CELL BIOLABS, INC.
Creating Solutions for Life Science Research

Oxidative Stress / Damage

- ☑ Choose Oxidative Stress Assays by Sample Type
- ☑ Oxidative Protein Damage
- ☑ Lipid Peroxidation
- ☑ DNA / RNA Damage
- ☑ Hypoxia Assays
- ☑ Reactive Oxygen Species (ROS) Assays
- ☑ Antioxidant Assays
- ☑ Oxidase / Peroxidase Assays

Biogenuix®

Measuring Oxidative Stress

Oxidative stress may be measured using one of three primary methods:

- Measure the reactive oxygen species (ROS) directly
- Measure the presence of antioxidants
- Measure the resulting damage to proteins, lipids, DNA or RNA (most reliable)

Use the following table to determine the best oxidative stress assays for your samples.

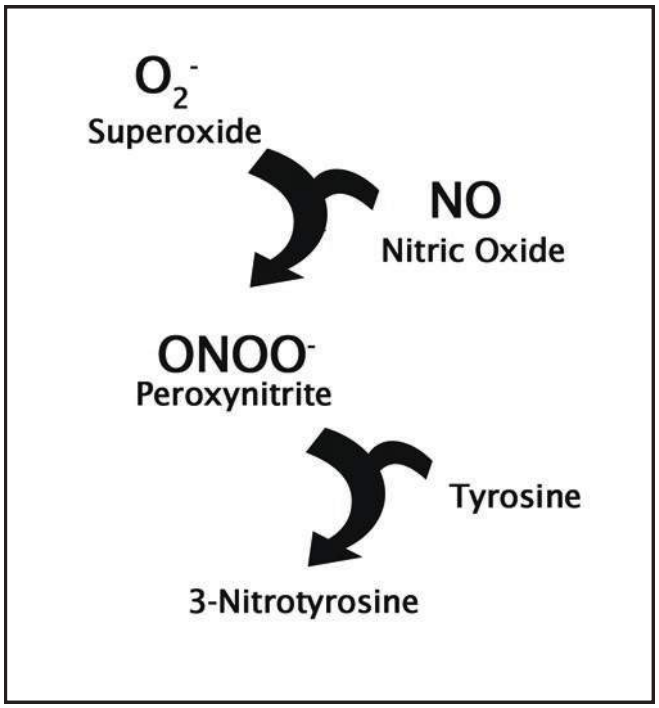
	Marker or Type of Damage	Sample Type				
		Cells	Tissues	Blood	Urine	Other
Protein Damage (p. 73-78)	Protein carbonyl content (PCC)	X	X	X		
	3-Nitrotyrosine	X	X	X		
	BPDE Protein Adduct	X	X	X		
	Advanced Glycation End Products (AGE)	X	X	X		
	Advanced Oxidation Protein Products (AOPP)	X	X	X		
	Protein Radicals	X	X	X		
	S-Glutathione Protein Adduct	X	X	X		
Lipid Peroxidation (p. 79-83)	4-Hydroxynonenal (4-HNE)	X	X	X		
	Malondialdehyde (MDA)	X	X	X	X	
	8-iso-Prostaglandin F2α (8-Isoprostane)	X	X	X	X	
	Oxidized LDL and HDL (OxLDL & OxHDL)			X		
DNA / RNA Damage and Repair (p. 84-90)	8-hydroxyguanosine (8-OHG)	X	X	X	X	Cerebrospinal Fluid
	8-hydroxydeoxyguanosine (8-OHdG)	X	X	X	X	
	Abasic (AP) sites	X	X			
	Aldehyde DNA Damage (Etheno adducts)	X	X			
	BPDE DNA Adduct	X	X			
	Comet Assay	X				
	Double-strand DNA breaks	X				
	UV DNA Damage (CPD and 6-4PP)	X				
Reactive Oxygen Species (p. 92-95)	Universal ROS	X	X	X	X	
	Hydrogen Peroxide	X	X	X	X	
	Nitric Oxide	X	X	X	X	Saliva
Antioxidants & Antioxidant Capacity (p. 96-101)	Superoxide Dismutase	X	X	X	X	
	Catalase	X	X	X		
	Glutathione	X	X	X	X	
	Ascorbic Acid	X	X	X		Food
	Total Antioxidant Capacity (TAC & FRAP)	X	X	X		Food
	Oxygen Radical Antioxidant Capacity (ORAC)	X	X	X		Food
	Hydroxyl Radical Antioxidant Capacity (HORAC)	X	X	X		
	Cellular Antioxidant Capacity (CAA)					Antioxidant compounds

Assays and Reagents for Protein Damage

Cellular proteins are subject to damage in the presence of reactive oxygen species (ROS). The resulting protein damage may take the form of nitration or oxidation of various amino acid residues, or may result in formation of advanced glycation end products (AGE) or advanced oxidation protein products (AOPP). We have developed unique assays to detect protein damage with higher sensitivity and more user-friendly protocols.

OxiSelect™ Nitrotyrosine Assay Kits and Antibodies

Our OxiSelect™ Nitrotyrosine Assay Kits provide a simple method to measure the formation of 3-nitrotyrosine in proteins. This assay is available in two formats: a 96-well competitive ELISA and an immunoblot kit. The ELISA format can detect the presence of 3-nitrotyrosine as low as 10 nM. Both kits can detect nitrotyrosine in protein from any species.



Formation of 3-Nitrotyrosine During Oxidative Stress.

Recent Product Citations

1. Shivanna, B. et al. (2015). Omeprazole attenuates pulmonary aryl hydrocarbon receptor activation and potentiates hyperoxia-induced developmental lung injury in newborn mice. *Toxicol. Sci.* 10.1093/toxsci/kfv183. (STA-303)
2. Capo, X. et al. (2015). Diet supplementation with DHA-enriched food in football players during training season enhances the mitochondrial antioxidant capabilities in blood monocnuclear cells. *Eur. J. Nutr.* **54**:35-49. (STA-303)
3. Zhang, Z.Y. et al. (2015). Enhanced therapeutic potential of nano-curcumin against subarachnoid hemorrhage-induced blood-brain barrier disruption through inhibition of inflammatory response and oxidative stress. *Mol. Neurobiol*. 10.1007/s12035-015-9635. (STA-305)
4. Yoshioka, K. et al. (2015). Sepiapterin prevents left ventricular hypertrophy and dilatory remodeling induced by pressure overload in rats. *Am J. Physiol. Heart Circ. Physiol*. 10.1152/ajpheart.00417.2015.
5. Peh, H.Y. et al. (2015). Vitamin E isoform ψ-tocotrienol downregulates house dust mite-induced asthma. *J. Immunol*. **195**:437-444. (STA-305)
6. Toth, P. et al. (2015) IGF-1 deficiency impairs neurovascular coupling in mice: implications for cerebromicrovascular aging. *Aging Cell* 10.1111/acel.12372. (STA-305)
7. Maingrette, F. et al. (2015). Psychological stress impairs ischemia-induced neovascularization: protective effect of fluoxetine. *Atherosclerosis* **241**:569-578. (STA-305)
8. Wang, Y.N. et al. (2015). Protein interacting with C-kinase deficiency impairs glutathione synthesis and increases oxidative stress via reduction of surface excitatory amino acid carrier 1. *J. Neurosci.* **35**:6429-6443. (STA-305)
9. 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)
10. 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)

Product Name	Detection	Size	Catalog Number
Nitrotyrosine ELISA Kit	Colorimetric	96 Assays	STA-305
		5 x 96 Assays	STA-305-5
Nitrotyrosine Immunoblot Kit	Immunoblot/ECL	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)	Immunoblot/ECL	10 µg	STA-304

OxiSelect™ Protein Carbonyl Assay Kits

The most common products of protein oxidation in biological samples are the carbonyl derivatives of Pro, Arg, Lys and Thr residues. Such derivatives are chemically stable and serve as markers for oxidative stress in most types of reactive oxygen species.

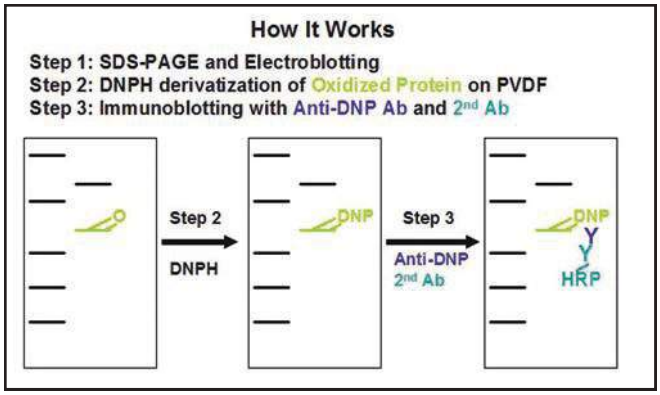
Our OxiSelect™ Protein Carbonyl Assay Kits provide rapid, efficient methods for detection of protein carbonyls. Four assay formats are available: immunoblot, ELISA, fluorometric and spectrophotometric. All formats are suitable for use with purified protein, plasma, serum, or cell lysate samples from any species.

Protein Carbonyl ELISA Kit

- **Sensitive**: Detects samples as low as 10 µg/ml
- **Greater Sample Retention**: No concentration or TCA precipitation steps that contribute to sample loss

Protein Carbonyl Immunoblot Kit

- **No Molecular Weight Shift**: DNPH derivatization after immunoblotting allows direct comparison of oxidized and non-oxidized protein fingerprints



Assay Principle for the OxiSelect™ Protein Oxidation Immunoblot Kit (STA-308).

Recent Product Citations

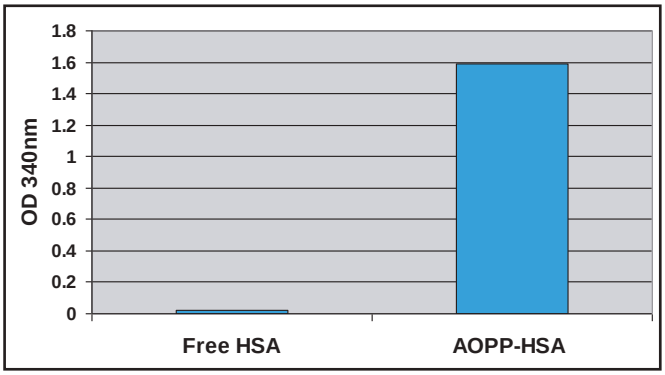
1. Laurizen, K.H. et al. (2015). Impaired dynamics and function of mitochondria caused by mtDNA toxicity leads to heart failure. *Am. J. Physiol. Heart Circ. Physiol.* **309**:H434-H449. (STA-307)
2. Tong, M. et al. (2014). Therapeutic reversal of chronic alcohol-related steatohepatitis with the ceramide inhibitor myriocin. *Int. J. Exp. Pathol.* **95**:49-63. (STA-307)
3. Zhou, J. et al. (2015). Correlations between photodegradation of bisretinoid constituents of retina and dicarbonyl adduct deposition. *J. Biol. Chem*. **290**:27215-27227. (STA-308)
4. Martorell, M. et al. (2015). Docosahexaenoic acid supplementation promotes erythrocyte antioxidant defense and reduces protein nitrosative damage in male athletes. *Lipids* **50**:131-148. (STA-308)
5. Cui, Z. et al. (2014). Identification of the immunoproteasome as a novel regulator of skeletal muscle differentiation. *Mol. Cell Biol.* **34**:96-109. (STA-308)
6. Kim, K.C. et al. (2015). Non-thermal dielectric-barrier discharge plasma damages human keratinocytes by inducing oxidative stress. *Int. J. Mol. Med*. **347**:29-38. (STA-310)
7. Ahn, M.Y. et al. (2015). Gene expression profiling and inhibition of adipose tissue accumulation of G. bimaculatus extract in rats on high fat diet. *Lipids Health Dis*. **14**:116. (STA-310)
8. Kim, H.K. et al. (2015). The link between mitochondrial complex I and brain-derived neurotrophic factor in SH-SY5Y cells—the potential of JNX1001 as a therapeutic agent. *Eur. J. Pharmacol.* **764**:379-384. (STA-310)
9. Seo, S.W. et al. (2015). Differential tissue-specific function of Adora2b in cardioprotection. *J. Immunol.* 10.4049/jimmunol.1402288. (STA-310)
10. Williams, A.S. et al. (2015). Innate and ozone-induced airway hyperresponsiveness in obese mice: role of TNFα. *Am. J. Physiol. Lung Cell Mol. Physiol.* **308**:L1168-L1177. (STA-310)
11. Westenbrink, B.D. et al. (2015). Mitochondrial reporgramming induced by CaMKIIδ mediates hypertrophy decompensation. *Circ. Res.* **116**:e28-e39. (STA-310)
12. 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. Appl. Physiol.* **118**:319-330. (STA-310)
13. Zhu, X. et al. (2015). Role of spermidine in overwintering of cyanobacteria. *J. Bacteriol.* **197**:2325-2334. (STA-315)
14. Cai, H. et al. (2015). Cancer chemoprevention: evidence of a nonlinear dose response for the protective effects of resveratrol in humans and mice. *Sci. Transl. Med*. **7**:298ra117. (STA-315)
15. Dupre-Aucouturier, S. et al. (2015). Trichostatin A, a histone deacetylase inhibitor, modulates unloaded-induced skeletal muscle atrophy. *J. Appl. Phys*. 10.1152/japplphysiol.01031.2014. (STA-315)
16. Tanase, M. et al. (2015). Hydrodynamic size-based separation and characterization of protein aggregates from total cell lysates. *Nat. Protoc.* **10**:134-148. (STA-315)

Product Name	Detection	Size	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/ECL	10 Blots	STA-308
Oxidized Protein Immunoblot Control (Carbonyl-BSA)	Immunoblot/ECL	10 µg	STA-309

OxiSelect™ AOPP Assay Kit

Advanced oxidation protein products are toxins created during oxidative stress in patients with diabetes mellitus, atherosclerosis, renal complications, and HIV. Our OxiSelect™ AOPP Assay Kit provides a quick, easy method for assessing AOPP levels.

- **Fast**: Obtain results in <30 minutes
- **Sensitive**: Detect concentrations as low as 5 µM



Untreated Human Serum Albumin and AOPP-HSA Positive Control Tested with the OxiSelect™ AOPP Assay Kit.

Recent Product Citations

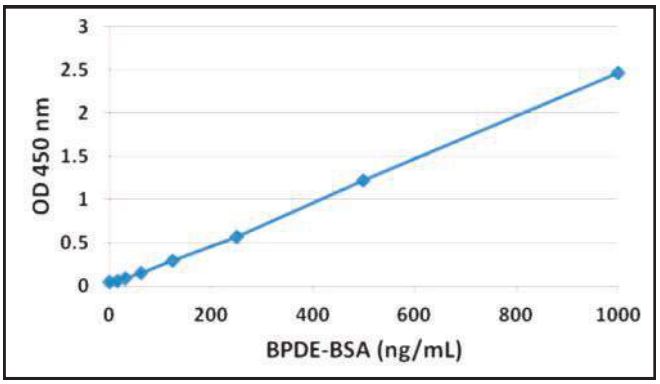
1. Jung, E. et al. (2015). Gemigliptin improves renal function and attenuates podocyte injury in mice with diabetic nephropathy. *Eur. J. Pharmacol.* 10.1016/j.ejphar.2015.04.055.
2. Bloomer, R.J. et al. (2015). Comparison of a restricted and unrestricted vegan diet plan with a restricted omnivorous diet plan on health-specific measures. *Healthcare* **3**:544-555.
3. Witthaus, M.W. et al. (2014). Bladder oxidative stress in sleep apnea contributes to detrusor instability and nocturia. *J. Urol.* 10.1016/j.juro.2014.11.055.
4. Zhang, Q. et al. (2014). Effects of ischemia and oxidative stress on bladder purinoceptors expression. *Urology* **84**:e1-e7.

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

OxiSelect™ BPDE Protein Adduct ELISA Kit

Polycyclic aromatic hydrocarbons (PAH) are potent carcinogenic pollutants commonly associated with oil, cigarette smoke, and automotive exhaust. They may also be found in some cooked foods. One PAH, benzo(a)pyrene, was the first chemical carcinogen to be discovered. Through a series of enzymatic reactions, benzo(a)pyrene is converted to benzo(a) pyrene 7,8 diol-9,10 epoxide (BPDE) which attacks both proteins and DNA.

Our OxiSelect™ BPDE Protein Adduct ELISA Kit provides a convenient method to measure the modification of proteins by BPDE.



BPDE-BSA Standard Curve Generated Using the OxiSelect™ BPDE Protein Adduct ELISA Kit.

- **Sensitive**: Detect concentrations as low as 60 ng/mL
- **Convenient**: Quantify on a standard microplate reader
- **Versatile**: Suitable for use with cell lysates, tissue homogenates, plasma or serum

Recent Product Citation

Feng, P.H. et al. (2015). Dysfunction of methionine sulfoxide reductases to repair damaged proteins by nickel nanoparticles. *Chem. Biol. Interact.* 10.1016/j.cbi.2015.05.003.

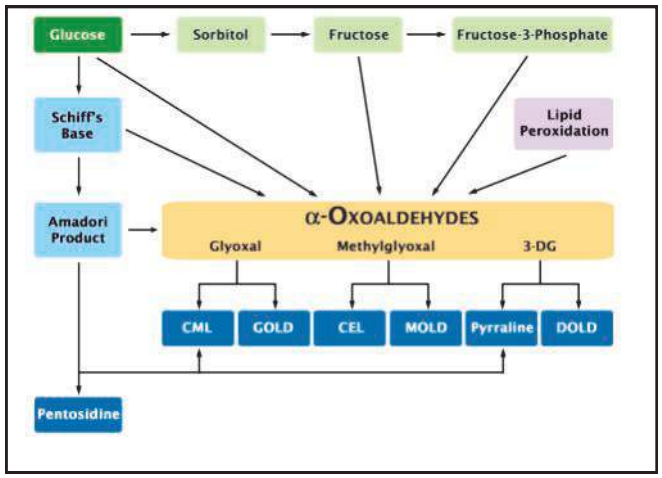
For information on our BPDE DNA Adduct ELISA Kit, please see **page 89**.

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

OxiSelect™ Advanced Glycation End Product Kits & Antibodies

Advanced glycation end products (AGE) are formed during the Maillard reaction where reducing carbohydrates react with lysine side chains and N-terminal amino groups of various macromolecules, particularly proteins. These AGE products can adversely affect the function of the affected proteins and play a role in atherosclerosis, diabetes, aging and renal disease.

Our OxiSelect™ Advanced Glycation End Product Kits are designed for the rapid detection of AGE protein adducts. We offer assays to study generic AGE formation or specific AGE strucutres including N^{ε}-(Carboxyethyl) lysine (CEL), N^{ε}-(Carboxymethyl) lysine (CML), and methylglyoxal (MG). All kits will detect AGE structures from protein of any species.



Advanced Glycation End Products (AGE) Pathways.

OxiSelect™ Advanced Glycation End Product (AGE) Competitive ELISA Kit

Our OxiSelect™ Advanced Glycation End Product (AGE) Competitive ELISA Kit detects a variety of AGE structures including CML and pentosidine. It does not detect CEL or methylglyoxal (MG).

Samples are added to a plate coated with an AGE-protein conjugate. AGE-protein adducts in the sample compete with the AGE-coated plate for antibody binding. High AGE adduct content in a sample results in less binding of the antibody to the plate, producing a low signal. Conversely, low AGE content in a sample results in most antibody binding to the plate, producing a higher signal.

- **Sensitive**: Detect levels as low as 1 µg/mL of AGE-protein adduct
- **Versatile**: Compatible with cell lysates, plasma, serum, or purified proteins

Recent Product Citations

1. Martins, L.S. et al. (2015). Advanced Glycation Endproducts (AGE) evolution after pancreas-kidney transplantation: plasmatic and cutaneous assessments. *Oxid. Med. Cell Longev.* 2189582.
2. Chen, S.J. et al. (2015). Methylglyoxal-derived hydroimidazolone residue of plasma protein can behave as a predictor of prediabetes in Spontaneously Diabetic Torii rats. *Physiol. Rep.* **3**:e12477.
3. Song, Y. et al. (2014). Ferulic acid alleviates the symptoms of diabetes in obese rats. *J. Funct. Foods* **9**:141-147.
4. Foster, D. et al. (2014). AGE metabolites: a biomarker linked to cancer disparity? *Cancer Epidemiol. Biomarkers Prev.* **23**:2186-2191.

Product Name	Detection	Size	Catalog Number
OxiSelect™ Advanced Glycation End Product (AGE) Competitive ELISA Kit	Colorimetric	96 Assays	STA-817
		5 x 96 Assays	STA-817-5
Glycoaldehyde-AGE-BSA	N/A	100 µg	STA-348

OxiSelect™ N^{ε}-(Carboxyethyl) Lysine (CEL) Competitive ELISA Kit

The OxiSelect™ N^{ε}-(Carboxyethyl) Lysine (CEL) Competitive ELISA Kit detects CEL protein adducts in a variety of samples including cell lysates, blood samples, and other protein sources.

- **Sensitive**: Detect levels as low as 100 ng/mL of CEL-protein adduct
- **Versatile**: Compatible with cell lysates, plasma, serum, or purified proteins

Recent Product Citation

Morgan, P.E. et al. (2014). Perturbation of human coronary artery endothelial cell redox state and NADPH generation by methylglyoxal. *PLoS One* **9**:e86564.

Product Name	Detection	Size	Catalog Number
OxiSelect™ N^{ε}-(Carboxyethyl) Lysine (CEL) Competitive ELISA Kit	Colorimetric	96 Assays	STA-813
CEL-BSA	N/A	100 µg	STA-302

OxiSelect™ N^{ε}-(Carboxymethyl) Lysine (CML) Assays and Antibodies

The OxiSelect™ N^{ε}-(Carboxymethyl) Lysine (CML) Competitive ELISA Kit detects CML protein adducts in a variety of samples including cell lysates, blood samples, and other protein sources.

- **Sensitive**: Detect levels as low as 3 ng/mL of CML-protein adduct with the ELISA kit
- **Versatile**: Compatible with cell lysates, plasma, serum, or purified proteins

Recent Product Citations

1. Martins, L.S. et al. (2015). Advanced Glycation Endproducts (AGE) evolution after pancreas-kidney transplantation: plasmatic and cutaneous assessments. *Oxid. Med. Cell Longev.* 2189582.
2. Niquet-Leridon, C. et al. (2015). The rehabilitation of raw and brown butters by the measurement of two of the major Maillard products, Nε -Carboxymethyl-Lysine and 5-hydroxymethylfurfural, with validated chromatographic methods. *Food Chemistry* **177**:361-368.
3. Huang, T.C. et al. (2014). Increased renal semicarbazide-sensitive amine oxidase activity and methylglyoxal levels in aristolochic acid-induced nephrotoxicity. *Life Sci.* **114**:4-11.
4. Morgan, P.E. et al. (2014). Perturbation of human coronary artery endothelial cell redox state and NADPH generation by methylglyoxal. *PLoS One* **9**:e86564.

Product Name	Detection	Size	Catalog Number
OxiSelect™ N^{ε}-(Carboxymethyl) Lysine (CML) Competitive ELISA Kit	Colorimetric	96 Assays	STA-816
		5 x 96 Assays	STA-816-5
OxiSelect™ N^{ε}-(Carboxymethyl) Lysine (CML) Immunoblot Kit	Immunoblot	10 Blots	STA-313
Goat Anti-N^{ε}-CML Polyclonal Antibody	Immunoblot/ELISA	100 µg	STA-013
Rabbit Anti-N^{ε}-CML Polyclonal Antibody	Immunoblot/ELISA	100 µg	STA-014
CML-BSA Control	N/A	100 µg	STA-314

OxiSelect™ Methylglyoxal (MG) Assays and Antibodies

The OxiSelect™ Methylglyoxal (MG) Competitive ELISA Kit detects MG protein adducts in a variety of samples including cell lysates, blood samples, and other protein sources.

- **Sensitive**: Detect levels as low as 200 ng/mL of MG-protein adduct
- **Versatile**: Compatible with cell lysates, plasma, serum, or purified proteins

Recent Product Citation

Morgan, P.E. et al. (2014). Perturbation of human coronary artery endothelial cell redox state and NADPH generation by methylglyoxal. *PLoS One* **9**:e86564.

Product Name	Detection	Size	Catalog Number
OxiSelect™ Methylglyoxal (MG) Competitive ELISA Kit	Colorimetric	96 Assays	STA-811
		5 x 96 Assays	STA-811-5
Mouse Anti-Methylglyoxal Monoclonal Antibody	Immunoblot/ Immunohistochemistry	100 µg	STA-011
MG-BSA	N/A	100 µg	STA-306

Oxidized / Nitrated Proteins

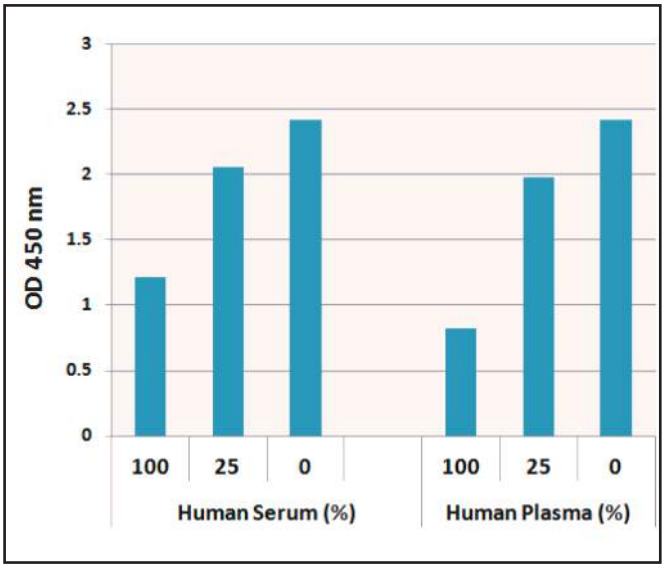
All proteins are provided at a concentration of 1.0 mg/mL.

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

OxiSelect™ s-Glutathione Adduct ELISA Kit

While glutathione protects cells from free radical damage as an antioxidant, it can also covalently atach to proteins through its sulfhydryl moiety upon derivatization by reactive oxygen species. Glutathione protein adducts can therefore serve as a marker of oxidative stress.

Our OxiSelect™ s-Glutathione Adduct Competitive ELISA Kit quantifies the glutathionylation of proteins in a standard 96-well plate. Protein standards and unknown samples are added to a plate precoated with an s-glutathione protein conjugate. A primary anti-s-glutathione antibody is added and competes for binding between the protein adduct in the sample and the protein adduct bound to the plate. High concentrations of adduct in samples leave little antibody to bind to the plate, resulting in a low O.D. value.



S-Glutathione Protein Adducts in Human Plasma and Serum.

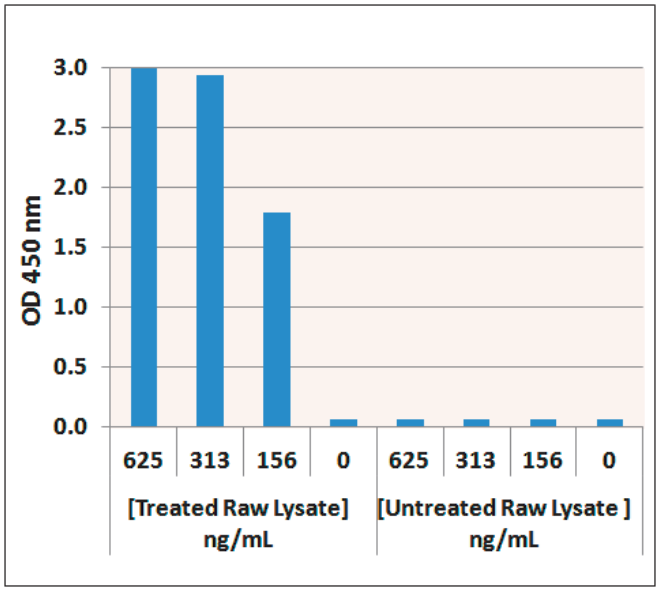
Product Name	Detection	Size	Catalog Number
OxiSelect™ s-Glutathione Adduct Competitive ELISA Kit	Colorimetric	96 Assays	STA-814

OxiSelect™ Protein Radical ELISA Kit

Protein radicals form from electron transfer from various reactive oxygen and reactive nitrogen species. Protein radicals have been linked to various disorders including amyotrophic lateral sclerosis, Huntington's Disease, and Alzheimer's Disease.

Our OxiSelect™ Protein Radical ELISA Kit quantifies free radicals in a standard 96-well plate. The kit employs electron spin resonance (ESO) technology, using the molecule DMPO as a spin trap to bind to the protein radical and create an adduct which can be detected with an anti-DMPO Nitrone Adduct Antibody.

The protein radical content in unknown samples is determined by comparing the optical density with a standard curve generated from predetermined DMPO Nitrone Adduct-HSA (human serum albumin) standards.



Detection of Protein Radicals in Raw 264.7 Cell Lysate. Raw 264.7 macrophages were trypsinized, washed, subjected to three freeze thaw cycles, and centrifuged. Lysates were subjected to 100 mM DMPO in the presence (left) or absence (right) of 4.4 mM H2O2 and 50 µM CuSO4.

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

Assays and Reagents for Lipid Peroxidation

Lipid peroxidation is a well-defined mechanism of cellular damage in both animals and plants that occurs during aging and in some disease states. Our OxiSelect™ Lipid Peroxidation Assays allow you to quickly and easily quantify the most common markers and by-products of lipid peroxidation.

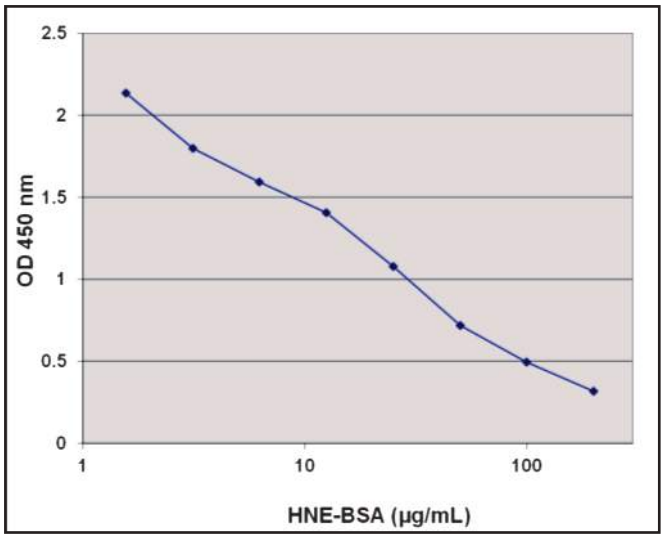
OxiSelect™ HNE ELISA Kits and Antibodies

4-hydroxynonenal (4-HNE) is a well-known by-product of lipid peroxidation and is widely accepted as a stable marker for oxidative stress. HNE protein adducts are typically stable when frozen for up to 6 months or more. Our OxiSelect™ HNE Adduct Competitive ELISA Kit provides a simple, user-friendly way to assess HNE adduct formation on lysine, histidine and/or cysteine.

- **Sensitive**: ELISA kit detects protein adducts as low as 2 µg/mL
- **Versatile**: Suitable for use with serum, plasma, cell lysates or tissue homogenates

Recent Product Citations

1. Hollis, F. et al. (2015). Mitochondrial function in the brain links anxiety with social subordination. *PNAS* **112**:15486-15491.
2. DuPont, J.J. et al. (2014). NADPH oxidase-derived reactive oxygen species contribute to impaired cutanoeous microvascular function in chronic kidney disease. *Am. J. Physiol. Renal Physiol.* **306**:F1499-F1506.
3. Kador, P.F. et al. (2014). Topical nutraceutical Optixcare EH ameliorates experimental ocular oxidative stress in rats. *J. Ocul. Pharmacol. Ther.* **30**:593-602.



Standard Curve Generated with the OxiSelect™ HNE Adduct Competitive ELISA Kit.

Product Name	Detection	Size	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	N/A	100 µg	STA-335

OxiSelect™ 8-iso-Prostaglandin F2α ELISA Kit (8-isoprostane)

The OxiSelect™ 8-iso-Prostaglandin F2α ELISA Kit provides rapid, sensitive detection of 8-iso-PGF2α as low as 50 pg/mL. The assay is suitable for quantitation of 8-isoprostane in a variety of sample types including cell and tissue lysates, plasma, serum, and urine.

Recent Product Citations

1. Wang, Z. et al. (2015). Mechanistic investigation of toxaphene induced mouse liver tumors. *Toxicol. Sci.* 10.1093/toxsci/kfv151.
2. Pereira, S. et al. (2015). Effect of N-acetyl-L-cysteine on insulin resistance caused by prolonged FFA elevation. *J. Endocrinol* 10.1530/JOE-14-0676.

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

OxiSelect™ MDA (Malondialdehyde) Assays and Antibodies

As a common by-product of lipid peroxidation, malondialdehyde (MDA) is a well-accepted marker of oxidative stress. Modification of proteins by MDA can cause structural and functional changes in oxidized proteins. We offer assays and antibodies to measure MDA in a variety of formats. Kits are available to measure total MDA as well as MDA protein adducts specifically.

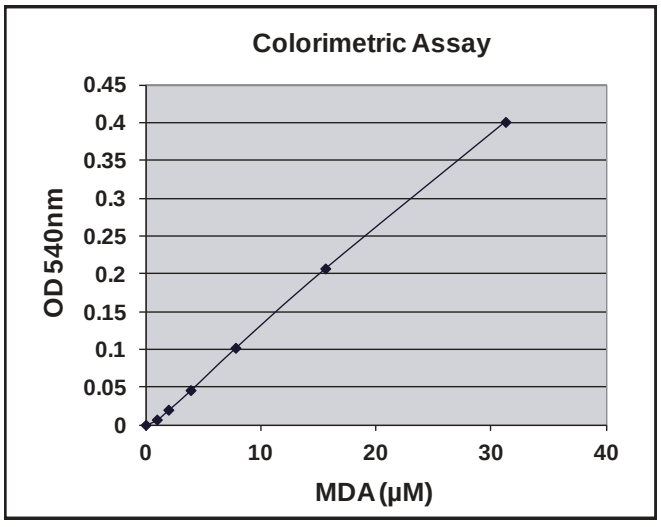
***Note**: MDA is most reliably detected in fresh samples, or in samples that have been frozen for a maximum of 1-2 months. For samples stored for longer periods, consider testing other markers of lipid peroxidation such as 4-HNE or 8-isoprostane.*

OxiSelect™ TBARS Assay Kit

The TBARS assay is a well-established method for screening and monitoring lipid peroxidation via the by-product malondialdehyde (MDA). MDA forms a 1:2 adduct with thiobarbituric acid.

Our OxiSelect™ TBARS Assay Kit provides a more user-friendly protocol for quantitation of the MDA-TBA adduct compared to other commercial assays. This assay detects total MDA, both free and in protein adducts, in a variety of samples including cell and tissue lysates, plasma, and urine.

- **Fast**: Obtain results in 30 minutes
- **Sensitive**: Smaller reaction volumes require less sample; detect as little as 2 µM
- **Convenient**: 96-well format; no glass tubes are required



MDA-TBA Standard Curve Using a Standard Plate Reader.

Recent Product Citations

1. Mohamed, R.A. et al. (2015). Role of adenosine A 2A receptor in cerebral ischemia reperfusion injury: signaling to phosphorylated extracellular signal regulated protein kinase (pERK1/2). *Neuroscience* 10.1016/j.neuroscience.2015.11.059.
2. Dugbartey, G.J. et al. (2015). Dopamine treatment attenuates acute kidney injury in a rat model of deep hypothermia and rewarming—the role of renal H2S-producing enzymes. *Eur. J. Pharmacol.* **769**:225-233.
3. Pettersen, K. et al. (2015). DHA-induced stress response in human colon cancer cells—focus on oxidative stress and autophagy. *Free Radic. Biol. Med.* **90**:158-172.
4. Songstad, N.T. et al. (2015). Effects of high intensity interval training on pregnant rats, and the placenta, heart and liver of their fetuses. *PLoS One* **10**:e0143095.
5. Brand, R.M. et al. (2015). Skin immunization obviates alcohol-related immune dysfunction. *Biomolecules* **5**:3009-3028.
6. Afify, H. et al. (2015). Molecular mechanisms of the modulatory effect of vitamin E on tacrolimus (FK506)-induced renal injury in rats. *Br. J. Pharm. Res.* **9**:1-9.
7. Palipoch, S. et al. (2015). Heme oxygenase-1 alleviates alcoholic liver steatosis: histopathological study. *J. Toxicol. Pathol.* 10.1293/tox.2015-0035.
8. Galougahi, K.K. et al. (2015). ß3-adrenoceptor activation relieves oxidative inhibition of the cardiac Na+-K+ pump in hyperglycemia induced by insulin receptor blockade. *Am. J. Physiol. Cell Physiol*. **309**:C286-C295.
9. Dal, S. et al. (2015). Oxidative stress status and liver tissue defenses in diabetic rats during intensive subcutaneous insulin therapy. *Exp. Biol. Med.* 10.1177/1535370215603837.
10. Lee, J.Y. et al. (2015). Effects of non-thermal plasma on the electrical properties of an erythrocyte membrane. *Appl. Phys. Lett*. **107**:113701.
11. Sun, Y. et al. (2015). Impacts of low level aflatoxin in feed and the use of yeast cell wall based feed additive on growth and health of nursery pigs. *Anim. Nutr.* 10.1016/j.aninu.2015.08.012.
12. Rangel-Huerta, O.D. et al. (2015). Normal or high polyphenol concentration in orange juice affects antioxidant activity, blood pressure, and body weight in obese or overweight adults. *J. Nutr.* **145**:1808-1816.
13. Sosa, R.A. et al. (2015). IFN-γ ameliorates autoimmune encephalomyelitis by limiting myelin lipid peroxidation. *PNAS USA* **112**:E5038-E5047.
14. Dhall, S. et al. (2015). Release of insulin from PLGA-alginate dressing steimulates regenerative healing of burn wounds in rats. *Clin. Sci. (Lond.)* **129**:1115-1129.

Product Name	Detection	Size	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 Assay Kits

Our MDA Adduct Assay Kits provide simple methods to measuring these protein adducts in a variety of sample types.

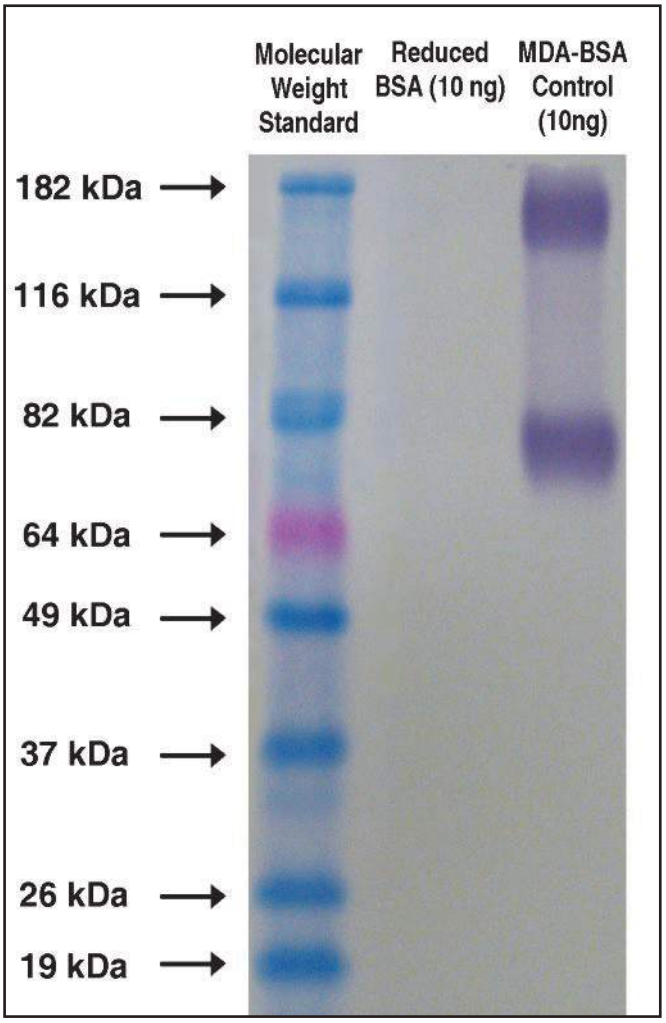
The MDA Adduct Competitive ELISA Kit is a sensitive method for the quantitation of MDA in proteins from cells, tissues, or blood. Samples are added to a malondialdehyde protein conjugate-coated plate. The MDA in the sample competes with the MDA on the plate for binding to the primary anti-MDA antibody. A high concentration of MDA in the sample results in little to no antibody binding to the plate, producing a low signal.

Our MDA Immunoblot is a convenient method for qualitative measurement of MDA protein adducts.

- **Sensitive**: ELISA kit detects MDA protein adducts as low as 6 pmol/mL
- **Versatile**: Suitable for use with serum, plasma, cell lysates or tissue homogenates

Recent Product Citations

1. Shivanna, B. et al. (2015). Omeprazole attenuates pulmonary aryl hydrocarbon receptor activation and potentiates hyperoxia induced developmental lung injury in newborn mice. *Toxicol. Sci.* 10.1093/toxsci/kfv183. (STA-331)
2. Maccarinelli, F. et al. (2014). A novel neuroferritinopathy mouse model (FTL 498InsTC) shows progressive brain iron dysregulation, morphological signs of early neurodegeneration and motor coordination deficits. *Neurobiol. Dis.* 10.1016/j.nbd.2014.10.023. (STA-331)
3. Galay, R.L. et al. (2014). Two kinds of ferritin protect ixodid ticks from iron overload and consequent oxidative stress. *PLoS One* **9**:e90661. (STA-331)
4. 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)
5. De Souza, P.C. et al. (2015). OKN-007 decreases free radical levels in a preclinical F98 rat glioma model. *Free Radic. Biol. Med.* 10.1016/j.freeradbiomed.2015.06.026. (STA-832)



Immunoblot of MDA-BSA Control Using the OxiSelect™ MDA Immunoblot Kit. Immunoblot control was electroblotted onto a nitrocellulose membrane, followed by detection with the provided anti-MDA antibody.

Product Name	Detection	Size	Catalog Number
OxiSelect™ MDA Immunoblot Kit	Immunoblot	10 Blots	STA-331
OxiSelect™ MDA Adduct Competitive ELISA Kit	Colorimetric	96 Assays	STA-832
		5 x 96 Assays	STA-832-5
MDA-BSA	N/A	100 µg	STA-333

OxiSelect™ MDA Polyclonal Antibodies

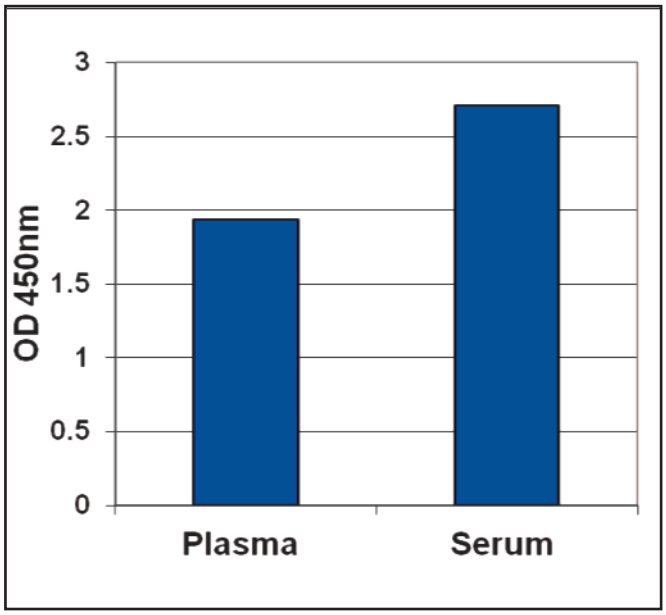
Product Name	Detection	Size	Catalog Number
Goat Anti-Malondialdehyde (MDA) Polyclonal Antibody	Immunoblot/ELISA	100 µg	STA-031
Rabbit Anti-Malondialdehyde (MDA) Polyclonal Antibody	Immunoblot/ELISA	100 µg	STA-032

OxiSelect™ Human Oxidized LDL ELISA Kits

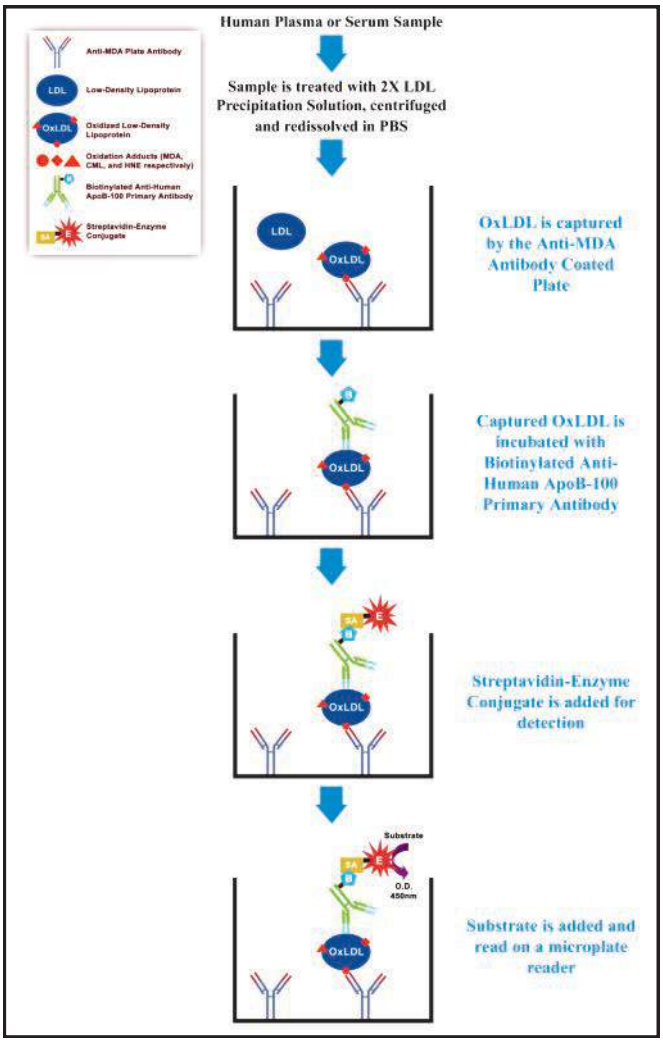
LDL contains a hydrophobic core of various lipids surrounded by one molecule of Apolipoprotein B-100 (ApoB-100), which promotes solubility of the LDL in blood. LDL, often described as “bad” cholesterol, is even more dangerous when it becomes oxidized. Oxidized LDL (OxLDL) is more reactive with surrounding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

- **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



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 diluting 1:160 in Assay Diluent according to the Assay Protocol.



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.

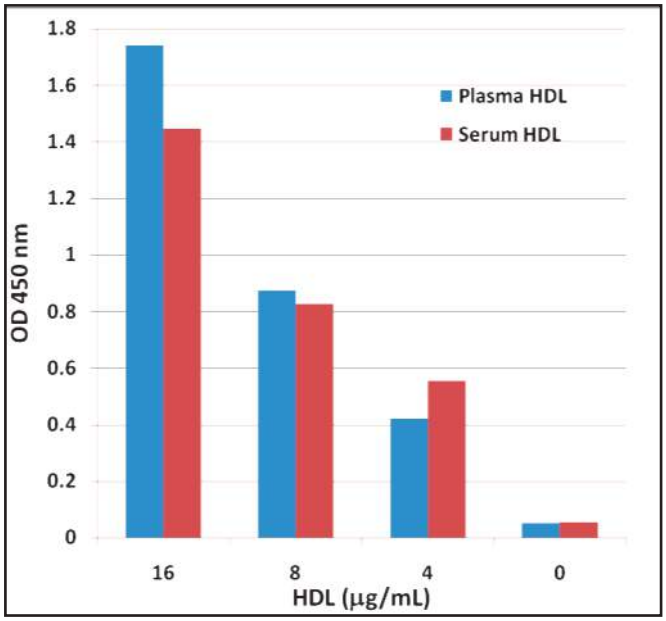
Product Name	Detection	Size	Catalog Number
OxiSelect™ Human Oxidized LDL ELISA Kit (CML-LDL Quantitation)	Colorimetric	96 Assays	STA-388
OxiSelect™ Human Oxidized LDL ELISA Kit (HNE-LDL Quantitation)	Colorimetric	96 Assays	STA-389
OxiSelect™ Human Oxidized LDL ELISA Kit (MDA-LDL Quantitation)	Colorimetric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

OxiSelect™ Human Oxidized HDL ELISA Kits

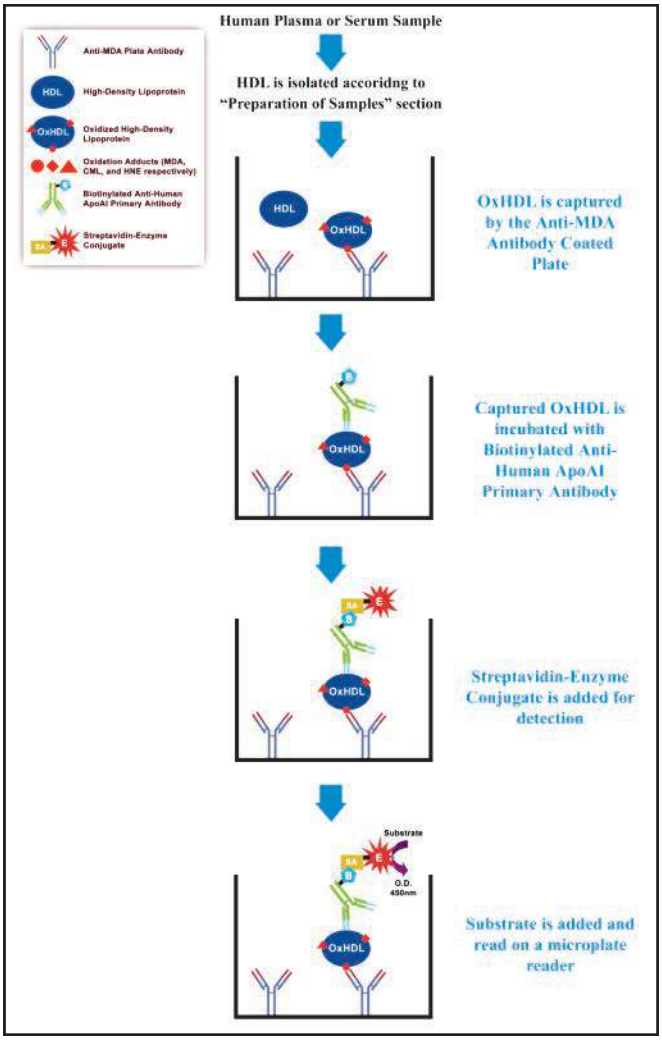
Like LDL, HDL (high density lipoprotein) can become oxidized in either the protein or lipid component. While HDL is often described as “good” cholesterol, oxidation of HDL can cause it to lose its usual cardioprotective properties and cause it to be more dangerous than helpful.

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

Assays for DNA & RNA Damage and Repair

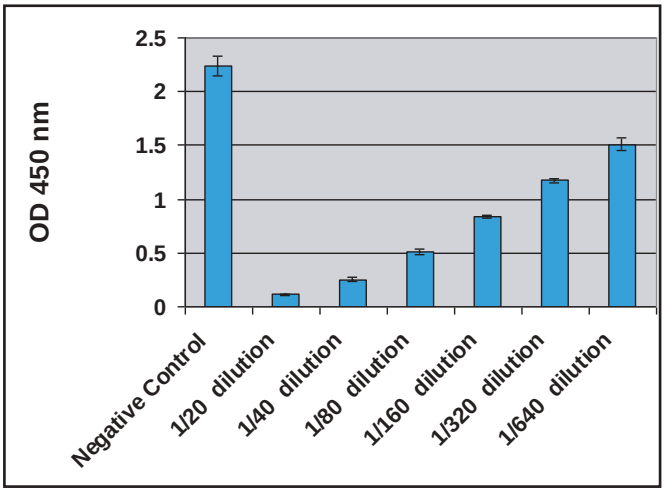
DNA is arguably the most biologically significant target of oxidative and cellular stress. Continuous DNA damage has been implicated in age-related development of various cancers. More recently, RNA damage has been described in conjunction with various neurological diseases including Alzheimer's and Parkinson's diseases. We offer a wide range of assays to measure the most common types of DNA and RNA damage in cells.

OxiSelect™ Oxidative DNA Damage ELISA Kit (8-OHdG Quantitation)

Among the various types of oxidative DNA damage, 8-hydroxydeoxyguanosine (8-OHdG) is a ubiquitous marker of oxidative stress. 8-OHdG, one of the by-products of DNA oxidative damage, is physiologically formed and enhanced by chemical carcinogens.

Our OxiSelect™ Oxidative DNA Damage ELISA Kit provides a powerful method for rapid quantitation of 8-OHdG in DNA samples. 8-OHdG is easily detectable directly in serum and urine samples, after it is excised and secreted during the DNA repair process. It also may be detected in DNA extracted from cells or tissues of any species, following full DNA digestion into single bases.

- **Highly Sensitive**: Detect as little as 100 pg/mL of 8-OHdG
- **Versatile**: Suitable for use with urine, serum, and DNA extracted from cells or tissues



8-OHdG Levels in a Human Urine Sample.

Recent Product Citations

1. Chaiprasongsuk, A. et al. (2015). Photoprotection by dietary phenolics against melanogenesis induced by UVA through Nrf2-dependent antioxidant responses. *Redox Biol.* 10.1016/j.redox.2015.12.006.
2. Zhang, Z.Y. et al. (2015). Enhanced therapeutic potential of nano-curcumin against subarachnoid hemorrhage-induced blood-brain barrier disruption through inhibition of inflammatory response and oxidative stress. *Mol. Neurobiol.* 10.1007/s12035-015-9635.
3. Huang, Y.T. et al. (2015). Resveratrol alleviates the cytotoxicity induced by the radiocontrast agent, ioxitalamate, by reducing the production of reactive oxygen species in HK-2 human renal proximal tubule epithelial cells in vitro. *Int. J. Mol. Med.* **37**:83.
4. Belenky, P. et al. (2015). Bactericidal antibiotics induce toxic metabolic perturbations that lead to cellular damage. *Cell Rep.* **13**:968-980.
5. Ren, J.D. et al. (2015). Molecular hydrogen inhibits lipopolysaccharide-triggered NLRP3 inflammasome activation in macrophages by targeting the mitochondrial reactive oxygen species. *Biochim. Biophys. Acta.* **1863**:50-55.
6. Huang, Y.T. et al. (2015). Therapeutic potential of thalidomide for gemcitabine-resistant bladder cancer. *Int. J. Oncol.* **47**:1711-1724.
7. Lim, S.W. et al. (2015). Inhibition of dipeptidyl peptidase IV protects tacrolimus-induced kidney injury. *Lab Invest.* 10.1038/labinvest.2015.93.
8. Dong, Y. et al. (2015). Alpha-lipoic acid attenuates cerebral ischemia and reperfusion injury via insulin receptor and PI3K/Akt-dependent inhibition of NADPH oxidase. *Int. J. Endocrinol.* **2015**:903186.
9. Schweitzer, K.S. et al. (2015). Endothelial disruptive pro-inflammatory effects of nicotine and e-cigarette vapor exposures. *Am. J. Physiol. Lung Cell Mol. Physiol.* **309**:L175-L187.
10. Ahn, M.Y. et al. (2015). Anti-aging effect and gene expression profiling of aged rats treated wtih *G. bimaculatus* extract. *Toxicol. Res.* **31**:173.
11. Sheng, H. et al. (2015). Bactericidal effect of photolysis of H2O2 in combination with sonolysis of water via hydroxyl radical generation. *PLoS One* **10**:e0132445.
12. Mu, H.N. et al. (2015). Caffeic acid attenuates rat liver reperfusion injury through Sirt3-dependent regulation of mitochondrial respiratory chain. *Free Radic. Biol. Med.* 10.1016/j.freeradbiomed.2015.04.033.
13. Glenn, D.J. et al. (2015). Cardiac steatosis potentiates angiotensin II effects in the heart. *Am. J. Physiol. Heart Circ. Physiol.* **308**:H339-H350.

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

OxiSelect™ Oxidative RNA Damage ELISA Kit (8-OHG Quantitation)

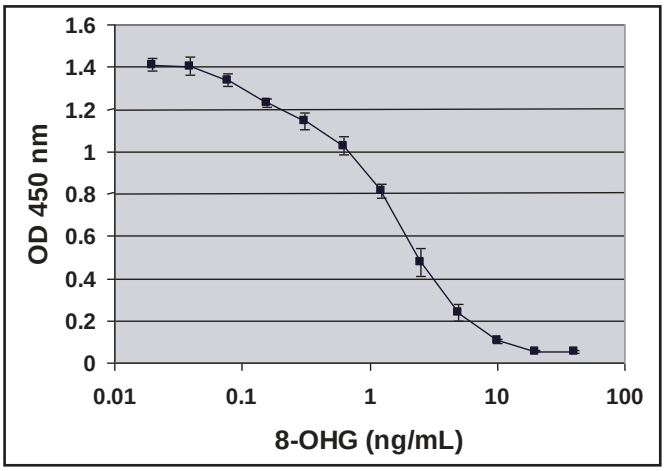
Similarly to 8-hydroxydeoxyguanosine (8-OHdG) forming during DNA oxidation, RNA can become oxidized resulting in 8-hydroxyguanosine (8-OHG). Oxidation of RNA has been implicated in a number of neurological diseases including Alzheimer's and Parkinson's diseases.

Our OxiSelect™ Oxidative RNA Damage ELISA Kit provides a powerful method for rapid quantitation of 8-OHG in urine, serum or cerebrospinal fluid. It also may be used to detect 8-OHG in RNA extracted from cells or tissues of any species.

Recent Product Citations

1. Belenky, P. et al. (2015). Bactericidal antibiotics induce toxic metabolic perturbations that lead to cellular damage. *Cell Rep.* **13**:968-980.
2. Tsai, C.H. et al. (2015). Transcriptional analysis of *Deinococcus radiodurans* reveal novel small RNAs that are differentially expressed under ionizing radiation. *Appl. Env. Microbiol*. **81**:1754.
3. Kannan, S. et al. (2012). Dendrimer-based postnatal therapy for neuroinflammation and cerebral palsy in a rabbit model. *Sci. Transl. Med*. **4**:130ra46.
4. Bazin, J. et al. (2011). Targeted mRNA oxidation regulates sunflower seed dormancy alleviation during dry after-ripening. *Plant Cell* **23**:2196-2208.

- **Highly Sensitive**: Detect as little as 150 pg/mL of 8-OHG
- **Versatile**: Suitable for use with urine, serum, cerebrospinal fluid, and DNA extracted from cells or tissues



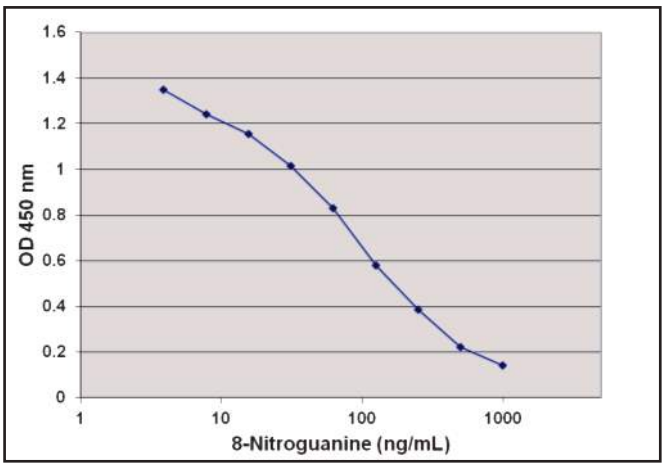
Standard Curve Generated with the OxiSelect™ Oxidative RNA Damage ELISA Kit (8-OHG).

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

OxiSelect™ Nitrosative DNA/RNA Damage ELISA Kit (8-Nitroguanine Quantitation)

Various reactive nitrogen species (RNS) including peroxynitrite and nitrogen oxides can form during pathophysiological conditions. These RNS can nitrate guanine bases to form 8-nitroguanine in both DNA and RNA. Nitrosative damage to DNA and RNA is a significant contributor to the age-related development of major inflammation-related diseases as well as colon, breast, and prostate cancers.

Our OxiSelect™ Nitrosative DNA/RNA Damage ELISA Kit provides a simple method for rapid quantitation of 8-nitroguanine in urine, serum or plasma samples. The assay measures total 8-nitroguanine from both DNA and RNA combined.



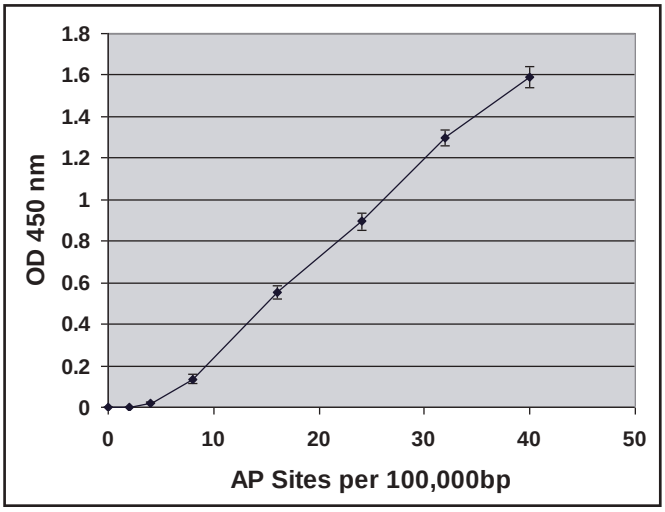
Standard Curve Generated with the OxiSelect™ Nitrosative DNA/RNA Damage ELISA Kit (8-Nitroguanine).

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

OxiSelect™ Oxidative DNA Damage Quantitation Kit (AP Sites)

Oxidative DNA Damage can manifest in the formation of apurinic or apyrimidinic (AP) sites, also known as loss of bases. Spontaneous base loss, if unrepaired, can inhibit transcription and may be mutagenic.

Our OxiSelect™ Oxidative DNA Damage Quantitation Kit provides a simple, user-friendly method for measuring AP sites in DNA. The assay uses an aldehyde reactive probe (ARP) which specifically reacts with an aldehyde group on the open ring of the AP site, followed by labeling with Biotin and subsequent detection by Streptavidin-enzyme conjugate.



Standard Curve Generated with the OxiSelect™ Oxidative DNA Damage Quantitation Kit (STA-324).

- **Highly Sensitive**: Detect as few as 4-40 AP sites in 10^5 bp of DNA
- **Versatile**: Suitable for use with genomic DNA from cells or tissues
- **Quantitative**: Kit includes both oxidized and reduced DNA standards for absolute quantitation

Recent Product Citations

1. Ferreira, E. et al. (2015). Glyceraldehyde-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-sulfhydration of MEK1 leads to PARP1 activation and DNA damage repair. *EMBO Rep.* **15**:792-800.

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

OxiSelect™ DNA Double-Strand Break Assay

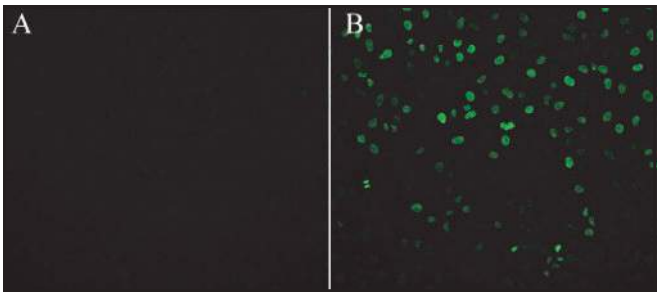
Double-strand breaks (DSB) are among the most dangerous types of DNA damage within cells. An early cellular response is phosphorylation of the histone variant H2AX at the site of the DSB. This triggers a cascade of events and appears to play a role in recruitment of repair factors to the damaged sites.

Our OxiSelect™ DNA Double-Strand Break Staining Kit provides an easy-to-use method for detecting DNA breaks. The kit utilizes simple immunofluorescence staining of the phosphorylated histone H2AX.

Recent Product Citations

1. Ohashi, S. et al. (2014). Preclinical validation of talaporfin sodium-mediated photodynamic therapy for espophageal squamous cell carcinoma. *PLoS One* **9**:e103126.
2. Matusda, S. et al. (2014). An easy-to-use genotoxicity assay using EGFP-MDC1-expressing human cells. *Gene Environ.* **36**:17-28.

- **Fast**: See staining results in about 3 hours
- **Positive Control**: DNA Double-strand break inducer included in kit



DNA Double-Strand Break Formation in A549 Cells. A549 cells were seeded at 50,000 cells/well overnight. Immunofluorescence staining was then performed according to the assay protocol. (A) Untreated cells. (B) Cells treated with 100 µM etoposide for one hour.

Product Name	Detection	Size	Catalog Number
OxiSelect™ DNA Double-Strand Break Staining Kit	Immuno-fluorescence	100 Assays	STA-321

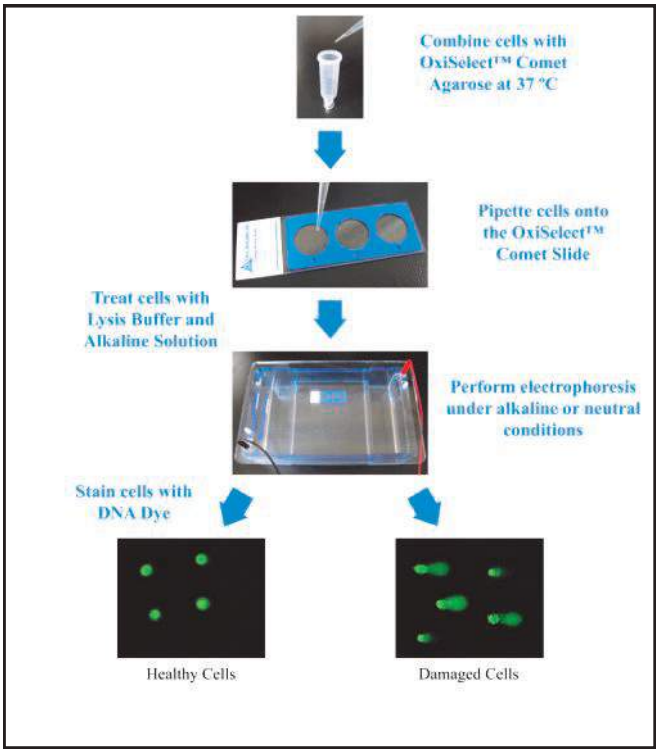
OxiSelect™ Comet Assays (Single Cell Gel Electrophoresis)

DNA damage can result from a variety of intracellular and extracellular stimuli, and can manifest in a variety of mutations to the DNA including base modifications, missing bases and single-stranded or double-stranded breaks. Traditionally the comet assay, or single cell gel electrophoresis (SCGE), has been used as a well-published, high-level screening tool to measure DNA damage in single cells.

Our OxiSelect™ Comet Assay Kits provide a quick, easy method to screen for DNA damage at a macro level. Our OxiSelect™ Comet Assay Slides have been specially treated for adhesion of low-melting agarose used in the assay. Damaged DNA moves farther in electrophoresis than intact DNA, causing a "tail" to form upon visualization under a fluorescence microscope.

Recent Product Citations

1. Ramy, N. et al. (2015). Jaundice, phototherapy and DNA damage in full-term neonates *J. Perinatol*. 10.1038/jp.2015.166. (STA-350, STA-351)
2. Wu, C.F. et al. (2015). Anticancer activity of cryptotanshinone on acute lymphoblastic leukemia cells. *Arch Toxicol.* 10.1007/s00204-015-1616-4. (STA-350, STA-351)
3. Singh, A.K. et al. (2012). Parental age affects somatic mutation rates in the progeny of flowering plants. *Plant Physiol.* **168**:247-257 (STA-350, STA-351)
4. Hou, W. et al. (2015). The protecting effect of deoxyschisandrin and schisandrin B on HaCaT cells against UVB-induced damage. *PLoS One* **10**:e0127177. (STA-350, STA-351)
5. Aydin, E. et al. (2014). The effect of carvacrol on healthy neurons and N2a cancer cells: some biochemical, anticancerogenicity and genotoxicity studies. *Cytotechnology* **66**:149-157. (STA-355)
6. Jones, D.A. et al. (2014). Changes in markers of oxidative stress and DNA damage in human visceral adipose tissue from subjects with obesity and type 2 diabetes. *Diabetes Res. Clin, Pract.* **106**:627-633. (STA-355)



Assay Principle for the OxiSelect™ Comet Assay Kit.

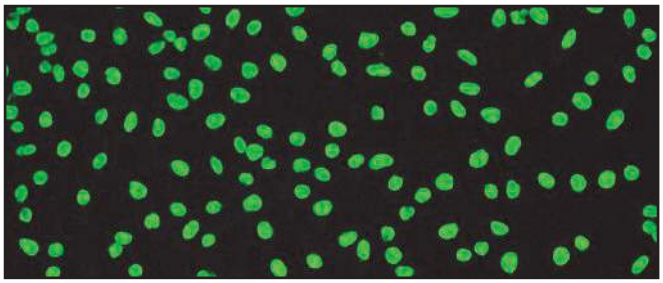
Etoposide Treatment of Jurkat Cells. Jurkat cells were either untreated (left) or treated with etoposide (right) prior to performing the OxiSelect™ Comet Assay.

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

OxiSelect™ UV-Induced DNA Damage Assays

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

Our OxiSelect™ UV-Induced DNA Damage Assays conveniently measure the formation of either CPD or 6-4PP in intact cells. Kits for each marker are available in three formats: an ELISA for DNA extracted from cells or tissues, a Cell-Based ELISA, and a Cellular Immunostaining kit.



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).

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. Zirkin, S. et al. (2013). The PIN-2 kinase is an essential component of the ultraviolet damage response that acts upstream to E2F-1 and ATM. *J. Biol. Chem*. **288**:21770-21789. (STA-322)
3. 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 Science* **235**:101-110. (STA-322-C)
4. Fujimori, N. et al. (2014). Plant DNA-damage repair/toleration 100 protein repairs UV-B-induced DNA damage. *DNA Repair (Amst.)* **21**:171-176. (STA-322-C)
5. Akaike, Y. et al. (2014). Homeodomain-interacting protein kinase 2 regulates DNA damage response through interacting with heterochromatin protein 1ψ. *Oncogene* 10.1038/onc.2014.278. (STA-323)
6. Dai, W. et al. (2015). A functional single-nucleotide polymorphism in the ERCC1 gene alters the efficiency of NB-UVB therapy in active vitiligo patients in a Chinese population. *Br. J. Dermatol.* 10.11118/bjd.13892. (STA-326)
7. Shin, S. et al. (2014). Protective effects of a new phloretin derivative against UVB-induced damage in skin cell model and human volunteers. *Int. J. Mol. Sci.* **15**:118919-18940. (STA-326)
8. Nunez-Lozano, R. et al. (2015). Biocompatible films with tailored spectral response for prevention of DNA damage in skin cells. *Adv. Healthc. Mater.* 10.1002/adhm.201500223. (STA-327)
9. Kuschal, C. et al. (2013). Repair of UV photolesions in Xeroderma pigemntosum group C cells induced by translational readthrough of premature termination codons. *PNAS* **110**:19483-19488. (STA-328)

OxiSelect™ UV-Induced DNA Damage ELISA Kits, for extracted DNA

Product Name	Detection	Size	Catalog Number
OxiSelect™ UV-Induced DNA Damage ELISA Combo Kit (CPD/6-4PP)	Colorimetric	96 Assays	STA-322-C
OxiSelect™ UV-Induced DNA Damage ELISA Kit (CPD Quantitation)	Colorimetric	96 Assays	STA-322
		5 x 96 Assays	STA-322-5
OxiSelect™ UV-Induced DNA Damage ELISA Kit (6-4PP Quantitation)	Colorimetric	96 Assays	STA-323
		5 x 96 Assays	STA-323-5

OxiSelect™ Cellular UV-Induced DNA Damage Staining Kits, for intact cells

Product Name	Detection	Size	Catalog Number
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 ELISA Kit (6-4PP)	Colorimetric	96 Assays	STA-328

OxiSelect™ Cellular UV-Induced DNA Damage ELISA Kits, for intact cells

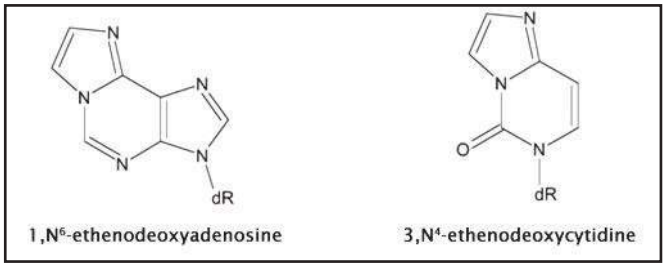
Product Name	Detection	Size	Catalog Number
OxiSelect™ Cellular UV-Induced DNA Damage Staining Kit (CPD)	Fluorescence Microscopy	96 Assays	STA-327
OxiSelect™ Cellular UV-Induced DNA Damage Staining Kit (6-4PP)	Fluorescence Microscopy	96 Assays	STA-329

OxiSelect™ Aldehyde-Induced DNA Damage Assays (Etheno Adducts)

Oxidation of phospholipids can lead to the formation of lipid hydroperoxides. These resulting short-lived hydroperoxides can either be converted to inert fatty acid alcohols, or can react with metals to form aldehydes such as malondialdehyde (MDA), 4-hydroxynonenal (HNE), acrolein, and crotonaldehyde. These aldehydes (which can also be formed through exposure to carcinogenic substances such as urethane or vinyl chloride) can damage DNA resulting in the formation of various etheno adducts, including 1,N^6-ethenodeoxyadenosine and 3,N^4-ethenodeoxycytidine. The presence of these bases can lead to base pair substitution mutations.

Our OxiSelect™ Aldehyde-Induced DNA Damage Assays conveniently measure the formation of either 1,N^6-ethenodeoxyadenosine (ethenoadenosine) or 3,N^4-ethenodeoxycytidine (ethenocytidine) in DNA extracted from cells or tissues.

In addition, we offer a convenient combination kit that can measure both etheno bases in separate wells of the same plate.



Etheno Base Structures that Form Adducts with DNA During Oxidative Stress.

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

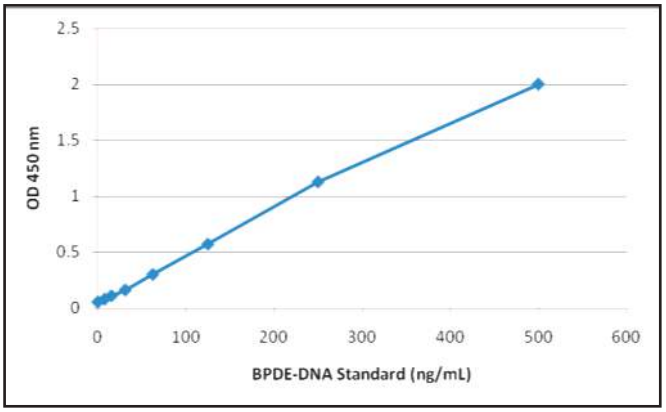
OxiSelect™ BPDE DNA Adduct ELISA Kit

Polycyclic aromatic hydrocarbons (PAH) are potent carcinogenic pollutants commonly associated with oil, cigarette smoke, and automotive exhaust. One PAH, benzo(a)pyrene, was the first chemical carcinogen to be discovered. Through a series of enzymatic reactions, benzo(a)pyrene is converted to benzo(a)pyrene 7,8 diol-9,10 epoxide (BPDE) which attacks both proteins and DNA.

Our OxiSelect™ BPDE DNA Adduct ELISA Kit provides a convenient method to measure BPDE adducts in DNA extracted from cells or tissues.

- **Sensitive**: Detect concentrations as low as 30 ng/mL
- **Convenient**: Quantify on a standard microplate reader

For information on our BPDE Protein Adduct ELISA Kit, please see **page 75**.



OxiSelect™ BPDE DNA Adduct ELISA Kit Standard Curve.

Recent Product Citations

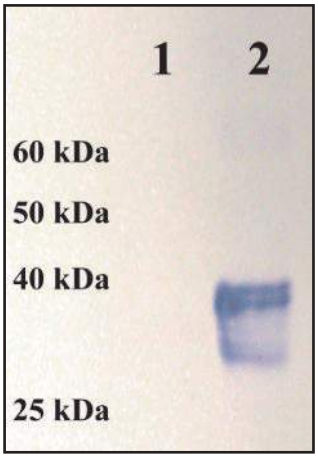
1. Barhoumi, R. et al. (2014). Effects of fatty acids on benzo[a] pyrene uptake and metabolism in human lung adenocarcinoma A549 cells. *PLoS One* **9**:e90908.
2. Chiu, C.Y. et al. (2014). Low-dose benzo(a)pyrene and its epoxide metabolite inhibit myogenic differentiation in human skeletal muscle-derived progenitor cells. *Toxicol. Sci.* 10.1093/toxsci/kfu003.

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

Checkpoint Kinase Activity Assays

Checkpoint kinases, specifically CHK1 and CHK2, are activated in response to DNA damage to subsequently phosphorylate Cdc25C prior to mitosis, which prompts cell cycle arrest. Mutation of these checkpoint kinases can ultimately lead to decreased DNA repair.

Our Checkpoint Kinase Activity Assays allow you to conveniently measure the activity of CHK1 and CHK2. The assays use recombinant Cdc25C as a checkpoint kinase substrate. Phosphorylated Cdc25C (Ser216) is detected using a phospho-specific antibody. Assays are available in two formats: a Western blot assay and a 96-well plate-based activity assay.



CHK1 Activity Immunoblot Assay. 1X Kinase Buffer with 10 ng of Active CHK1 was incubated with 0.2 mM ATP and 8 µg of Cdc25C at 37ºC for one hour. Kinase reaction was stopped by adding SDS-PAGE sample buffer. **Lane 1**: Without kinase (negative control). **Lane 2**: With kinase. Phosphorylation was detected by anti-phospho-Cdc25C antibody.

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

Global DNA Methylation ELISA Kit

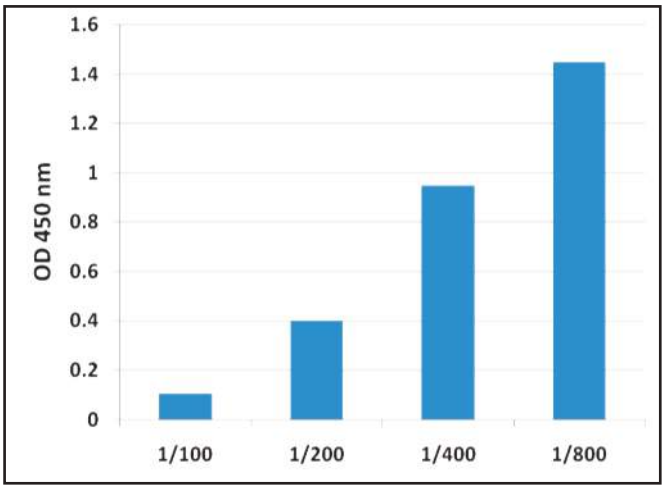
DNA methylation is an epigenetic change shown to be associated with nearly every biological process. In mammalian cells, DNA methylation is found predominantly at CpG dinucleotides; however, in certain cases such as embryonic stem cells it may also be found in non-CpG contexts. Due to the important role of DNA methylation in maintaining genomic stability, deregulation of DNA methylation is associated with various diseases including cancer.

Our Global DNA Methylation and Hydroxymethylation Assays provide a convenient, accurate way to quantify 5'-methyl-2'-deoxycytidine (5MedCyd) and 5-hydroxymethylcytosine respectively. Unknown samples are compared with a standard provided with each kit.

Recent Product Citations

1. Shah, S. et al. (2015). Bone morphogenetic protein 4 (BMP4) induces bufalo (*Bubalus bubalis*) embryonic stem cell differentiation into germ cells. *Biochimie* **119**:113-124.
2. Creppy, E.E. et al. (2014). Study of epigenetic properties of Poly(HexaMethylene Biguanide) hydrochloride (PHMB). *Int. J. Environ. Res. Public Health* **11**:8069-8092.
3. Jefferson, W. et al. (2013). Persistently altered epigenetic marks in the mouse uterus after neonatal estrogen exposure. *Mol. Endocrinol*. **27**:1666-1677.

- **Sensitive**: Detect as little as 15 nM of 5MedCyd
- **Versatile**: Suitable for use with any isolated DNA as well as urine samples
- **Convenient**: Quantify on a standard microplate reader



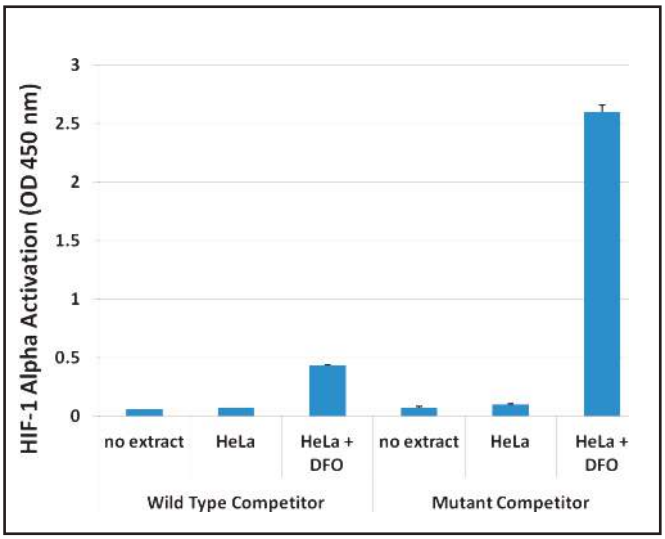
5MedCyd Levels in Human Urine Sample as Measured with the Global DNA Methylation ELISA Kit.

Product Name	Detection	Size	Catalog Number
Global DNA Methylation ELISA Kit (5'-methyl-2'-deoxycytidine Quantitation)	Colorimetric	96 Assays	STA-380
		5 x 96 Assays	STA-380-5

HIF-1 Alpha DNA Binding Activity Assay Kit

Cell hypoxia, or low oxygen condition, is a normal physiological response to certain body stressors such as high altitudes, but it also can be a symptom of pathological conditions. In some cases hypoxia may contribute to the inducement of oxidative stress. In response to hypoxic conditions, the hypoxia-inducible factor 1 transcriptional activator complex (HIF-1) plays a role in activating several hypoxia-responsive genes such as erythropoietin and VEGF. During hypoxia, the alpha subunit of HIF-1 accumulates and translocates from the cytosol to the nucleus, where it dimerizes with the beta subunit and becomes transcriptionally active. It then binds transcriptional coactivators to induce gene expression.

The HIF-1 Alpha DNA Binding Activity Assay Kit is an ELISA-based assay to detect activated HIF-1. Active HIF-1 complex is captured on a double-stranded oligo containing a hypoxic response element (HRE) that is attached to the plate. Detection is then performed with a primary antibody followed by an HRP-conjugated secondary antibody. The assay will detect HIF-1 complexes from human, mouse or rat samples.



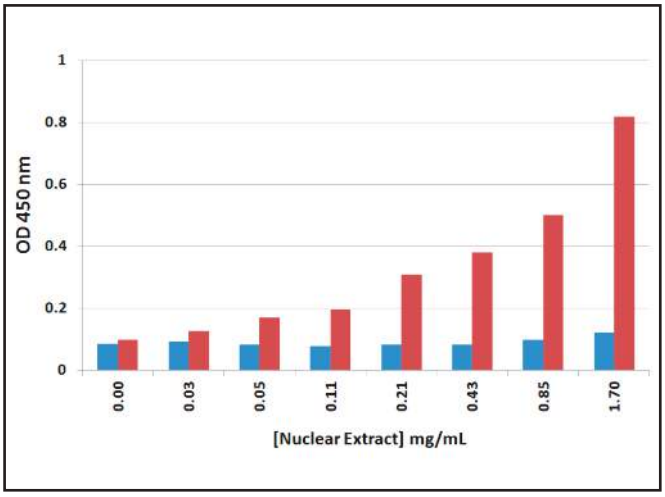
Detection Specificity of HIF-1 Alpha. HeLa cells were incubated in the presence or absence of 0.2 mM deferoxamine mesylate (DFO) for 4 hours at 37ºC. Nuclear extracts were prepared using the Nuclear/Cytosolic Fractionation Kit (#AKR-171). 100 pmol of non-biotinylated wild type or mutated HRE double stranded competitor oligos were added to the Complete DNA Binding Buffer just prior to inclusion in the assay.

Product Name	Detection	Size	Catalog Number
HIF-1 Alpha DNA Binding Activity Assay Kit	Colorimetric	96 Assays	CBA-282

HIF-1 Alpha ELISA Kits

Our HIF-1 Alpha ELISA Kits provide a convenient method for detection and quantitation of human, mouse, or rat HIF-1 Alpha in cells or tissues. Two ELISA kit formats are available:

- The HIF-1 Alpha Sandwich ELISA Kit detects HIF -1 Alpha in any protein sample including tissue homogenates, whole cell lysates, or nuclear extracts. Samples are added to an anti-HIF-1 Alpha antibody coated plate. Quantitation of unknown samples is performed by comparison of the OD values to those of a known standard.
- The HIF-1 Alpha Cell Based ELISA Kit allows the detection of HIF-1 Alpha levels in intact cells. Cells are seeded in a tissue culture treated plate suitable for reading in a 96-well plate-based luminometer. Cells are fixed and permeabilized to allow detection with the anti-HIF-1 antibody. Detection is performed by chemiluminescence.



Detection of Nuclear HIF-1 Alpha. HeLa cells were incubated in the presence or absence of 0.2 mM DFO for 4 hours at 37ºC. Nuclear extracts were prepared using the Nuclear/Cytosolic Fractionation Kit. HIF-1 Alpha levels were measured in untreated (blue bars) and treated (red bars) extracts according to the Assay Protocol.

Product Name	Detection	Size	Catalog Number
HIF-1 Alpha Sandwich ELISA Kit	Colorimetric	96 Assays	CBA-280
HIF-1 Alpha Cell Based ELISA Kit	Chemiluminescent	96 Assays	CBA-281

Reactive Oxygen Species Assays

Reactive oxygen species (ROS) such as superoxide and hydrogen peroxide are continually produced during metabolic processes. Excess ROS can lead to cellular injury in the form of damaged DNA, lipids and proteins. We offer assays for quantitation of various reactive oxygen species, in both *in vitro* and intracellular formats.

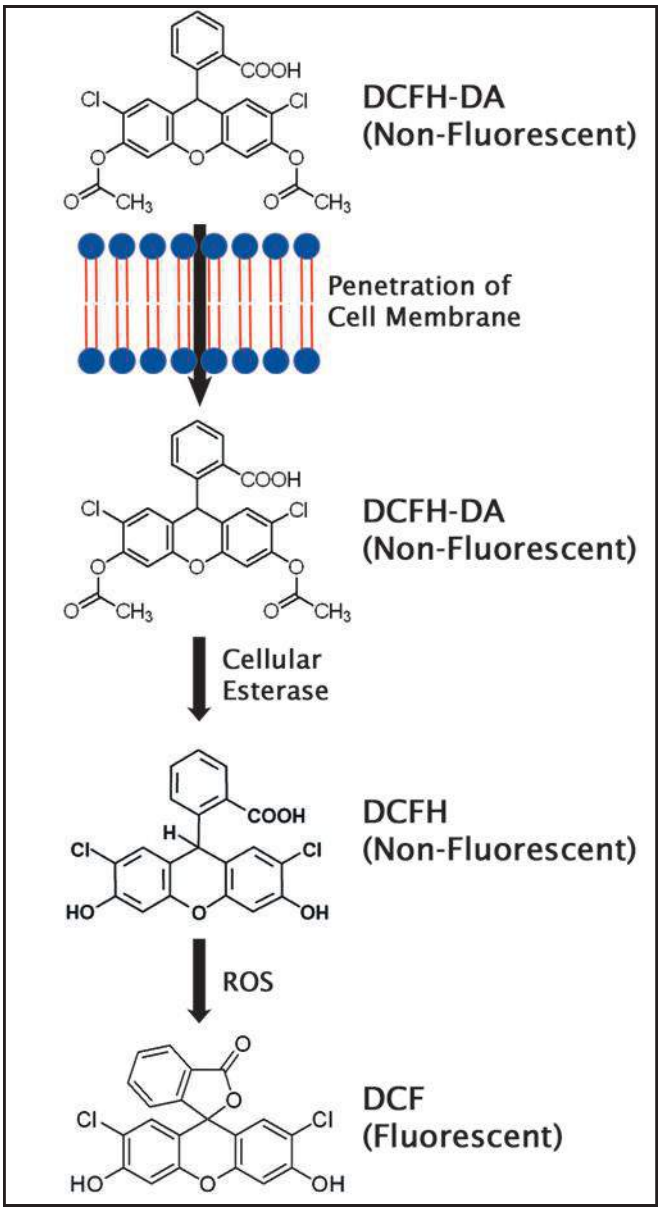
OxiSelect™ Intracellular ROS Assay Kit

The OxiSelect™ Intracellular ROS Assay Kit measures the activity of hydroxyl, peroxyl, and other reactive oxygen species. The assay uses the cell-permeable fluorogenic probe DCFH-DA, which diffuses into cells and is deacetylated into the non-fluorescent DCFH. In the presence of ROS, the DCFH is oxidized into highly fluorescent DCF. Fluorescence is quantified on a fluorometric plate reader.

- **Sensitive**: Detect concentrations as little as 10 pM
- **Fast**: Entire protocol takes about one hour

Recent Product Citations

1. Zhelev, Z. et al. (2015). 2-deoxy-D-glucose sensitizes cancer cells to barasertib and everolimus by ROS-independent mechanism(s). *Anticancer Res*. **35**:6623-6632.
2. Gao, S. et al. (2015). Apoptotic effects of Photofrin-Diomed 630-PDT on SHEEC human esophageal squamous cancer cells. *Int. J. Clin. Exp. Med.* **8**:15098.
3. Wang, Y. et al. (2015). ROS-mediated activation of JNK/p38 contributes partially to the pro-apoptotic effect of ajoene on cells of lung adenocarcinoma. *Tumor Biol.* 10.1007-s13277-015-4181-9.
4. Kim, K.A. and Yim, J.E. (2015). Antioxidative activity of onion peel extract in obese women: a randomized, double-blind, placebo controlled study. *J. Cancer Prev*. **20**:202-207.
5. Dong, H. et al. (2015). Paeoniflorin inhibition of 6-hydroxydopamine-induced apoptosis in PC12 cells via suppressing reactive oxygen species-mediated PKCδ/NF-κB pathway. *Neuroscience* **285**:70-80.
6. Zou, Y. et al. (2015). Phytoestrogen ß-ecdysterone protects PC12 cells against MPP+-induced neurotoxicity in vitro: involvement of PI3K-Nrf2-regulated pathway. *Toxicol. Sci.* 10.1093/toxsci/kfv111.
7. 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.
8. Patlolla, A.K. et al. (2015). Cytogenetic evaluation of functionalized single-walled carbon nanotube in mice bone marrow cells. *Environ. Toxicol.* 10.1002/tox.22118.
9. 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.
10. Li, C. et al. (2015). The interplay between autophagy and apoptosis induced by tanshinone IIA in prostate cancer cells. *Tumor Biol.* 10.1007/s13277-015-4602-9.
11. Di, K. et al. (2015). Marizomib activity as a single agent in malignant gliomas: ability to cross the blood-brain barrier. *Neuro Oncol*. 10.1093/neuonc/nov299.



Assay Principle for the OxiSelect™ Intracellular ROS Assay.

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

OxiSelect™ In Vitro ROS/RNS Assay Kit

Free radicals and related reactive oxygen species (ROS) and reactive nitrogen species (RNS) can appear in the body both inside and outside the cell. Until recently it has been difficult to detect ROS and RNS outside of intact cells.

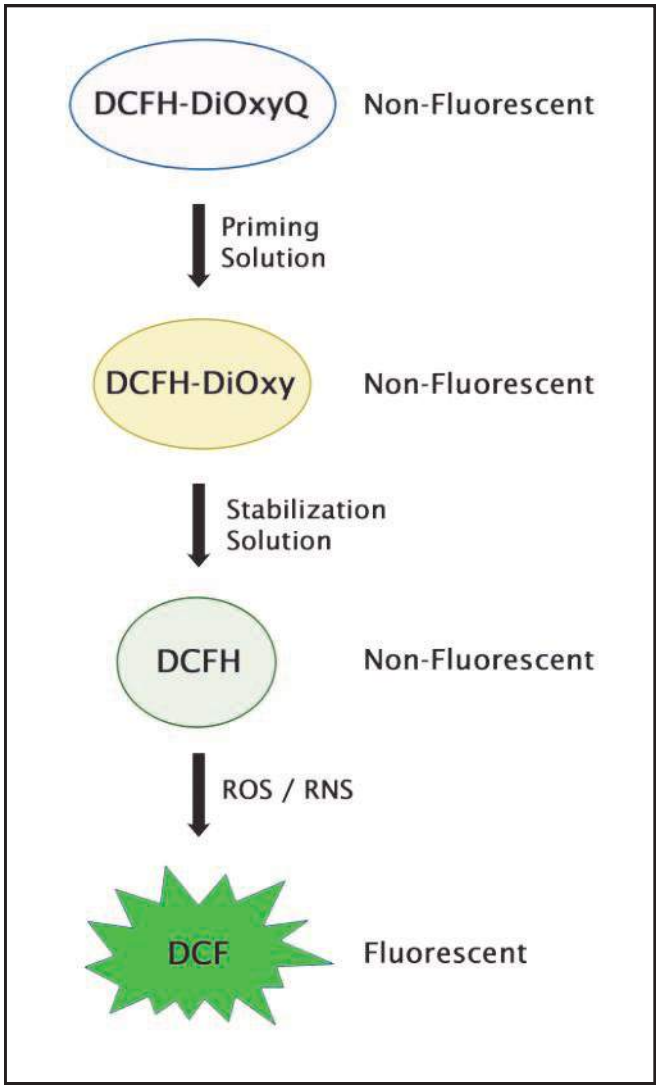
The OxiSelect™ In Vitro ROS/RNS Assay Kit allows you to measure ROS and RNS formation in various body fluids including urine, serum and plasma. It is also useful for testing cell lysates, tissue homogenates, and cell culture supernatants.

The assay universally measures reactive oxygen and reactive nitrogen species that may include hydrogen peroxide, nitric oxide, peroxynitrite, peroxyl radicals, and others. The assay principle is similar to our Intracellular ROS Assay (previous page), except that the chemistry is modified to allow detection of ROS outside the cell. Fluorescence is quantified on a fluorometric plate reader.

Recent Product Citations

1. Dong, W. et al. (2015). Enhancement of thiamin content in *Arabidopsis thaliana* by metabolic engineering. *Plant Cell Physiol.* **56**:2285-2296.
2. Li, M. et al. (2015). Role of PKCδ in insulin sensitivity and skeletal muscle metabolism. *Diabetes* **64**:4023-4032.
3. Zhelev, Z. et al. (2015). 2-deoxy-D-glucose sensitizes cancer cells to barasertib and everolimus by ROS-independent mechanism(s). *Anticancer Res*. **35**:6623-6632.
4. Hiramoto, K. et al. (2015). The role of the active oxygen produced from gp91phox NADPH oxidase on the newborn weight of mouse pups. *Biol. Med*. **7**:259.
5. Hu, X.Q. et al. (2015). Direct effect of chronic hypoxia in supressing large conductance Ca2+-activated K+ channel activity in ovine uterine arteries via increasing oxidative stress. *J. Physiol*. 10.1113/JP271626.
6. Klaren, W.D. et al. (2015). Progression of micronutrient alternation and hepatotoxicity following acute PCB126 exposure. *Toxicology* **338**:1-7.
7. Roche, J.R. et al. (2015). Effects of precalving body condition score and prepartum feeding level on production, reproduction, and health parameters in pasture-based transition dairy cows. *J. Dairy Sci.* 10.3168/jds.2014.9269.
8. Xiao, D. et al. (2015). Antenatal antioxidant prevents nicotine-mediated hypertensive response in rat adult offspring. *Biol. Reprod.* 10.1095/biolreprod.115.132381.
9. Barhwal, K. et al. (2015). Insulin receptor A and Sirtuin 1 synergistically improve learning and spatial memory following chronic salidroside treatment during hypoxia. *J. Neurochem. 10*.1111/jnc.13225.
10. Pawlak, M. et al. (2015). Ketone body therapy protects from lipotoxicity and acute liver failure upon PPAR α-deficiency. *Mol. Endocrinol.* 10.1210/me/20147-1383.
11. Jiao, S.S. et al. 92015). Edaravone alleviates Alzheimer's disease-type pathologies and cognitive deficits. *PNAS* **112**:5225.

- **Sensitive**: Detect concentrations as little as 10 pM for DCF or 40 nM for hydrogen peroxide
- **Fast**: Entire protocol takes about one hour
- **Versatile**: Suitable for a wide variety of sample types including urine, serum, plasma, cell lysates, tissue homogenates and cell culture supernatants



Assay Principle for the OxiSelect™ In Vitro ROS/RNS Assay.

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

OxiSelect™ Hydrogen Peroxide Assay, Colorimetric

Hydrogen peroxide is one of the most prevalent and most stable of the various reactive oxygen species. The half-life of hydrogen peroxide is significantly longer than that of most ROS, making it easier to detect in many sample types.

Our OxiSelect™ Hydrogen Peroxide Assay Kit provides a simple method for quantitation of hydrogen peroxide. This colorimetric 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 may be read on a standard microplate reader. The assay may be run with either aqueous phase or lipid phase samples.

- **Sensitive**: Detect as little as 1 µM
- **Fast**: Easy 30-90 minute incubation, depending on sample type
- **Versatile**: Suitable for plasma, serum, urine, and cell culture supernatants (for cells and tissues, please use our OxiSelect™ Hydrogen Peroxide / Peroxidase assays below)

Recent Product Citations

1. Delijewski, M. et al. (2014). Effect of nicotine on melanogenesis and antioxidant status in HEMn-LP melanocytes. *Environ. Res*. **134**:309-314.
2. Chang, C.H. et al. (2014). Curcumin-protected PC12 cells against glutamate-induced oxidative toxicity. *Food Technol. Biotechnol.* **52**:468-478.
3. Di Cesare Mannelli, L. et al. (2014). PPAR-ψ impairment alters peroxisome functionality in primary astrocyte cell cultures. *Biomed. Res. Int.* 10.1155/2014/546453.

Product Name	Detection	Size	Catalog Number
OxiSelect™ Hydrogen Peroxide Assay Kit	Colorimetric	500 Assays	STA-343

OxiSelect™ Hydrogen Peroxide / Peroxidase Assays

Our OxiSelect™ Hydrogen Peroxide / Peroxidase Assay Kit provides a convenient plate-based method for quantitation of hydrogen peroxide or peroxidases in a wide variety of sample types.

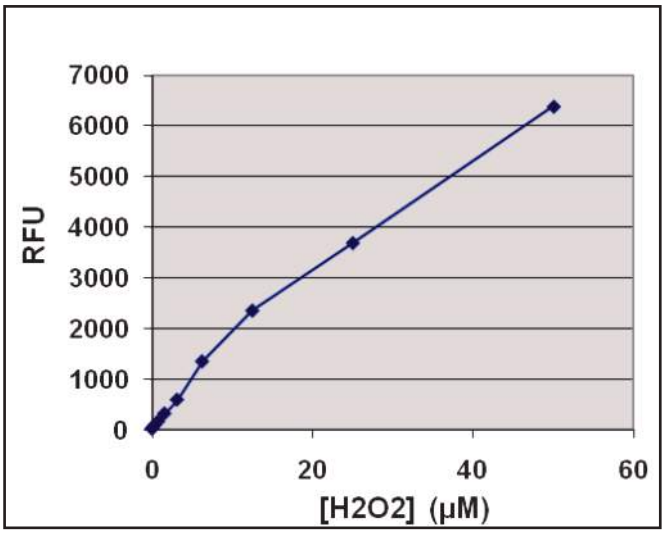
These kits uses either a colorimetric or a fluorogenic probe which provides a signal in the presence of peroxides and is catalyzed by peroxidases.

The kits include both a hydrogen peroxide standard and a peroxidase standard for quantitative results with either target.

Recent Product Citations

1. Zhao, X. et al. (2014). Cleaning up after ICH: the role of Nrf2 in modulating microglia function and hematoma clearance. *J. Neurochem*. **133**:144-152. (STA-344)
2. Ishida, T. et al. (2014). The effect of dihydropyrazines on human hepatoma HepG2 cells: a comparative study using 2,3-dihydro-5,6-dimethylpyrazine and 3-hydro-2, 2, 5, 6-tetramethylpyrazine. *J. Toxicol. Sci.* **39**:601-608. (STA-344)
3. Bak, J.S. (2014). Electron beam irradiation enhances the digestibility and fermentatino yield of water-soaked lignocellulosic biomass. *Biotechnology Reports* **4**:30-33. (STA-344)
4. Lara-Chavez, A. et al. (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)

- **Sensitive**: Detect as little as 50 nM
- **Fast**: Easy 30 minute incubation
- **Versatile**: Measure either hydrogen peroxide or peroxidase in plasma, serum, urine, cell culture supernatants, cell lysates and tissue homogenates



Standard Curve Generated with the OxiSelect™ Hydrogen Peroxide/Peroxidase Assay (Fluorometric).

Product Name	Detection	Size	Catalog Number
OxiSelect™ Hydrogen Peroxide/Peroxidase Assay Kit	Colorimetric	500 Assays	STA-844
	Fluorometric	500 Assays	STA-344

OxiSelect™ Intracellular Nitric Oxide Assay Kit

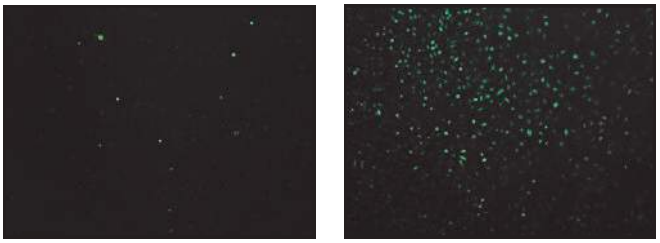
Nitric oxide (NO) is a progenitor of various reactive nitrogen species (RNS). Because of its short half-life, nitric oxide is often difficult to detect directly.

The OxiSelect™ Intracellular Nitric Oxide Assay Kit allows direct detection of NO in intact cells. A cell-permeable fluorogenic probe is added to cells; upon treatment to induce oxidative stress, nitric oxide generated within the cell binds to the probe and produces a bright fluorescent signal. Results may be visualized under a fluorescence microscope or quantified in a 96-well fluorescence plate reader.

Recent Product Citations

1. Nasrallah, R. et al. (2015). Endoglin potentiates nitric oxide synthesis to enhance definitive hematopoiesis. *Biology Open*. **4**:819-829.
2. Syed. D.N.. et al. (2014). Involvement of ER stress and activation of apoptotic pathways in fisetin induced cytotoxicity in human melanoma. *Arch. Biochem. Biophys.* **563**:108-117.

- **Direct detection**: Probe binds directly to nitric oxide, not to by-products such as nitrate and nitrite
- **Sensitive**: Detect as little as 3 nM
- **Versatile**: Read results as endpoint or time course (kinetic) in a fluorescence plate reader, or visualize under a fluorescence microscope



Induction of NOS in RAW 264.7 Cells. Cells were seeded in a 96-well plate at 100,000 cells/well. Cells were uninduced (left) or induced with 50 ng/mL LPS and 10 ng/mL IFNγ (right) for 20 hours at 37ºC.

Product Name	Detection	Size	Catalog Number
OxiSelect™ Intracellular Nitric Oxide (NO) Assay Kit	Fluorometric	96 Assays	STA-800
		5 x 96 Assays	STA-800-5

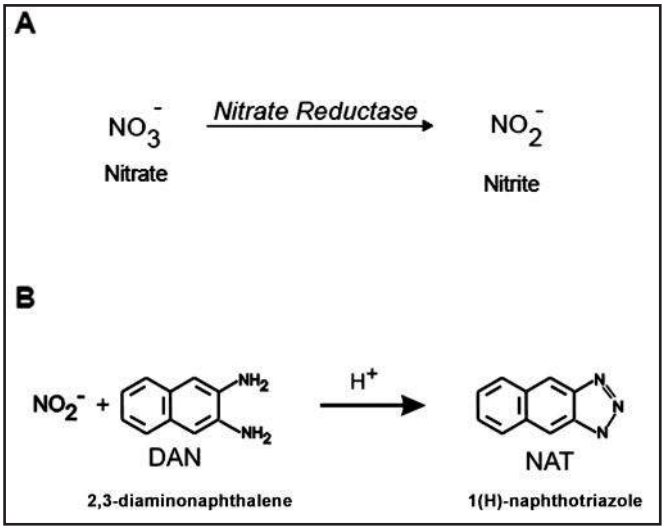
OxiSelect™ In Vitro Nitric Oxide Assay Kits

Nitric oxide (NO) is difficult to detect directly in vitro due to its short half-life. It is therefore common to measure nitric oxide formation by detection of its final oxidized products, nitrate and nitrite.

The OxiSelect™ In Vitro Nitric Oxide Assay Kits provide a convenient plate-based method for the quantitation of nitrate and nitrite in a variety of sample types. First, nitrate is reduced to nitrite. Then total nitrite is measured by the addition of a Griess Reagent (for colorimetric detection) or a fluorometric probe (for fluorescence detection). Results are then quantified in a 96-well plate reader. These kits are suitable for use with serum, plasma, urine, saliva, cell lysates, and culture media.

Recent Product Citation

Wang, Z. et al. (2015). Dual-microstructured porous, anisotropic film for biomimicking of endothelial basement membrane. *ACS Appl. Mater. Interfaces* 10.1021/acsami.5b02464.



Assay Principle for the OxiSelect™ In Vitro Nitric Oxide (Nitite / Nitrate) Assay, Fluorometric Format.

Product Name	Detection	Size	Catalog Number
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

Antioxidant Assays

ROS generation is normally counterbalanced by the action of antioxidant enzymes and other redox molecules. We offer two types of assays for antioxidant quantitation:

- Assays to quantify the presence or activity of antioxidant molecules
- Assays to determine the antioxidant capacity of biomolecules

OxiSelect™ Catalase Activity Assay Kits

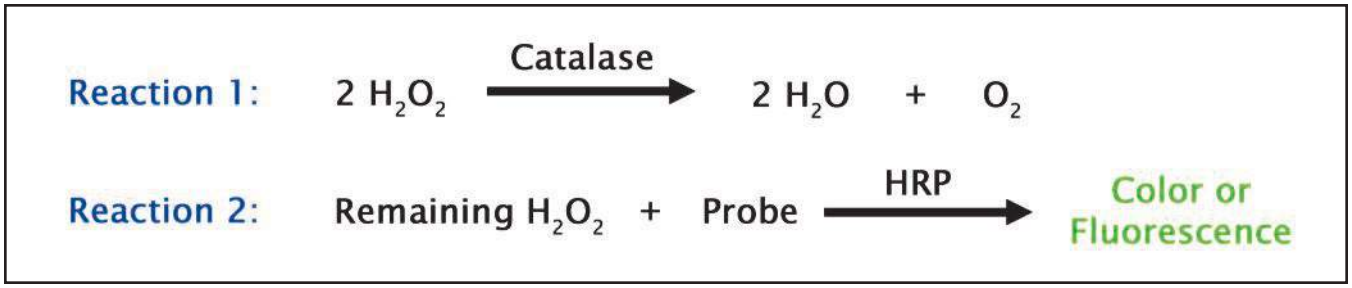
Catalase is a ubiquitous enzyme that destroys hydrogen peroxides formed during oxidative stress. Since hydrogen peroxides have a longer half-life than most free radicals and can make up a large portion of all reactive oxygen species, the ability to remove hydrogen peroxides can be extremely important at combating oxidative stress.

Our OxiSelect™ Catalase Activity Assay Kits provide a quick, user-friendly protocol to monitor catalase activity from a variety of sample types. Kits are available with either colorimetric or fluorometric detection.

- **Sensitive**: Detect as little as 1.25 units/mL (colorimetric) or 50 mU/mL (fluorometric)
- **Fast**: Obtain results in less than 30 minutes
- **Versatile**: Suitable for use with whole blood, plasma, serum, cell lysates or tissue homogenates
- **High Throughput**: 96-well format

Recent Product Citations

1. Iqbal, S. et al. (2015). Trehalose improves semen antioxidant enzymes activity, post-thaw quality, and fertility in Nili Ravi buffaloes (*Bubalus bubalis*). *Theriogenology* 10.1016/j.theriogenology.2015.11.004. (STA-339)
2. Cheng, Y.Y. et al. (2015). SIRT1-related inhibition of pro-inflammatory responses and oxidative stress are involved in the mechanism of nonspecific low back pain relief after exercise through modulation of Toll-like receptor 4. *J. Biochem*. **158**:299-308. (STA-341)
3. Yener, A.U. et al. (2015). Effects of kefir on ischemia-reperfusion injury. *Eur. Rev. Med. Pharmacol. Sci.* **19**:887-896. (STA-341)
4. Javanbakht, M.H. et al. (2015). Evaluation of antioxidant enzyme activity and antioxidant capacity in patients with newly diagnosed pemphigus vulgaris. *Clin. Exp. Dermatol*. 10.1111/ced.12489. (STA-341)
5. 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**:1270-1278. (STA-341)
6. Saikolappan, S. et al. (2015). Inactivation of the organic hydroperoxide stress resistance regulator OhrR enhances resistance to oxidative stress and isoniazid in *Mycobacterium smegmatis*. *J. Bacteriol.* **197**:51-62. (STA-341)
7. Torres, F. et al. (2015). Melatonin reduces oxidative stress and improves vascular function in pulmonary hypertensive newborn sheep. *J. Pineal Res*. 10.1111/jpi.12222. (STA-341)



Assay Principle for the OxiSelect™ Catalase Acitivity Assays. Catalase present in samples converts hydrogen peroxide into water and oxygen (Reaction 1). Any remaining hydrogen peroxide that is not converted reacts with a colorimetric or fluorometric probe in the presence of horseradish peroxidase (Reaction 2) to produce a color or fluorescence which is measured in a plate reader.

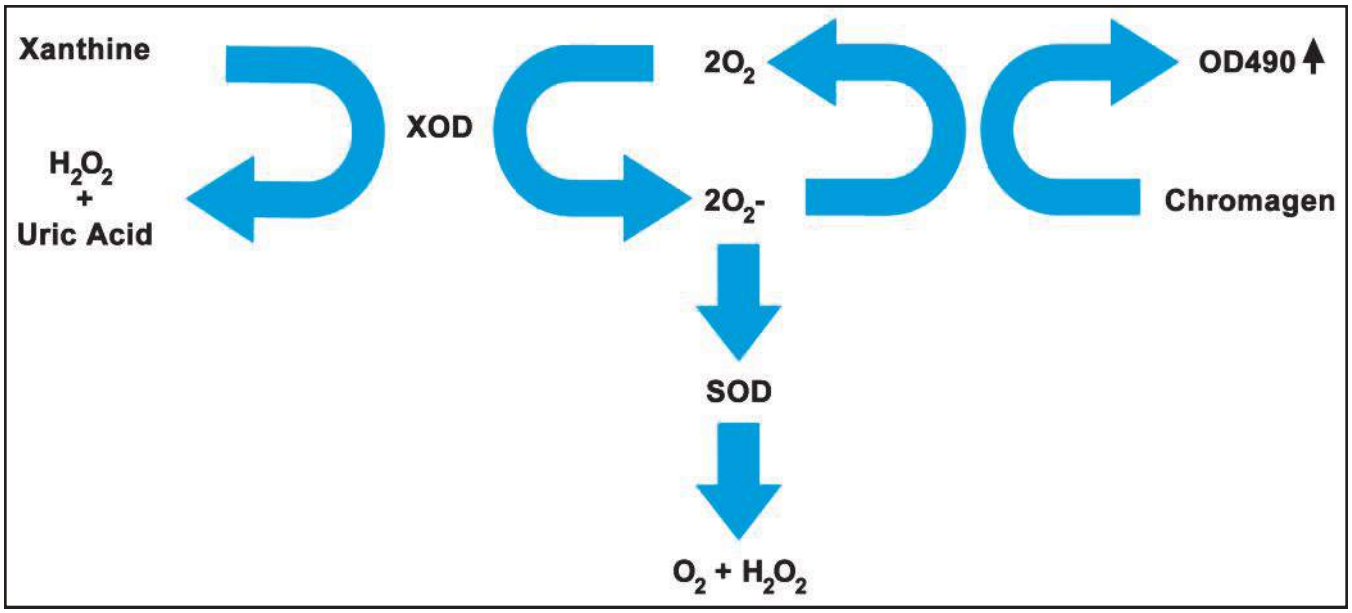
Product Name	Detection	Size	Catalog Number
OxiSelect™ Catalase Activity Assay Kit	Colorimetric	96 Assays	STA-341
	Fluorometric	96 Assays	STA-339

OxiSelect™ Superoxide Dismutase Activity Assay

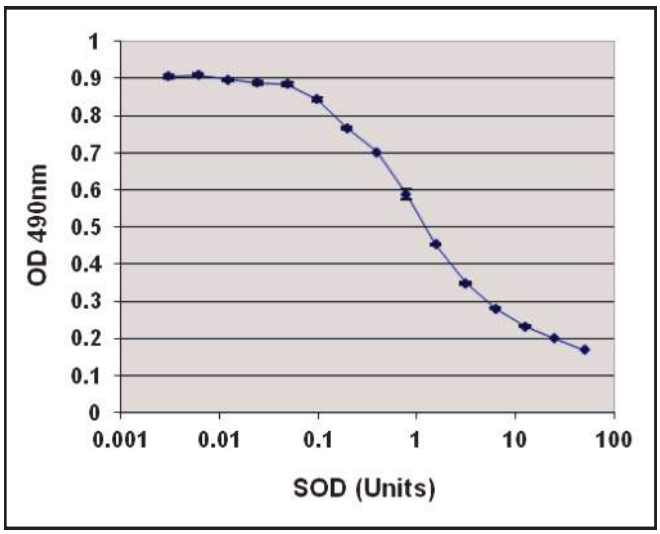
Superoxide dismutase (SOD), which catalyzes the dismutation of the superoxide anion into hydrogen peroxide and molecular oxygen, is one of the most important antioxidant enzymes.

The OxiSelect™ Superoxide Dismutase Activity Assay uses a xanthine/xanthine oxidase (XOD) system to generate superoxide anions and a chromagen to produce a water-soluble dye upon reduction by the superoxide anions.

- **Sensitive**: Detect as little as 0.6 units/mL
- **Fast**: Obtain results in about 2 hours
- **Versatile**: Suitable for use with urine, serum, cells or tissue samples



OxiSelect™ Superoxide Dismutase Activity Assay Principle. Superoxide anions generated by a Xanthine/Xanthine Oxidase system are detected with the provided chromagen. SOD reduces superoxide concentrations, so higher SOD concentrations result in a decreased signal.



Standard Curve Using the OxiSelect™ Superoxide Dismutase Activity Assay.

Recent Product Citations

1. Arumugam, A. et al. (2015). Desacetyl nimbinene inhibits breast cancer growth and metastasis through reactive oxygen species mediated mechanisms. *Tumor Biol*. 10.1007/s13277-015-4468-x.
2. Pandupuspitasari, N. S. (2015). Effects of diludine on the production, oxidative status, and biochemical parameters in transition cows. *J. Environ. Agric. Sci.* **6**:3-9.
3. Hunter, J.P. et al. (2015). Ischaemic conditioning reduces kidney injury in an experimental large-animal model of warm renal ischaemia. *Br. J. Surg.* 10.1002/bjs.9909.
4. Tarhan, S. et al. (2015). Direct and protective effects of single or combined addition of vincristine and ε-viniferin on human HepG2 cellular oxidative stress markers in vitro. *Cytotechnology* 10.1007/s10616-015-69863-z.
5. Perez, E. et al. (2015). Improved antitumor effect of paclitaxel administered in vivo as pH and glutathione-sensitive nanohydrogels. *Int. J. Pharm*. **492**:10-19.
6. Cheng, Y.Y. et al. (2015). SIRT1-related inhibition of pro-inflammatory responses and oxidative stress are involved in the mechanism of nonspecific low back pain relief after exercise through modulation of Toll-like receptor 4. *J. Biochem*. **158**:299-308.

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

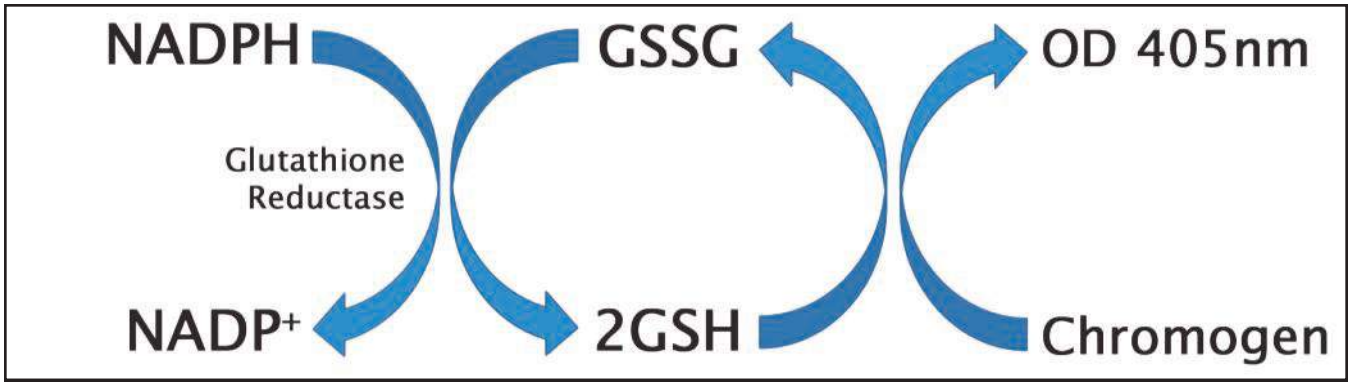
OxiSelect™ Total Glutathione (GSSG/GSH) Assay Kit

The OxiSelect™ Total Glutathione Assay Kit is a quantitative assay for measuring total combined reduced (GSH) and oxidized (GSSG) glutathione content in a variety of sample types. Oxidized glutathione is enzymatically reduced, followed by colorimetric detection in a microplate reader.

- **Sensitive**: Detect as little as 8 nM total glutathione
- **Fast**: Obtain results in less than 30 minutes
- **Versatile**: Suitable for use with saliva, urine, serum, plasma, and cell or tissue lysates

Recent Product Citations

1. Lee, Y.M. et al. (2015). Inhibition of glutamine utilization sensitizes lung cancer cells to apigenin-induced apoptosis resulting from metabolic and oxidative stress. *Int. J. Oncol.* **48**:399-408.
2. Yim, B. et al. (2015). Cadmium modulates the mRNA expression and activity of glutathione S-transferase in the monogonont Rotifer *Brachionus koreanus*. *Toxicol. Environ. Health Sci.* **7**:217-223.
3. Perez, E. et al. (2015). Improved antitumor effect of paclitaxel administered in vivo as pH and glutathione-sensitive nanohydrogels. *Int. J. Pharm*. **492**:10-19.
4. 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.



Assay Principle for the OxiSelect™ Total Glutathione Assay Kit. In the presence of NADPH, glutathione reductase (provided) converts all glutathione into reduced form (GSH). The reduced glutathione then reacts with the provided chromogen to yield a color detectable at 405 nm.

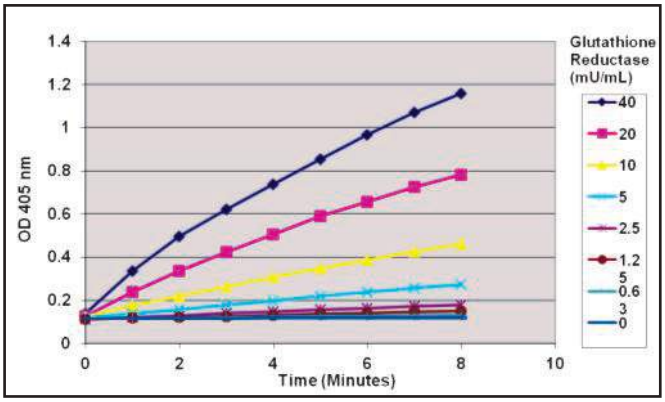
Product Name	Detection	Size	Catalog Number
OxiSelect™ Total Glutathione (GSSG/GSH) Assay Kit	Colorimetric	100 Assays	STA-312

OxiSelect™ Glutathione Reductase Assay Kit

The OxiSelect™ Glutathione Reductase Assay Kit is a quantitative assay for measuring the activity levels of glutathione reductase in a variety of sample types.

The assay principle is similar to that of our Total Glutathione Assay Kit above, except that endogenous levels of glutathione reductase drive the reduction of oxidized glutathione (GSSG) to reduced glutathione (GSH).

- **Sensitive**: Detect activity levels as low as 0.6 mU/mL
- **Fast**: Obtain results in less than 30 minutes
- **Versatile**: Suitable for use with erythrocytes, plasma, cell lysates, or tissue extracts



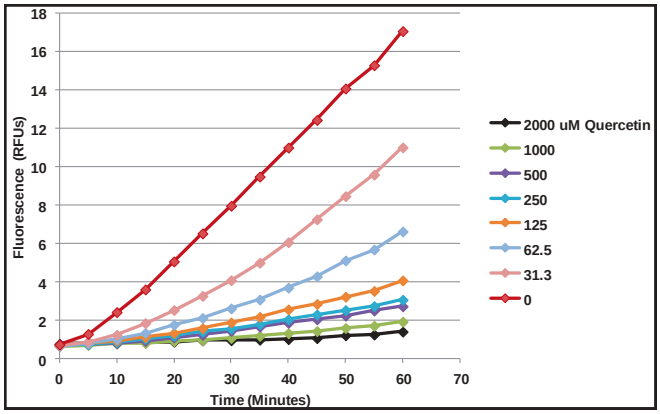
Standard Curve Generated with the OxiSelect™ Glutathione Reductase Assay Kit. Various concentrations of glutathione reductase standard were tested according to the Assay Protocol. OD values were read at 1 minute increments at 405 nm.

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

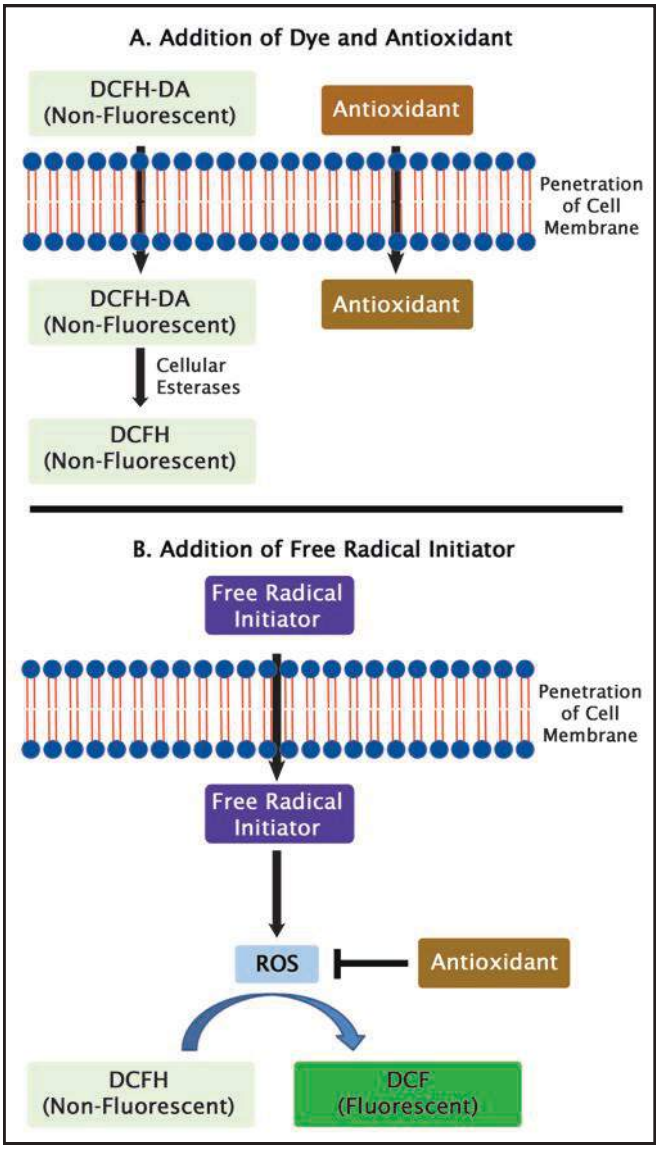
OxiSelect™ Cellular Antioxidant Assay Kit, for *in vivo* Evaluation of Exogenous Antioxidants

Measuring the effects of antioxidant compounds in an in vitro assay may not accurately reflect their efficacy because such assays do not account for physiological conditions such as pH, temperature, uptake, metabolism, or the bioavailability or efficacy of an antioxidant compound.

The OxiSelect™ Cellular Antioxidant Activity Assay Kit provides a mechanism to test exogenous antioxidants in a cell-based environment, delivering a more accurate measurement of the compound's true physiological efficacy. A cell-permeable fluorometric dye is added to intact cells; when free radicals are generated, they bind to the dye producing a bright fluorescent signal. When the exogenous antioxidant is added, it eliminates the free radicals resulting in decreased fluorescence.



Cellular Antioxidant Activity of Quercetin in HeLa Cells. 60,000 HeLa cells were seeded and cultured in a 96-well plate until confluent. Cells were then pretreated with DCFH-DA and Quercetin for 60 minutes at 37ºC. Free Radical Initiator was then added to the cells to begin the assay. Fluorescence readings were taken every 5 minutes for one hour at 37ºC.

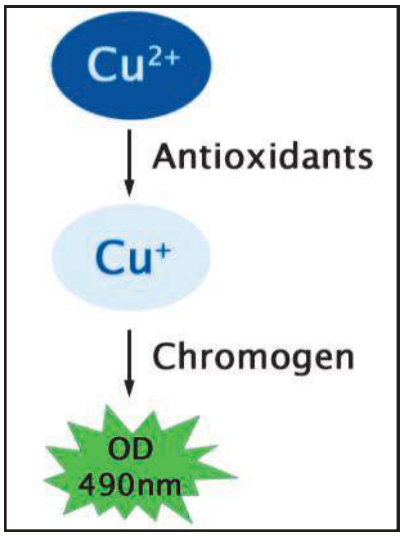


Assay Principle for the OxiSelect™ Cellular Antioxidant Activity Assay Kit. An exogenous antioxidant compound is added to cells along with DCFH-DA dye. Upon entry into the cell, the DCFH-DA is cleaved to DCFH which can bind reactive oxygen species (ROS) generated within the cell by the addition of a free radical initiator. Binding of DCFH to ROS yields DCF which produces a bright fluorescence. The presence of the exogenous antioxidant compound reduces the ROS available to the DCFH dye, yielding a lower fluorescent signal.

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

OxiSelect™ Total Antioxidant Capacity (TAC) Assay Kit

The OxiSelect™ Total Antioxidant Capacity (TAC) Assay Kit measures the total antioxidant capacity of biomolecules from a variety of sample types via a Single Electron Transfer (SET) mechanism. The assay works with a variety of antioxidants and is suitable for testing plasma, serum, urine, cell lysates, tissue homogenates and food extracts.



OxiSelect™ Total Antioxidant Capacity Assay Principle.

Recent Product Citations

1. Dong, W. et al. (2015). Enhancement of Thiamin Content in *Arabidopsis thaliana* by metabolic engineering. *Plant Cell Physiol*. **56**:2285-2296.
2. Padnupuspitasari, N.S. et al. (2015). Effects of diludine on the production, oxidative status, and biochemical parameters in transition cows. *J. Environ. Agric. Sci*. **6**:3-9.
3. Ni, R. et al. (2015). Mitochondrial calpain-1 disrupts ATP synthase and induces superoxide generation in type-1 diabetic hearts: a novel mechanism contributing to diabetic cardimyopathy. *Diabetes* 10.2337/db15-0963.
4. Liu, M. et al. (2015). Shen-Kang protects 5/6 nephrectomized rats against renal injury by reducing oxidative stress through the MAPK signaling pathways. *Int. J. Mol. Med*. **36**:975-984.
5. Perez, E. et al. (2015). Improved antitumor effect of paclitaxel administered in vivo as pH and glutathione-sensitive nanohydrogels. *Int. J. Pharm*. **492**:10-19.
6. Turkmenoglu, F.P. et al. (2015). Characterization of volatile compounds of eleven Achillea species from Turkey and biological activities of essential oil and methanol extract of *A. hamzaoglui* arabaci & budak. *Molecules* **20**:11432-11458.
7. 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.
8. Youn, P. et al. (2015). Cytoprotection against Beta-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.
9. Beretta, G.L. et al. (2015). Unravelling “off-target” effects of redox-active polymers and polymer multilayered capsules in prostate cancer cells. *Nanoscale* 10.1039/C4NR07240E.

Product Name	Detection	Size	Catalog Number
OxiSelect™ Total Antioxidant Capacity (TAC) Assay Kit	Colorimetric	200 Assays	STA-360

OxiSelect™ ORAC and HORAC Activity Assay Kits

The ORAC (Oxygen Radical Antioxidant Capacity) and HORAC (Hydroxyl Radical Antioxidant Capacity) assays measure the antioxidant capacity of biomolecules against peroxyl radicals and hydroxyl radicals, respectively. The assays are suitable for plasma, cell fractions, and tissue lysates, as well as solid and aqueous nutrition samples.

Recent Product Citations

1. Nishikawa, Y. et al. (2015). Cytoprotective effects of lysophospholipids from sea cucumber *Holothuria atra*. *PLoS One* **10**:e0135701. (STA-345)
2. Orena, S. et al. (2015). Extracts of fruits and vegetables activate the antioxidant response element in IMR-32 cells. *J. Nutr*. **145**:2006-2011. (STA-345)
3. Okutsu, K. et al. (2015). Antioxidants in heat-processed koji adn teh production mechanisms. *Food Chem*. 10.1016/j.foodchem.2015.04.004. (STA-345)
4. Wada, S.I. et al. (2015). Novel autophagy inducers lentztrehaloses A, B and C. *J. Antibiot. (Tokyo)* 10.1038/ja.2015.23. (STA-345)
5. Jeong, M.H. et al. (2015). In vitro evaluation of Cordyceps militaris as a potential radioprotective agent. *Int. J. Mol. Med*. **34**:1349-1357. (STA-346)
6. Gardner, A.W. et al. (2014). Greater endothelial apoptosis and oxidative stress in patients with peripheral artery disease. *Int. J. Vasc. Med.* 10.1155/2014/160534. (STA-346)

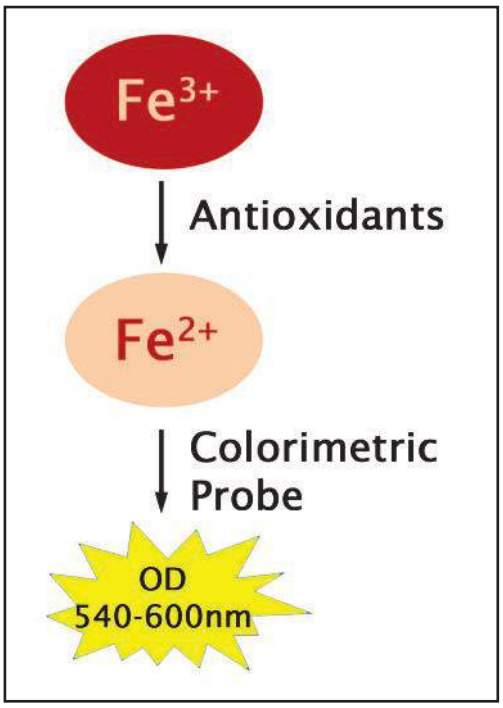
Product Name	Detection	Size	Catalog Number
OxiSelect™ ORAC Activity Assay Kit	Fluorometric	192 Assays	STA-345
		5 x 192 Assays	STA-345-5
OxiSelect™ HORAC Activity Assay Kit	Fluorometric	192 Assays	STA-346
		5 x 192 Assays	STA-346-5

OxiSelect™ Ferric Reducing Antioxidant Power (FRAP) Assay Kit

The OxiSelect™ Ferric Reducing Antioxidant Power (FRAP) Assay Kit is a quantitative assay for measuring the antioxidant potential within a variety of sample types. Following the reduction of ferric iron (Fe3+) to ferrous iron (Fe2+) by antioxidants present in the sample, the colorimetric probe provided in the kit develops a blue color that may be easily read in a standard plate reader at 540-600 nm.

The antioxidant potential of samples is determined by comparing their optical densities to an iron standard curve. Results are calculated as Fe2+ equivalents, or FRAP value.

- **Sensitive**: Detect as little as 2 µM of Fe2+ iron equivalents
- **Fast**: Quick 10 minute protocol
- **Versatile**: Suitable for use with serum, plasma, lysates, biological fluids, and purified food or drug extracts.



OxiSelect™ Ferric Reducing Antioxidant Power (FRAP) Assay Principle.

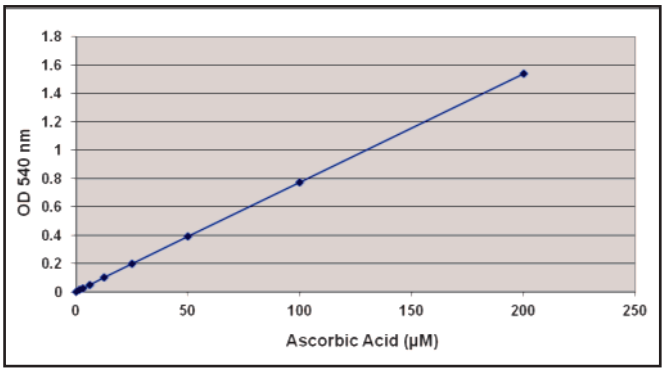
Product Name	Detection	Size	Catalog Number
OxiSelect™ Ferric Reducing Antioxidant Power (FRAP) Assay Kit	Colorimetric	200 Assays	STA-859

OxiSelect™ Ascorbic Acid Assay Kit (FRASC)

Ascorbic acid is a vital water-soluble antioxidant found in living organisms. Ascorbic acid is critical for a variety of functions related to tissue growth and wound healing, neurotransmitter formation, blood cholesterol levels, and free radical neutralization.

The OxiSelect™ Ascorbic Acid Assay Kit is a quantitative assay for measuring the ascorbic acid content within a variety of samples. The assay is based on the Ferric Reducing/Antioxidant Ascorbic Acid (FRASC) chemistry driven by the electron donating reducing power of antioxidants. The kit employs ascorbate oxidase, which allows the user to differentiate the ascorbic acid content from other antioxidants present in the sample. Ascorbic acid levels in samples are determined by measuring the difference in optical density between two sample wells, with and without the oxidase enzyme.

- **Sensitive**: Detect as little as 1 µM of ascorbic acid
- **Fast**: Obtain results in less than 30 minutes
- **Versatile**: Suitable for use with serum, plasma, urine, saliva, tissue homogenates, cell extracts, and purified food or drug extracts



Standard Curve Generated with the OxiSelect™ Ascorbic Acid Assay Kit (FRASC).

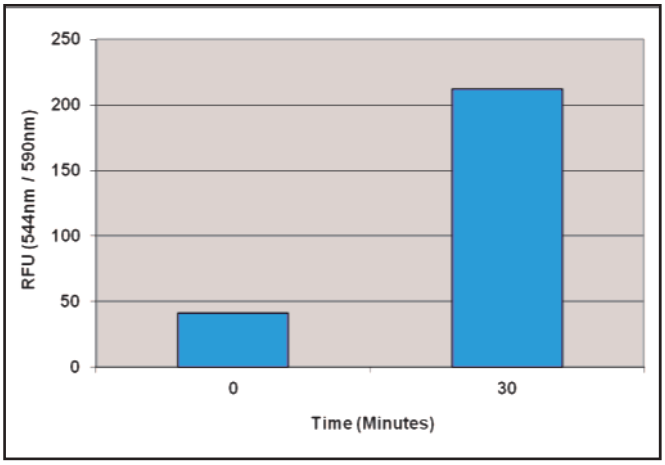
Product Name	Detection	Size	Catalog Number
OxiSelect™ Ascorbic Acid Assay Kit (FRASC)	Colorimetric	200 Assays	STA-860

OxiSelect™ Myeloperoxidase (MPO) Assay Kits

Myeloperoxidase (MPO) is a heme-based peroxidase enzyme that has been implicated in many disease states, and elevated MPO levels have been linked to coronary artery disease. In the presence of hydrogen peroxide, myeloperoxidase is converted to an active redox intermediary form (MPO-I). From there the enzyme plays two roles:

- A chlorination reaction by way of conversion of chloride ions to hypochlorous acid
- A peroxidation reaction where MPO is ultimately converted back to its native state

Our OxiSelect™ Myeloperoxidase Assay Kits provide a convenient way to detect and quantify myeloperoxidase activity levels. Chlorination and peroxidation activities are measured separately.



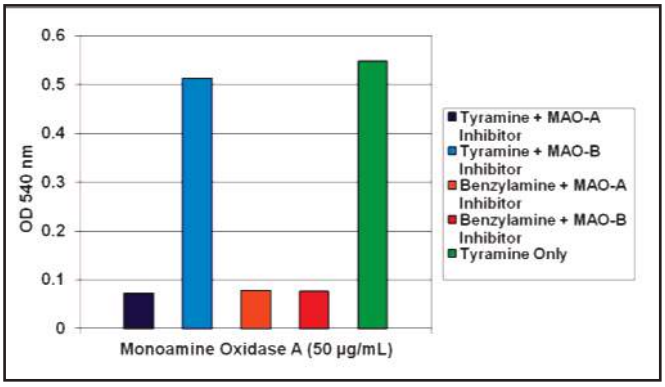
Measurement of the Peroxidation Activity of Purified Human MPO. 650 pM of purified human myeloperoxidase was tested according to the Assay Protocol. The peroxidation activity was determined to be 42 µU/mL.

Product Name	Detection	Size	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

OxiSelect™ Monoamine Oxidase Assay Kits

Monoamine oxidases (MAO) are a collection of enzymes found in the outer mitochondrial membrane that catalyze the oxidative deamination of monoamines. MAO exists as two isoforms, MAO-A and MAO-B, which are differentiated based on localization, substrate affinity, and inhibitor specificity. MAOs regulate neurotransmitters, and dysfunction of MAOs have been associated with depression, drug abuse, migraines, schizophrenia, attention deficit disorder, and Parkinson's and Alzheimer's diseases.

OxiSelect™ Monoamine Oxidase Assay Kits measure MAO-A and MAO-B in biological samples. MAO reacts with a substrate, generating hydrogen peroxide. A reaction between hydrogen peroxide and a probe results in a signal that is directly proportional to the level of MAO in the sample. Quantitation is performed in a colorimetric or fluorescence plate reader.



Measurement of MAO-A. 50 µg/mL of Monoamine Oxidase A was incubated with the MAO-A Inhibitor (Clorgyline) or MAO-B Inhibitor (Pargyline) according to the Assay Protocol. Each was subsequently incubated with the substrates Tyramine or Benzylamine within the Assay Working Solution for 45 minutes. OD values were read at 540 nm on a standard colorimetric plate reader.

Product Name	Detection	Size	Catalog Number
OxiSelect™ Monoamine Oxidase Assay Kit	Colorimetric	96 Assays	XPX-5006
		5 x 96 Assays	XPX-5006-5
	Fluorometric	96 Assays	XPX-5000
		5 x 96 Assays	XPX-5000-5

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