



# OXIDATIVE STRESS

Comprehensive Tools for Quantifying  
Cellular Responses to Oxidative Damage

# ALLEVIATE THE STRESS OF OXIDATIVE STRESS RESEARCH

Monitor Molecular Origins and Consequences of Oxidative Stress

The term oxidative stress reflects an imbalance in free radical formation within a cell or organism, most commonly in the form of reactive oxygen or nitrogen species (ROS/RNS). ROS/RNS such as superoxide anions, hydroxyl radicals, hydrogen peroxide, nitric oxide, and peroxynitrite originate from a variety of sources including changes in aerobic metabolism, immune activation, UV radiation, heme accumulation, and hypoxia. Failure of the cell's defense mechanisms to compensate for accumulating insults such as mitochondrial dysfunction, DNA damage, misfolded proteins, and lipid peroxidation can trigger programmed cell death pathways, and has been linked to clinically relevant diseases including cancer, cardiovascular disease, asthma, ischemia, diabetes, and neurodegenerative disease.

## Pro-and Antioxidants

SCREEN-WELL® REDOX Library  
SCREEN-WELL® Natural Products Library  
Flavones & Isoflavones  
Radical Scavengers  
SOD and Glutathione Peroxidase Mimetics

## REDOX Enzymes

Heme Oxygenase ELISAs & Antibodies  
Glutathione Peroxidase/Reductase Assay Kits  
p47Phox Antibodies and NADPH Oxidase Inhibitors  
Superoxide Dismutase ELISAs & Antibodies

## Hypoxia

ROS-ID™ Hypoxia/Oxidative Stress Detection Kit  
HIF-1α & HIF-2α Antibodies  
HIF-1/2 Activators & Inhibitors

## Lipid Peroxidation

8-iso-PGF<sub>2α</sub> ELISA Kit  
ALDetect™ Lipid Peroxidation Assays  
HETE/HODE/LTC ELISA Kits  
Lipoxygenase Enzymes  
OXI-TEK TBARS Assay Kit

## Mitochondrial Dysfunction

MITO-ID® Extracellular O<sub>2</sub> & pH Sensor Kits  
MITO-ID® Membrane Potential Kits

## Programmed Cell Death

Apoptosis/Necrosis Detection Kit  
Comet SCGE Assay Kit  
CYTO-ID® Autophagy Detection Kit  
NUCLEAR-ID® Chromatin Condensation Kit  
p53/Bcl-2/Bax/XIAP/ & Cytochrome C ELISA Kits  
p62 & NBR1 ELISA Kits

## Heat Shock Proteins

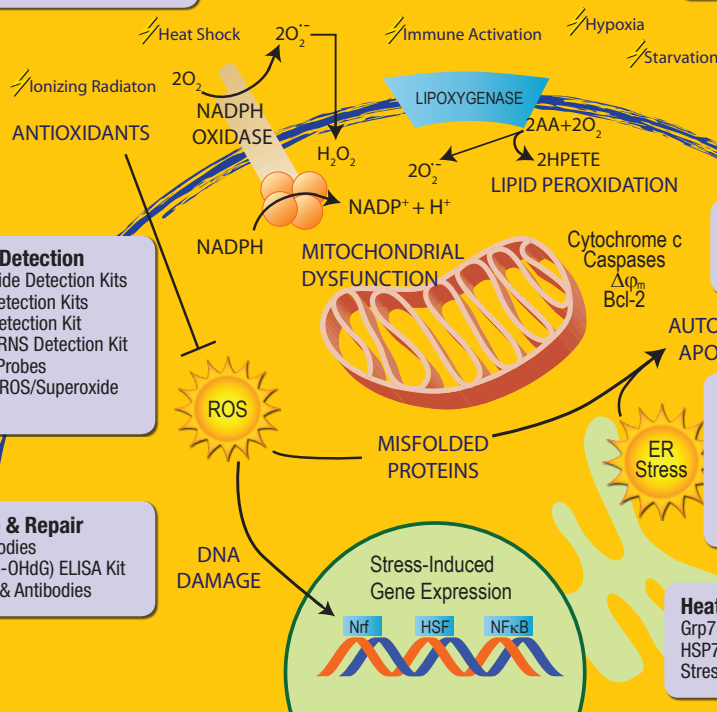
Grp75/Grp78/Calnexin/Calreticulin Antibodies  
HSP70/HSP40/HSP27/HSF-1 Antibodies & ELISAs  
Stressgen® HSP/Chaperone Products

## Free Radical Detection

Hydrogen Peroxide Detection Kits  
Nitrate/Nitrite Detection Kits  
ROS-ID™ NO Detection Kit  
ROS-ID™ ROS/RNS Detection Kit  
Spin Traps and Probes  
ROS-ID™ Total ROS/Superoxide Detection Kit

## DNA Damage & Repair

AIF & DFF Antibodies  
DNA Damage (8-OHdG) ELISA Kit  
PARP Inhibitors & Antibodies



## Live Cell Analysis

Our expertise in fluorescent probe chemistry and cellular analysis combine to provide high-sensitivity fluorescent probes for profiling free radical production and the cellular consequences of their accumulation under conditions of oxidative stress. Our unique fluorescent probe-based assays and widely cited antibodies enable multiplex detection of ROS/RNS, superoxide, hypoxia, as well as sensitive assays for mitochondrial function, apoptosis, and autophagy.

## Immunoassays & Antibodies

As a trusted manufacturer of thousands of widely cited and thoroughly validated ELISA kits and antibodies, we understand quality means delivering sensitivity, specificity, and consistency. Over 300 immunoassays and 3000 antibodies enable sensitive & specific detection of protein and small molecule biomarkers of oxidative stress. Our assay kits and reagents are some of the most widely cited products for quantification of critical stress-regulating metabolic enzymes and stress-responsive pathways.

## Small Molecule Chemistry

More than 3,000 biologically characterized small molecules and the industry's most diverse collection of compound libraries enables the modulation of oxidative stress pathways. Our catalog includes hundreds of REDOX compounds, natural products, and bioactive lipids available as ready-to-screen SCREEN-WELL® libraries or as individual and bulk compounds. Over 50 spin traps and probes facilitate molecular characterization of free radical production.



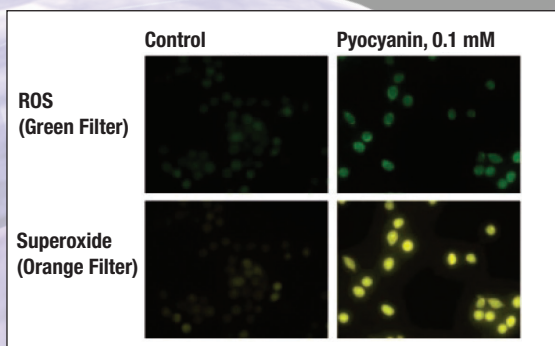
# LIVE CELL, MULTIPLEX ANALYSIS KITS

## Accurately Profile Total ROS and Superoxide with Dual-readout Assay

### ROS-ID™ Total ROS/Superoxide Detection Kit – 89165-882

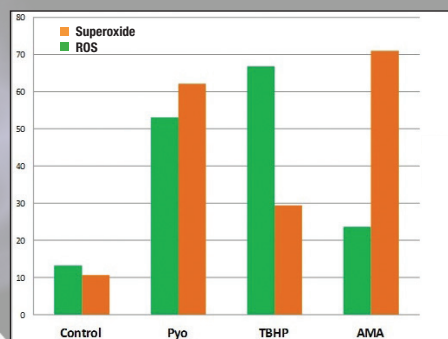
- Non-invasive fluorescent probes allow simultaneous discrimination of total ROS and superoxide in live cells
- Profile to distinguish between hydrogen peroxide, peroxyxynitrite and hydroxyl radicals using included inhibitors
- Dyes compatible with major components of tissue culture media (phenol red, FBS and BSA) for microscopy and flow cytometry
- Red dye for detection of Nitric Oxide also available (89165-888/89165-864)

### Multiplex Analysis of Total ROS AND Superoxide



Data represents treatment of HeLa cells with Pyocyanin (ROS/SO inducer). Total ROS dye fluoresces green in the presence of ROS, while the SO-specific dye fluoresces yellow/orange (bottom right).

### Convenient Quantifiable Flow Cytometry Assay



Data represents % of positive HeLa cells following treatment with Pyocyanin (ROS/SO inducer), TBHP (ROS inducer), or AMA (Superoxide inducer).

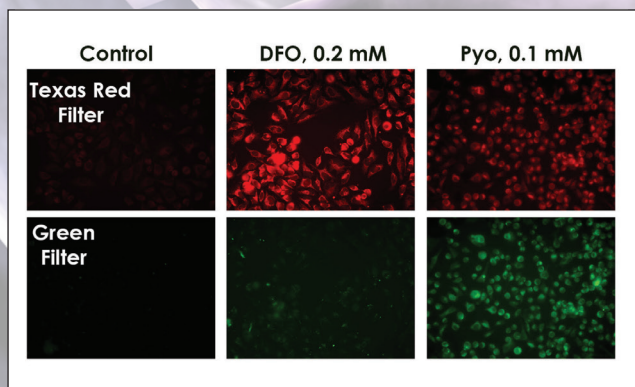
PRODUCT NAME	Cat. No.	EX/EM	Application
ROS-ID™ Total ROS/Superoxide Detection Kit	89165-882	Oxidative Stress 504/524 ● Superoxide 530/590 ●	
ROS-ID™ ROS/RNS Detection Kit	89165-864	Oxidative Stress 504/524 ● Superoxide 530/590 ● NO 648/666 ●	
ROS-ID™ Total ROS Detection Kit	89165-884	504/524 ●	
ROS-ID™ Superoxide Detection Kit	89165-886	530/590 ●	
ROS-ID™ NO Detection Kit	89165-888	648/666 ●	

## Multiplex, Real-time Analysis of Hypoxia and ROS in Live Cells

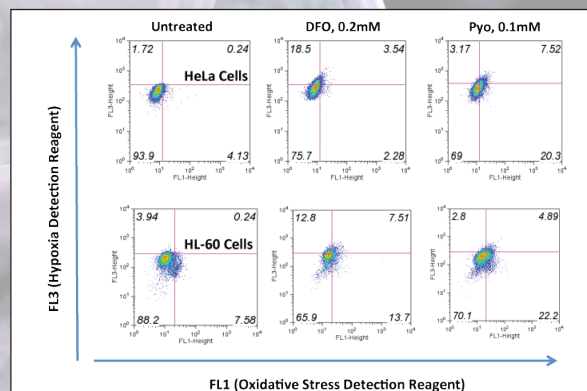
### ROS-ID™ Hypoxia/Oxidative Stress Detection Kit – 10136-016

- Sensitive hypoxia dye fluoresces red when converted by nitroreductases
- Total ROS dye enables simultaneous detection of hypoxia (red) and ROS (green)
- Non-toxic, cell permeable dyes optimized to avoid artifactual fluorescence
- Suitable for microscopic or flow cytometric analysis of adherent or suspension cells

### Simultaneously Monitor Hypoxic Status and ROS Formation



### Quantitative Multiparametric Assay for Flow Cytometry



Bright red fluorescence of the Hypoxia probe is observed following its conversion by cellular nitroreductases under hypoxic conditions such as those induced chemically by treatment with the hypoxia-mimetic desferrioxamine (DFO). The assay facilitates simultaneous quantification of hypoxic status (FL3/red) and presence of ROS (FL1/green) by flow cytometry.

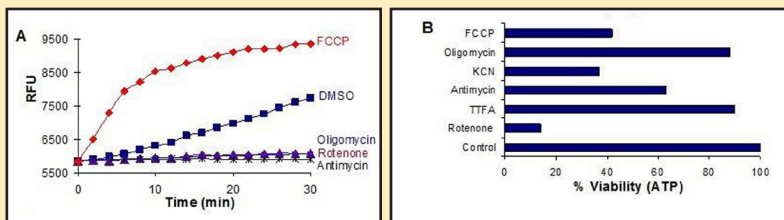
# HIGH-THROUGHPUT ASSAYS FOR MITOCHONDRIAL FUNCTION

## MITO-ID® Extracellular O<sub>2</sub> Sensor Kits

This oxygen-sensitive phosphorescent probe can be used to assess O<sub>2</sub> consumption by cultured cells, isolated mitochondria, microorganisms, tissues, and enzymes.

- Phosphorescent probe increases in signal intensity with O<sub>2</sub> consumption (I<sub>O<sub>2</sub></sub> levels)
- Amenable to 96- and 384-well microplates for high-throughput analysis on standard fluorescence plate readers (Ex/Em 380/650nm)
- Cell permeable probe also available for tracing intracellular O<sub>2</sub> levels
- Multiplex with MITO-ID® pH Sensor Probe to confirm mitochondrial toxicity

## Detect Mitochondrial Dysfunction Within Minutes of Treatment



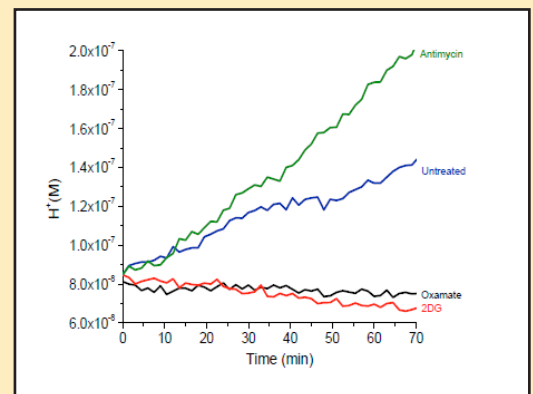
Assessment of mitochondrial function with MITO-ID® Extracellular O<sub>2</sub> Sensor Kit (A) or traditional ATP assay (B) following treatment with mitochondrial inhibitors (Oligomycin, Rotenone, Antimycin), uncoupling agent (FCCP), or control (DMSO). Results illustrate that drug-induced mitochondrial dysfunction is evident immediately post-treatment (A) despite varying levels of viability at 24 hours by ATP assay (B).

## MITO-ID® Extracellular pH Sensor Probe

This pH-sensitive phosphorescent probe can be used to monitor cellular acid extrusion, the result of increased glycolytic flux associated with mitotoxicity.

- pH sensitive probe increases in signal intensity with increasing acidity
- Simple mix-and-read protocol for 96-well microplates.
- Amenable to standard fluorescence plate readers (Ex/Em 340/615nm)

## Efficiently Monitor Glycolytic Activity



Acidification profiles of HepG2 cells treated with glucose transport inhibitors (2DG, Oxamate) or mitochondrial inhibitor (Antimycin) relative to control.

### PRODUCT NAME

### Cat. No.

MITO-ID® Extracellular O <sub>2</sub> Sensor Kit	10136-032
MITO-ID® Extracellular O <sub>2</sub> Sensor Kit (High Sensitivity)	10136-034 10136-036
MITO-ID® Intracellular O <sub>2</sub> Sensor Probe	10136-038
MITO-ID® Extracellular O <sub>2</sub> Sensor Probe	10136-040

### PRODUCT NAME

### Cat. No.

MITO-ID® Extracellular pH Sensor Probe	10136-042
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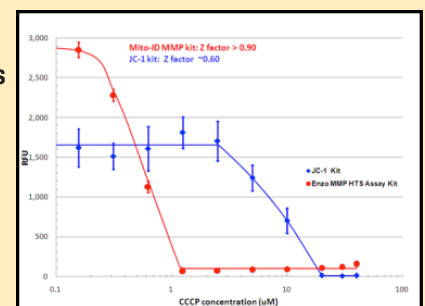
# QUANTIFY LOSS OF MMP IN LIVE CELLS

## MITO-ID® Membrane Potential Cytotoxicity Assay Kit – 89165-900

A real-time mitochondrial membrane potential assay with superior sensitivity

- 10X more sensitive than JC-1 with superior aqueous solubility
- Photostable dual-emission dye
- No-wash/no-medium removal
- Separate MITO-ID® Red/Green assays available for detection of mitochondrial mass
- Suitable for high-throughput applications

Detect MMP Perturbations with 10X More Sensitivity than JC-1





# DETECT & QUANTIFY BIOMARKERS OF OXIDATIVE STRESS

## High-sensitivity ELISA & Detection Kits

### HIGH-SENSITIVITY ELISA & DETECTION KITS

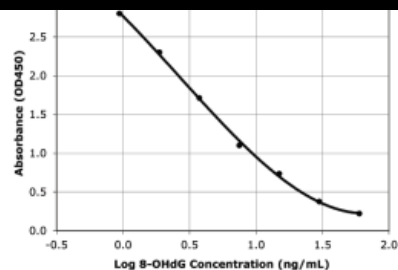
PRODUCT NAME	Cat. No.	SIZE	READOUT
12(S)-HETE ELISA Kit	89141-102	1x96 wells	Colorimetric
ALDetect™ Lipid Peroxidation Assay Kit	89156-446	100 assays	Colorimetric
Cu/Zn-Superoxide Dismutase ELISA Kit	89155-894	1x96 wells	Colorimetric
Cytochrome C (H) ELISA Kit	89141-202	1x96 wells	Colorimetric
Direct 8-iso-PGF <sub>2α</sub> ELISA Kit	89141-138	1x96 wells	Colorimetric
Glutathione (total) Detection Kit	89141-234	4x96 wells	Colorimetric
HO-1 (human), ELISA Kit	89141-866	1x96 wells	Colorimetric
HO-1 (mouse) IMMUNOSETS®	89141-780	5x96 wells	Colorimetric
HO-1 (rat), ELISA Kit	89141-868	1x96 wells	Colorimetric
Hydrogen Peroxide Detection Kit	89141-674	1x96 wells	Colorimetric
Myeloperoxidase (human), ELISA Kit	89141-168	1x96 wells	Colorimetric
Nitric Oxide (Total) Detection Kit	89141-754	2x96 wells	Colorimetric
OXI-TEK TBARS Assay Kit	89156-088	160 tests	Fluorometric
Protein Carbonyl ELISA Kit	89156-130	1x96 wells	Colorimetric
Red Hydrogen Peroxide Assay Kit	89165-870	5x96 wells	Fluorometric

### PRODUCT HIGHLIGHT

#### DNA Damage (8-OHdG) ELISA Kit – 89141-832

- Quantify levels < 1ng/mL
- Rapid results in < 2.5 hours
- Tested in a variety of biofluids (urine, serum, saliva)
- Convenient colorimetric 96-well plate format

#### Rapidly Detect <1 ng/mL 8-OH dG



#### PRODUCT NAME

#### Cat. No.

DNA Damage (8-OHdG) ELISA Kit

89141-832

### WIDELY-CITED ANTIBODIES



PRODUCT NAME	Cat. No.	SPECIES	PRODUCT NAME	Cat. No.	SPECIES
Biliverdin Reductase, pAb	200062-418 / 200062-422	Human, Mouse, Rat, Others	HIF-1α, pAb	89145-154	Human, Mouse
Calnexin, pAb	200062-778 / 200063-274 95042-142	Human, Mouse, Rat, Others	HO-1, mAb (HO-1-1)	89141-976 / 89141-980 89141-982	Human, Mouse, Rat, Others
Calreticulin, mAb (FMC 75)	95043-736 / 95043-738 95043-740 / 95043-742 200062-596 / 200062-598	Human, Others	HO-1, mAb (HO-1-2)	89141-986 / 89141-984	Human, Mouse, Rat, Others
Calreticulin, pAb	200062-592 / 200062-594 95046-142	Human, Mouse, Rat, Others	HO-1, pAb	10049-534 / 95046-310	Human, Mouse, Rat, Others
Cu/Zn SOD, pAb	89142-032 / 89106-700 89106-702 / 95046-094	Human, Mouse, Rat, Others	iNOS, pAb	95046-000 / 95045-998	Human, Rat, Others
eNOS, pAb	10050-282	Human, Mouse, Rat, Others	Metallothionein, mAb (UC1MT)	95043-874 / 95043-876	Human, Mouse, Rat, Others
Grp94, mAb (9G10)	200062-774	Human, Mouse, Rat, Others			

# MODULATE WITH PRO- AND ANTI-OXIDANT COMPOUNDS

## REDOX Compound Library - 89156-302/89156-304

The SCREEN-WELL® REDOX Library contains 84 ready-to-screen compounds with defined prooxidant or antioxidant activity. All compounds come pre-dissolved in DMSO and are available in bulk quantities for resupply

- Hydroperoxides
- Polyphenolics
- Glutathione peroxidase inhibitors
- Metal chelators
- Thiols
- Thiol traps
- Lazaroids
- Radical scavengers
- SOD mimetics

### SELECT SMALL MOLECULE MODULATORS

COMPOUND	Cat. No.	ACTIVITY
Buthionine sulfoximine	89158-508	γ-Glutamyl transpeptidase inhibitor
Carnosic Acid	89147-522 / 89147-520	Antioxidant
Eicosapentaenoic acid	89158-304 / 89158-302	Inhibits PGE <sub>2</sub> formation
L-Ergothioneine	89158-490 / 89158-488	Antioxidant
Resveratrol	89158-478 / 89158-480	Antioxidant

*Monitor Molecular Origins. Quantify Cellular Consequences.*

**You may also be interested in:**



**GLOBAL HEADQUARTERS**  
Enzo Life Sciences Inc.  
10 Executive Boulevard  
Farmingdale, NY 11735

**EUROPE**  
Enzo Life Sciences (ELS) AG  
Industriestrasse 17  
CH-4415 Lausen, Switzerland

**Put our experience to work for you!**

Our broad range of scientific expertise and industry-proven manufacturing capabilities enables us to provide comprehensive solutions for oxidative stress!



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