ananth, S. et al. (2014). Regulation of the cholesterol efflux transporters ABCA1 and ABCG1 in retina in hemochromatosis and by the endogenous siderophore 2,5-dihydroxygbenzoic acid. *Biochim. Biophys. Acta*. **1842**:603-612. (STA-390)



Total Cholesterol Standard Curve.



Assay Principle for the Total Cholesterol Assay Kit (Fluorometric).

Product Name	Detection	Size	Catalog Number
Total Cholesterol Assay Kit	Colorimetric	192 Assays	STA-384
	Fluorometric	192 Assays	STA-390

HDL-Cholesterol Assay Kit

Our HDL-Cholesterol Assay Kit provides a simple plate -based format similar to our Total Cholesterol Assays (previous page). This kit measures the amount of cholesterol in the HDL fraction isolated from serum, plasma, cell lysates or tissue homogenates.

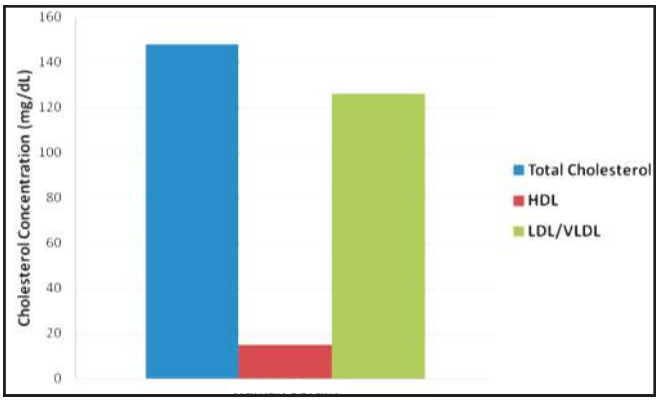
- **Sensitive**: Detect as little as 1 µM
- **Fast**: Simple 45 minute assay protocol
- **Easy-to-use**: Detect in a 96-well plate fluorescence-based plate reader

Product Name	Detection	Size	Catalog Number
HDL-Cholesterol Assay Kit	Fluorometric	96 Assays	STA-394

HDL and LDL/VLDL Cholesterol Assay Kit

Our HDL and LDL/VLDL Cholesterol Assay Kit is similar in principle to our Total Cholesterol Assay Kit, but allows you to quantify HDL and LDL/VLDL separately in serum samples. After separating samples into HDL and LDL/VLDL fractions, the fluorometric assay is run according to the Assay Principle for the Total Cholesterol Assay Kit (previous page).

In the presence of cholesterol esterase, the assay will measure total cholesterol in both free cholesterol and cholesteryl ester forms. In the absence of the esterase, the assay will measure only free cholesterol. Quantitation of cholesteryl ester alone may be calculated by subtracting free cholesterol from total cholesterol levels.



Quantitation of Total Cholesterol, LDL/VLDL, and HDL from Human Serum.

Recent Product Citations

1. Sessions-Bresnahan, D.R. et al. (2015). Effect of obesity on the preovulatory follicle and lipid fingerprint of equine oocytes. *Biol. Reprod.* 10.1095/biolreprod.115.130187.
2. O'Hare, E.A. et al. (2014). Disruption of LDLR causes increased LDL-C and vascular lipid accumulation in a Zebrafish model of hypercholesterolemia. *J. Lipid Res.* **55**:2242-2253.

Product Name	Detection	Size	Catalog Number
HDL and LDL/VLDL Cholesterol Assay Kit	Fluorometric	192 Assays	STA-391

Human Lipoproteins

Our human lipoproteins are isolated from human plasma following ultracentrifugation.

Product Name	Size	Catalog Number
Human High Density Lipoprotein (HDL)	100 µg	STA-243
Human High Density Lipoprotein-2 (HDL-2)	100 µg	STA-244
Human High Density Lipoprotein-3 (HDL-3)	100 µg	STA-245
Human Low Density Lipoprotein (LDL)	100 µg	STA-241
Human Low Density Lipoprotein (LDL), Copper (Cu++) Oxidized	100 µg	STA-214
Human Low Density Lipoprotein (LDL), Malondialdehyde Modified	100 µg	STA-212
Human Low Density Lipoprotein (LDL), Nitrated	100 µg	STA-213
Human Very Low Density Lipoprotein (VLDL)	100 µg	STA-242

Human Apolipoprotein ELISA Kits

Apolipoproteins comprise the protein component of lipoprotein assemblies. Apolipoproteins fall into two classes:

- Non-exchangeable Apo B associates with LDL
- Exchangeable Apo A, C and E associate with HDL

Our Human Apo ELISA Kits provide a convenient and sensitive method for quantifying specific apolipoproteins in serum, plasma, or other biological fluids.

Apo (a)	Apo AI	Apo AII	Apo B	Apo CI	Apo CII	Apo CIII	Apo E
1 ng/mL	50 pg/mL	0.3 ng/mL	1 ng/mL	200 pg/mL	1 ng/mL	50 pg/mL	200 pg/mL

Detection Limits of Cell Biolabs' Human Apo ELISA Kits.

Recent Product Citations

1. Bissig-Choisat, B. et al. (2015). Development and rescue of human familial hypercholesterolaemia in a xenograft mouse model. *Nat. Commun.* **6**:7339. (STA-359)
2. Song, X. et al. (2014). APOA-I: a possible novel biomarker for metabolic side effects in first episode schizophrenia. *PLoS One* **9**:e93902. (STA-362)
3. Lee, J.Y. et al. (2014). Apolipoprotein E likely contributes to a maturation step of infectious hepatitis C virus particles and interacts with viral envelope glycoproteins. *J. Virol.* **88**:12422-12437. (STA-364, STA-367)
4. Xu, D.D. et al. (2014). Discovery and identification of serum potential biomarkers for pulmonary tuberculosis using iTRAQ-coupled two-dimensional LC-MS/MS. *Proteomics* **14**:322-331. (STA-365)
5. Rice, S.J. et al. (2015). Proteomic profiling of human plasma identifies apolipoprotein E (APOE) as being associated with smoking and a marker for squamous metaplasia of the lung. *Proteomics* 10.1002/pmic.201500029. (STA-367)
6. Sukhanov, S. et al. (2015). Insulin-like growth factor I reduces lipid oxidation and foam cell formation via downregulation of 12/15-lipoxygenase. *Atherosclerosis* **238**:313-320. (STA-368)

Product Name	Detection	Size	Catalog Number
Human Apo(a) ELISA Kit	Colorimetric	96 Assays	STA-359
Human ApoAI ELISA Kit	Colorimetric	96 Assays	STA-362
Human ApoAII ELISA Kit	Colorimetric	96 Assays	STA-363
Human ApoB ELISA Kit	Colorimetric	96 Assays	STA-368
Human ApoCI ELISA Kit	Colorimetric	96 Assays	STA-364
Human ApoCII ELISA Kit	Colorimetric	96 Assays	STA-365
Human ApoCIII ELISA Kit	Colorimetric	96 Assays	STA-366
Human ApoE ELISA Kit	Colorimetric	96 Assays	STA-367

Human Apolipoproteins

Following ultracentrifugation, lipoproteins are isolated from human plasma. Water-soluble apolipoproteins are then purified from delipidated lipoprotein.

Product Name	Size	Catalog Number
Human Apolipoprotein AI	100 µg	STA-232
Human Apolipoprotein AII	100 µg	STA-233
Human Apolipoprotein B-100	100 µg	STA-234
Human Apolipoprotein B-100, Malondialdehyde Modified	100 µg	STA-211
Human Apolipoprotein CI	100 µg	STA-235
Human Apolipoprotein CIII	100 µg	STA-237

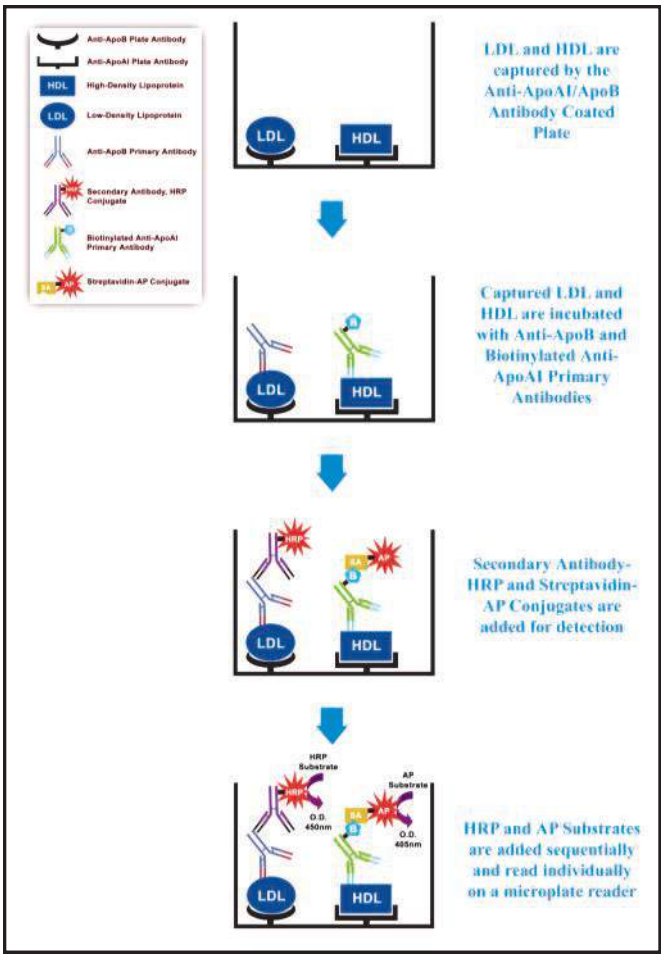
Human ApoAI and ApoB Duplex ELISA Kit

As the primary protein components of HDL and LDL respectively, ApoAI and ApoB are arguably the most significant apolipoproteins in lipid metabolism research.

Our Human ApoAI and ApoB Duplex ELISA Kit provides a convenient tool to quantify both proteins in a single serum or plasma sample. Unlike other multiplex assays, our ApoAI and ApoB Duplex ELISA does not require a luminometer for detection. Simply quantify both proteins using a standard colorimetric ELISA plate reader.

The ELISA plate is coated with Anti-ApoAI and Anti-ApoB antibodies, which respectively capture HDL and LDL from the sample. Biotinylated Anti-ApoAI and Anti-ApoB detection antibodies are added, followed by enzyme conjugates. Alkaline phosphatase substrate is added allowing quantitation of ApoAI. After washing, HRP is added to allow quantiation of ApoB.

- **Efficient**: Quantify two apolipoproteins from the same sample in just a few hours
- **Sensitive**: Detect as little as 0.1 ng/mL of ApoAI and 1 ng/mL of ApoB from serum or plasma
- **Quantitative**: Compare results to known ApoAI and ApoB standards



Human ApoAI and ApoB Duplex ELISA Kit Assay Principle.

Product Name	Detection	Size	Catalog Number
Human ApoAI and ApoB Duplex ELISA Kit	Colorimetric	96 Assays	STA-361

Antibodies to Apolipoproteins

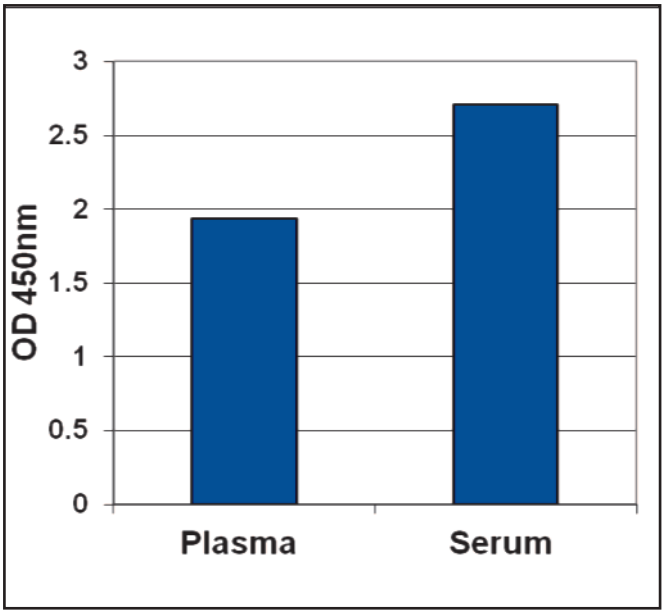
Antibodies are affinity purified.

Product Name	Detection	Size	Catalog Number
Sheep Anti-Human Apolipoprotein (a) Polyclonal Antibody	Immunoblot/ELISA	100 µg	STA-131
Goat Anti-Human Apolipoprotein AI Polyclonal Antibody	Immunoblot/ELISA	100 µg	STA-132
Rabbit Anti-Human Apolipoprotein AII Polyclonal Antibody	Immunoblot/ELISA	100 µg	STA-133
Goat Anti-Human Apolipoprotein B-100/48 Polyclonal Antibody	Immunoblot/ELISA	100 µg	STA-134
Rabbit Anti-Human Apolipoprotein CI Polyclonal Antibody	Immunoblot/ELISA	100 µg	STA-135
Rabbit Anti-Human Apolipoprotein CII Polyclonal Antibody	Immunoblot/ELISA	100 µg	STA-136
Rabbit Anti-Human Apolipoprotein CIII Polyclonal Antibody	Immunoblot/ELISA	100 µg	STA-137
Goat Anti-Human Apolipoprotein E Polyclonal Antibody	Immunoblot/ELISA	100 µg	STA-138

OxiSelect™ Human Oxidized LDL ELISA Kits

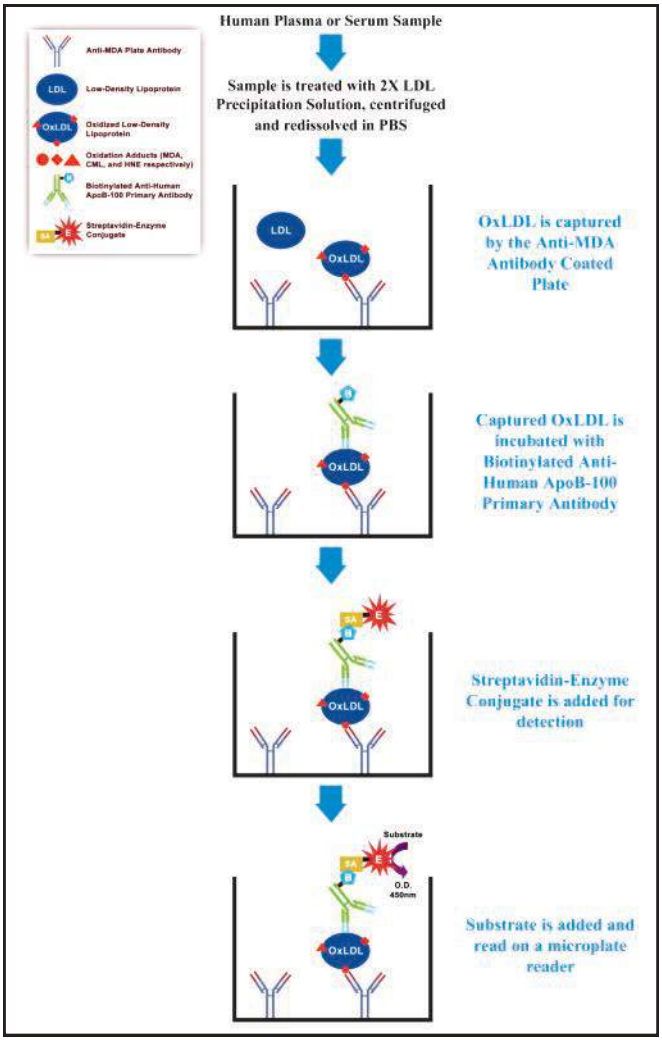
LDL contains a hydrophobic core of various lipids surrounded by one molecule of Apolipoprotein B-100 (ApoB-100), which promotes solubility of the LDL in blood. LDL, often described as “bad” cholesterol, is even more dangerous when it becomes oxidized. Oxidized LDL (OxLDL) is more reactive with surrounding tissues and can collect within the inner lining of arteries.

Our OxiSelect™ Human Oxidized LDL ELISA Kits are designed for the detection and quantitation of modified LDL in human plasma or serum. Kits are available to detect MDA-LDL, CML-LDL, or HNE-LDL in either the protein or lipid component of LDL. Our OxPL-LDL kit specifically detects oxidation in the phospholipid component of LDL.



Quantitation of MDA-LDL in Serum and Plasma Samples. Serum and plasma samples were treated with LDL Precipitation Solution. Precipitated LDL pellets were resuspended in 1.6 mL of PBS before further dilution 1:160 in Assay Diluent according to the Assay Protocol.

- **Sensitive**: Detect as little as 50 ng/mL of MDA-LDL, 150 ng/mL of CML-LDL, 150 ng/mL of HNE-LDL, or 100 ng/mL of OxPL-LDL
- **Quantitative**: Compare unknown samples with provided copper oxidized LDL standard



OxiSelect™ Human Oxidized LDL ELISA Assay Principle.

MDA is the most commonly found damage marker in oxidized LDL, but it can degrade in frozen samples after 1-2 months. CML and HNE, while less commonly found in OxLDL, may be more reliably detectable in samples that have been frozen for several months.

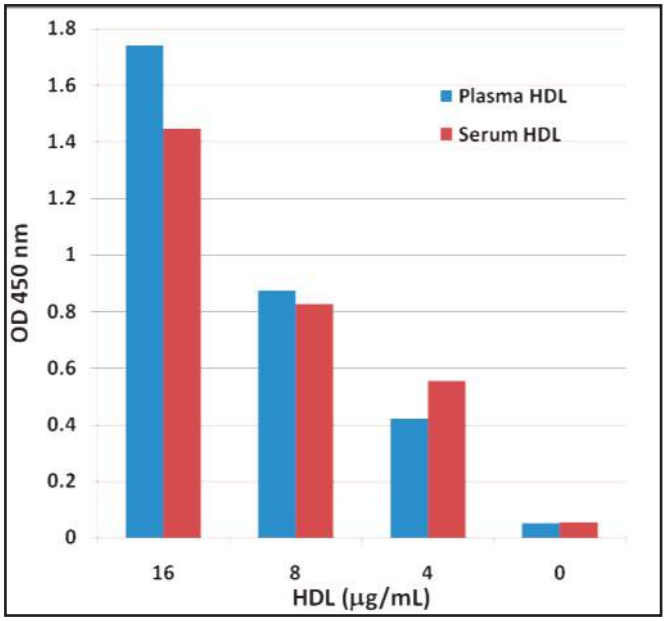
Product Name	Detection	Size	Catalog Number
OxiSelect™ Human Oxidized LDL ELISA Kit (CML-LDL Quantitation)	Colorimetric	96 Assays	STA-388
OxiSelect™ Human Oxidized LDL ELISA Kit (HNE-LDL Quantitation)	Colorimetric	96 Assays	STA-389
OxiSelect™ Human Oxidized LDL ELISA Kit (MDA-LDL Quantitation)	Colorimetric	96 Assays	STA-369
OxiSelect™ Human Oxidized LDL ELISA Kit (OxPL-LDL Quantitation)	Colorimetric	96 Assays	STA-358

OxiSelect™ Human Oxidized HDL ELISA Kits

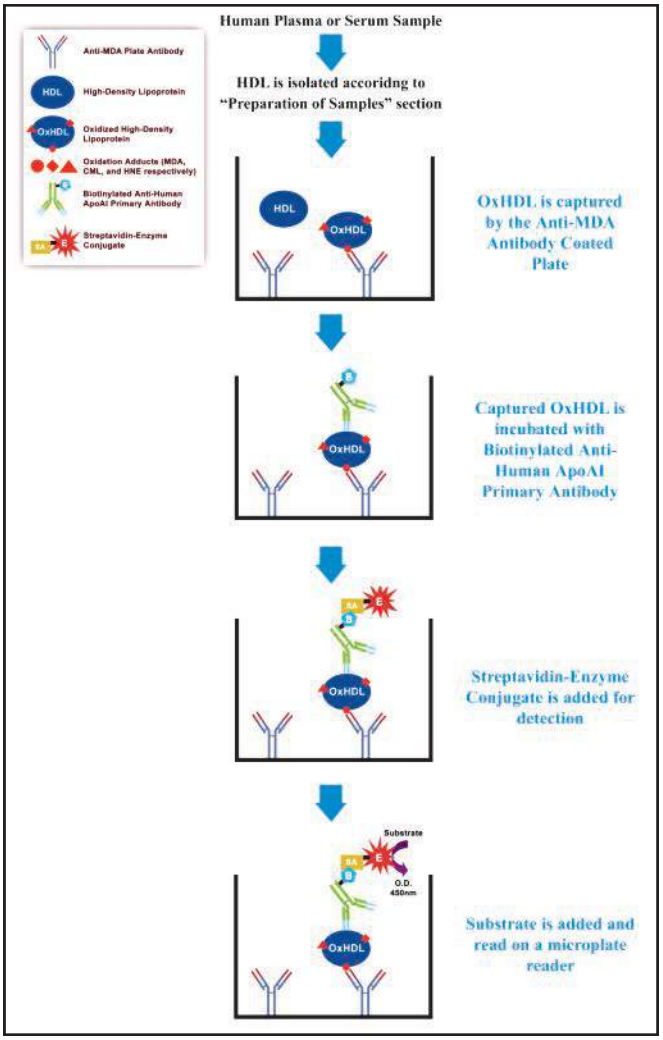
Like LDL, HDL (high density lipoprotein) can become oxidized in either the protein or lipid component. While HDL is often described as “good” cholesterol, oxidation of HDL can cause it to lose its usual cardioprotective properties and cause it to be more dangerous than helpful.

Our OxiSelect™ Human Oxidized HDL ELISA Kits are designed for the detection and quantitation of modified HDL in human plasma or serum. Kits are available to detect MDA-HDL, CML-HDL or HNE-HDL.

- **Sensitive**: Detect as low as 1 ng/mL of MDA-HDL, 1 ng/mL of CML-HDL, or 2 ng/mL of HNE-HDL
- **Quantitative**: Compare unknown samples with provided copper oxidized HDL standard



Quantitation of HNE-HDL in Serum and Plasma Samples. Serum and plasma samples were isolated and diluted in Assay Diluent.



Assay Principle for the OxiSelect™ Human Oxidized HDL ELISA (MDA-HDL Quantitation).

MDA is the most commonly found damage marker in oxidized HDL, but it can degrade in frozen samples after 1-2 months. CML and HNE, while less commonly found in OxHDL, may be more reliably detectable in samples that have been frozen for several months.

Product Name	Detection	Size	Catalog Number
OxiSelect™ Human Oxidized HDL ELISA Kit (CML-HDL Quantitation)	Colorimetric	96 Assays	STA-888
OxiSelect™ Human Oxidized HDL ELISA Kit (HNE-HDL Quantitation)	Colorimetric	96 Assays	STA-889
OxiSelect™ Human Oxidized HDL ELISA Kit (MDA-HDL Quantitation)	Colorimetric	96 Assays	STA-869

Human LDL Receptor ELISA Kit

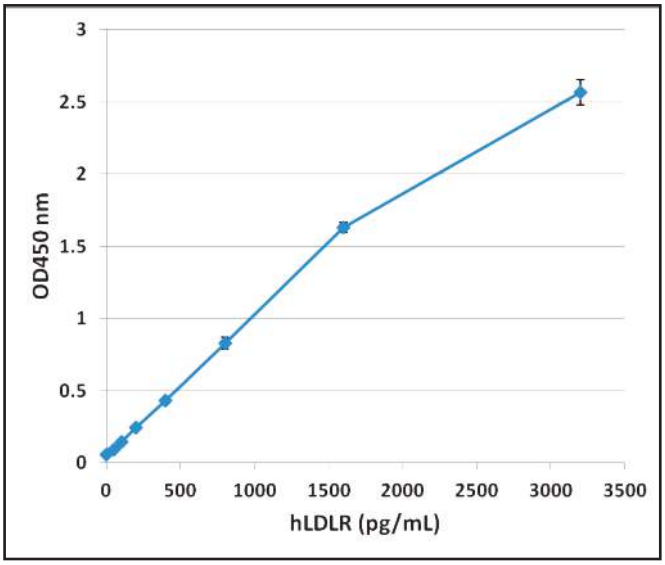
Cholesterol can be toxic when accumulated in excess in cell membranes. The low-density lipoprotein receptor (LDLR) is the primary means of removing cholesterol from the circulation. LDLR is a transmembrane protein that transports cholesterol-carrying lipoprotein particles (primarily LDL) into cells. Receptor-ligand complexes enter the cell by endocytosis; bound lipoproteins are subsequently released in the low-pH setting of the endosome, while the receptors return to the cell surface.

Our Human LDLR ELISA Kit provides a simple, convenient method for the detection and quantitation of LDL receptor in a variety of human sample types.

- **Sensitive**: Detect as little as 50 pg/mL of human LDLR
- **Versatile**: Assay is compatible with plasma, serum, cell lysates and tissue homogenates
- **Quantitative**: Compare results to a known human LDLR standard

Recent Product Citation

Alvarez, M.L. et al. (2015). MicroRNA-271 decreases the level and efficiency of the LDL receptor and contributes to the dysregulation of cholesterol homeostasis. *Atherosclerosis* **242**:595-604.



Standard Curve Generated with the Human LDLR ELISA Kit.

Product Name	Detection	Size	Catalog Number
Human LDLR ELISA Kit	Colorimetric	96 Assays	STA-386

Human LOX-1 ELISA Kit

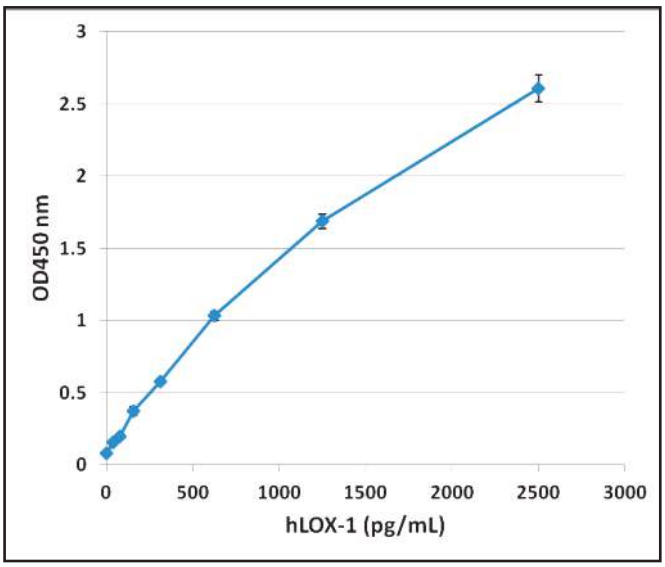
Monocytes and macrophages can form atherosclerotic lesions when they take in oxidized LDL (OxLDL). Uptake is done via the lectin-like oxidized LDL receptor-1 (LOX-1), which is expressed in vascular endothelium as well as in vascular smooth muscle cells, differentiated macrophages and platelets. LOX-1 can be cleaved and released as a soluble form (sLOX-1), which can serve as a prognostic biomarker in serum for early acute coronary syndromes, stroke and coronary heart disease.

Our Human LOX-1 ELISA Kit provides a simple, convenient method for the detection and quantitation of LOX-1 receptor in a variety of sample types.

- **Sensitive**: Detect as little as 40 pg/mL
- **Versatile**: Assay is compatible with plasma, serum, cell lysates, tissue homogenates, or cell culture supernatants
- **Quantitative**: Compare results to a known human LOX-1 standard

Recent Product Citation

Wu, J. et al. (2013). Clinical nephrology—IgA nephropathy, lupus nephritis, vasculitis. *Nephrol. Dial. Transplant.* **28**:i175-i184.



Standard Curve Generated with the Human LOX-1 ELISA Kit.

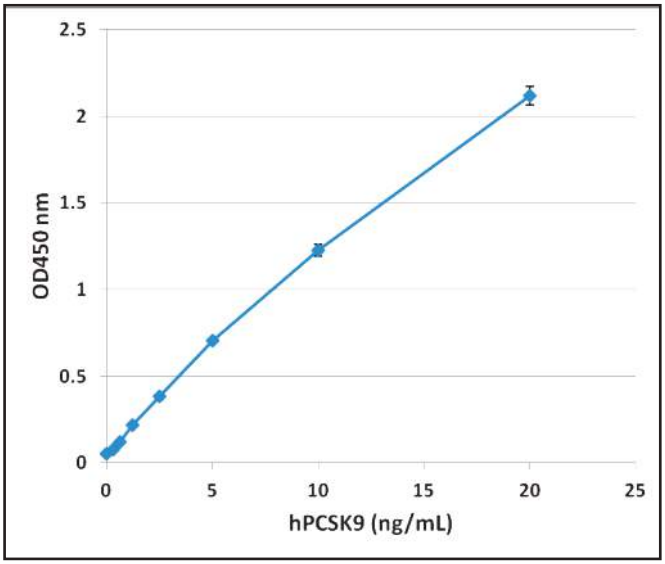
Product Name	Detection	Size	Catalog Number
Human LOX-1 ELISA Kit	Colorimetric	96 Assays	STA-387

Human PCSK9 ELISA Kit

Proprotein convertase subtilisin kexin 9 (PCSK9) is a member of the proteinase K subfamiliy of subtilisin-related serine endoproteases. PCKS9 mediates LDL receptor (LDLR) degradation by binding to the EGF domain of the LDLR. This binding prevents LDLR from being sorted to the endosomes for recycling back to the cell surface. Instead, the PCSK9/LDLR complex is distributed to the lysosomes for degradation.

Our Human PCKS9 ELISA Kit provides a simple, convenient method for the detection and quantitation of PCSK9 in a variety of human sample types.

- **Sensitive**: Detect as little as 150 pg/mL of human PCSK9
- **Versatile**: Assay is compatible with plasma, serum, and cell and tissue lysates
- **Quantitative**: Compare results to a known human PCSK9 standard



Standard Curve Generated with the Human PCSK9 ELISA Kit.

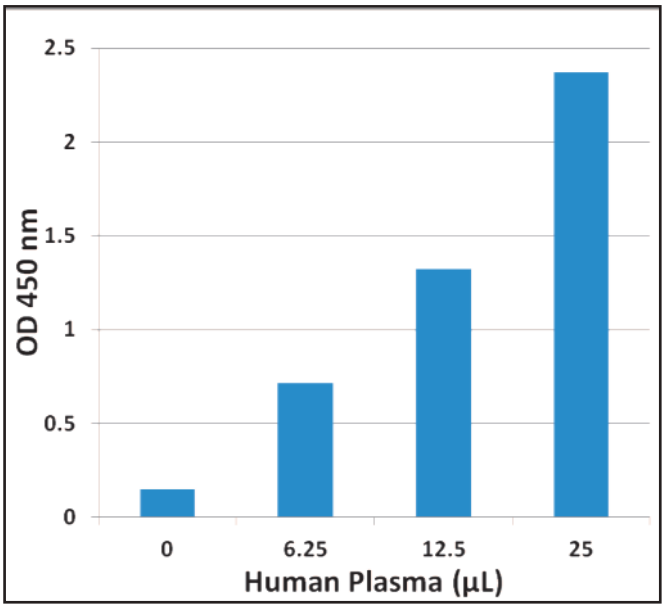
Product Name	Detection	Size	Catalog Number
Human PCSK9 ELISA Kit	Colorimetric	96 Assays	STA-385

Human LRP1 ELISA Kit

LDL Receptor-Related Protein 1 (LRP1), also known as CD91, is a member of the LDL receptor family. LRP1 is involved in many physiological processes including the clearing of a variety of circulatory molecules such as proteinase-inhibitor complexes, serpin enzyme complexes, and activated coagulation factors. It has also been shown to be involved in the regulation of cell migration, macrophage phagocytosis, and blood brain barrier permeability.

Our Human LRP1 ELISA Kit provides a convenient plate-based format for the detection and quantitation of LRP1 in a variety of human sample types. A standard of known concentration of LRP1 is provided against which unknown samples may be quantified.

- **Sensitive**: Detect as little as 50 pg/mL of human PCSK9
- **Versatile**: Assay is compatible with plasma, serum, and cell and tissue lysates
- **Quantitative**: Compare results to a known human LRP1 standard



Detection of Soluble LRP1 in Human Plasma with the Human LRP1 ELISA Kit.

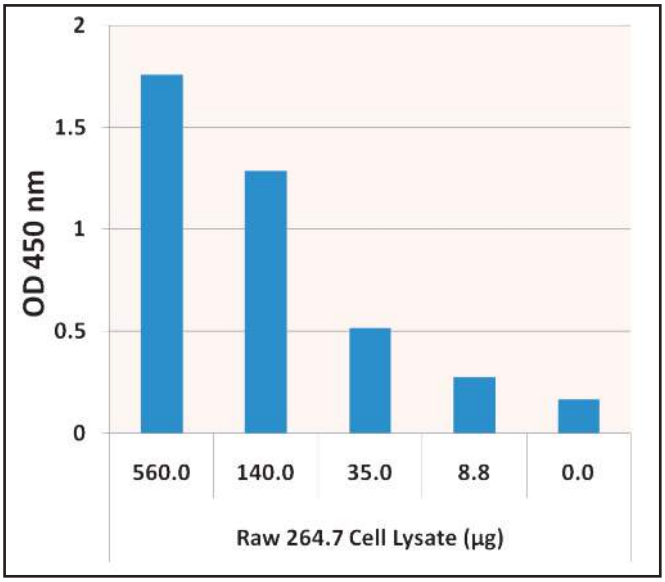
Product Name	Detection	Size	Catalog Number
Human LRP1 ELISA Kit	Colorimetric	96 Assays	STA-609

Scavenger Receptor Class B Member 1 (SRB1) ELISA Kit

Scavenger Receptor Class B Member 1, also known as SRB1 or SCARB1, is a transmembrane protein that plays a critical role in the reverse cholesterol transport pathway where cholesterol is cleared from macrophages and peripheral tissues and transported to the liver. SRB1 appears to mediate binding of HDL and the selective uptake of cholesteryl esters (CE).

Our Scavenger Receptor Class B Member 1 (SRB1) ELISA Kit provides a convenient format for the quantitation of SRB1 in human and rodent samples. Each kit provides sufficient reagents to perform up to 96 assays including standards and unknowns.

- **Sensitive**: Detect as little as 600 pg/mL of human SRB1
- **Versatile**: Assay is compatible with plasma, serum, and cell or tissue lysates
- **Quantitative**: Compare results to a known human SRB1 standard



Detection of SRB1 in Mouse Raw 264.7 Cell Lysate.

Product Name	Detection	Size	Catalog Number
Scavenger Receptor Class B Member 1 (SRB1) ELISA Kit	Colorimetric	96 Assays	STA-630

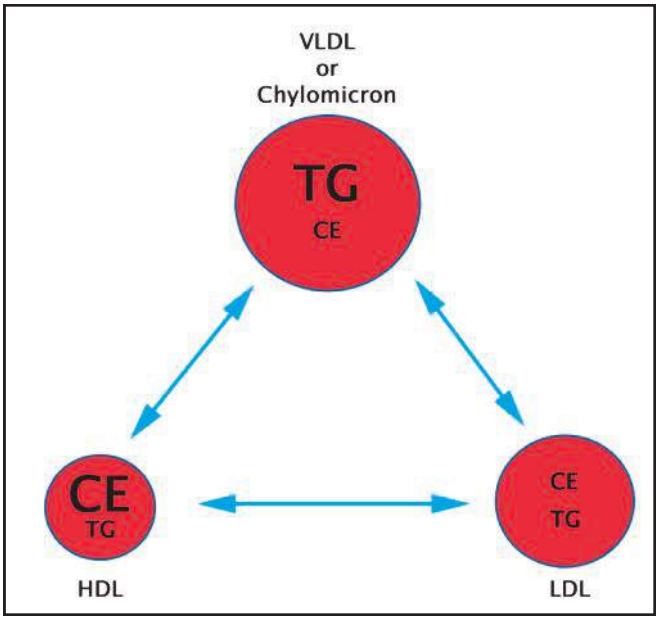
Human Cholesteryl Ester Transfer Protein (CETP) ELISA Kit

Cholesterol exists within lipoproteins in two forms: a free alcohol and a fatty cholesteryl ester. The cholesteryl ester is the predominant form of cholesterol transport and storage.

Cholesteryl ester transfer protein (CETP) promotes the transfer of both cholesteryl esters and triglycerides between various types of lipoprotein particles: HDL, LDL, VLDL, and chylomicrons.

Our Human CETP ELISA Kit provides a simple, convenient method for the detection and quantitation in a variety of human sample types.

- **Sensitive**: Detect as little as 60 ng/mL of human CETP
- **Versatile**: Assay is compatible with plasma, serum, and other biological fluids
- **Quantitative**: Compare results to a known human CETP standard



CETP Promotes Bidirectional Transfer of Cholesteryl Esters (CE) and Triglycerides (TG) Between Lipoproteins.

Product Name	Detection	Size	Catalog Number
Human Cholesteryl Ester Transfer Protein (CETP) ELISA Kit	Colorimetric	96 Assays	STA-614

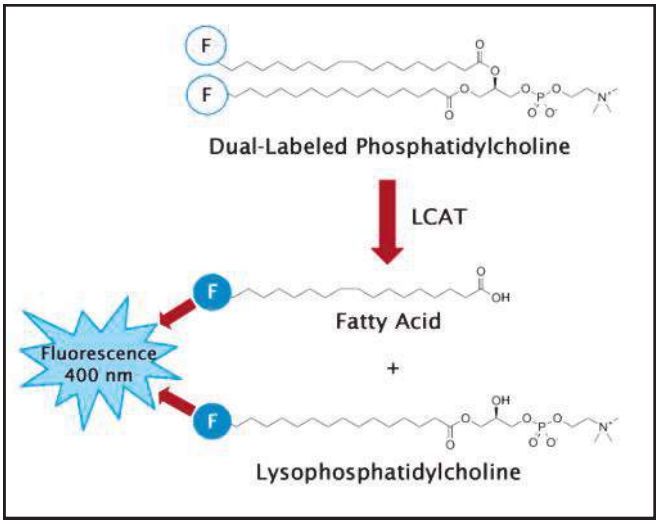
Lecithin Cholesterol Acyltransferase (LCAT) Activity Assay Kit

Lecithin cholesterol acyltransferase (LCAT) is an enzyme associated with lipoproteins and plays a key role in promoting the transfer of excess cell-associated cholesterol from peripheral tissues to the liver to be excreted. LCAT catalyzes the transfer of an sn-2 acyl group from phosphatidylcholine to cholesterol, forming a cholesteryl ester. LCAT is bound to lipoproteins in the blood including HDL and LDL.

Our LCAT Activity Assay Kit provides a simple, convenient method for measuring the phospholipase activity of LCAT in a variety of sample types including plasma, serum, cell lysates and tissue homogenates. Quantitation of LCAT activity is performed in a 96-well fluorescence-based plate reader. This assay may also be used to quantify other calcium independent phospholipase activities such as lipoprotein phospholipase A2 (LP-PLA2).

Recent Product Citation

Jung, M.A. et al. (2015). Hypocholesterolemic effects of *Curcuma longa* L. with *Nelumbo nucifera* leaf in an in vitro model and a high cholesterol diet-induced hypercholesterolemic mouse model. *Animal Cells and Systems* 10.1080/19768354.2014.992953.



Assay Principle for the LCAT Activity Assay Kit. The close proximity of fluorescence labels on a dual-labeled fluorogenic probe keeps the fluorescence quenched. Upon cleavage of the probe by LCAT, fluorescence of the monomers can be measured at an excitation of 342 nm and emission of 400 nm.

Product Name	Detection	Size	Catalog Number
Lecithin Cholesterol Acyltransferase (LCAT) Activity Assay Kit	Fluorometric	100 Assays	STA-615

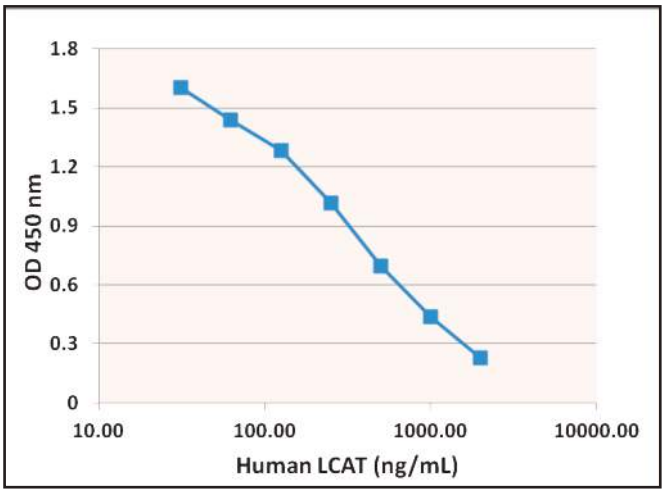
Lecithin Cholesterol Acyltransferase (LCAT) ELISA Kit

Lecithin cholesterol acyltransferase (LCAT) is an enzyme that is associated with lipoproteins and plays a key role in promoting the transfer of excess cell-associated cholesterol from peripheral tissues to the liver to be excreted.

LCAT catalyzes the transfer of an sn-2 acyl group from phosphatidylcholine to cholesterol, forming a cholesteryl ester. LCAT is bound to various lipoproteins in the blood, including HDL and LDL.

Our LCAT ELISA Assay Kit provides a simple, convenient method for quantifying LCAT levels in a variety of sample types including plasma, serum, and cell and tissue lysates. Quantitation of LCAT activity is performed in a standard 96-well plate reader.

- **Sensitive**: Detect as little as 30 ng/mL of LCAT
- **Versatile**: Suitable for human, mouse, rat or rabbit samples



Standard Curve Generated with the Lecithin Cholesterol Acyltransferase (LCAT) ELISA Kit.

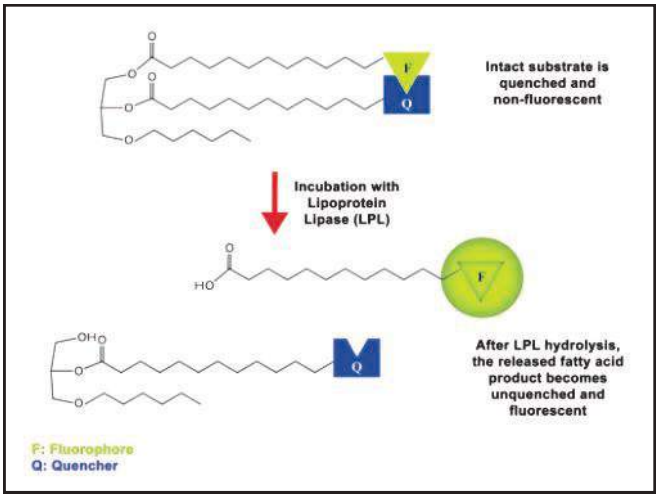
Product Name	Detection	Size	Catalog Number
Lecithin Cholesterol Acyltransferase (LCAT) ELISA Kit	Colorimetric	96 Assays	STA-616

Lipoprotein Lipase (LPL) Activity Assay Kit

Our Lipoprotein Lipase (LPL) Activity Assay Kit provides a simple, convenient method to measure LPL activity in a variety of sample types. This kit uses a fluorogenic triglyceride analog as a lipase substrate. The quenched substrate is cleaved at the sn-1 position by LPL producing a fluorescent product that can be detected in a 96-well fluorescence plate reader. This assay will also measure the activity of endothelial and hepatic lipases. It cannot distinguish between these lipases and LPL.

Recent Product Citations

1. Sun, X. et al. (2015). Insulin dissociates the effects of Liver X receptor on lipogenesis, endoplasmic reticulum stress and inflammation. *J. Biol. Chem.* 10.1074/jbc.M115.668269.
2. Downing, L.E. et al. (2015). A grape seed procyanidin extract ameliorates fructose-induced hypertriglyceridemia in rats via enhanced fecal bile acid and cholesterol excretion and inhibition of hepatic lipogenesis. *PLoS One* **10**:e0140267.
3. Kim, H.K. et al. (2015). Regulation of energy balance by the hypothalamic lipoprotein lipase regulator Angptl3. *Diabetes* **64**:1142-1153.
4. Dib, L. et al. (2014). LXRα fuels fatty acid-stimulated oxygen consumption in white adipocytes. *J. Lipid Res*. **55**:247-257.



Assay Principle for the LPL Activity Assay Kit. The fluorogenic substrate is initially quenched and non-fluorescent. Upon cleavage of the probe by incubation with lipoprotein lipase (LPL), fluorescence can be measured at an excitation of 342 nm and emission of 400 nm.

Product Name	Detection	Size	Catalog Number
Lipoprotein Lipase (LPL) Activity Assay Kit	Fluorometric	100 Assays	STA-610

Lipoprotein Lipase (LPL) ELISA Kit

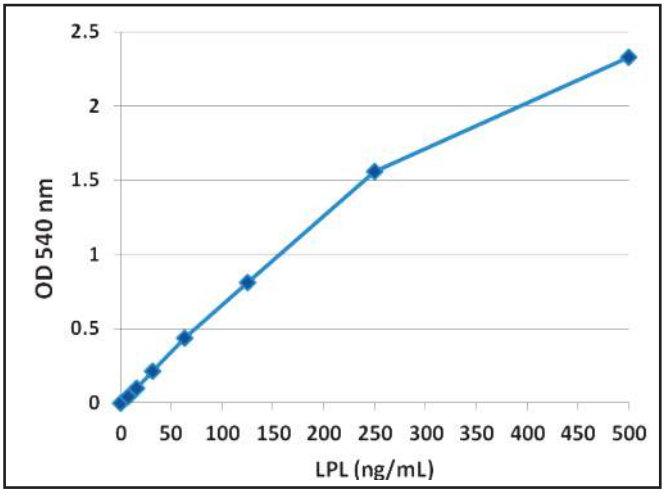
Lipoprotein lipase (LPL) is the key plasma lipase responsible for the hydrolysis of the triglyceride core found in very low density lipoprotein (VLDL) particles formed in the liver. A mutation in the gene coding for LPL can lead to deficiencies in the enzyme, resulting in a diminished ability to breakdown fatty acids. Such LPL deficiency is known as chylomicronemia or Type I hyperlipoproteinemia.

Our Lipoprotein Lipase (LPL) ELISA Kit provides a simple, convenient method to measure LPL levels in plasma, serum or other biological fluids from a variety of species (see below). LPL amounts are quantified against the provided LPL Standard in a colorimetric 96-well microplate reader.

- **Sensitive**: Detect as little as 20 ng/mL of LPL
- **Versatile**: Suitable for human, rat, bovine, guinea pig, or chicken samples (but not mouse)

Recent Product Citation

Chan, D.C. et al. (2014). Inter-relationships between proprotein convertase subtilisin/kexin type 9, apolipoprotein C-III and plasma apolipoprotein B-48 transport in obese subjects: a stable isotope study in the postprandial state. *Clin. Sci. (Lond.)* **128**:379-385.



Standard Curve Generated with the Lipoprotein Lipase (LPL) ELISA Kit.

Product Name	Detection	Size	Catalog Number
Lipoprotein Lipase (LPL) ELISA Kit	Colorimetric	96 Assays	STA-611

Serum Triglyceride Quantitation Kits

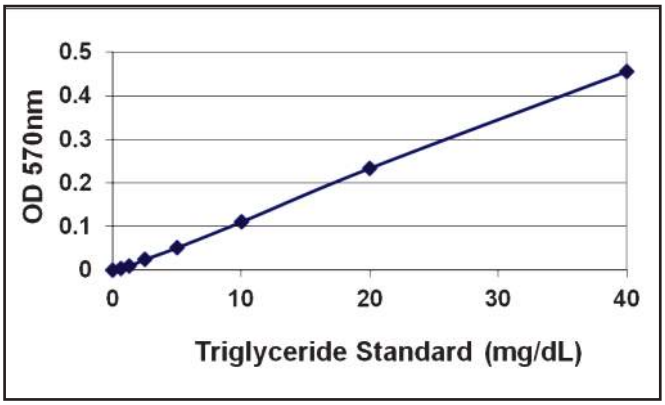
Triglycerides serve as an energy source and play a key role in lipid metabolism. Lipases secreted into the intestines hydrolyze the triglyceride ester bond, producing glycerol and free fatty acids. Hepatic lipases also break down triglycerides in the liver to assemble very low density lipoprotein (VLDL) particles.

Our Serum Triglyceride Quantitation Kits use a coupled enzymatic reaction system to measure triglyceride concentrations. First, a lipase hydrolyzes the ester bond, yielding free glycerol. The glycerol is then phosphorylated and oxidized, producing hydrogen peroxide, which reacts with the probe provided with each kit. Kits are available with either colorimetric or fluorescence-based detection, both of which are performed in a 96-well microtiter plate.

Recent Product Citations

1. Chellan, B. et al. (2014). IL-22 is induced by S100/calgranulin and impairs cholesterol efflux in macrophages by downregulating ABCG1. *J. Lipid Res*. **55**:443-454. (STA-396)
2. Marino, A. et al. (2014). ITCH deficiency protects from diet-induced obesity. *Diabetes* **63**:550-561. (STA-396)

- **Sensitive**: Detect as little as 10 µM (1 mg/dL) with the colorimetric format and 2 µM (0.2 mg/dL) with the fluorometric format
- **Versatile**: Suitable for serum, plasma, and cell and tissue lysates



Standard Curve Generated with the Serum Triglyceride Quantitation Kit (Colorimetric).

Want to measure free glycerol content? See our Free Glycerol Assay Kits on **page 150**.

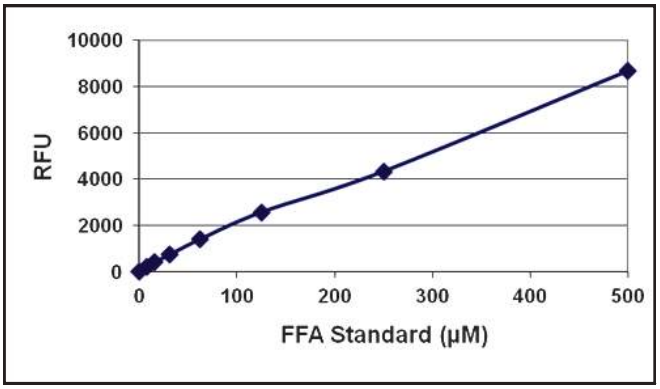
Product Name	Detection	Size	Catalog Number
Serum Triglyceride Quantification Kit	Colorimetric	100 Assays	STA-396
	Fluorometric	100 Assays	STA-397

Free Fatty Acid (FFA) Assay Kits

Our Free Fatty Acid Assay Kits use a coupled enzymatic reaction system to measure free fatty acid concentrations in serum or plasma. Acyl CoA Synthetase catalyzes FFA acylation of CoA. The Acyl-CoA is then oxidized by Acyl CoA Oxidase, producing hydrogen peroxide, which reacts with the kit's probe. Kits are available with either colorimetric or fluorescence-based detection, both of which are performed in a 96-well microtiter plate.

Recent Product Citations

1. Kahouli, I. et al. (2015). In-vitro characterization of the anti-cancer activity of the probiotic bacterium *Lactobasillus fermentum* NCIMB 5221 and potential against colorectal cancer. *J. Cancer Sci. Ther*. **7**:224-235. (STA-618)
2. Diane, A. et al. (2014). PACAP is essential for the adaptive thermogenic response of brown adipose tissue to cold exposure. *J. Endocrinol.* **222**:327-339. (STA-618)



Standard Curve Generated with the Free Fatty Acid Assay Kit (Fluorometric).

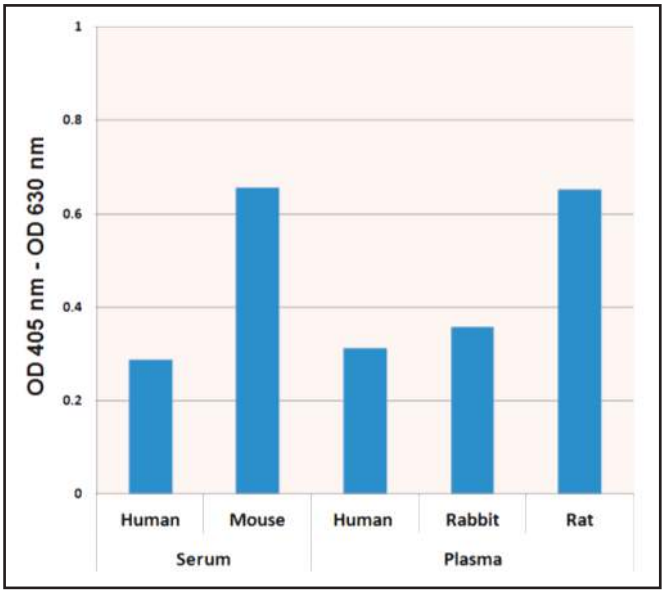
Product Name	Detection	Size	Catalog Number
Free Fatty Acid Assay Kit	Colorimetric	100 Assays	STA-618
	Fluorometric	100 Assays	STA-619

Total Bile Acid Assays

While bile acid synthesis is critical for the removal of cholesterol from the body, bile acids are also required for proper uptake of nutrients in the small intestine. Our Total Bile Acid Assay Kits provide a convenient 96-well plate-based method to measure the total bile acid content in a variety of sample types. These assays are based on an enzyme driven reaction in which bile acids are incubated in the presence of 3-alpha hydroxysteroiddehydrogenase.

The reaction used with the colorimetric kit requires the presence of NADH and thio-NAD+. The thio-NAD+ is reduced to thio-NADH which is detected by colorimetric absorbance.

The fluorometric kit requires incubation with NAD+, which is converted to NADH. Diaphorase then uses NADH to reduce resazurin to resorufin, which is detected fluorometrically at 560 nm excitation and 590 nm emission.



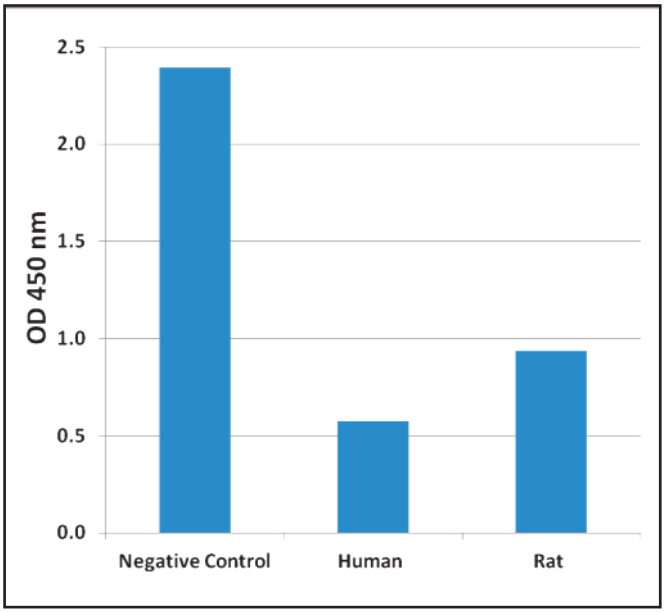
Samples from Various Species Tested with the Total Bile Acid Assay Kit (Colorimetric).

Product Name	Detection	Size	Catalog Number
Total Bile Acid Assay Kit	Colorimetric	100 Assays	STA-631
	Fluorometric	96 Assays	MET-5005

Cholic Acid ELISA Kit

Cholic acid is a primary bile acid that is synthesized from excess cholesterol by the liver. Bile acid synthesis is critical for cholesterol removal from the body as well as uptake of dietary lipids, fat soluble vitamins, and other nutrients from the small intestine. Determining circulatory levels of bile acids may be used to identify certain liver diseases.

Our Cholic Acid ELISA Kit is designed for detection and quantitation of cholic acid in plasma, serum, urine, feces, or lysates. This assay is a competitive ELISA where unknown samples are added to a plate pre-adsorbed with a cholic acid conjugate. An anti-cholic acid antibody is added, and the cholic acid content in unknown samples competes with the cholic acid on the plate for binding to the antibody. High levels of cholic acid in samples will bind most of the antibody, leaving little binding of antibody to the plate and producing a low signal. Low levels of cholic acid result in most antibody bound to the plate, resulting in a higher signal.



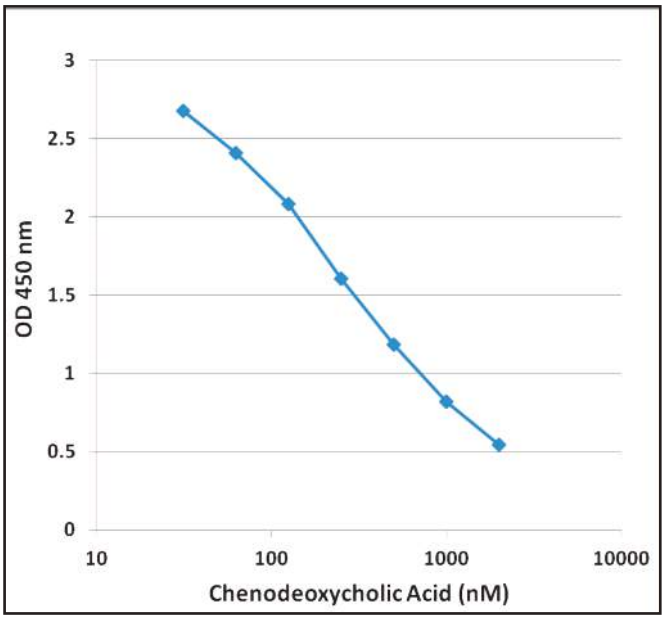
Cholic Acid Levels in Undiluted Human or Rat Serum, Compared to Negative Control.

Product Name	Detection	Size	Catalog Number
Cholic Acid ELISA Kit	Colorimetric	96 Assays	MET-5007

Chenodeoxycholic Acid ELISA Kit

Chenodeoxycholic acid is a primary bile acid that is synthesized from excess cholesterol by the liver. Bile acid synthesis is critical for cholesterol removal from the body as well as uptake of dietary lipids, fat soluble vitamins, and other nutrients from the small intestine. Determining circulatory levels of bile acids may be used to identify certain liver diseases.

Our Chenodeoxycholic Acid ELISA Kit is designed for detection and quantitation of chenodeoxycholic acid in plasma, serum, urine, feces, or lysates. This assay is a competitive ELISA where unknown samples are added to a plate pre-adsorbed with a chenodeoxycholic acid conjugate. An anti-chenodeoxycholic acid antibody is added, and the chenodeoxycholic acid content in unknown samples competes with the bile acid on the plate for binding to the antibody. High levels of chenodeoxycholic acid in samples will bind most of the antibody, leaving little binding of antibody to the plate and producing a low signal. Low levels result in most antibody bound to the plate, resulting in a higher signal.



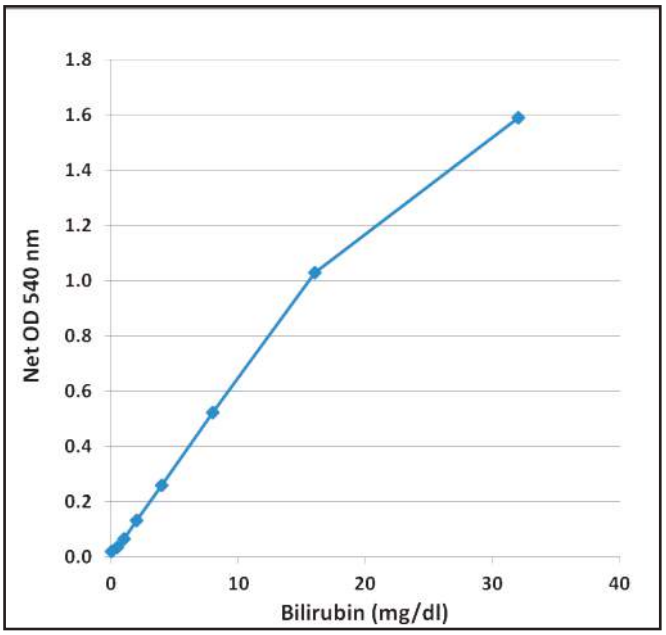
Chenodeoxycholic Acid ELISA Standard Curve.

Product Name	Detection	Size	Catalog Number
Chenodeoxycholic Acid ELISA Kit	Colorimetric	96 Assays	MET-5008

Bilirubin Assay Kit

Bilirubin, a byproduct of heme breakdown, can exist conjugated to glucuronic acid (direct) and as unconjugated (indirect). The unconjugated form is found in the blood bound to albumin and is transported to the liver. Bilirubin becomes conjugated to glucuronic acid in the liver, making it more soluble and allowing for excretion into bile. High levels of bilirubin have been correlated with jaundice and Gilbert's syndrome, while low levels have been associated with cardiovascular disease and diabetes mellitus.

Our Bilirubin Assay Kit measures total and direct bilirubin in plasma, serum, urine, or lysates. This assay is based on the Jendrassik-Grof method, in which diazotized sulfanilic acid reacts with conjugated (direct) bilirubin, forming azobilirubin that is detectable in a colorimetric plate reader. Since unconjugated (indirect) bilirubin reacts slowly, an accelerant can be added to the reaction to measure total bilirubin.



Total Bilirubin Standard Curve.

Product Name	Detection	Size	Catalog Number
Bilirubin Assay Kit	Colorimetric	200 Assays	MET-5010

Phosphatidylcholine Assay Kit

Phosphatidylcholine is the foremost phospholipid in eukaryotic cell membranes and comprises about 70% of the total phospholipids in plasma lipoproteins.

Our Phosphatidylcholine Assay Kit is a simple fluorometric assay that measures phosphatidylcholine in plasma, serum, cell suspensions or tissue homogenates. Phospholipase D enzyme hydrolyzes phosphatidylcholine into phosphatidic acid and choline. The choline is then oxidized by choline oxidase to produce hydrogen peroxide, which is detected by a fluorogenic probe in the presence of horseradish peroxidase (HRP).

Recent Product Citation
Park, E.S. et al. (2014). Phosphatidylcholine alteration identified using MALDI imaging MS in HBV-infected mouse livers and virus-mediated regeneration defects. *PLoS One* **9**:e94127.

Product Name	Detection	Size	Catalog Number
Phosphatidylcholine Assay Kit	Fluorometric	96 Assays	STA-600

Sphingomyelin Assay Kit

Our Sphingomyelin Assay Kit is a simple fluorometric assay that measures sphingomyelin levels in plasma, serum, cell suspensions or tissue homogenates. Sphingomyelinase hydrolyzes sphingomyelin into ceramide and phosphocholine, which in turn is broken down into choline. Choline is enzymatically oxidized to produce hydrogen peroxide, which is detected with a fluorogenic probe in the presence of horseradish peroxidase (HRP).

Recent Product Citation
Winkler, E.A. et al. (2014). Blood-spinal cord barrier disruption contributes to early motor-neuron degeneration in ALS-model mice. *PNAS* **111**:E1035-E1042.

Product Name	Detection	Size	Catalog Number
Sphingomyelin Assay Kit	Fluorometric	96 Assays	STA-601

Total Phosphatidic Acid Assay Kit

Our Total Phosphatidic Acid Assay Kit measures total phosphatidic acid content, including lysophosphatidic acid (LPA), in cell and tissue samples by a coupled enzymatic reaction system. Lipase is used to hydrolyze the phosphatidic acid samples to glycerol-3-phosphate. Then the glycerol-3-phosphate is oxidized by glycerol-3-phosphate oxidase (GPO), producing hydrogen peroxide which reacts with the kit's fluorometric probe.

Product Name	Detection	Size	Catalog Number
Total Phosphatidic Acid Assay Kit	Fluorometric	96 Assays	MET-5019

Acetylcholine Assay Kits

Our Acetylcholine Assay Kits provide a simple, convenient method to quantify acetylcholine in plasma, serum, cell suspensions, or tissue homogenates.

Recent Product Citation
Kim, M.S. et al. (2014). Ginsenoside Re and Rd enhance the expression of cholinergic markers and neuronal differentiation in neuro-2a cells. *Biol. Pharm. Bull.* **37**:826-833. (STA-602)

Product Name	Detection	Size	Catalog Number
Acetylcholine Assay Kit	Colorimetric	100 Assays	STA-603
	Fluorometric	100 Assays	STA-602

Human C-Reactive Protein ELISA Kit

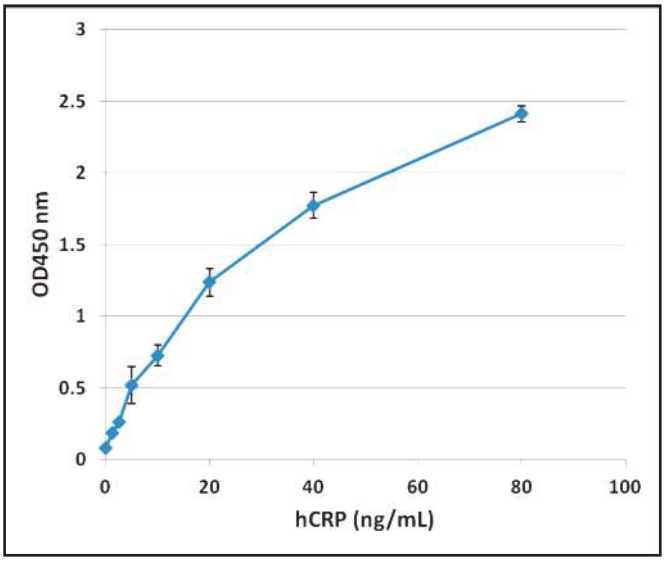
C-Reactive Protein (CRP) is a serum protein that binds with high affinity to phosphocholine residues as well as other autologous and extrinsic ligands. CRP is a well-established marker of inflammation and tissue damage, and it has been associated with cardiovascular disease, atherosclerosis, and other diseases.

Our Human C-Reactive Protein (CRP) ELISA Kit provides a simple, convenient method to measure CRP levels in human plasma, serum, or other biological fluids. CRP amounts are quantified against the provided CRP Standard in a colorimetric 96-well microplate reader.

Recent Product Citations

1. Alexandrov, P.N. et al. (2015). Nanomolar aluminum induces expression of the inflammatory systemic biomarker C-reactive protein (CRP) in human brain microvessel endothelial cells (hBMECs). *J. Inorg. Biochem.* 10.1016/j.jinorgbio.2015.07.013.
2. Cakar, M. et al. (2015). Arterial stiffness and endothelial inflammation in prediabetes and newly diagnosed diabetes patients. *Arch. Endocrinol. Metab.* 10.1590/2359-3997000000061.
3. Chandra, P. et al. (2014). Prospects and advancements in C-reactive protein detection. *World J. Methodol.* **4**:1-6.
4. Barisione, G. et al. (2014). Mechanisms for reduced pulmonary diffusing capacity in haematopoietic stem-cell transplantation recipients. *Respir. Physiol. Neurobiol.* **194**:54-61.

- **Sensitive**: Detect as little as 1 ng/mL of CRP
- **Versatile**: Suitable for plasma, serum, or other biological fluids



Standard Curve Generated with the Human C-Reactive Protein (CRP) ELISA Kit.

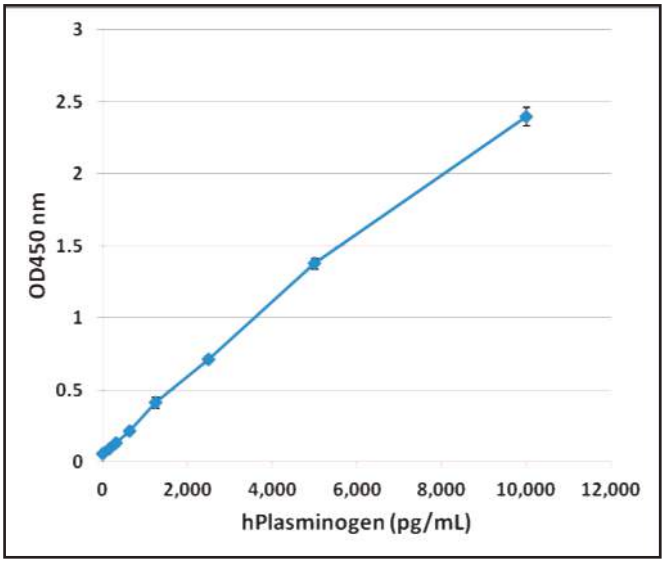
Product Name	Detection	Size	Catalog Number
Human C-Reactive Protein (CRP) ELISA Kit	Colorimetric	96 Assays	STA-392

Human Plasminogen ELISA Kit

Plasminogen is a plasma glycoprotein that plays a role in macrophage recruitment, arterial stenosis, atherosclerosis, aneurysm formation, wound healing, and neovascularization. Plasminogen exists as an inactive proenzyme, but when converted to the active enzyme plasmin it serves to digest fibrin. This activation is catalyzed by tissue-type plasminogen activator (tPA) or urokinase-type plasminogen activator (uPA).

Our Human Plasminogen ELISA Kit provides a simple, convenient method to measure plasminogen levels in human plasma, serum, or other biological fluids. Plasminogen amounts are quantified against the provided Plasminogen Standard in a colorimetric 96-well microplate reader.

- **Sensitive**: Detect as little as 150 pg/mL of plasminogen
- **Versatile**: Suitable for plasma, serum, or other biological fluids



Standard Curve Generated with the Human Plasminogen ELISA Kit.

Product Name	Detection	Size	Catalog Number
Human Plasminogen ELISA Kit	Colorimetric	96 Assays	STA-393

Human Albumin ELISA Kit

Human serum albumin (HSA) is the most abundant protein in human plasma, constituting about half the protein in blood serum. It is typically found in concentrations around 50 mg/mL. Produced in the liver in a preproalbumin state, albumin transports hormones, fatty acids, and other compounds through the circulation. It also maintains pH and osmotic pressure.

Our Human Albumin ELISA Kit provides a simple, convenient method to measure HSA levels in human plasma, serum, urine, or other biological fluids. Human albumin amounts are quantified against the provided standard in a colorimetric 96-well microplate reader.

- **Sensitive**: Detect as little as 100 pg/mL of human serum albumin
- **Versatile**: Suitable for plasma, serum, or other biological fluids

Product Name	Detection	Size	Catalog Number
Human Albumin ELISA Kit	Colorimetric	96 Assays	STA-383

BCG Albumin Assay Kit

Our BCG Albumin Assay Kit provides an extremely fast alternative to our Albumin ELISA Kit. This kit uses a proprietary formulation of Bromocresol Green, which forms a color complex specifically with albumin in samples. No pretreatment is required. The assay is performed in a 96-well plate and read using a standard colorimetric plate reader.

- **Fast**: Measure albumin levels in about 5 minutes
- **Versatile**: Suitable for plasma, serum, urine, or other biological fluids
- **Quantitative**: Compare unknown albumin samples to a known standard (provided)

Product Name	Detection	Size	Catalog Number
BCG Albumin Assay Kit	Colorimetric	250 Assays	MET-5017

Human Serum Proteins

Our human albumin and oxidized albumin were isolated and purified by HPLC. C-reactive protein was isolated from human pleural fluid. Plasminogen was isolated and purified from human plasma following an ultracentrifugation procedure.

Product Name	Size	Catalog Number
Human Albumin	100 µg	STA-230
Human Albumin, Malondialdehyde Modified	100 µg	STA-210
Human C-Reactive Protein	100 µg	STA-240
Human Plasminogen	100 µg	STA-239

Antibodies to Human Serum Proteins

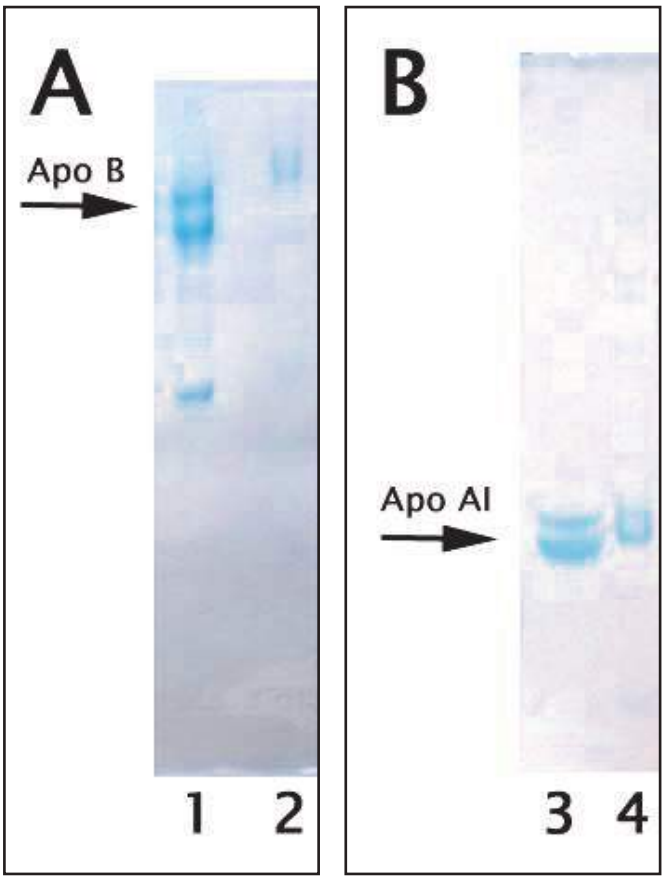
Antibodies are affinity purified.

Product Name	Detection	Size	Catalog Number
Goat Anti-Human Albumin Polyclonal Antibody	Immunoblot/ELISA	100 µg	STA-130
Rabbit Anti-Human C-Reactive Protein Polyclonal Antibody	Immunoblot/ELISA	100 µg	STA-140
Goat Anti-Human Plasminogen Polyclonal Antibody	Immunoblot/ELISA	100 µg	STA-139

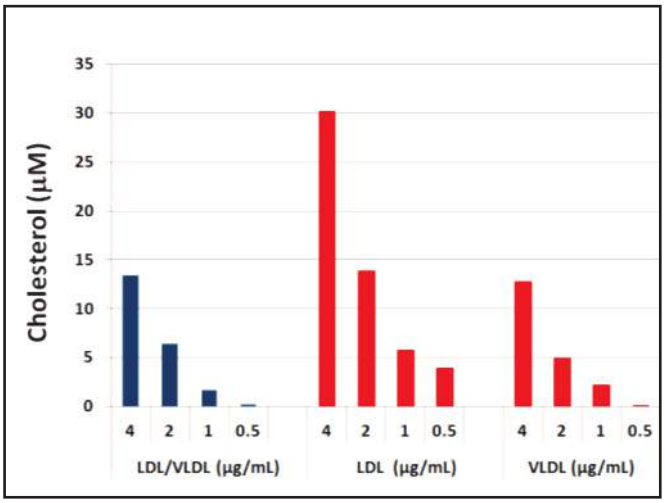
Lipoprotein Purification Kits, Ultracentrifugation Free

Traditionally, lipoproteins such as HDL, LDL and VLDL have been purified from plasma or serum via the use of ultracentrifugation, which can be tedious and time consuming.

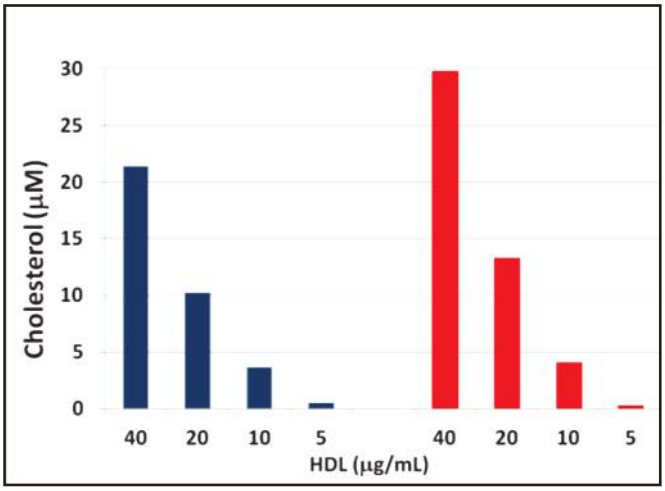
Our Lipoprotein Purification Kits provide comparable purity without the need for an ultracentrifuge. Samples are separate into two fractions, one containing HDL and the other containing LDL and VLDL. Fractions are then further purified using standard table-top centrifugation speeds.



SDS PAGE of Purified Lipoproteins. **(A)** 20 µg of LDL/VLDL purified using either the LDL/VLDL and HDL Purification Kit (lane 1) or ultracentrifugation (lanes 2) was loaded on a 3-8% Tris Acetate Gel. **(B)** 20 µg of HDL purified using either the LDL/VLDL and HDL Purification Kit (lane 3) or ultracentrifugation (lane 4) was loaded on a 12% Bis Tris gel. Both gels were stained with Coomassie Brilliant Blue Dye.



Detection of Cholesterol in Purified LDL/VLDL Samples. LDL/VLDL purified from the LDL/VLDL and HDL Purification Kit (blue bars) or by ultracentrifugation (red bars) was tested for the presence of cholesterol using Cell Biolabs' Total Cholesterol Assay Kit (Fluorometric).



Detection of Cholesterol in Purified HDL Samples. HDL purified from the LDL/VLDL and HDL Purification Kit (blue bars) or by ultracentrifugation (red bars) was tested for the presence of cholesterol using Cell Biolabs' Total Cholesterol Assay Kit (Fluorometric).

Product Name	Size	Catalog Number
HDL Purification Kit (Ultracentrifugation Free)	10 preps	STA-607
LDL/VLDL Purification Kit (Ultracentrifugation Free)	10 preps	STA-606
LDL/VLDL and HDL Purification Kit (Ultracentrifugation Free)	10 preps	STA-608

Lipid Extraction and Separation Kits, Chloroform Free

Traditional methods of extracting lipids from tissues or cells, such as the well-published Folch method, use chloroform as the extraction solvent. This method has a couple of disadvantages. First, the organic phase ends up below the aqueous phase, creating problematic removal through the upper phase that risks contamination. Second, chloroform has been classified in many places as a probable carcinogen.

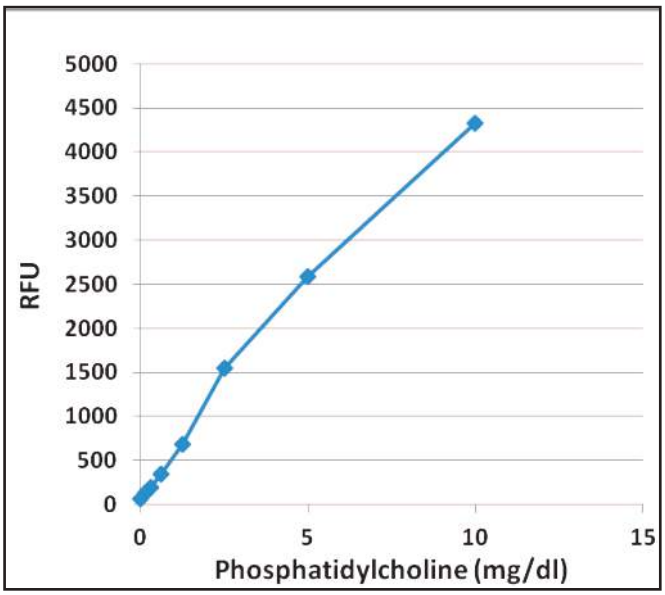
Our Lipid Extraction Kit overcomes both disadvantages of the Folch method. The kit provides a chloroform-free extraction method, and the use of proprietary organic solvents places the organic phase above the aqueous phase, allowing easy removal without disturbing the aqueous layer.

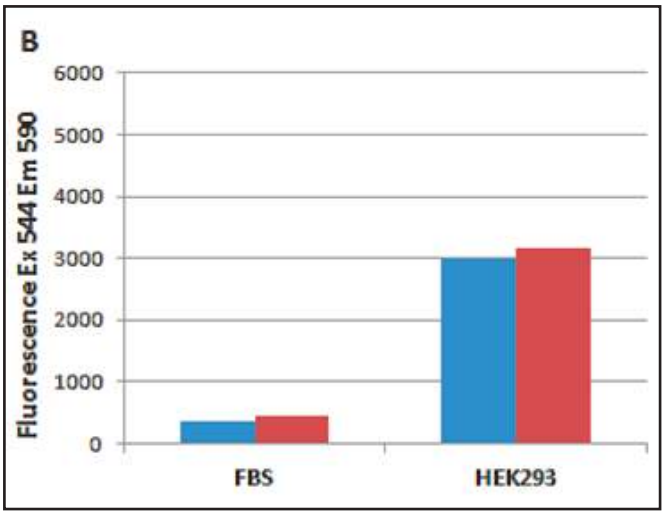
Our Polar/Neutral Lipid Separation Kit allows you to separate polar and neutral lipid fractions from lipids extracted either with our Lipid Extraction Kit or by the Folch method. For best results from start to finish, choose our Lipid Extraction & Polar/Neutral Lipid Separation Combo Kit.

Each kit provides sufficient reagents for 50 extractions from 100 µL sample sizes, but reagents may be scaled up for larger samples.

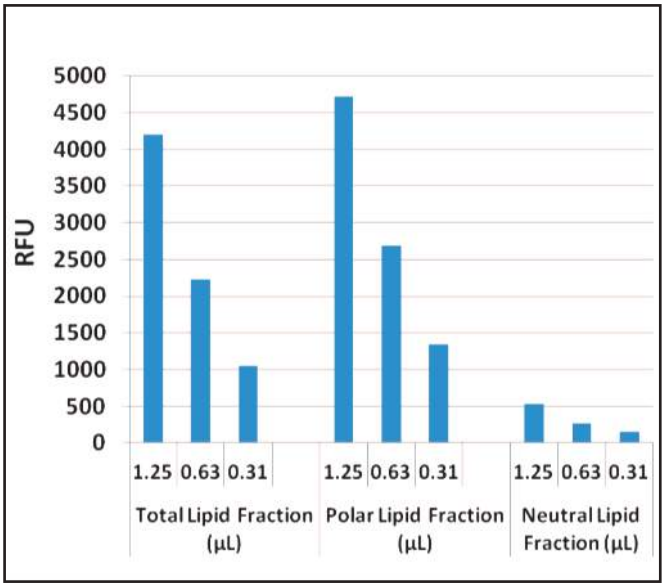
Recent Product Citation

Pamir, N. et al. (2015). Granulocyte macrophage-colony stimulating factor-dependent dendritic cells restrain lean adipose tissue expansion. *J. Biol. Chem.* 10.1074/jbc.M115.645820. (STA-612)





Total Cholesterol Assay Performed on Extracted Lipids. Lipids extracted from fetal bovine serum (FBS) and HEK293 cells were prepared using the traditional Folch method (blue) and the Lipid Extraction Kit (red). Samples were tested for the presence of cholesterol in the Total Cholesterol Assay Kit (Cat. #STA-390).



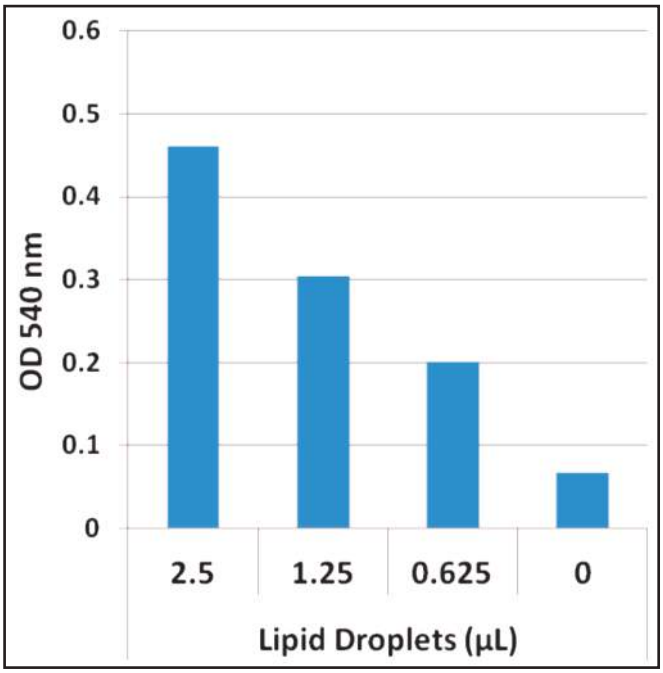
Phophatidylcholine Assay Performed on Extracted Lipids. **Top:** Phosphatidylcholine Standard Curve. **Bottom:** Total, polar and neutral lipids were extracted from homogenized chicken liver using the Lipid Extraction Kit (Chloroform Free) and tested for the presence of phosphatidylcholine according to the Assay Protocol.

Product Name	Size	Catalog Number
Lipid Extraction Kit (Chloroform Free)	50 Preps	STA-612
Polar/Neutral Lipid Separation Kit (Chloroform Free)	50 Preps	MET-5009
Lipid Extraction & Polar/Neutral Lipid Separation Combo Kit (Chloroform Free)	50 Preps	MET-5009-C

Lipid Droplet Isolation Kit

Lipid droplets are organelles that are rich in lipids, contain a lipid rich core, and are surrounded by a phospholipid monolayer as well as outer lipid droplet associated proteins. They are commonly found in adipose tissue of animals, although they are found in all eukaryotes. Lipid droplets function to regulate the hydrolysis and storage of neutral lipids and also serve as storage for cholesterol and acyl-glycerols used to form and maintain cellular membranes.

Our Lipid Droplet Isolation Kit uses simple gradient centrifugation, but circumvents the need for large sample sizes or ultracentrifugation. A lipid droplet source such as tissue or cultured cells is homogenized; a gradient is then created with the homogenate, and the material is centrifuged. The lipid droplets float to the top of the gradient and are recovered by carefully pipetting. Each kit provides sufficient reagents to isolate up to 50 preps based on a 50-100 mg tissue or cultured cell sample size.



Triglyceride Quantification of Lipid Droplets Isolated from Chicken Liver.

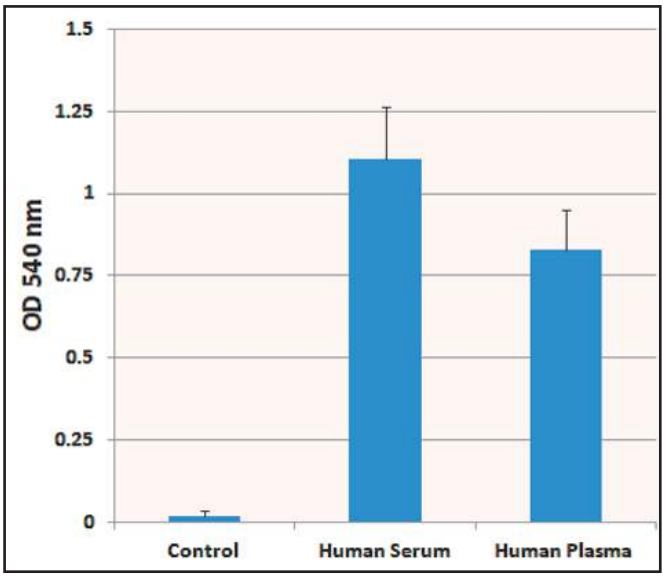
Product Name	Size	Catalog Number
Lipid Droplet Isolation Kit	50 preps	MET-5011

Lipid Quantification Kits

Our Lipid Quantification Kits provide a convenient plate-based method to measure the lipid content in various samples. The colorimetric assay uses a sulfo-phospho-vanillin method to detect unsaturated fatty acids. Samples are acidified and heated to solubilize and prime the lipids. The lipids then react with vanillin in acidic conditions to form a colorimetric product detectable in a standard 96-well microplate reader.

The fluorometric assay specifically measures neutral lipid content from samples and provides a 10-fold sensitivity advantage compared to the colorimetric format.

These kits are compatible with plasma and serum samples, or with crude or purified lipids extracted from cells. Each kit provides sufficient reagents for 100 assays including standards and unknown samples.



Quantification of Lipids from Human Serum or Plasma.

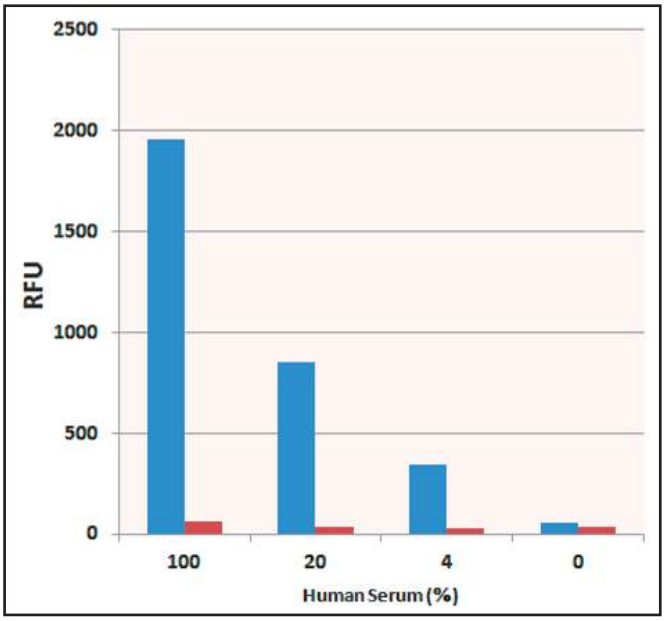
Product Name	Detection	Size	Catalog Number
Lipid Quantification Kit (unsaturated fatty acids)	Colorimetric	100 Assays	STA-613
Lipid Quantification Kit (neutral lipids)	Fluorometric	100 Assays	STA-617

Glutamate Assay Kit

Glutamate is a non-essential amino acid that has a key metabolic role in processes such as the citric acid cycle and removal of excess nitrogen waste. It is one of the major excitatory neurotransmitters of the mammalian brain and is involved in learning and memory.

Our Glutamate Assay Kit is a simple HTS-compatible assay for measuring glutamate levels in biological samples without the need for pretreatment. Glutamate oxidase converts glutamate to a-ketoglutarate while producing ammonia and hydrogen peroxide as byproducts. The hydrogen peroxide reacts with a fluorometric probe in the presence of HRP, producing the highly fluorescent product Resorufin which is measured in a fluorescence-based microplate reader. L-Alanine and glutamate-pyruvate transaminase are added to regenerate glutamate in the reaction.

- **Sensitive**: Detect as little as 0.3 µM of glutamate
- **Versatile**: Suitable for plasma, serum, urine, lysates and cell culture supernatants



Detection of Glutamate in Human Serum. Pooled serum was incubated in the presence (blue bars) and absence (red bars) of glutamate oxidase and glutamate-pyruvate transaminase.

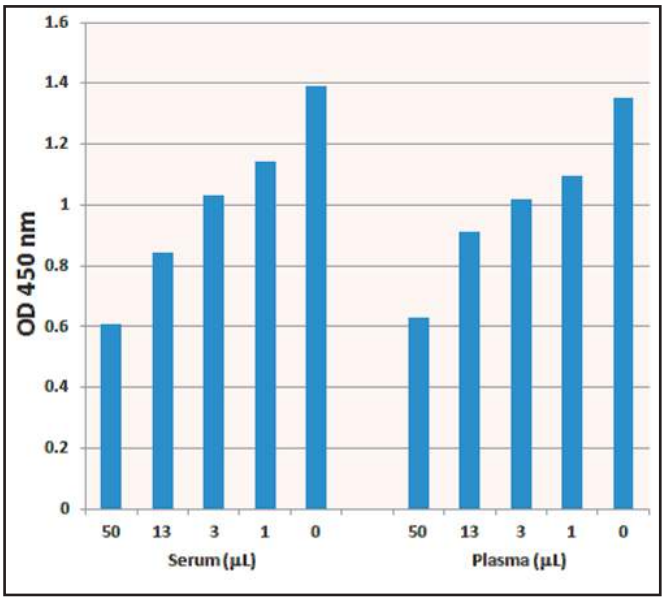
Product Name	Detection	Size	Catalog Number
Glutamate Assay Kit	Fluorometric	200 Assays	STA-674

Homocysteine ELISA Kit

Homocysteine is an amino acid intermediate formed during the production of the essential dietary amino acid methionine. It is a homologue of cysteine, differing only in that it contains an extra side chain methylene bridge. High levels of homocysteine in the blood have been associated with premature incidences of vascular disease, making it a likely risk factor for heart disease.

Our Homocysteine ELISA Kit is competitive ELISA developed for the detection and quantitation of homocysteine in a variety of sample types. Each kit provides sufficient reagents to perform up to 96 assays including standards and unknown samples.

- **Sensitive**: Detect as little as 10 ng/mL of homocysteine
- **Versatile**: Suitable for plasma, serum, lysates, or other biological fluid samples



Detection of Homocysteine in Human Serum and Plasma.

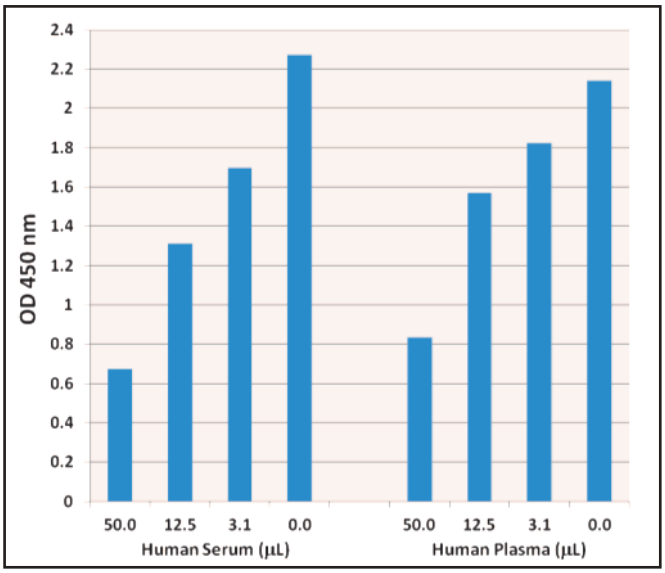
Product Name	Detection	Size	Catalog Number
Homocysteine ELISA Kit	Colorimetric	96 Assays	STA-670

S-Adenosylmethionine and S-Adenosylhomosteine ELISA Kits

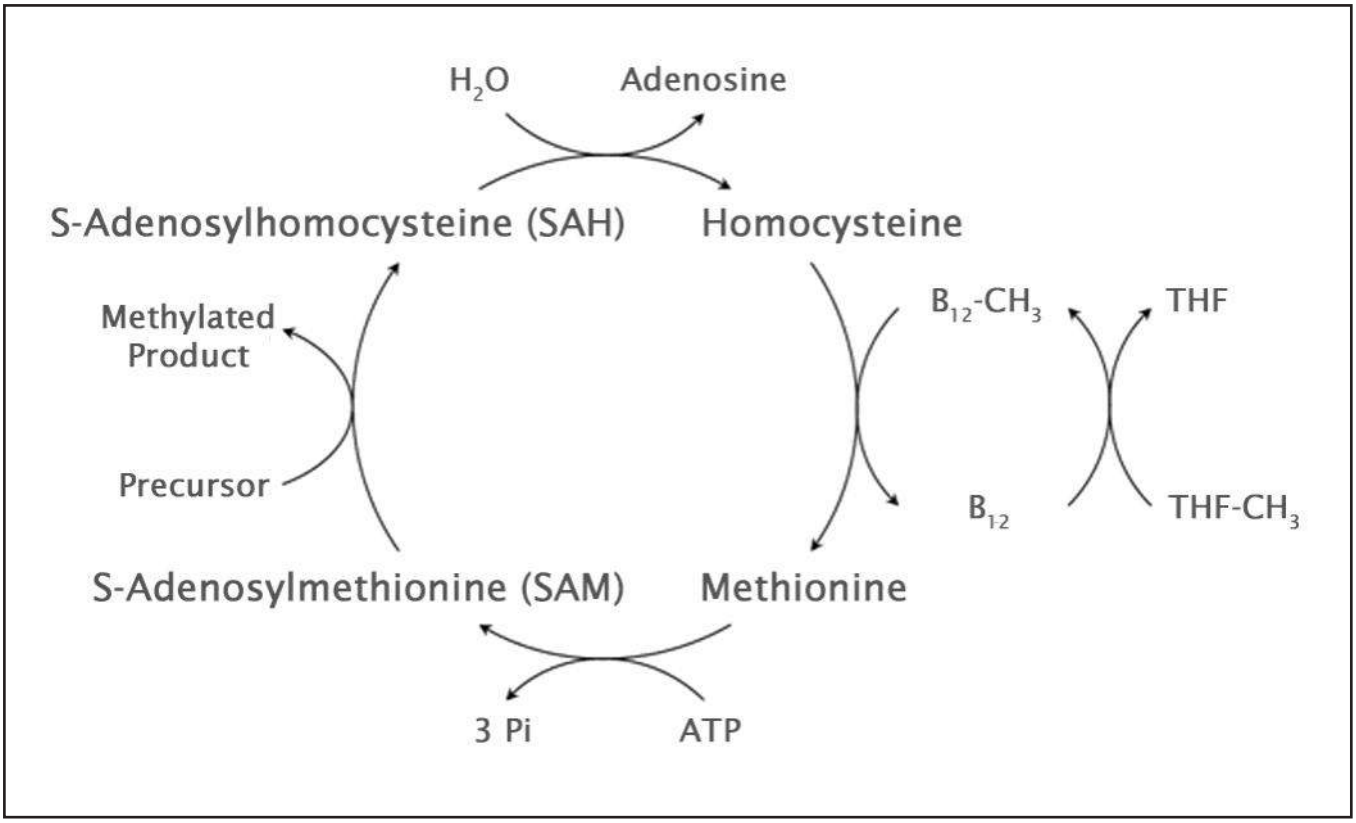
S-adenosylmethionine (SAM) is a methyl donor involved in the transfer of a methyl group to DNA, proteins, phospholipids, RNA, and neurotransmitters. Reactions that break down and regenerate SAM are referred to as the SAM cycle. SAM-dependent methylases convert SAM to S-adenosylhomocysteine (SAH), which is further broken down to homocysteine and adenosine.

Donation of the SAM methyl group converts SAM into SAH, the latter being a potent inhibitor of methylation. For this reason, the SAM/SAH ratio has been used as an index of methylation potention in a cell.

Our SAM and SAH ELISA Kits use a competitive ELISA format to detect and quantify SAM and SAH in a variety of sample types. To enable convenient quantitation of the SAM/SAH ratio, we offer the SAM/SAH ELISA Combo Kit.



Detection of S-Adenosylmethionine in Human Serum and Plasma.



The SAM Cycle.

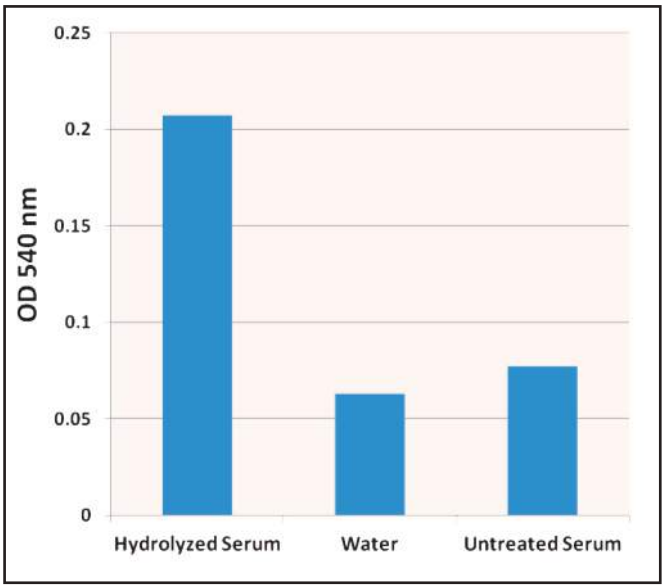
Product Name	Size	Catalog Number
S-Adenosylmethionine (SAM) ELISA Kit	96 Assays	STA-672
S-Adenosylhomocysteine (SAH) ELISA Kit	96 Assays	STA-671
S-Adenosylmethionine (SAM) and S-Adenosylhomocysteine (SAH) ELISA Combo Kit	96 Assays	STA-671-C

Hydroxyproline Assay Kit

Hydroxyproline is an amino acid that is synthesized from the irreversible post-translational hydroxylation of proline by prolyl hydroxylase. Hydroxyproline is found almost exclusively in the protein collagen, in the Y position of the repeating tripeptide Gly-X-Y. By allowing sharp twisting of the collagen helix, hydroxyproline helps to stabilize the collagen structure.

Since hydroxyproline has been found on so few proteins other than collagen, it has been used as a marker to quantify levels of collagen and/or gelatin (partially hydrolyzed collagen).

Our Hydroxyproline Assay Kit is a simple assay for measuring hydroxyproline levels in a variety of sample types. The hydroxyproline is converted to a pyrrole which reacts with the Ehrlich's Reagent to produce a chromophore that is read with a standard microplate reader.



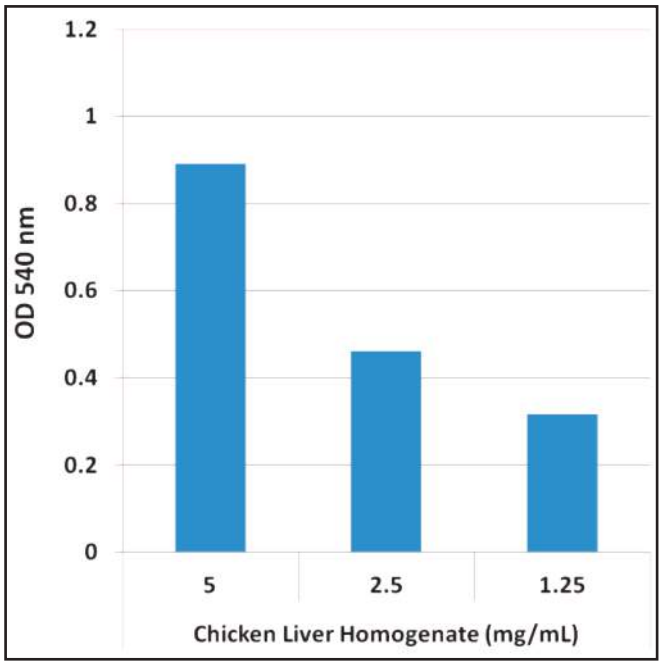
Detection of Hydroxyproline in Human Serum. Pooled serum with (left) and without (right) acid hydrolysis were tested according to the Assay Protocol. Water was included as a negative control.

Product Name	Detection	Size	Catalog Number
Hydroxyproline Assay Kit	Colorimetric	96 Assays	STA-675

Soluble Collagen Assay Kit

Collagen serves as the major structural component of animal connective tissues. Furthermore, collagen comprises about 30% of the total protein content in most animals, making it the most abundant animal protein. This important protein plays an important role in preserving healthy myocardial function, as it contributes to myocyte orientation and heart force transmission.

The Soluble Collagen Assay Kit provides a convenient microplate-based method for the detection of soluble collagen from cell or tissue samples. First, samples are dried down in a 96-well plate. A Sirius Read reagent is added to stain the triple helix structure (Gly-X-Y) of collagen. The stained collagen is then washed with an Acidic Reagent, eluted from the plate with a Basic Reagent, and then quantified in a standard colorimetric plate reader at OD 540 nm.



Detection of Soluble Collagen in Chicken Liver. Chicken liver was homogenized in 0.5M Acetic Acid and 0.1 mg/mL Pepsin.

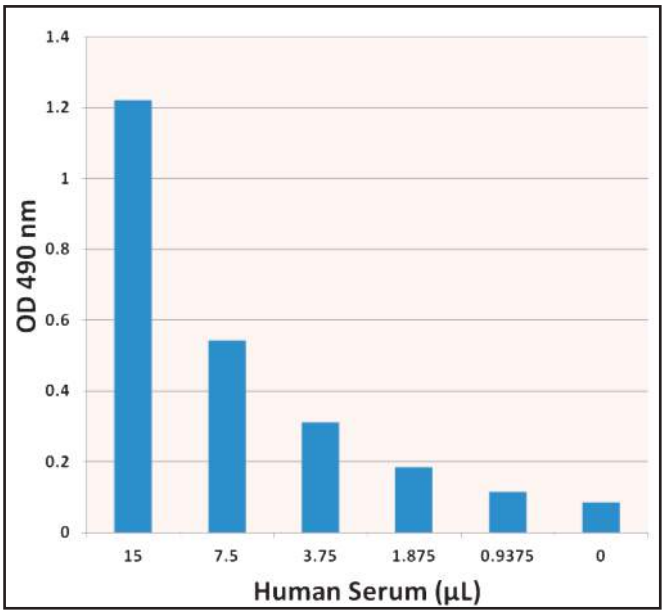
Product Name	Detection	Size	Catalog Number
Soluble Collagen Assay Kit	Colorimetric	96 Assays	MET-5016

Total Carbohydrate Assay Kit

The measurement of total carbohydrate content is important in several fields including food, petroleum, pharmaceutical and environmental research. Many techniques such as light scattering, NMR, capillary electrophoresis, IR spectroscopy and chromatography have been used, but these techniques can be costly, time consuming, and require complex analytical skills.

The Total Carbohydrate Assay kit is a simple, convenient assay that measures the total carbohydrate content of foods or biological samples. Carbohydrates in samples are compared to a known glucose standard provided in the kit.

- **Sensitive**: Detect as little as 62.5 µM
- **Versatile**: Suitable for food samples, plasma, serum, urine, cell lysates, or tissue homogenates



Total Carbohydrate Detection in Human Serum.

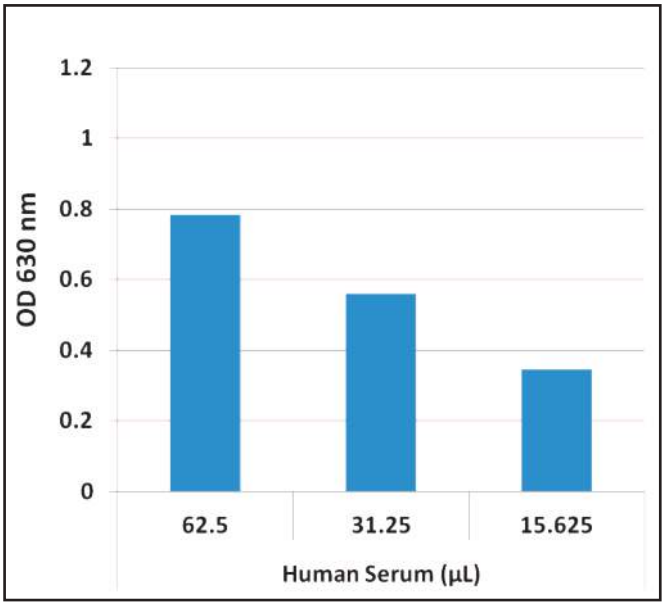
Product Name	Detection	Size	Catalog Number
Total Carbohydrate Assay Kit	Colorimetric	100 Assays	STA-682

Total Sialic Acid Assay Kit

Sialic acids comprise a family of derivatives of nine-carbon monosaccharides. They are found in highest concentrations in brain gangliosides which function in neurotransmission, memory storage, and synapse function. Additionally, sialic acids can bind to proteins to create sialoglycoproteins, a buildup of which can facilitate the entry of metastatic cancer cells into the bloodstream.

Our Total Sialic Acid Assay kit is a simple colorimetric assay that measures the total sialic acid content present in biological samples. Samples are first treated with an Oxidizing Reagent, followed by treatment with Resorcinol Reagent. Under acidic conditions the sialic acid forms a chromophore which is extracted into an alcohol to be read in a standard 96-well microplate reader.

- **Sensitive**: Detect as little as 25 µM
- **Versatile**: Suitable for plasma, serum, saliva, urine, cell lysates, tissue homogenates, or cell culture supernatants



Total Sialic Acid Standard Curve.

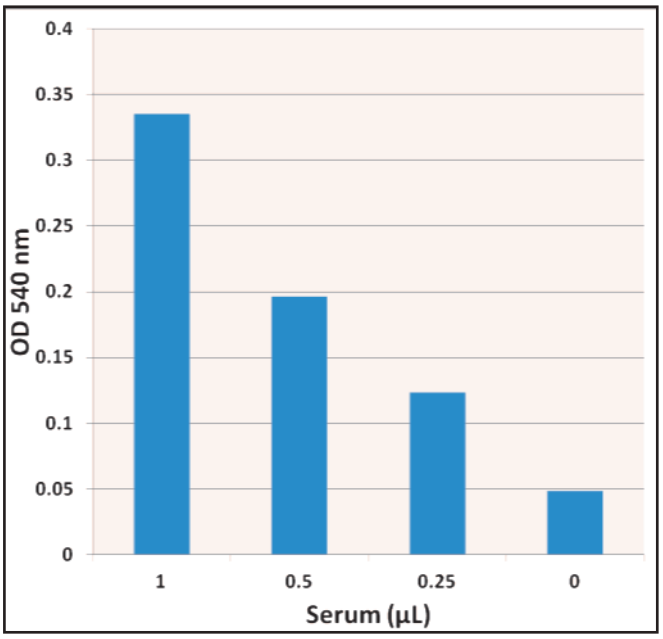
Product Name	Detection	Size	Catalog Number
Total Sialic Acid Assay Kit	Colorimetric	100 Assays	MET-5015

Glucose Assay Kits

Glucose is an important source of energy in plants, prokaryotes, and eukaryotes via processes including respiration and fermentation. Our Glucose Assay Kits are simple microplate-based assays that measure the total amount of glucose present in foods or various biological sample types. In the presence of oxygen, glucose oxidase catalyzes the conversion of glucose to D-gluconic acid, with hydrogen peroxide as the byproduct. Hydrogen peroxide reacts with probe to produce a signal.

Kits are available with either colorimetric or fluorometric detection in a 96-well plate reader.

- **Sensitive**: Detect as little as 6.25 µM in the colorimetric format or 1.56 µM in the fluorometric format
- **Versatile**: Suitable for food samples, plasma, serum, urine, lysates, or other biological fluids



Detection of Glucose in Human Serum.

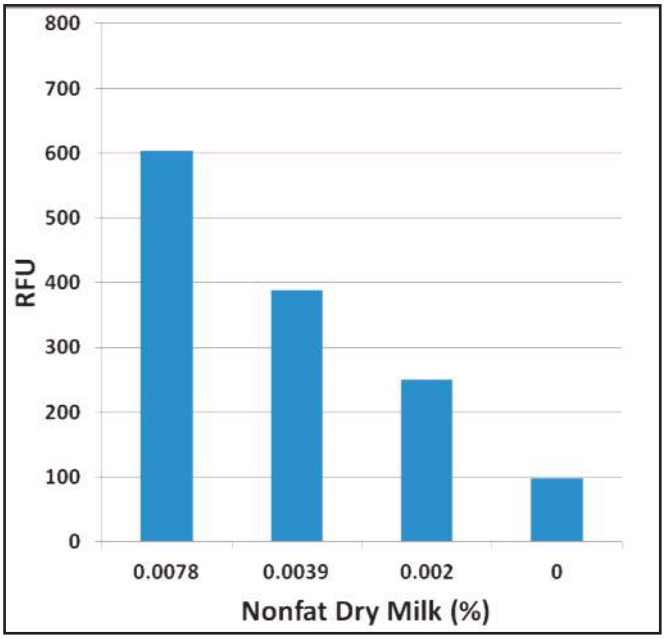
Product Name	Detection	Size	Catalog Number
Glucose Assay Kit	Colorimetric	500 Assays	STA-680
	Fluorometric	500 Assays	STA-681

Lactose Assay Kit

Lactose is a common disaccharide that has implications for a significant portion of the human population due to lactose interolance, better described as lactase deficiency due to the lack of the enzyme that breaks down lactose.

Since the severity of lactose maldigestion symptoms can depend on the amount of lactose consumed, it is important to quantify the relative amounts of lactose in various food sources.

Our Lactose Assay Kit is a simple plate-based assay that measures the total amount of lactose in milk based food products, as well as biological samples such as blood or urine from lactating animals. The kit can detect lactose levels as low as 10 µM. Quantitation is performed in a 96-well plate using a fluorescence-based microplate reader.



Detection of Lactose in Bovine Nonfat Dry Milk.

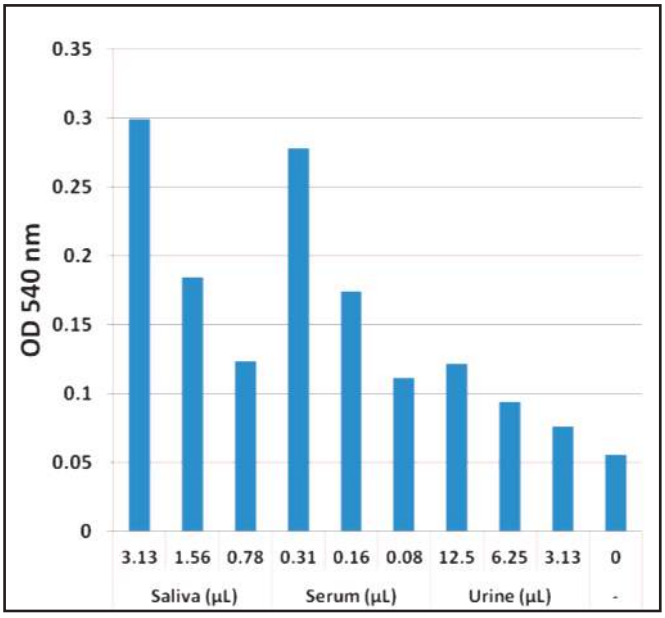
Product Name	Detection	Size	Catalog Number
Lactose Assay Kit	Fluorometric	100 Assays	MET-5001

Lactate Assay Kits

Lactic acid is an alpha hydroxyl acid that can ionize a carboxyl proton to yield the lactate ion. Lactate, like glucose, is thought to be one of the main energy sources in the brain. Lactate is also an important molecule in various industries including food, wine-making, and household detergents.

The Lactate Assay Kits are simple, convenient assays for the detection and quantitation of total lactate levels present in biological samples. In the presence of oxygen, lactate oxidase converts lactate to pyruvate, producing hydrogen peroxide as a byproduct. The hydrogen peroxide reacts with a probe in the presence of HRP and produces a signal

Kits are available with either colorimetric or fluorometric detection in a 96-well plate reader.



Detection of Lactate in Various Human Biological Samples.

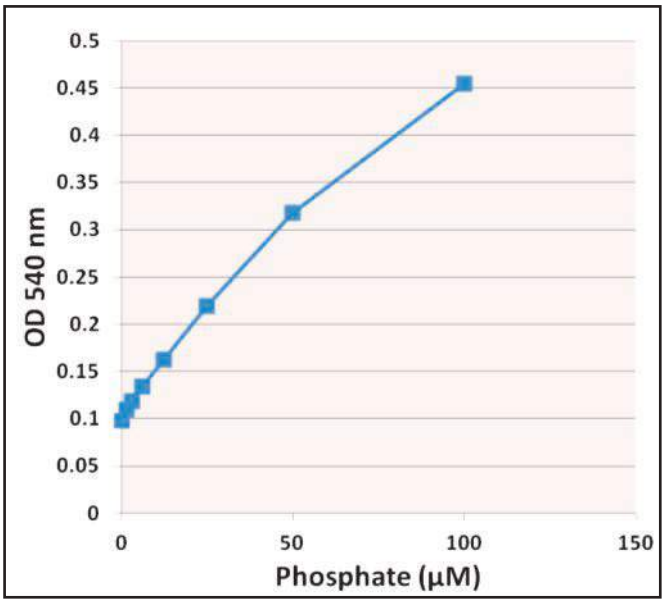
Product Name	Detection	Size	Catalog Number
Lactate Assay Kit	Colorimetric	100 Assays	MET-5012
	Fluorometric	100 Assays	MET-5013

Phosphate Assay Kits

Phosphate is found in biological systems in both organic and inorganic forms. Many metabolic processes are regulated by phosphate such as amino acid metabolism, activation of proteins, carbon metabolism, enzymatic cell signaling, and energy transfer.

Our Phosphate Assay Kits are simple assays that measure total inorganic phosphate (P_i) in solutions, food products, or biological samples in a convenient 96-well microplate format. In the presence of inorganic phosphate, maltose is converted to glucose and glucose-1-phosphate by maltose phosphorylase. The glucose is then converted to D-gluconic acid and hydrogen peroxide by glucose oxidase. The resulting hydrogen peroxide is detected with a highly specific probe.

Kits are available with either colorimetric or fluorometric detection in a 96-well plate reader.



Phosphate Assay Standard Curve.

Product Name	Detection	Size	Catalog Number
Phosphate Assay Kit	Colorimetric	1000 Assays	STA-685
	Fluorometric	1000 Assays	STA-686

Renal Function Assays

Our Renal Function Assays provide a simple, sensitive method to test for various markers related to kidney function:

- Uric Acid / Uricase
- Urea
- Creatinine
- Protein Carbamylation

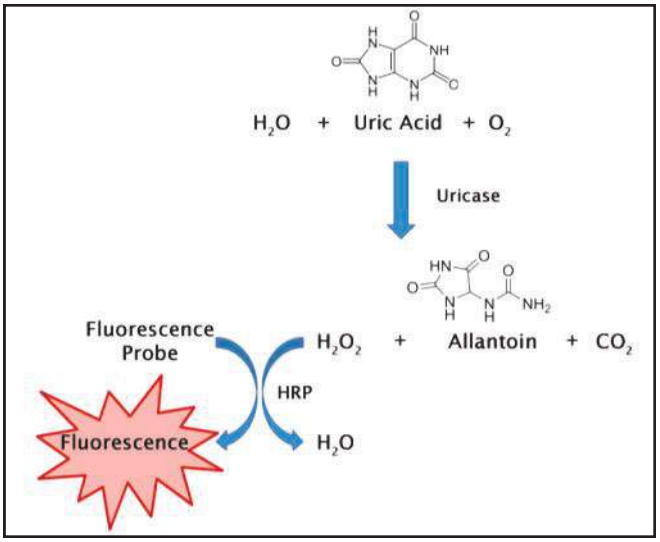
Uric Acid/Uricase Assay Kit

Uric acid is the final oxidation end product of purine nucleotide metabolism. Uric acid is a potent antioxidant that is released during hypoxic conditions and is usually excreted in the urine via glomerular filtration. Our Uric Acid / Uricase Assay Kit is a simple 96-well microplate-based assay for measuring concentrations of either uric acid or uricase in serum, plasma or urine samples. Detection is performed in a fluorescence-based plate reader.

- **Sensitive**: Detect as little as 0.5 µM of uric acid or 1 mU/mL of uricase
- **Quantitative**: Kit includes both uric acid and uricase standards

Recent Product Citation

Leiba, A. et al. (2015). Uric acid levels within the normal range predict increased risk of hypertension—a cohort study. *Am. J. Hypertens. American* 10.1016/j.jash.2015.05.010.



Assay Principle for the Uric Acid / Uricase Assay Kit.

Product Name	Detection	Size	Catalog Number
Uric Acid/Uricase Assay Kit	Fluorometric	400 Assays	STA-375

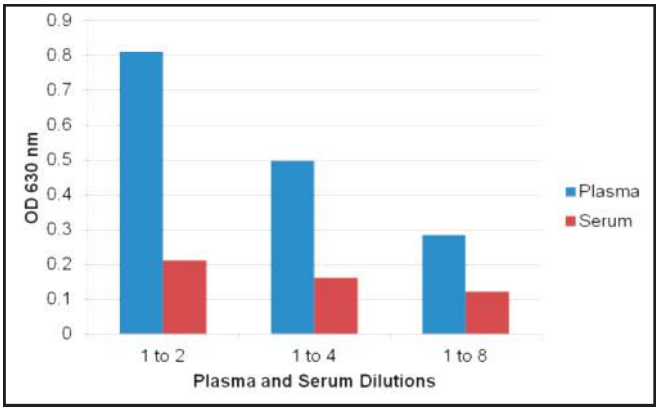
Urea Assay Kit

Urea is the end product of protein nitrogen metabolism and is the primary vehicle for removing toxic ammonia from the body. Urea quantitation is one of the most widely applied tests for kidney function evaluation. Our Urea Assay Kit is a simple 96-well microplate-based assay for measuring urea concentrations in serum, plasma, lysates, or urine samples. Detection is performed in standard colorimetric plate reader.

- **Sensitive**: Detect as little as 1 mg/dL of urea
- **Quantitative**: Measure unknown samples against a known urea standard curve

Recent Product Citation

Bruinsma, B.G. et al. (2014). Subnormothermic machine perfusion for ex vivo preservation and recovery of the human liver for transplantation. *Am. J. Transplant.* **14**:1400-1409.

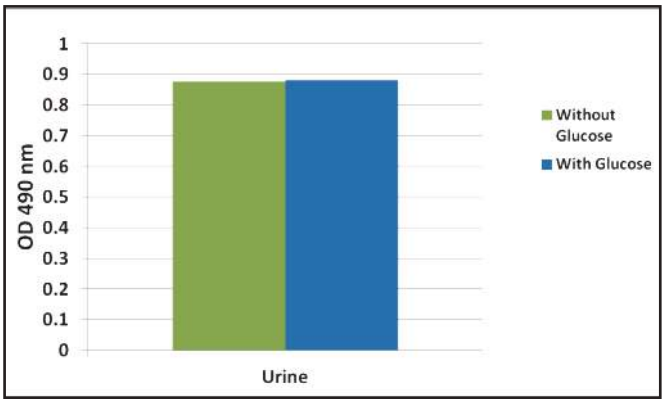


Human Plasma and Serum Samples Tested with the Urea Assay Kit.

Product Name	Detection	Size	Catalog Number
Urea Assay Kit	Fluorometric	192 Assays	STA-382

Urinary Creatinine Assay Kit

Our Urinary Creatinine Assay Kit is based on the Jaffe reaction between creatinine and alkaline picrate, which produces an orange-red color complex that can be easily read by a standard microplate reader. A creatinine standard is provided to allow quantitative measurements of creatinine levels in urine samples. The assay is simple and takes less than one hour to perform.



Creatinine Levels in Urine Samples in the Presence and Absence of Glucose.

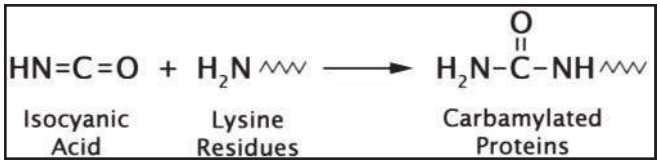
Recent Product Citations

1. Bone, R.N. et al. (2015). Inhibition of Ca2+-independent phospholipase A2ß (iPLA2ß) ameliorates islet infiltration and incidence of diabetes in NOD mice. *Diabetes* **64**:541-554.
2. Zis, P. et al. (2014). Memory decline in Down syndrome and its relationship to iPF2alpha, a urinary marker of oxidative stress. *PLoS One* **9**:e97709.
3. Day, R. et al. (2013). Apelin retards the progression of diabetic nephropathy. *Am. J. Physiol. Renal Physiol*. **304**:F788-F800.

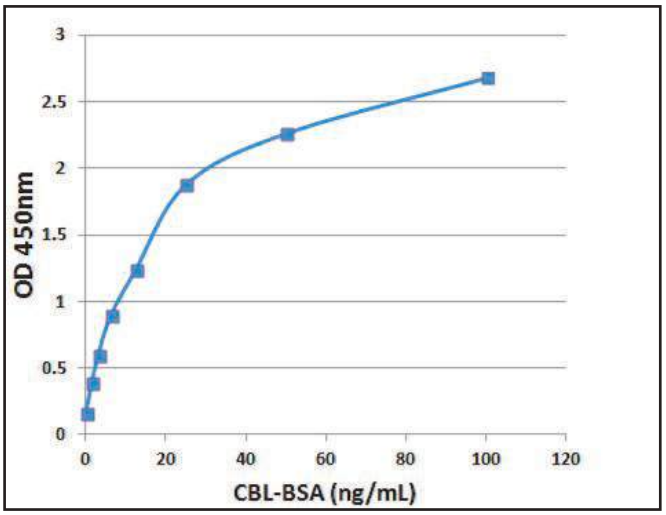
Product Name	Detection	Size	Catalog Number
Urinary Creatinine Assay Kit	Colorimetric	192 Assays	STA-378

Protein Carbamylation ELISA Kit and Antibodies

Carbamylation is a post-translational modification which occurs throughout the lifespan of proteins in vivo. Carbamylation results from the binding of isocyanic acid, which spontaneously arises from high concentrations of urea, to lysine residues of proteins as carbamyl-lysine (CBL). Our Protein Carbamylation Sandwich ELISA Kit is a convenient microplate-based method for the evaluation of protein carbamylation in a variety of sample types. In addition, polyclonal antibodies are available for use in Western blot and ELISA applications.



Formation of Carbamyl-Lysine (CBL) During Carbamylation of Proteins.



Standard Curve Generated with the OxiSelect™ Protein Carbamylation Sandwich ELISA Kit.

Recent Product Citations

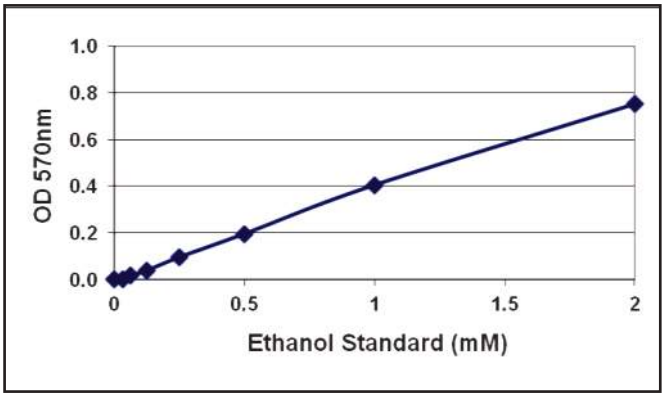
1. Joshi, A.D. et al. (2015). Homocitrullination is a novel histone H1 epigenetic mark dependent on aryl hydrocarbon receptor recruitment of carbamoyl phosphate synthase 1. *J. Biol. Chem.* 10.1074/jbc.M115.678144. (STA-077)
2. Koro, C. et al. (2014). Carbamylation of immunoglobulin abrogates activation of the classical complement pathway. *Eur. J. Immunol.* **44**:3403-3412. (STA-078)

Product Name	Detection	Size	Catalog Number
OxiSelect™ Protein Carbamylation Sandwich ELISA	Colorimetric	96 Assays	STA-877
Goat Anti-Carbamyl-Lysine (CBL) Polyclonal Antibody	Immunoblot/ELISA	50 µg	STA-077
Rabbit Anti-Carbamyl-Lysine (CBL) Polyclonal Antibody	Immunoblot/ELISA	50 µg	STA-078
Carbamyl Lysine-BSA	N/A	10 µg	STA-379

Alcohol Assay Kits

Our Alcohol Assay Kits provide a convenient plate-based method to measure primary alcohols, including ethanol, in plasma, serum or saliva samples.* The kit uses an enzymatic oxidation reaction that produces hydrogen peroxide, which reacts with the provided probe.

Kits are available with either colorimetric or fluorescence-based detection, both of which are performed in a 96-well microtiter plate. The colorimetric assay can detect alcohol levels as low as 30 µM, while the fluorometric assay detects as low as 15 µM.



Standard Curve Generated with the Alcohol Assay Kit.

**These assays are not suitable for urine samples.*

Recent Product Citation

Wu, Qi et al. (2014). High level expression, efficient purification, and bioactivity of recombinant human metallothionein 3 (rhMT3) from methylotrophic yeast *Pichia pastoris*. *Protein Expr. Purif.* **101**:121-126. (STA-620)

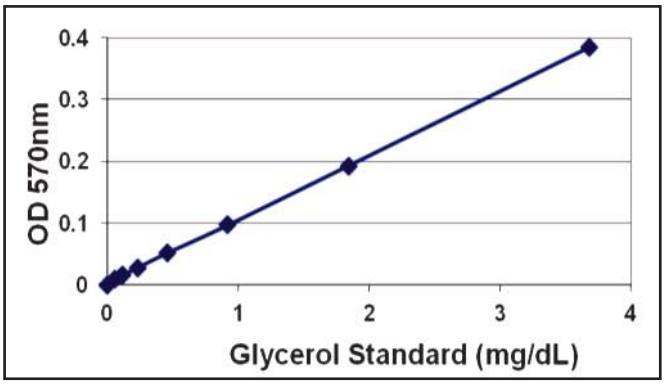
Product Name	Detection	Size	Catalog Number
Alcohol Assay Kit	Colorimetric	100 Assays	STA-620
	Fluorometric	100 Assays	STA-621

Free Glycerol Assay Kits

Glycerol is the backbone of triglycerides. Lipases secreted in the intestines hydrolyze the triglyceride ester bond, producing glycerol and free fatty acids.

Our Free Glycerol Assay Kits use a coupled enzymatic reaction system to measure free, endogenous glycerol concentrations. The glycerol is phosphorylated and oxidized, producing hydrogen peroxide, which reacts with the probe provided with each kit.

Kits are available with either colorimetric or fluorescence-based detection, both of which are performed in a 96-well microtiter plate.



Standard Curve Generated with the Free Glycerol Assay Kit.

Recent Product Citation

Desarzens, S. et al. (2014). Hsp90 blockers inhibit adipocyte differentiation and fat mass accumulation. *PLoS One* **9**:e94127. (STA-398)

Product Name	Detection	Size	Catalog Number
Free Glycerol Assay Kit	Colorimetric	100 Assays	STA-398
	Fluorometric	100 Assays	STA-399

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