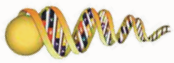
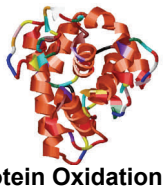
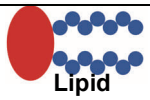
Oxidative Stress / Damage

Choose the Best Assays for your Sample Type

	Marker or Type of Damage	Sample Type				
		Cells	Tissues	Serum or Plasma	Urine	Other
 **DNA / RNA Damage and Repair** (p. 2-5)	8-hydroxydeoxyguanosine (8-OHdG)	X	X	X	X	
	8-hydroxyguanosine (8-OHG)	X	X	X	X	CSF
	8-Nitroguanine			X	X	
	Abasic (AP) sites	X	X			
	Aldehyde Damage (Etheno adducts)	X	X			
	Benzo(a)pyrene diol epoxide (BPDE)	X	X			
	Checkpoint Kinase	X				
	Comet Assay (various types of damage)	X				
	Double-strand DNA breaks	X				
	UV Damage (CPD or 6-4PP)	X	X			
 **Protein Oxidation / Nitration** (p. 6-9)	Protein Carbonyl Content	X	X	X		
	3-Nitrotyrosine	X	X	X		
	Advanced Glycation End Products (AGE)	X	X	X		
	Advanced Oxidation Protein Products (AOPP)	X	X	X		
	Benzo(a)pyrene diol epoxide (BPDE)	X	X	X		
	Protein Carbamylation	X	X	X		
	Protein Radicals	X	X	X		
	S-Glutathione Adducts	X	X	X		
 **Lipid Peroxidation** (p. 10-11)	4-Hydroxynonenal (4-HNE)	X	X	X		
	8-iso-Prostaglandin F2α (8-Isoprostane)	X	X	X	X	
	Malondialdehyde (MDA) / TBARS	X	X	X	X	
	Oxidized LDL & HDL			X		
Reactive Oxygen Species (p. 12-13)	Universal ROS Detection (DCF)	X	X	X	X	
	Hydrogen Peroxide / Peroxidase	X	X	X	X	
	Nitric Oxide	X	X	X	X	
Peroxidases (p. 13)	Myeloperoxidase	X	X			
Antioxidants & Antioxidant Capacity (p. 14-15)	Superoxide Dismutase	X	X	X	X	
	Catalase	X	X	X		
	Ascorbic Acid	X	X	X	X	
	Glutathione	X	X	X	X	Saliva
	Glutathione Reductase	X	X	X		
	Total Antioxidant Capacity (TAC)	X	X	X	X	Food
	Ferric Reducing Antioxidant Power (FRAP)	X	X	X	X	Food
	Oxygen Radical Antioxidant Capacity (ORAC)	X	X	X		Food
	Hydroxyl Radical Antioxidant Capacity (HORAC)	X	X	X		Food
	Cellular Antioxidant Activity					Food

Easily measure distinct types of nucleic acid damage in various assay formats

DNA / RNA Damage Assays

DNA is arguably one of the most biologically significant targets of cellular stress. DNA may be damaged by a variety of endogenous and exogenous sources, and the damage may take various forms:

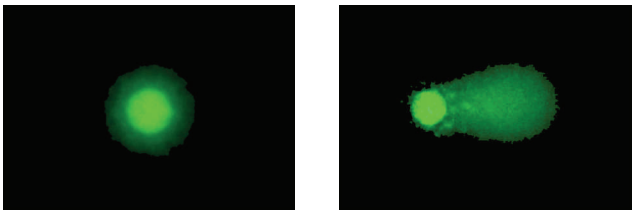
- **Oxidative DNA damage** refers to the oxidation of specific bases
- **Hydrolytic DNA damage** involves the deamination or total removal of individual bases
- **DNA strand breaks** involve a cut in one or both strands; double-strand breaks are especially dangerous and can be mutagenic
- **Pyrimidine dimers** are formed most often from ultraviolet radiation
- **Polycyclic aromatic hydrocarbons** are often formed from exposure to chemical carcinogens

RNA damage typically manifests as oxidative damage and has been implicated in various neurological ailments including Alzheimer's and Parksinson's diseases.

Universal DNA Damage: Comet Assay

The Comet Assay is a well-published method to detect various types of DNA damage in intact cells by electrophoresis. Damaged DNA is easily distinguished from healthy DNA by light microscopy; the damaged DNA moves farther when current is applied, creating a "comet" shape (see below).

Various software programs are commercially available to provide quantitation of damaged DNA detected with the Comet Assay.

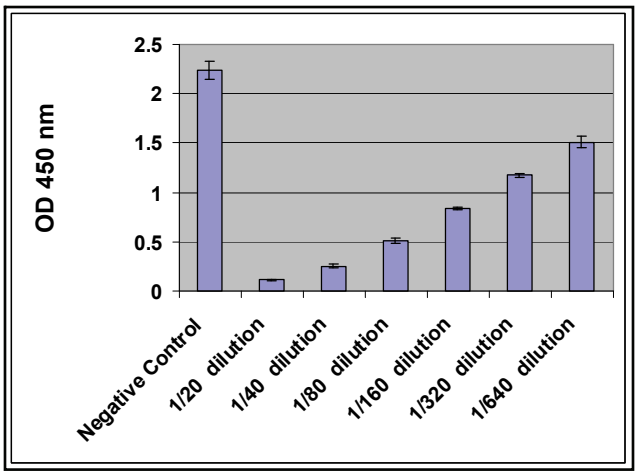


Jurkat Cells Treated without (left) and with (right) Etoposide using the OxiSelect™ Comet Assay Kit and Analyzed by Light Microscopy.

Oxidative DNA Damage: 8-OHdG

8-hydroxydeoxyguanosine (8-OHdG) is the most common marker for oxidative DNA damage and can be measured in virtually any species. It is formed and enhanced most often by chemical carcinogens.

Our OxiSelect™ Oxidative DNA Damage ELISA provides a highly sensitive method for measuring 8-OHdG formation. Detect as little as 100 pg/mL in DNA isolated from urine, serum, cells and tissues.



Levels of 8-OHdG in Human Urine Measured with the OxiSelect™ Oxidative DNA Damage ELISA (8-OHdG Quantitation).

Oxidative RNA Damage: 8-OHG

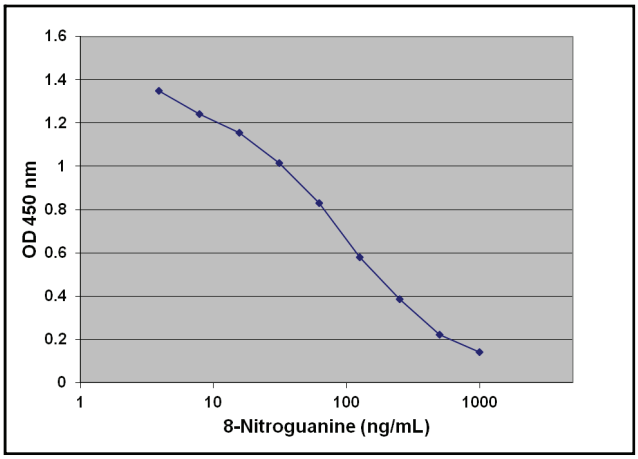
Like its DNA counterpart 8-OHdG above, 8-OHG (8 -hydroxyguanosine) is the most common marker for oxidative RNA damage.

The OxiSelect™ Oxidative RNA Damage ELISA has a detection limit of 300 pg/mL and is suitable for use with cells, tissues, serum, urine or cerebrospinal fluid.

Nitrosative Damage: 8-Nitroguanine

In addition to oxidative damage of guanosine and deoxyguanosine, guanine bases may be damaged by the presence of reactive nitrogen species.

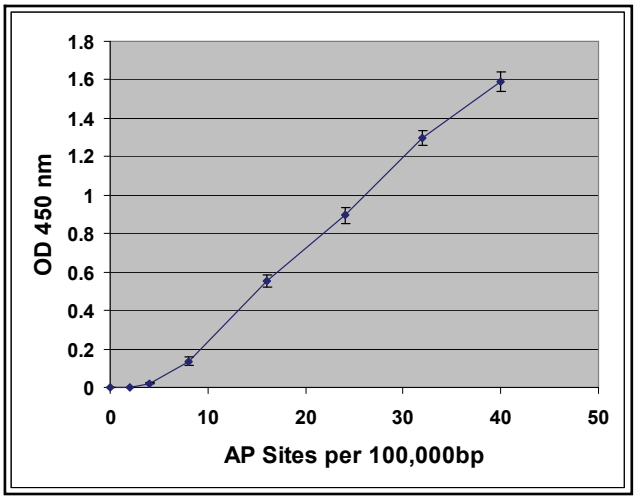
Our OxiSelect™ Nitrosative DNA/RNA Damage ELISA Kit measures total 8-nitroguanine (DNA and RNA combined) in serum, plasma, or urine samples. The assay is sensitive to 1 ng/mL.



Standard Curve Generated using the OxiSelect™ Nitrosative DNA/RNA Damage ELISA Kit (8-Nitroguanine).

Hydrolytic DNA Damage: AP Sites

Loss of DNA bases can be particularly mutagenic, and if left unrepaired these AP (apurinic / apyrimidinic) sites can inhibit transcription. Our OxiSelect™ DNA Damage Quantitation Kit (AP sites) provides a highly sensitive method for quantitation of AP sites. Quantify as few as 4-40 AP sites per 10^5 bp of DNA in tissue or cell lysates.

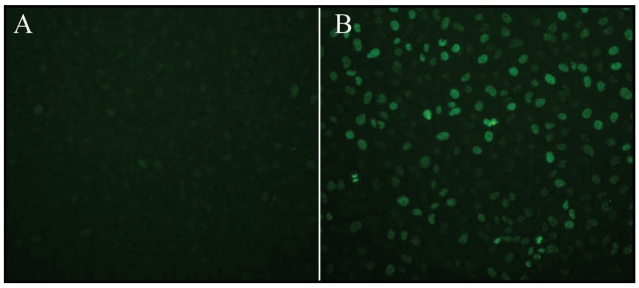


Standard Curve Generated using the OxiSelect™ Oxidative DNA Damage Quantitation Kit (AP Sites).

DNA Double-Strand Breaks

Double-strand breaks (DSB) in DNA are among the most dangerous types of DNA damage. One of the first responses to DSBs in mammalian cells is the phosphorylation of the Ser139 residue of a histone variant, H2AX, which occurs within seconds at the site of the damage. This phosphorylation causes chromatin condensation and appears to play an important role in recruitment of repair factors.

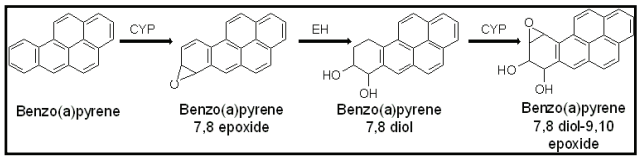
Our OxiSelect™ DNA Double-Strand Break Staining Kit detects DSBs in cultured cells. Detection is performed by immunofluorescence staining of the phosphorylated H2AX.



DNA Double-Strand Break Detection in Untreated (left) and Etoposide-Treated (right) A549 Cells using the OxiSelect™ DNA Double-Strand Break Staining Kit.

BPDE DNA Adduct Assay

Benzo(a)pyrene diol epoxide (BPDE) is a mutagen that may create adducts with DNA as well as proteins. It is a derived from benzo(a)pyrene which is polycyclic aromatic hydrocarbon (PAH), a family of chemical carcinogens commonly found in environmental pollution. Our BPDE DNA Adduct ELISA Kit provides a sensitive method to quantify BPDE adduct formation.



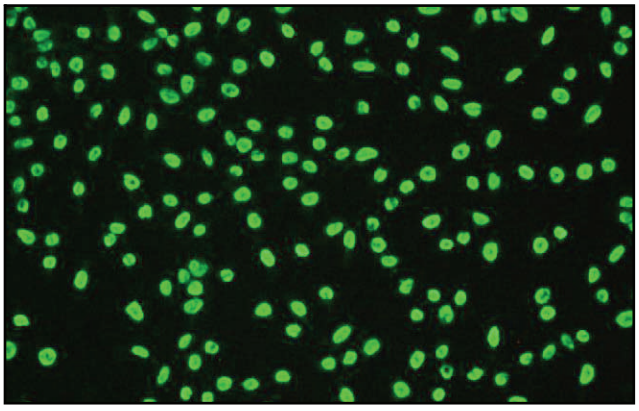
Chemical Conversion of Benzo(a)pyrene to Benzo(a)pyrene 7,8-diol-9,10 epoxide (BPDE).

UV-Induced Damage: Pyrimidine Dimers

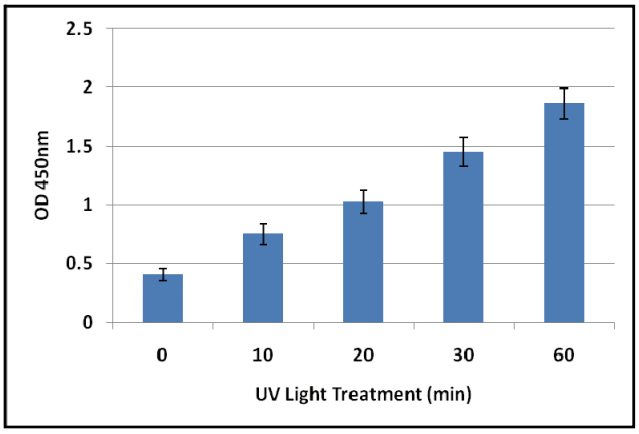
Absorption of ultraviolet radiation can damage DNA by the formation of pyrimidine dimers. The two main forms of pyrimine dimers are cyclobutane pyrimidine dimers (CPD) and pyrimidine (6-4) pyrimidone photoproducts (6-4PP).

We offer assay kits to measure either CPD or 6-4PP formation in 3 convenient formats:

- **ELISA kits** to measure CPD or 6-4PP in DNA samples isolated from cells or tissues
- **Cell-Based ELISA kits** for use on intact cells
- **Immunostaining kits** for visualization by fluorescence microscopy



UV-Induced DNA Damage in HeLa Cells Treated with Ultraviolet Light for 30 minutes and Visualized with the OxiSelect™ Cellular UV-Induced DNA Damage Staining Kit (CPD).



6-4PP Levels in Calf Thymus DNA Exposed to UV Light for the Times Indicated and Quantified with the OxiSelect™ UV-Induced DNA Damage ELISA Kit (6-4PP Quantitation).

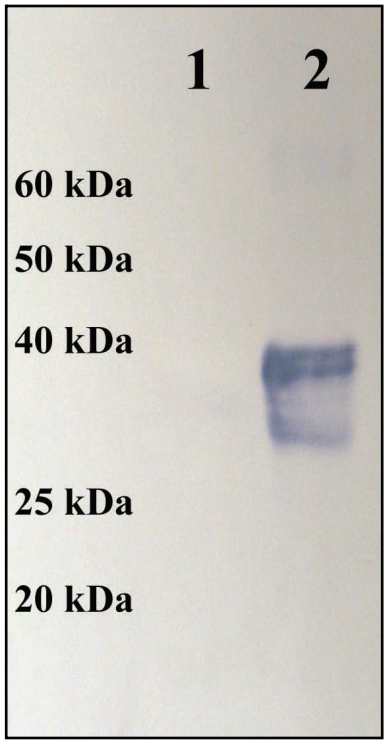
Aldehyde-Induced Damage: Etheno Adducts

Aldehydes may be present in cells and tissues as a natural downstream by-product of phospholipid oxidation, or they may result from exposure to carcinogens. Such aldehydes can damage DNA in the form of etheno adducts to various DNA bases.

Our OxiSelect™ Aldehyde-Induced DNA Damage ELISA Kits provide a user-friendly method for the quantitation of ethenoadenosine or ethenocytidine in DNA extracted from cells or tissues. Additionally, a convenient combination kit provides a method for detecting both adducts in one plate.

Checkpoint Kinase Assays

Checkpoint kinases can be activated in response to DNA damage prior to mitosis, phosphorylating Cdc25C which leads to cell cycle arrest. Cells are thus prevented from passing the DNA damage to daughter cells. Our Checkpoint Kinase Assay Kits provide a simple method to quantify Cdc25C phosphorylation. Formats include an Immunoblot kit and a 96-well Activity Assay with detection on a colorimetric plate reader.



Immunoblot without (lane 1) and with (lane 2) kinase using the CHK1 Activity Immunoblot Assay.

DNA Damage Assay Selection Guide				
Type of Damage	**Assay / Marker**	**Sample Types**	**Assay Format**	**Kit Sizes**
Universal Damage	**Comet Assay (Single Cell Gel Electrophoresis)**	• Intact Cells	3-Well Slides	15 wells 75 wells 375 wells
			96-Well Slides	96 wells 5 x 96 wells
Oxidative Damage (base oxidation)	**8-OHdG**	• Cell Lysate • Tissue Homogenate • Serum • Plasma • Urine	ELISA	96 assays 5 x 96 assays
Nitrosative Damage (base nitration)	**8-Nitroguanine**	• Serum • Plasma • Urine	ELISA	96 assays 5 x 96 assays
Hydrolytic Damage (base loss)	**AP (Abasic) Sites**	• Cell Lysate • Tissue Homogenate	Colorimetric	50 assays
Strand Cleavage	**Double-Strand Breaks**	• Intact Cells	Immuno-fluorescence Staining	100 assays
Etheno Adducts	**Ethenoadenosine**	• DNA isolated from Cells or Tissues	ELISA	96 assays
	Ethenocytidine	• DNA isolated from Cells or Tissues	ELISA	96 assays
Pyrimidine Dimers	**Cyclobutane Pyrimidine Dimers (CPD)**	• Intact Cells • DNA isolated from Cells or Tissues	ELISA	96 assays
		• Intact Cells	Fluorescence Microscopy	96 assays
	Pyrimidine (6-4) Pyrimidone Photoproducts (6-4PP)	• Intact Cells • DNA isolated from Cells or Tissues	ELISA	96 assays
		• Intact Cells	Fluorescence Microscopy	96 assays
Polycyclic Aromatic Hydrocarbons (PAH)	**Benzo(a)pyrene diol epoxide (BPDE)**	• DNA isolated from Cells or Tissues	ELISA	96 assays

Accurately measure oxidative and nitrative protein damage with greater sensitivity

Protein Damage Assays

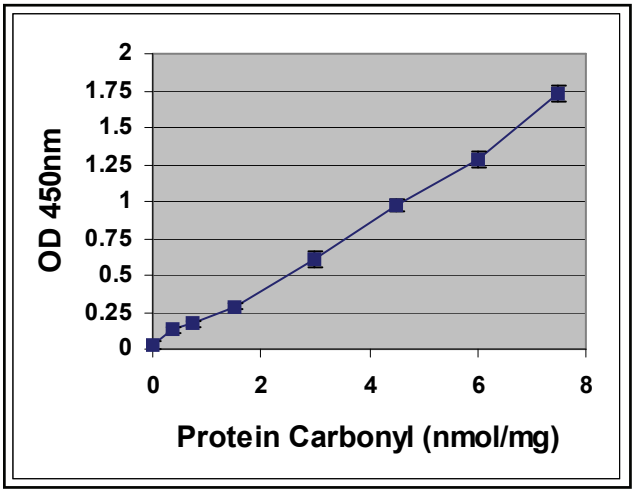
Protein damage in the presence of reactive oxygen species (ROS) and reactive nitrogen species (RNS) is extremely common. The resulting damage can take the form of oxidation or nitration of various amino acid residues, or of protein adducts.

In addition, ROS can result in other by-products such as advanced glycation end products (AGE) and advanced oxidation protein products (AOPP) which have implications in a variety of disease states.

Protein Carbonyl Assays

The most common marker for protein oxidation is protein carbonyl content (PCC). Our OxiSelect™ Protein Carbonyl Assays provide a highly sensitive high-throughput method for quantitation of PCC.

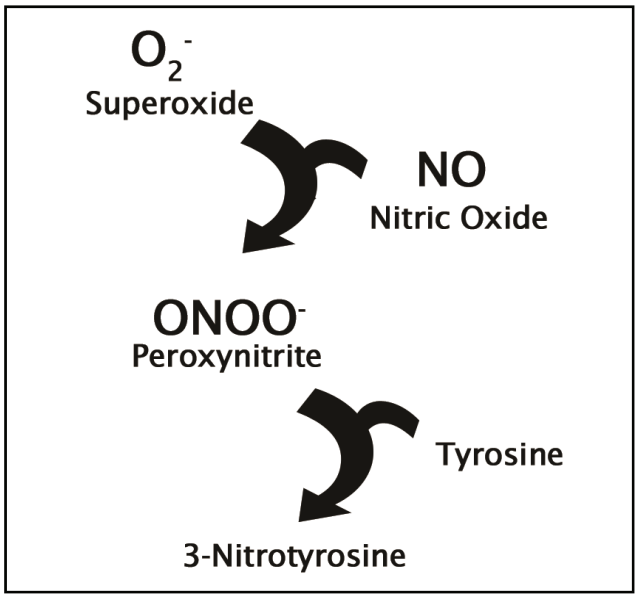
In particular, our Protein Carbonyl ELISA can detect as little as 10 µg/mL, which is up to 400-fold better than other commercial assays. Alternatively, our Protein Carbonyl Immunoblot Kit allows direct comparison of oxidized and non-oxidized protein fingerprints, a shortcoming of other PCC immunoblot kits. Kits are also available in fluorometric and spectrophotometric formats.

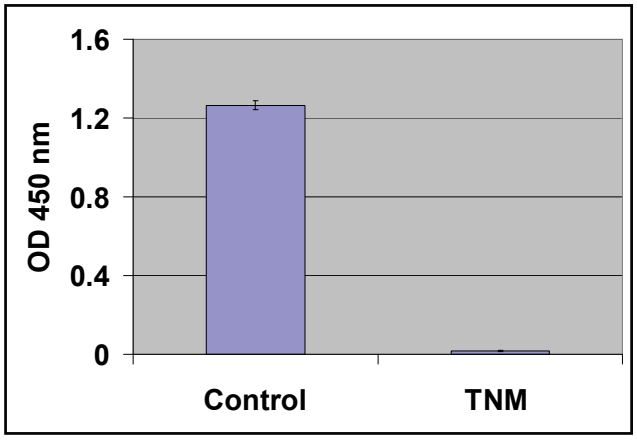


Standard Curve Generated with the OxiSelect™ Protein Carbonyl ELISA Kit.

Nitrotyrosine Assays

Reactive nitrogen species most commonly results in nitration of tyrosine residues of proteins; the predominant result is the formation of 3-nitrotyrosine. Our OxiSelect™ Nitrotyrosine Assays easily quantify protein nitration by either ELISA or immunoblot.





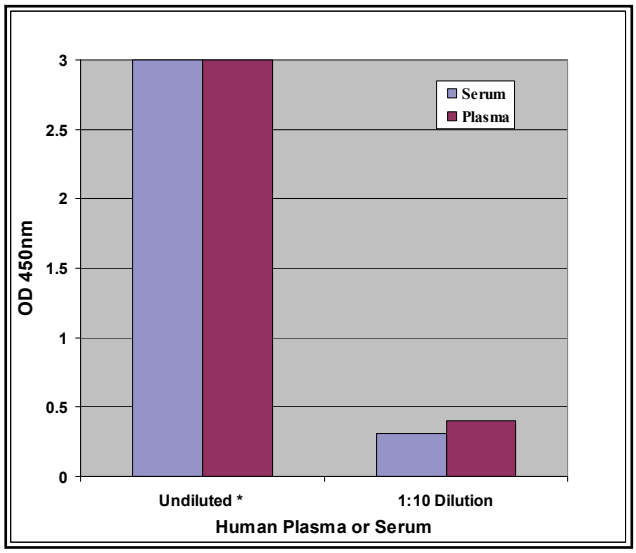
Protein Nitration by Tetranitromethane using the OxiSelect™ Nitrotyrosine ELISA Kit.

Advanced Glycation End Products (AGE) Assays

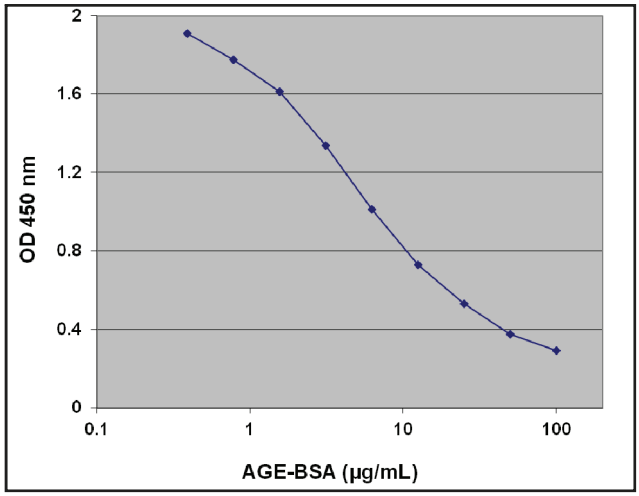
AGEs are byproducts of the Maillard reaction in which reducing carbohydrates react with lysine side chains and N-terminal amino groups of proteins. Many unique AGE species have been identified including the following:

- Methylglyoxal (MG)
- N-epsilon (Carboxyethyl) Lysine (CEL)
- N-epsilon (Carboxymethyl) Lysine (CML)

We offer highly sensitive ELISA kits to quantify these individual AGE species. In addition, our AGE ELISA Kit provides a sensitive method to universally detect advanced glycation end products implicated in oxidative stress and vascular damage.



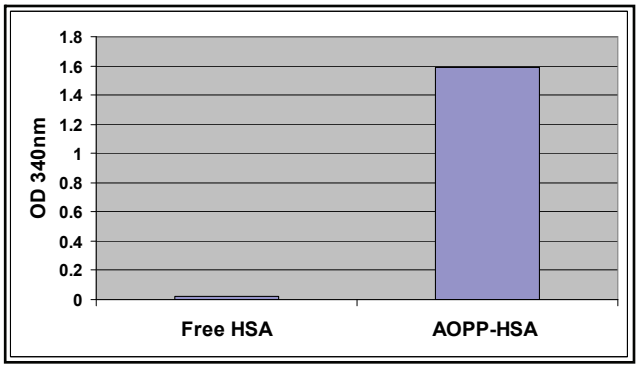
CML Levels in Normal Human Blood Samples.



Standard Curve Generated with the OxiSelect™ AGE Competitive ELISA Kit.

Advanced Oxidation Protein Products (AOPP) Assay

For oxidative stress related to diabetes, atherosclerosis, renal disease or HIV, the AOPP assay provides a quick 30 minute protocol to measure the formation of advanced oxidation protein products.

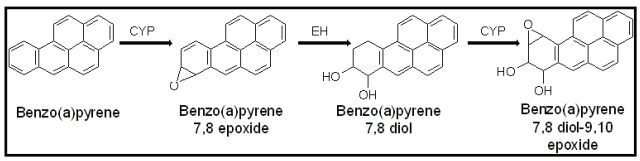


AOPP-HSA Positive Control and Untreated HSA at a Concentration of 100 µM using the OxiSelect™ AOPP Assay Kit.

BPDE Protein Adduct Assay

Benzo(a)pyrene diol epoxide (BPDE) is a mutagen that may create adducts with proteins as well as DNA. It is a derived from benzo(a)pyrene which is polycyclic aromatic hydrocarbon (PAH), a family of chemical carcinogens commonly found in environmental pollution.

Our BPDE Protein Adduct ELISA Kit provides a sensitive method to quantify BPDE adduct formation.

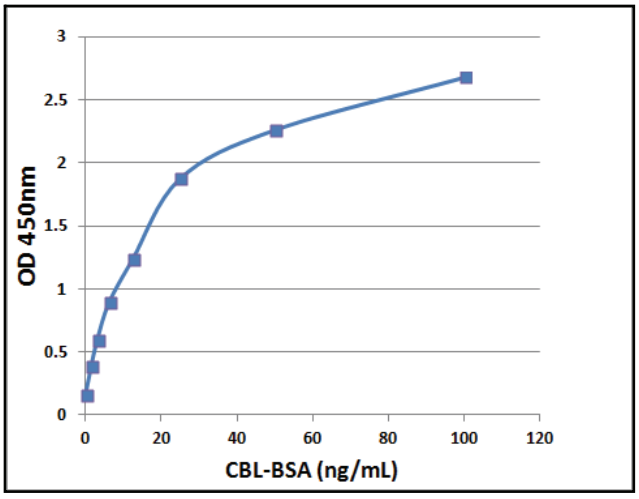


Chemical Conversion of Benzo(a)pyrene to Benzo(a)pyrene 7,8-diol-9,10 epoxide (BPDE).

Protein Carbamylation

Carbamylation is a post-translational modification of lysine residues resulting from the binding of isocyanic acid, which is spontaneously derived from high concentrations of urea.

Our Protein Carbamylation Sandwich ELISA Kit provides a convenient method for detection and quantitation of protein carbamylation in plasma, serum, cell lysates and purified proteins.



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

S-Glutathione Protein Adducts

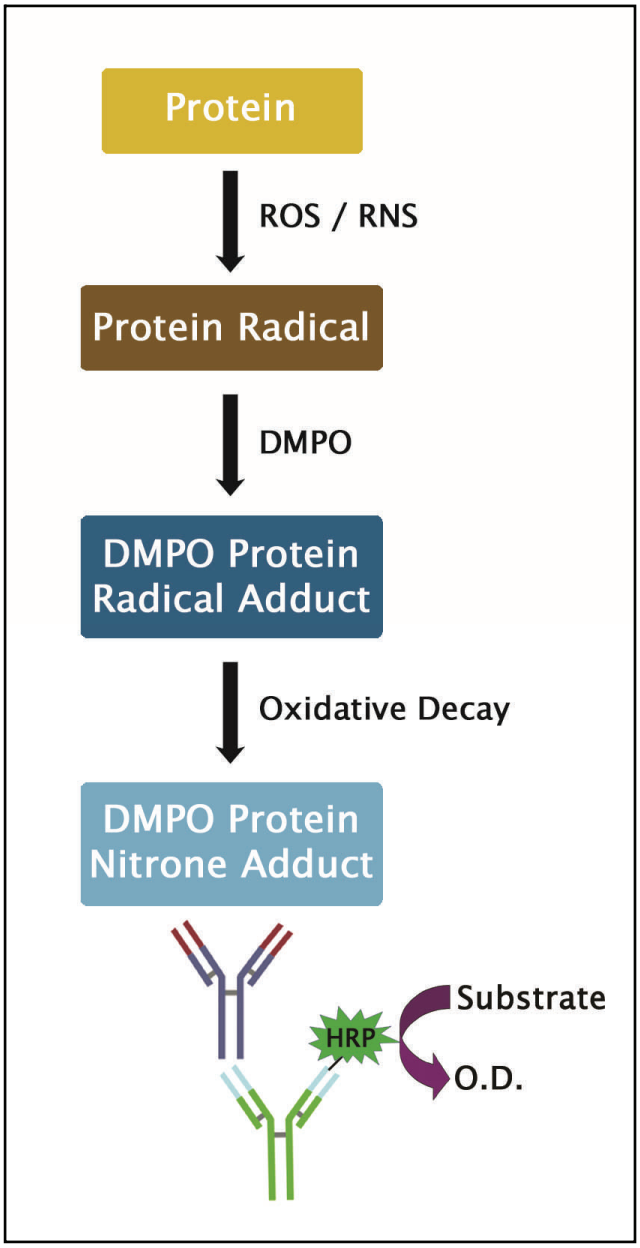
Glutathione is a natural antioxidant, but it also can form adducts to proteins via its sulfhydryl moiety after being derivatized by the presence of reactive oxygen species. Therefore, s-glutathione protein adducts may serve as a marker of oxidative stress.

Our OxiSelect™ S-Glutathione Protein Adduct ELISA Kit quantifies the gluathionylation of proteins in a convenient 96-well plate format. The kit is suitable for use with protein samples from a variety of sources including cell and tissue lysates, serum, or plasma.

Protein Radicals

Protein radicals are unstable intermediate molecules that form from the removal of an electron or hydrogen atom by various reactive oxygen or nitrogen species.

Our Protein Radical ELISA Kit provides a unique method to detect these early unstable radicals. A DMPO molecule acts as a spin-trap and creates a more stable form that can be quantified in a standard 96-well plate reader.



Assay Principle for the OxiSelect™ Protein Radical ELISA Kit.

Protein Damage Assay Selection Guide				
Assay / Marker	**Sample Types**	**Assay Format**	**Detection Limit**	**Kit Sizes**
Protein Carbonyl Content (PCC)	• Cell Lysate • Tissue Homogenate • Serum • Plasma	ELISA	10 µg/mL	96 assays 5 x 96 assays
		Fluorometric	40 nM	100 assays
		Spectrophotometric	1 mg/mL	40 assays
		Immunoblot		10 blots
3-Nitrotyrosine	• Cell Lysate • Tissue Homogenate • Serum • Plasma	ELISA	10 nM	96 assays 5 x 96 assays
		Immunoblot		10 blots
Advanced Glycation End Products (AGE)	• Cell Lysate • Serum • Plasma	ELISA	500 ng/mL	96 assays
Methylglyoxal (MG)	• Cell Lysate • Serum • Plasma	ELISA	200 ng/mL	96 assays
N^{ε}-Carboxyethyl Lysine (CEL)	• Cell Lysate • Serum • Plasma	ELISA	100 ng/mL	96 assays
N^{ε}-Carboxymethyl Lysine (CML)	• Cell Lysate • Serum • Plasma	ELISA	50 ng/mL	96 assays
		Immunoblot		10 blots
Advanced Oxidation Protein Products (AOPP)	• Cell Lysate • Tissue Homogenate • Plasma	Colorimetric	5 µM	200 assays
Benzoyl(a)pyrene Diol Epoxide (BPDE)	• Cell Lysate • Serum • Plasma	ELISA	60 ng/mL	96 assays
Protein Carbamylation	• Cell Lysate • Serum • Plasma	ELISA	4 ng/mL	96 assays
S-Glutathione Protein Adducts	• Cell Lysate • Serum • Plasma	ELISA	14 ng/mL	96 assays
Protein Radicals	• Cell Lysate • Serum • Plasma	ELISA	2 ng/mL	96 assays

Quantify stable by-products of lipid peroxidation with user-friendly protocols

Lipid Peroxidation Assays

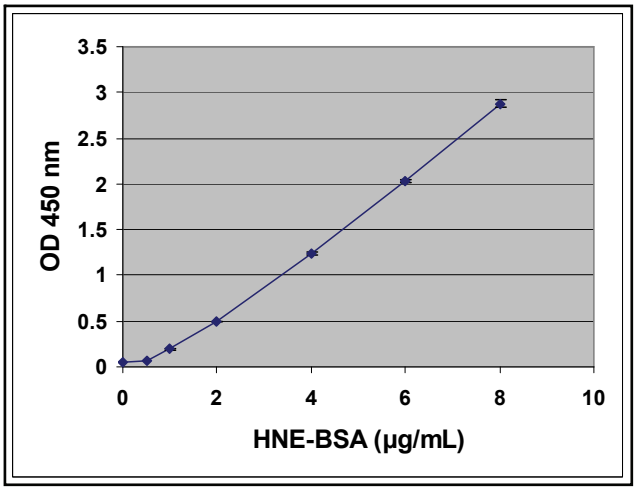
Lipid peroxidation is the result of free radical damage to lipids in the cell membrane; it occurs during the aging process as well as a variety of diseases. Lipid peroxides are unstable and cannot be measured directly, but they break down to stable by-products which can be reliably quantified.

Our OxiSelect™ Lipid Peroxidation Assays provide convenient and sensitive methods for detecting and quantifying specific byproducts of lipid peroxides.

4-Hydroxynonenal (4-HNE) Assay

4-HNE is a very common by-product of lipid peroxidation. It quickly binds to histidine and lysine residues of proteins forming very stable adducts that can be easily and reliably quantified.

Our OxiSelect™ HNE Adduct Competitive ELISA provides accurate quantitation of HNE-His adducts. The entire assay may be completed in about 4 hours.

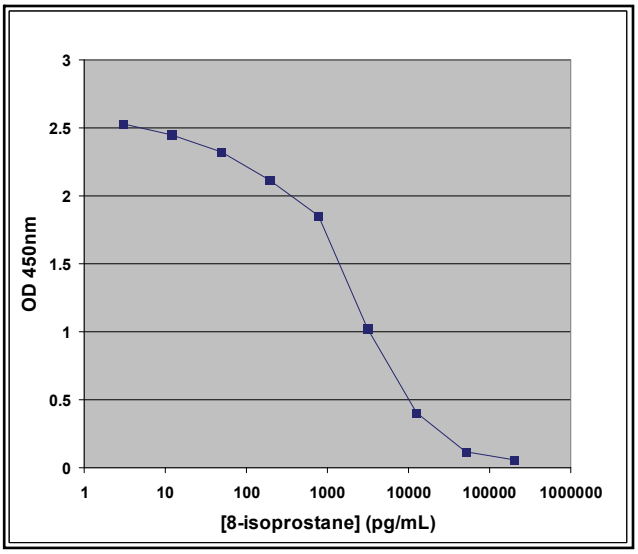


HNE-BSA Standard Curve Generated with the OxiSelect™ HNE-His Adduct ELISA Kit.

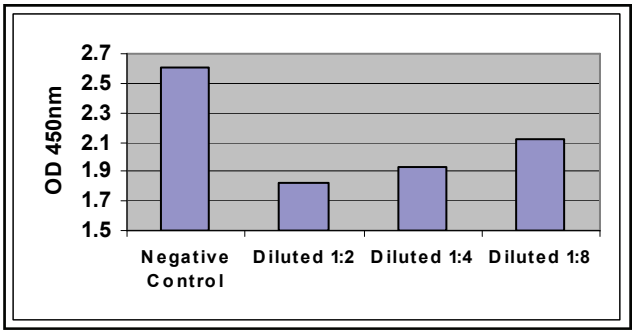
8-iso-Prostaglandin F2α (8-isoprostane) Assay

8-isoprostane is another stable by-product of lipid peroxidation, and is easily detectable in urine as well as cell and tissue lysates.

The OxiSelect™ 8-iso-Prostaglandin F2a ELISA Kit provides highly sensitive detection in a high-throughput 96-well format.



Human Urine Sample Tested with the OxiSelect™ 8-iso-Prostaglandin F2α Assay.

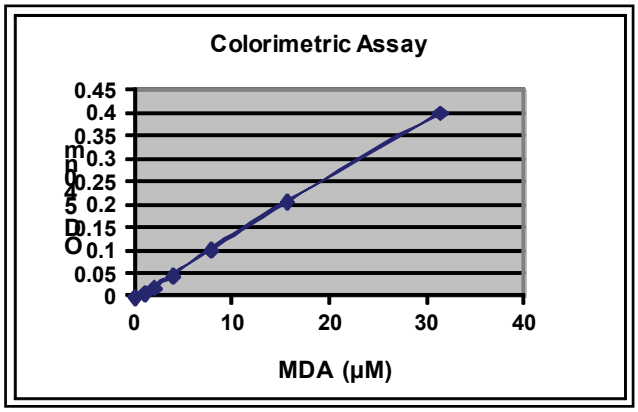


Human Urine Sample Tested with the OxiSelect™ 8-iso-Prostaglandin F2α Assay.

Malondialdehyde (MDA) Assays

MDA is one of the most common by-products of lipid peroxidation. Like 4-HNE, it creates stable adducts that may be easily quantified using one of the following assay formats:

- Our OxiSelect™ TBARS Assay measures total MDA in a quick 30 minute procedure using colorimetric or fluorometric detection. Unlike other TBARS kits, no glass tubes or marbles are required.
- The OxiSelect™ MDA-Adduct ELISA measures MDA-Adduct formation in a 96-well plate
- The OxiSelect™ MDA Immunoblot Kit provides a fast, semi-quantitative method

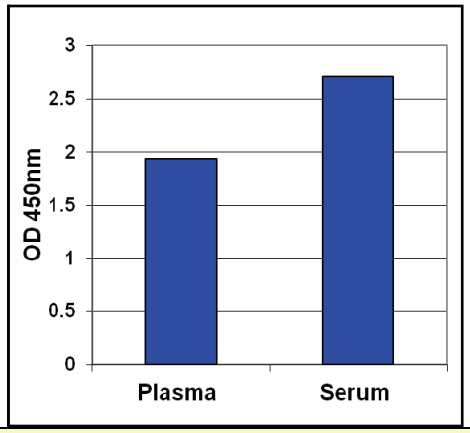


MDA-TBA Standard Curve Generated with the OxiSelect™ TBARS Assay Kit.

Oxidized LDL (OxLDL) and Oxidized HDL (OxHDL) Assays

Low density lipoprotein (LDL) is often described as "bad" cholesterol, but it is even more dangerous in the human body when it becomes oxidized. Likewise, high density lipoprotein (HDL) is often described as "good" cholesterol, but when oxidized it can lose its cardioprotective properties. Oxidation can take the form of malondialdehyde (MDA), N-carboxymethyl lysine (CML), or 4-hydroxynonenal (HNE) modifications.

Our Oxidized LDL and HDL ELISA Kits are designed for the quantitation of oxidized LDL or HDL n human plasma and serum.



OxLDL Determination in Plasma and Serum Samples.

Lipid Peroxidation Assay Selection Guide

Assay / Marker	Sample Types	Assay Format	Detection Limit	Kit Sizes
4-Hydroxynonenal (HNE)	• Cell Lysate • Tissue Homogenate • Serum • Plasma	ELISA	2 µg/mL	96 wells
Malondialdehyde (MDA)	• Cell Lysate • Tissue Homogenate • Serum • Plasma • Urine	TBARS Method	2 µM	200 assays
		ELISA	6 pmol/mg	96 wells
		Immunoblot		10 blots
8-iso-Prostaglandin F2α (8-isoprostane)	• Cell Lysate • Tissue Homogenate • Plasma • Urine	ELISA	50 pg/mL	96 wells
Oxidized LDL or HDL (MDA, CML or HNE)	• Plasma • Serum	ELISA	50-150 ng/mL	96 wells

Measure reactive oxygen species with high sensitivity in intact cells, cell lysates, or blood samples

Reactive Oxygen Species (ROS) Assays

Many forms of reactive oxygen species (ROS) may be present in biological samples: hydroxyl, peroxyl, oxygen ions and free radicals. While many ROS are unstable, the presence of ROS may be measured indirectly by assaying their effects on substrates. OxiSelect™ ROS Assays Kits are designed for detection of various ROS types or of specific species such as hydrogen peroxide or nitric oxide.

Universal ROS Assays

Our OxiSelect™ ROS Assay Kits are ideal for universal detection of reactive oxygen species in your sample using a fluorogenic probe.

- Our **Intracellular ROS Assay** quantifies ROS in intact cells
- Our **In Vitro ROS/RNS Assay** measures ROS in cell lysates, serum, plasma, or urine samples

Nitric Oxide Assays

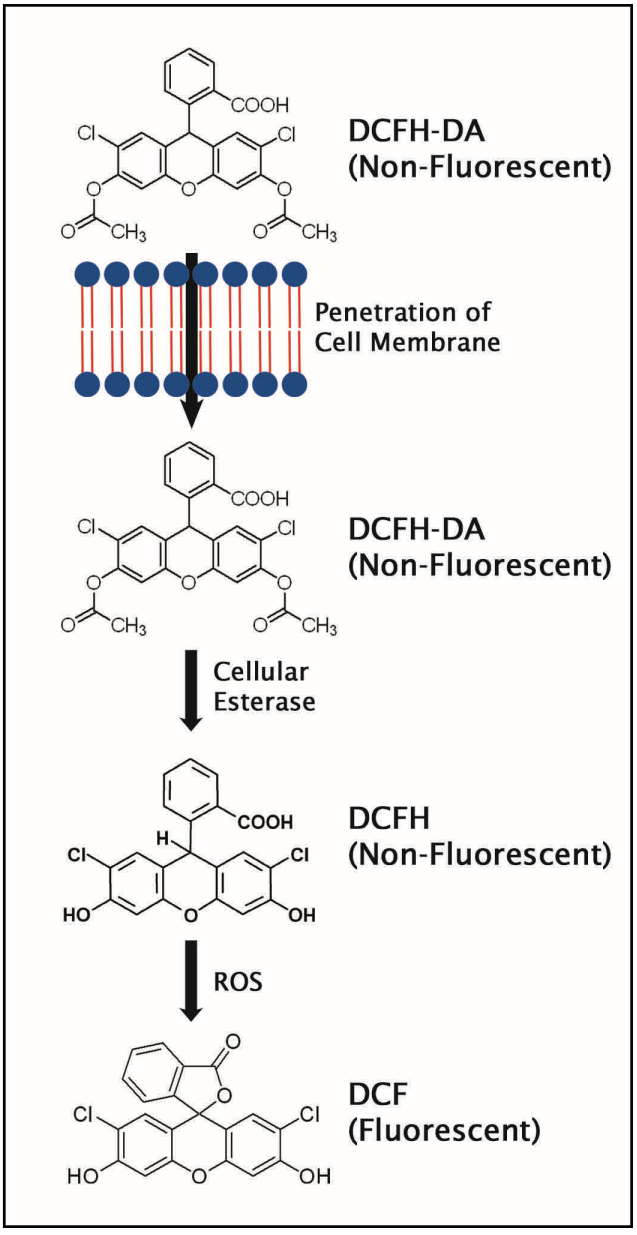
Our OxiSelect™ Nitric Oxide Assay Kits are ideal for detection of nitric oxide in a variety of samples.

- Our **Intracellular Nitric Oxide Assay** quantifies nitric oxide in intact cells using a fluorogenic probe.
- Our **In Vitro Nitric Oxide Assays** measure nitric oxide levels in cell lysates, serum, plasma, or urine samples. Assays are available with colorimetric or fluorometric detection.

Hydrogen Peroxide Assays

Our colorimetric Hydrogen Peroxide Assay measures the oxidation of ferrous (Fe^{2+}) ions to ferric (Fe^{3+}) ions in the presence of peroxides. The ferric ions form a complex with a provided dye which can be read on a standard microplate reader. Suitable for blood or urine only.

Our fluorometric Hydrogen Peroxide/Peroxidase Assay uses a probe which is converted to a fluorescent state in the presence of peroxides and catalyzed by peroxidases. This assay is also suitable for the measurement of peroxidases and is compatible with cells, tissues, or blood samples.



Assay Principle for the OxiSelect™ Intracellular ROS Assay Kit.

ROS Assay Selection Guide				
Assay / Marker	**Sample Types**	**Assay Format**	**Detection Limit**	**Kit Sizes**
Universal ROS, Intracellular	• Intact Cells	Fluorometric	10 pM	96 assays 5 x 96 assays
Universal ROS & RNS, In Vitro	• Cell Lysate • Serum • Plasma • Urine	Fluorometric	10 pM	96 assays 5 x 96 assays
Hydrogen Peroxide	• Serum • Plasma	Colorimetric	1 µM	500 assays
	• Cell Lysate • Tissue Homogenate • Serum • Plasma	Fluorometric	50 nM	500 assays
Nitric Oxide	• Intact Cells	Fluorometric	3 nM	96 assays 5 x 96 assays
	• Cell Lysate • Tissue Homogenate • Serum • Plasma	Colorimetric	2 µM	96 assays 5 x 96 assays
		Fluorometric	500 nM	96 assays 5 x 96 assays

Peroxidase Activity Assays

Peroxidases play a key role in the generation of reactive oxygen species during oxidative stress. Many peroxidases use hydrogen peroxide as the primary substrate. We offer a variety of assays to measure the activity levels of peroxidase enzymes.

Peroxidase/Hydrogen Peroxide Assay

Our Hydrogen Peroxide/Peroxidase Assay uses a fluorogenic probe to measure peroxidase activity levels. The non-fluorescent probe is converted to a fluorescent state in the presence of peroxides and catalyzed by peroxidases.

This assay is suitable for the measurement of peroxidases in cells, tissues, or blood samples.

Myeloperoxidase (MPO) Assays

Myeloperoxidase (MPO) is a heme-based peroxidase enzyme that has been implicated in coronary artery disease when present at elevated levels.

MPO is converted to an active redox intermediary form in the presence of hydrogen peroxide. The active enzyme then plays two roles:

- Chlorination activity, where chloride ions are converted to hypochlorous acid.
- Peroxidation activity

Our OxiSelect™ Myeloperoxidase Assays measure either chlorination activity or peroxidation activity of MPO in cell and tissue lysates. Our Myeloperoxidase Chlorination Activity Assay kits are available with either colorimetric or fluorometric detection. Our Myeloperoxidase Peroxidation Activity Assay uses fluorescence-based detection.

Quantify antioxidant capacity or specific antioxidant enzymes in a variety of sample types

Antioxidant Assays

Ascorbic Acid Assay

Ascorbic acid is a vital water-soluble antioxidant that is critical for a variety of functions as well as free radical neutralization. Our OxiSelect™ Ascorbic Acid Assay uses the FRASC (Ferric Reducing / Antioxidant Ascorbic Acid) chemistry in conjunction with ascorbate oxidase, an enzyme which allows differentiation between ascorbic acid and other antioxidants present in the sample. The kit is suitable for use with lysates, serum, plasma, and urine samples.

Superoxide Dismutase Assay

Superoxide dismutase is an important antioxidant enzyme that catalyzes the dismutation of superoxide anions into hydrogen peroxide and oxygen molecules.

Our OxiSelect™ Superoxide Dismutase Activity Assay provides a convenient way to measure the activity of this enzyme in a variety of sample types. Quantitation is performed on a standard 96-well plate reader.

Glutathione Assays

Glutathione is a powerful antioxidant that exists in reduced (GSH) and oxidized (GSSG) forms. On average about 90% of glutathione exists in the reduced form, allowing it to function as an electron donor to eliminate reactive oxygen species.

Our OxiSelect™ Total Glutathione Assay Kit measures the total glutathione content in a variety of samples including cell lysates, serum, plasma, urine, and saliva.

The OxiSelect™ Glutathione Reductase Assay Kit provides a convenient method for measuring the activity of this important enzyme, which is responsible for converting oxidized glutathione back to its reduced form, thereby restoring its antioxidant capability.

Cellular Antioxidant Assay for Exogenous Antioxidants

In vitro assays can be used to demonstrate the effectiveness of an antioxidant molecule, but its effectiveness is better established in a cellular environment. Our Cellular Antioxidant Activity Assay Kit allows you to measure the true efficacy of an exogenous antioxidant molecule in an intracellular environment. Activity levels are measured by quantitation on a fluorescence-based plate reader.

Catalase Assays

Catalase is a ubiquitous enzyme that destroys hydrogen peroxide formed during oxidative stress. It therefore often works downstream from superoxide dismutase. Our OxiSelect™ Catalase Activity Assays provides a convenient plate-based way to measure the activity of this enzyme in serum, plasma, cell lysates or tissue homogenates. Assays are available with either colorimetric or fluorometric detection.

Antioxidant Capacity Assays

In addition to measuring specific antioxidants, it is possible to evaluate the total antioxidant capacity of biological fluids, cells and extracts. We offer the following antioxidant capacity assays:

- Total Antioxidant Capacity (TAC) and Ferric Reducing Antioxidant Power (FRAP) assays measure the total antioxidant capacity of a sample via reduction in copper ions and iron ions, respectively.
- The ORAC and HORAC Assays provide a convenient way to measure oxygen radical antioxidant capacity and hydroxyl radical antioxidant capacity, respectively.

All the above assays may be used to test the antioxidant capacity in cell lysates, serum, plasma, and various food extracts.

Antioxidant Assay Selection Guide				
Assay / Marker	**Sample Types**	**Assay Format**	**Detection Limit**	**Kit Sizes**
Ascorbic Acid (FRASC)	• Cell Lysate • Tissue Extracts • Serum / Plasma • Urine	Colorimetric	1 µM	200 assays
Glutathione	• Cell Lysate • Tissue Extracts • Serum / Plasma • Urine • Saliva	Colorimetric	4 nM	100 assays
Glutathione Reductase	• Cell Lysate • Tissue Extracts • Plasma	Colorimetric	0.6 mU/mL	100 assays
Superoxide Dismutase	• Cell Lysate • Tissue Homogenate • Serum • Urine	Colorimetric	0.6 Units/mL	100 assays
Catalase	• Cell Lysate • Tissue Homogenate • Serum / Plasma	Colorimetric	1.25 Units/mL	96 assays
Total Antioxidant Capacity (TAC)	• Cell Lysate • Tissue Extracts • Serum / Plasma • Urine • Nutrition Samples	Colorimetric	5 µM	200 assays
Ferric Reducing Antioxidant Power (FRAP)	• Cell Lysate • Tissue Extracts • Serum / Plasma • Nutrition Samples	Colorimetric	2 µM	200 assays
Oxygen Radical Antioxidant Capacity (ORAC)	• Cell Lysate • Tissue Extracts • Plasma • Nutrition Samples	Fluorometric	2.5 µM	192 assays
Hydroxyl Radical Antioxidant Capacity (HORAC)	• Cell Lysate • Tissue Extracts • Plasma • Nutrition Samples	Fluorometric	100 µM	192 assays
Cellular Antioxidant Assay	• Exogenous Antioxidant Samples	Fluorometric	31 µM Quercetin	192 assays

Ordering Information and Published Citations

Comet Assays for DNA Damage

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ Comet Assay Kit (3-Well Slides)	Light Microscopy	15 Assays	STA-350
		75 Assays	STA-351
		5 x 75 Assays	STA-351-5
OxiSelect™ Comet Assay Slides (3-Well)	Light Microscopy	5 Slides	STA-352
		25 Slides	STA-353
		125 Slides	STA-353-5
OxiSelect™ 96-Well Comet Assay Kit	Light Microscopy	96 Assays	STA-355
		5 x 96 Assays	STA-355-5
OxiSelect™ 96-Well Comet Slides	Light Microscopy	1 Slide	STA-356
		5 Slides	STA-356-5
OxiSelect™ Comet Assay Control Cells (positive & control)	N/A	1 Set	STA-354

Recent Product Citations

1. Haeger, S.M. et al. (2015). Smad4 loss promotes lung cancer formation but increases sensitivity to DNA topoisomerase inhibitors. *Oncogene* 10.1038/onc.2015.112. (STA-350)
2. Prasad, M.A. et al. (2015). Ebf1 heterozygosity results in increased DNA damage in pro-B cell and their synergistic transformation by Pax5 haploinsufficiency. *Blood* 10.1182/blood-2014-12-617282. (STA-350)
3. Savage, K.I. et al. (2015). BRCA1 deficiency exacerbates estrogen-induced DNA damage and genomic instability. *Cancer Res.* **74**:2773-2784. (STA-351)
4. Choi, S.K. et al. (2012). Poly(ADP-ribose) polymerase 1 inhibition improves coronary arteriole function in type 2 diabetes mellitus. *Hypertension* **59**:1060-1068. (STA-351)
5. Tyagi, A. et al. (2011). Resveratrol selectively induces DNA damage, independent of Smad4 expression, in its efficacy against human head and neck squamous cell carcinoma. *Clin. Physiol.* **304**:H567-H578. (STA-355)

Oxidative DNA Damage Assays

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ Oxidative DNA Damage ELISA Kit (8-OHdG Quantitation)	Colorimetric	96 Assays	STA-320
		5 x 96 Assays	STA-320-5

Recent Product Citations

1. Thurmond, P. et al. (2015). Structural modifications of the prostate in hypoxia, oxidative stress, and chronic ischemia. *Korean J. Urology* **56**:187-196.
2. Kaushik, N. et al. (2015). Non-thermal plasma with 2-deoxy-D-glucose synergistically induces cell death by targeting glycolysis in blood cancer cells. *Sci. Rep.* **5**:8726.
3. Keshari, K.R. et al. (2015). Noninvasive in vivo imaging of diabetes-induced renal oxidative stress and response to therapy using hyperpolarized 13C dehydroascorbate magnetic resonance. *Diabetes* **64**:344-352.
4. Glenn, D.J. et al. (2015). Cardiac steatosis potentiates angiotensin II effects in the heart. *Am. J. Physiol. Heart Circ. Physiol.* **308**:H339-350.
5. Attri, P. et al. (2015). Influence of reactive species on the modification of biomolecules generated from the soft plasma. *Sci. Rep.* **5**:8221.
6. Grek, C.L. et al. (2015). S-glutathionylation of buccal cell proteins as biomarkers of exposure to hydrogen peroxide. *BBA Clinical* **2**:31-39.
7. Chen, G. et al. (2015). CYP2J2 overexpression attenuates nonalcoholic fatty liver disease induced by high-fat diet in mice. *Am. J. Physiol. Endocrinol. Metab.* **308**:E97-E110.

Oxidative RNA Damage Assays

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ Oxidative RNA Damage ELISA Kit (8-OHG Quantitation)	Colorimetric	96 Assays	STA-325
		5 x 96 Assays	STA-325-5

Recent Product Citations

1. Tsai, C.H. et al. (2015). Transcriptional analysis of Deinococcus radiodurans reveals novel small RNAs that are differentially expressed under ionizing radiation. *Appl. Environ. Microbiol.* **81**:1754-1764.
2. Kannan, S. et al. (2012). Dendrimer-based postnatal therapy for neuroinflammation and cerebral palsy in a rabbit model. *Sci. Transl. Med.* **4**:130ra46.
3. Bazin, J. et al. (2011). Targeted mRNA oxidation regulates sunflower seed dormancy alleviation during dry after-ripening. *Plant Cell* **23**:2196-2208.

Ordering Information and Published Citations

Nitrosative RNA Damage Assays

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ Nitrosative DNA/RNA Damage ELISA Kit (8-Nitroguanine Quantitation)	Colorimetric	96 Assays	STA-825
		5 x 96 Assays	STA-825-5

Hydrolytic DNA Damage Assay

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ DNA Damage Quantitation Kit (AP Sites)	Colorimetric	50 Assays	STA-324

Recent Product Citations

1. Ferreira, E. et al. (2015). Glyceraldeyde-3-phosphate dehydrogenase is required for efficient repair of cytotoxic DNA lesions in Escherichia coli. *Int. J. Biochem. Cell Biol.* **60**:202-212.
2. Zhao, K. et al. (2014). S-sulfhydrylation of MEK1 leads to PARP-1 activation and DNA damage repair. *EMBO Rep*. **15**:792-800.
3. Messaoudi, N. et al. (2013). Global stress response in a prokaryotic model of DJ-1-associated Parkinsonism. *J. Bacteriol.* **195**:1167-1178.

DNA Double-Strand Break Assay

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ DNA Double-Strand Break Staining Kit	Immunofluorescence	100 Assays	STA-321

Recent Product Citation

Edwards, A.K. et al. (2014). A peptide inhibitor of synuclein-g reduces neovascularization of human endometriotic lesions. *Mol. Human Reprod.* 10.1093/molehr/gau054.

UV-Induced DNA Damage Assays

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ UV-Induced DNA Damage ELISA Kit (6-4PP)	Colorimetric	96 Assays	STA-323
		5 x 96 Assays	STA-323-5
OxiSelect™ UV-Induced DNA Damage ELISA Kit (CPD)	Colorimetric	96 Assays	STA-322
		5 x 96 Assays	STA-322-5
OxiSelect™ UV-Induced DNA Damage ELISA Combo Kit (CPD / 6-4PP)	Colorimetric	96 Assays	STA-322-C
OxiSelect™ Cellular UV-Induced DNA Damage ELISA Kit (6-4PP)	Colorimetric	96 Assays	STA-328
OxiSelect™ Cellular UV-Induced DNA Damage ELISA Kit (CPD)	Colorimetric	96 Assays	STA-326
		5 x 96 Assays	STA-326-5
OxiSelect™ Cellular UV-Induced DNA Damage Staining Kit (6-4PP)	Fluorescence Microscopy	96 Assays	STA-329
OxiSelect™ Cellular UV-Induced DNA Damage Staining Kit (CPD)	Fluorescence Microscopy	96 Assays	STA-327

Recent Product Citations

1. Donninger, H. et al. (2015). The RASSF1A tumor suppressor regulates XPA-mediated DNA repair. *Mol. Cell Biol*. **35**:277-287. (STA-322)
2. Gao, L.. et al. (2015). The tomato DDI2, a PCNA ortholog, associating with DDB1-CUL4 complex is required for UV-damaged DNA repair and plant tolerance to UV stress. *Plant Sci.* **235**:101-110. (STA-322-C)
3. Harberts, E. et al. (2015). Ultraviolet radiation signaling through TLR4/MyD88 constrains DNA repair and plays a role in cutaneous immunosuppression. *J. Immunol.* 10.1049/jimmunol.1402583. (STA-326)
4. Kuschal, C. et al. (2013). Repair of UV photolesions in Xeroderma pigmentosum group C cells induced by translational readthrough of premature termination codons. *PNAS* **110**:19483-19488. (STA-328)

BPDE DNA Adduct Assay

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ BPDE DNA Adduct ELISA Kit	Colorimetric	96 Assays	STA-357

Recent Product Citation

Chiu, C.Y. et al. (2014). Low-dose benzo(a)pyrene and its epoxide metabolite inhibit myogenic differentiation in human skeletal muscle-derived progenitor cells. *Toxicol. Sci.* 10.1093/toxsci/kfu003.

Ordering Information and Published Citations

Aldehyde-Induced DNA Damage Assays

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ Aldehyde Induced DNA Damage ELISA Kit (Ethenoadenosine)	Colorimetric	96 Assays	STA-820
OxiSelect™ Aldehyde Induced DNA Damage ELISA Kit (Ethenocytidine)	Colorimetric	96 Assays	STA-821
OxiSelect™ Aldehyde Induced DNA Damage ELISA Combo Kit (Ethenoadenosine / Ethenocytidine)	Colorimetric	96 Assays	STA-820-C

Checkpoint Kinase Assays

Product Name	Detection	Size / Qty	Catalog Number
96-Well Checkpoint Kinase Activity Assay Kit	Colorimetric Plate Reader	96 Assays	STA-414
		5 x 96 Assays	STA-414-5
Checkpoint Kinase Activity Immunoblot Kit	Immunoblot	20 Assays	STA-413

Protein Carbonyl Assays and Reagents

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ Protein Carbonyl ELISA Kit	Colorimetric	96 Assays	STA-310
		5 x 96 Assays	STA-310-5
OxiSelect™ Protein Carbonyl Fluorometric Assay	Fluorometric	100 Assays	STA-307
OxiSelect™ Protein Carbonyl Spectrophotometric Assay	Spectrophotometric	40 Assays	STA-315
OxiSelect™ Protein Carbonyl Immunoblot Kit	Immunoblot	10 Blots	STA-308
Oxidized Protein Immunoblot Control (Carbonyl-BSA)	N/A	10 µg	STA-309

Recent Product Citations

1. Zabala, V. et al. (2015). Potential contributions of the tobacco nicotine-derived nitrosamine ketone (NKK) in the pathogenesis of steatohepatitis in a chronic plus binge rat model of alcohol liver disease. *Alcohol and Alcoholism* **50**:118-131. (STA-307)
2. Blanquer-Rosello, M.D. et al. (2015). Leptin modulates mitochondrial function, dynamics and biogenesis in MCF-7 cells. *J. Cell Biochem*. 10.1002/jcb.25158. (STA-308)
3. Westenbrink, B.D. et al. (2015). Mitochondrial reprogramming induced by CAMKIIδ mediates hypertrophy decompensation. *Circ. Res.* **116**:e28-e39. (STA-310)
4. Alway, S.E. et al. (2015). Green tea extract attenuates muscle loss and improves muscle function during disuse, but fails to improve muscle recovery following unloading in aged rats. *J. Applied Phyisol*. **118**:319-330. (STA-310)
5. Ravikumar, P. et al. (2014). α-Klotho protects against oxidative damage in pulmonary epithelia. *Am. J. Physiol. Lung Cell* **307**:L566. (STA-310)
6. Stier, A. et al. (2014). Mitochondrial uncoupling prevents cold-induced oxidative stress: a case study using UCP1 knockout mice. *J. Exp. Biol.* **217**:624-630. (STA-315)

Nitrotyrosine Assays and Reagents

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ Nitrotyrosine ELISA Kit	Colorimetric	96 Assays	STA-305
		5 x 96 Assays	STA-305-5
OxiSelect™ Nitrotyrosine Immunoblot Kit	Immunoblot	10 Blots	STA-303
Goat Anti-Nitrotyrosine Polyclonal Antibody	Immunoblot / ELISA	100 µg	STA-003
Rabbit Anti-Nitrotyrosine Polyclonal Antibody	Immunoblot / ELISA	100 µg	STA-004
Protein Tyrosine Nitration Control (Nitrotyrosine-BSA)	N/A	10 µg	STA-304

Recent Product Citations

1. Wang, Y.N. et al. (2015). Protein interacting with C-kinase 1 deficiency impairs glutathione synthesis and increases oxidative stress via reduction of surface excitatory amino acid carrier 1. *J. Neurosci*. **35**:6429-6443. (STA-305)
2. Sataranatarajan, K. et al. (2015). Neuron specific reduction in CuZnSOD is not sufficient to initiate a full sarcopenia phenotype. *Redox Biol.* 10.1016/j.redox.2015.04.005. (STA-305)
3. Antosova, M. et al. (2015). The influence of L-NAME on iNOS expression and markers of oxidative stress in allergen induced airway hyperreactivity. *Adv. Exp. Med. Biol.* **838**:1-10. (STA-305)
4. Stonehouse, W. et al. (2015). Palmolein and olive oil consumed within a high protein test meal have similar effects on postprandial endothelial function in overweight and obese men: a randomized controlled trial. *Atherosclerosis*. **239**:178-185. (STA-305)

Ordering Information and Published Citations

Advanced Glycation End Products (AGE) Assays and Reagents

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ Advanced Glycation End Products (AGE) Competitive ELISA Kit	Colorimetric	96 Assays	STA-817
		5 x 96 Assays	STA-817-5
OxiSelect™ Methylglyoxal (MG) Competitive ELISA Kit	Colorimetric	96 Assays	STA-811
		5 x 96 Assays	STA-811-5
OxiSelect™ N-epsilon-(Carboxyethyl) Lysine (CEL) Competitive ELISA Kit	Colorimetric	96 Assays	STA-813
OxiSelect™ N-epsilon-(Carboxymethyl) Lysine (CML) Competitive ELISA Kit	Colorimetric	96 Assays	STA-816
		5 x 96 Assays	STA-816-5
OxiSelect™ N-epsilon-(Carboxymethyl) Lysine (CML) Immunoblot Kit	Immunoblot	10 Blots	STA-313
Mouse Anti-Methylglyoxal Monoclonal Antibody	Immunoblot/IHC	100 µg	STA-011
Goat Anti-N-epsilon-CML Polyclonal Antibody	Immunoblot/ELISA	100 µg	STA-013
Rabbit Anti-N-epsilon-CML Polyclonal Antibody	Immunoblot/ELISA	100 µg	STA-014
CEL-BSA Control	N/A	100 µg	STA-302
CML-BSA Control	N/A	100 µg	STA-314
Glycoaldehyde-BSA Control	N/A	100 µg	STA-348
MG-BSA Control	N/A	100 µg	STA-306

Recent Product Citations

1. Morgan, P.E. et al. (2014). Perturbation of human coronary artery endothelial cell redox state and NADPH generation by methylglyoxal. *PLoS One* **9**:e86564. (STA-811, STA-813, STA-816)
2. Niquet-Leridon, C. et al. (2015). The rehabilitation of raw and brown buttersby the measurement of two of the major Maillard products, Nε-Carboxymethyl-lysine and 5-hydroxymethylfurfural, with validated chromatographic methods. *Food Chem.* **177**:361. (STA-816)
3. Huang, T.C. et al. (2014). Increased renal semicarbazide-sensitivie amine oxidase activity and methylglyoxal levels in aristolochic acid-induced nephrotoxicity. *Life Sci.* **114**:4-11. (STA-816)
4. Foster, D. et al. (2014). AGE metabolites: a biomarker linked to cancer disparity?. *Cancer Epidemiol. Biomarkers Prev.* **23**:2186-2191. (STA-817)

Advanced Oxidation Protein Products (AOPP) Assay

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ AOPP Assay Kit	Colorimetric	200 Assays	STA-318
AOPP-Human Serum Albumin (AOPP-HSA)	N/A	50 µL	STA-319

Recent Product Citations

1. Thurmond, P. et al. (2015). Structural modifications of the prostate in hypoxia, oxidative stress, and chronic ischemia. *Korean J. Urol*. **56**:187-196. (STA-318)
2. Umanksaya, A. et al. (2015). Genetically enhancing mitochondrial antioxidant activity improves muscle function in aging. *PNAS USA* **111**:15250-15255. (STA-318)
3. Bloomer, R. et al. (2013). Safety profile of caffeine and 1,3-dimethylamylamine supplementation in healthy men. *Human and Exp. Toxicol.* 10.1177/0960327113475680. (STA-318)
4. Park, S.H. et al. (2012). Effects of neutral pH and low-glucose degradation product-containing peritoneal dialysis fluid on systemic markers of inflammation and endothelial dysfunction: a randomized controlled 1-year follow-up study. *Nephrol. Dial. Transp*. **27**:1191-1199. (STA-318)
5. Anderson, D. et al. (2010). Albumin-based microbubbles bind up-regulated scavenger receptors following vascular injury. *J. Biol. Chem.* **285**:40645-40653. (STA-318)

BPDE Protein Adduct Assay

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ BPDE Protein Adduct ELISA Kit	Colorimetric	96 Assays	STA-301

Ordering Information and Published Citations

Protein Carbamylation Assay and Reagents

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

S-Glutathione Adduct ELISA Kit

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ S-Glutathione Adduct Competitive ELISA Kit	Colorimetric	96 Assays	STA-814

Protein Radical ELISA Kit

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ Protein Radical ELISA Kit	Colorimetric	96 Assays	STA-810

Oxidized / Nitrated Proteins

Product Name	Detection	Size / Qty	Catalog Number
Copper (Cu++) Oxidized Human Low Density Lipoprotein (LDL)	N/A	100 µg	STA-214
Malondialdehyde (MDA) Modified Human Albumin	N/A	100 µg	STA-210
Malondialdehyde (MDA) Modified Human Apolipoprotein B-100	N/A	100 µg	STA-211
Malondialdehyde (MDA) Modified Low Density Lipoprotein (LDL)	N/A	100 µg	STA-212
Nitrated Low Density Lipoprotein (LDL)	N/A	100 µg	STA-213

4-Hydroxynonenal (HNE) Assays

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ HNE Adduct Competitive ELISA Kit	Colorimetric	96 Assays	STA-838
		5 x 96 Assays	STA-838-5
Goat Anti-4-Hydroxynonenal (HNE) Polyclonal Antibody	Immunoblot/ELISA	100 µg	STA-034
Rabbit Anti-4-Hydroxynonenal (HNE) Polyclonal Antibody	Immunoblot/ELISA	100 µg	STA-035
HNE-BSA Control	N/A	100 µg	STA-335

Recent Product Citations

1. Allegra, M. et al. (2014). Pro-oxidant activity of indicaxanthin from Opuntia ficus indica modulates arachidonate metabolism and prostaglandin synthesis through lipid peroxide production in LPS-stimulated RAW 264.7 macrophages. *Redox Biol.* **2**:892-900. (STA-838)
2. Dickerson, R. et al. (2014). Does oral supplementation of a fermented papaya preparation correct respiratory burst function of innate immune cells in type 2 diabetes mellitus patients? *Antiox. Redox Signal* 10.1089/ars.2014.6138. (STA-838)
3. Kador, P.F. et al. (2014). Topical neutraceutical Optixcare EH ameliorates experimental ocular oxidative stress in rats. *J. Ocul. Pharmacol. Ther.* **30**:593-602. (STA-838)
4. Dupont, J.J. et al. (2014). NADPH oxidase-derived reactive oxygen species contribute to impaired cutaneous microvascular function in chronic kidney disease. *Am. J. Physiol. Renal Physiol.* **306**:F1499-F1506. (STA-838)

Ordering Information and Published Citations

8-Isoprostaglandin F2α (8-Isoprostane) Assay

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ 8-iso-Prostaglandin F2α ELISA Kit	Colorimetric	96 Assays	STA-337
		5 x 96 Assays	STA-337-5

Recent Product Citations

1. Sagun, G. et al. (2015). Levels of F2 isoprostane in Behcet's disease: correlation with cardiometabolic risk factors. *Redox Rep.* 10.1179/1351000215Y.0000000008.
2. Paneni, F. et al. (2015). Adverse epigenetic signatures by histone methyltransferase set7 contribute to vascular dysfunction in patients with type 2 diabetes mellitus *Circ. Cardiovasc. Genet.* **8**:150-158.
3. Dallatu, M.K. et al. (2015). The role of hypoxia-inducible factor/prolyl hydroxylation pathway in deoxycorticosterone acetate/salt hypertension in the rat. *J. Hypertens.* 10.4172/2167-1095.1000184.
4. Dugas, T.R. et al. (2014). Hydrogen sulfide cytoprotective signaling is endothelial nitric oxide synthase-nitric oxide dependent. *PNAS* **111**:3182-3187.

Malondialdehyde (MDA) Assays and Reagents

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ TBARS Assay Kit (MDA Quantitation)	Colorimetric or Fluorometric	200 Assays	STA-330
		5 x 200 Assays	STA-330-5
OxiSelect™ MDA Adduct Competitive ELISA Kit	Colorimetric	96 Assays	STA-832
		5 x 96 Assays	STA-832-5
OxiSelect™ MDA Immunoblot Kit	Immunoblot	10 Blots	STA-331
Goat Anti-Malondialdehyde (MDA) Polyclonal Antibody	Immunoblot/ELISA	100 µg	STA-031
Rabbit Anti-Malondialdehyde (MDA) Polyclonal Antibody	Immunoblot/ELISA	100 µg	STA-032
MDA-BSA Control	N/A	100 µg	STA-333

Recent Product Citations

1. Wu, Y.P. et al. (2015). Cedrus deodara pine needle as a potential source of natural antioxidants: bioactive constituents and antioxidant activities. *J. Funct. Foods* **14**:605-612. (STA-330)
2. Yener A.U. et al. (2015). Effects of kefir on ischemia-reperfusion injury. *Eur. Rev. Med. Pharmacol. Sci.* **19**:887-896. (STA-330)
3. Mika, M. et al. (2015). Anti-atherosclerotic activity of catechins depends on their stereoisomerism. *Atherosclerosis* 10.1016/j.atherosclerosis.2015.02.026. (STA-330)
4. Nassar, N.N. et al. (2015). Saxagliptin: a novel antiparkinsonian approach. *Neuropharmacology* **89**:308-317. (STA-330)
5. Romero, A. et al. (2015). Evidence of dose-additive effects of a type II pyrethroid mixture. In vitro assessment. *Environ. Res.* **138**:58-66. (STA-330)
6. Chang, Q. et al. (2014). Cytochrome P450 2C epoxygenases mediate photochemical stress-induced death of photoreceptors. *J. Biol. Chem.* **289**:8337-8352. (STA-330)
7. Montez, P. et al. (2012). Angiotensin receptor blockade recovers hepatic UCP2 expression and aconitase and SDH activities and ameliorates hepatic oxidative damage in insulin resistant rats. *Endocrinology* **153**:5845-5856. (STA-331)
8. Lazrak, A. et al. (2011). Regulation of alveolar epithelial Na+ channels by ERK1/2 in chlorine breathing mice. *Am. J. Respir. Cell Mol. Biol.* **46**:342-354. (STA-331)

Oxidized LDL Assays

Product Name	Detection	Size / Qty	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

Recent Product Citations

1. Wang, F. et al. (2015). Shift of the interconnection from the reaction system of paraoxonase 1 to the peroxidation reaction system of myeloperoxidase with HDL-C levels: a marker of atherosclerosis in patients with normal cholesterol levels. *Clin. Chem. Acta.* **438**:370-375. (STA-369, STA-389)
2. Stojanov, M. et al. (2013). Total bilirubin in young men and women: association with risk markers for cardiovascular diseases. *Clin. Biochem.* **46**:1516-1519. (STA-369)
3. Park, S.Y. et al. (2015). Study on the health benefits of brown algae (Sargassum muticum) in volunteers. *J. Food Nutr. Res.* **3**:126-130. (STA-388)

Ordering Information and Published Citations

Oxidized HDL Assays

Product Name	Detection	Size / Qty	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

Intracellular Reactive Oxygen Species (ROS) Assay

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ Intracellular ROS Assay Kit	Fluorometric	96 Assays	STA-342
		5 x 96 Assays	STA-342-5

Recent Product Citations

1. Xie, H.X. et al. (2015). Identification and functional characterization of the novel Edwardsiella tarda effector EseJ. *Infect. Immun.* **83**:1650-1660
2. Sun, L. et al. (2015). Tyrosol prevents ischemia/reperfusion-induced cardiac injury in H9c2 cells: involvement of ROS, Hsp70, JNK and ERK, and apoptosis. *Molecules* **20**:3758-3775.
3. Lolicato, F. et al. (2015). The cumulus cell layer protects the bovine maturing oocyte against fatty acid-induced lipotoxicity. *Biol. Reprod.* 10.1095/biolreprod.114.120634.
4. Tummala, K.S. et al. (2014). Inhibition of de novo NAD+ synthesis by oncogenic URI causes liver tumorigenesis through DNA damage. *Cancer Cell* **26**:826-839.
5. Guo, S. et al. (2014). Control of antioxidative response by the tumor suppressor protein PML through regulating Nrf2 activity. *Mol. Biol. Cell* **25**:2485-2498.
6. Li, R.W. et al. (2014). Uptake and protective effects of ergothioneine in human endothelial cells. *J. Pharmacol. Exp. Ther.* **350**:691-700.
7. Song, H. et al. (2014). Group VIA phospholipase A2 mitigates palmitate-induced ß-cell mitochondrial injury and apoptosis. *J. Biol. Chem.* **289**:14194-14210.
8. Lee, S.O. et al. (2014). The orphan nuclear receptor NR4A1 (Nur77) regulates oxidative and endoplasmic reticulum stress in pancreatic cancer cells. *Mol. Cancer Res.* **12**:527-538.

In Vitro Reactive Oxygen Species (ROS) Assay

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ *In Vitro* ROS/RNS Assay Kit	Fluorometric	96 Assays	STA-347
		5 x 96 Assays	STA-347-5

Recent Product Citations

1. Jiao, S.S. et al. (2015). Edaravone alleviates Alzheimer's Disease-type pathologies and cognitive deficits. *PNAS* **112**:5225-5230.
2. Khadir, A. et al. (2015). MAP kinase phosphatase DUSP1 is overexpressed in obese humans and modulated by physical exercise. *Am. J. Physiol. Endocrinol. Metab.* **308**:E71-E83.
3. Jeong, J.J.. et al. (2015). The probiotic mixture IRT5 ameliorates age-dependent colitis in rats. *Int. Immunopharmacol.* 10.1016/j.intimp.2015.04.021.
4. Schmidt-Heydt, M. et al. (2015). Oxidative stress induces the biosynthesis of citrinin by Pennicillium verrucosum at the expense of ochratoxin. *Int. J. Food Microbiol.* **192**:1-6.
5. Hao, Y. et al. (2014). Mycoplasma pneumonia modulates STAT3-STAT6/EGFR-FOXA2 signaling to induce overexpression of airway mucins. *Infect. Immun.* **82**:5246-5255.
6. Pandey, D. et al. (2014). Transcriptional regulation of endothelial arginase 2 by histone deacetylase 2. *Arterioscler. Thomb. Vasc. Biol.* **34**:1556-1566.

Nitric Oxide Assays

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ Intracellular Nitric Oxide (NO) Assay Kit	Fluorometric	96 Assays	STA-800
		5 x 96 Assays	STA-800-5
OxiSelect™ *In Vitro* Nitric Oxide (Nitrite/Nitrate) Assay Kit	Colorimetric	100 Assays	STA-802
		5 x 100 Assays	STA-802-5
	Fluorometric	100 Assays	STA-801
		5 x 100 Assays	STA-801-5

Ordering Information and Published Citations

Hydrogen Peroxide / Peroxidase Assays

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ Hydrogen Peroxide Assay Kit	Colorimetric	500 Assays	STA-343
OxiSelect™ Hydrogen Peroxide / Peroxidase Assay Kit	Fluorometric	500 Assays	STA-344

Recent Product Citations

1. Otreba, M. et al. (2015). Melanogenesis and antioxidant defense system in normal human melanocytes cultured in the presence of chlorpromazine. *Toxicol. In Vitro* **29**:221-227. (STA-343)
2. Konarikova, K. et al. (2015). Anticancer effect of black tea extract in human cancer cell lines. *SpringerPlus* **4**:127. (STA-343)
3. Kang, J. et al. (2014). Suppression of photosynthetic gene expression in roots is required for sustained root growth under phosphate deficiency. *Plant Physiol.* **27**:1156-1170. (STA-343)
4. Ke, K. et al. (2014). Reactive oxygen species induce the association of SHP-1 with c-Src and the oxidation of both to enhance osteoclast survival. *Am. J. Physiol. Endocrinol. Metab.* **307**:E61-E70. (STA-343)
5. Lara-Chavez, A. et a. (2015). Global gene expression profiling of two switchgrass cultivars following inoculation with Burkholderia phytofirmans strain PsJN. J. Exp. Bot. 10.1093/jxb/erv096. (STA-344)
6. Kim, E.Y. et al. (2012). Sustained activation of N-methyl-D-aspartate receptors in podocytes leads to oxidative stress, mobilization of transient receptor potential canonical 6 channels, nuclear factor of activated T cells activation, and apoptotic cell death. *Mol. Pharmacol.* **82**:728-737. (STA-344)
7. Kim, E.Y. et al. (2012). Insulin increases surface expression of TRPC6 channels in podocytes: role of NADPH oxidases and reactive oxygen species. *Am. J. Physiol. Renal Physiol.* **302**:F298-F307. (STA-344)

Myeloperoxidase Assays

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ Myeloperoxidase Chlorination Activity Assay Kit	Colorimetric	200 Assays	STA-803
	Fluorometric	192 Assays	STA-804
OxiSelect™ Myeloperoxidase Peroxidation Activity Assay Kit	Fluorometric	192 Assays	STA-805

Ascorbic Acid Assay

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ Ascorbic Acid Assay Kit (FRASC)	Colorimetric	200 Assays	STA-860

Total Glutathione Assay

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ Total Glutathione (GSSG/GSH) Assay Kit	Colorimetric	100 Assays	STA-312

Recent Product Citations

1. Nuora, A. et al. (2015). The impact of beef steak thermal processing on lipid oxidation and postprandial inflammation related responses. *Food Chem.* **184**:57-64.
2. Avalos, A. et al. (2015). Effects of silver and gold nanoparticles of different sizes in human pulmonary fibroblasts. *Toxicol. Mech. Method.* **23**:1-9.
3. Shen, Y.B. et al. (2015). Effect of feed grade L-methionine on growth performance and gut health in nursery pigs compared with conventional DL-methionine. *J. Anim. Sci.* **92**:5530-5539.
4. Lim, J.H. et al. (2014). Targeting mitochondrial oxidative metabolism in melanoma causes metabolic compensation through glucose and glutamine utilization. *Cancer Res.* **74**:3535-3545.
5. Mohamed, M.I. et al. (2014). Induction of oxidative stress following low dose ionizing radiation in ICR mice. *World J. Med. Sci.***10**:198-203.
6. Mani, S. et al. (2013). Decreased endogenous production of hydrogen sulfide accclerates atherosclerosis. *Circulation* **127**:2523-2534.
7. Karakus, E. et al. (2013). Agomelatine: an antidepressant with new potent hepatoprotective effects on paracetamol-induced liver damage in rats. *Human and Exp. Toxicol.* 10.01177/0960327112472994.

Glutathione Reductase Assay

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ Glutathione Reductase Assay Kit	Colorimetric	100 Assays	STA-812

Ordering Information and Published Citations

Cell-Based Exogenous Antioxidant Activity Assay

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ Cellular Antioxidant Activity Assay Kit	Fluorometric	192 Assays	STA-349

Superoxide Dismutase Activity Assay

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ Superoxide Dismutase Activity Assay Kit	Colorimetric	100 Assays	STA-340

Recent Product Citations

1. Yazici, A. et al. (2015). Comparison of pre-treatment and post-treatment use of selenium in retinal ischemia reperfusion injury. *Int. J. Ophthalmol.* **8**:263-268.
2. Wang, J. et al. (2015). Oxidative damage of naphthenic acids on the Eisenia fetida earthworm. *Environ. Toxicol*. 10.1002/tox.22139.
3. Alway, S.E. et al. (2015). Green tea extract attenuates muscle loss and improves muscle function during disuse, but fails to improve muscle recovery following unloading in aged rats. *J. Applied Phyisol*. **118**:319-330.
4. Rajapaksha, A. et al. (2015). Effects of macromolecular crowding on the structure of a protein complex: a small angle scattering study of superoxide dismutase. *Biophys. J.* **108**:967-974
5. Medlow, P. et al. (20135). Exercise training protects the LDL I subfraction from oxidation susceptibility in an aged human population. *Atherosclerosis* **239**:516-522.

Catalase Activity Assays

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ Catalase Activity Assay Kit	Colorimetric	96 Assays	STA-341
	Fluorometric	500 Assays	STA-339

Recent Product Citations

1. Yener, A.U. et al. (2015). Effects of kefir on ischemia-reperfusion injury. *Eur. Rev. Med. Pharmacol. Sci.* **19**:887-896. (STA-341)
2. Mora, M. et al. (2015). Minocycline increases the activity of superoxide dismutase and reduces the concentration of nitric oxide, hydrogen peroxide and mitochondrial malondialdehyde in manganese treated Drosophila melanogaster. *Neurochem. Res*. **39**:1270-12478. (STA-341)
3. Saikolappan, S. et al. (2015). Inactivation of the organic hydroperoxide stress resistant regulator OhrR enhances resistance to oxidative stress and isoniazid in mycobacterium smegmatis. *J. Bacteriol*. **197**:51-62. (STA-341)

Antioxidant Capacity Assays

Product Name	Detection	Size / Qty	Catalog Number
OxiSelect™ Total Antioxidant Capacity (TAC) Assay Kit	Colorimetric	200 Assays	STA-360
OxiSelect™ Ferric Reducing Antioxidant Power (FRAP) Assay kit	Colorimetric	200 Assays	STA-859
OxiSelect™ ORAC Activity Assay Kit	Fluorometric	192 Assays	STA-345
		5 x 192 Assays	STA-345-5
OxiSelect™ HORAC Activity Assay Kit	Fluorometric	192 Assays	STA-346
		5 x 192 Assays	STA-346-5

Recent Product Citations

1. Park, S.Y. et al. (2015). Study on the health benefits of brown algae (Sargassum muticum) in volunteers. *J. Food Nutr. Res*. **3**:126-130. (STA-360)
2. Youn, P. et al. (2015). Cytoprotection against ß-amyloid (aß) peptide-mediated oxidative damage and autophagy by Keap1 RNAi in human glioma U87mg cells. *Neurosci. Res.* 10.1016/j.neures.2014.12.015. (STA-360)
3. Sashindran, R. et al. (2015). Evaluation of neuroprotective effect of quercetin and coenzyme q10 in ethanol induced neurotoxicity in mice. *Int. J. Appl. Biol. Pharm.* **6**:67-71. (STA-360)
4. Ravikumar, P. et al. (2014). α-Klotho protects against oxidative damage in pulmonary epithelia. *Am. J. Physiol. Lung Cell* **307**:L566. (STA-360)
5. Okutsu, K. et al. (2015). Antioxidants in heat processed koji and the production mechanisms. *Food Chem*. 10.1016/j.foodchem.2015.04.004. (STA-345)
6. Yang, J. et al. (2014). Validation of genome-wide association study (GWAS)-identified disease risk alleles with patient specific stem cell lines. *Hum. Mol. Genet*. **23**:3445-3455. (STA-345)
7. Gardner, A.W. et al. (2015). Endothelial cell inflammation and antioxidant capacity are associated with exercise performance and microcirculation in patients with symptomatic peripheral artery disease. *Angiology* 10.1177/0003319714566863. (STA-346)
8. Jeong, M.H. et al. (2014). Protective activity of a novel resveratrol analogue, HS-1793, against DNA damage in 137CS-irradiated CHO-K1 cells. *J. Radiat. Res*. **55**:464-475. (STA-346)

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