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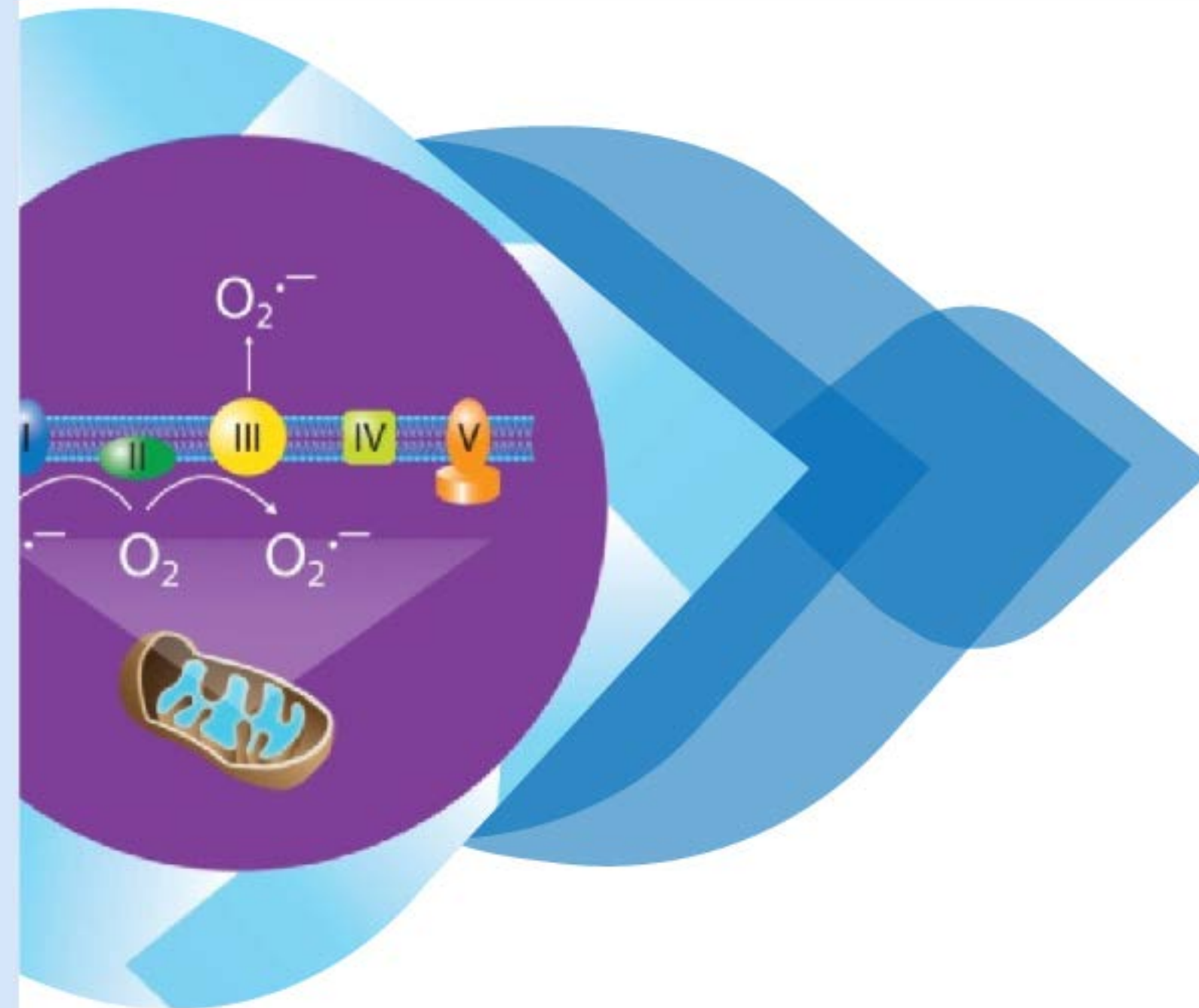
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# Metabolism Assay Kits

## Oxidative Stress



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## METABOLISM ASSAY KITS

Elabsience specializes in immunodiagnostic technology for life science community, which has become a professional and reliable supplier of scientific research products through the unremitting efforts of employees. The products have passed ISO9001 and CE certification while widely being recognized by the (global) market and trusted by customers from more than 100 countries on 5 continents.

Elabsience has developed a series of metabolism assay kits to meet the requirements of researchers for rapid and efficient detections of biochemical indicators by simple operation, high sensitive and great performance during the years of R&D and innovation.

## PRODUCT ADVANTAGE

### QC system:

Strictly control from R&D to production and delivery of the kit;

### Performance:

Intra-CV<5%, Inter-CV<1.0% ; Recovery rate :100±5%; R<sup>2</sup>: > 0.99;

### Sample Types:

Biological fluids, Tissues and cell, plant, Drug etc, and providing the sample reference dilution table;

### Instrument requirements:

Spectrophotometer, Microplate reader, Fluorescence Microplate;

### Research Areas:

Oxidative stress, Liver and kidney function, amino acids and proteins, plant stress resistance and other fields;

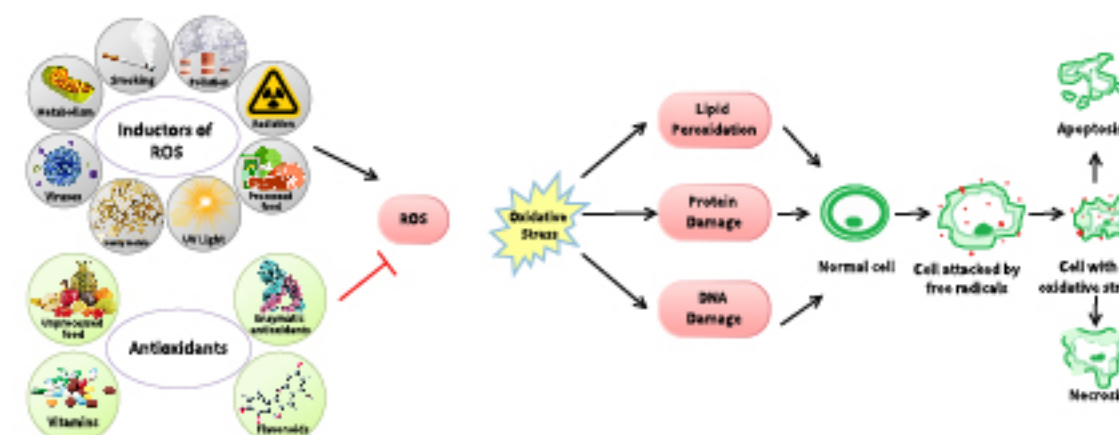
### Tech Support:

Professional team to provide timely and efficient service, to solve all kinds of pre-sales/after-sales questions;

## OXIDATIVE STRESS

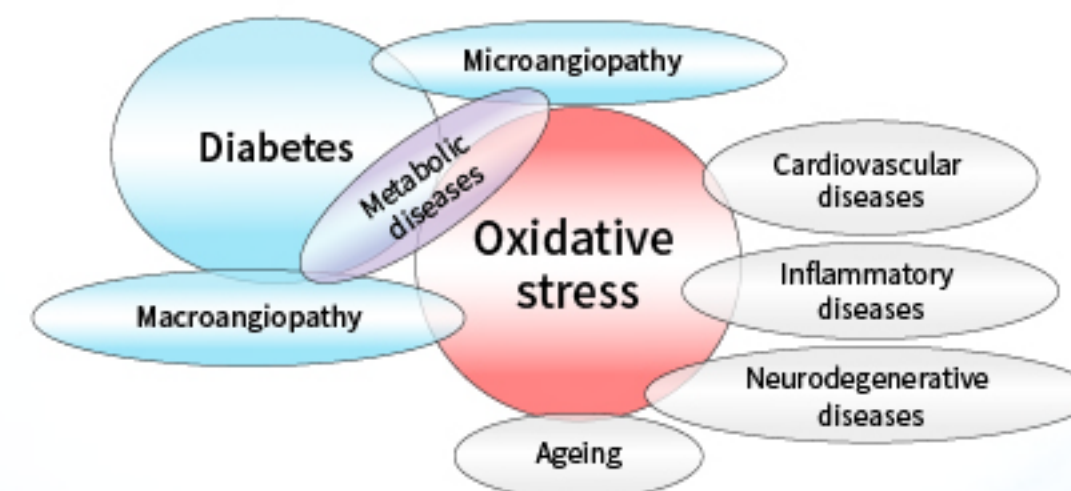
### OXIDATIVE STRESS INTRODUCTION

Oxidative stress refers to the process of oxidative damage caused by the imbalance of the generation and clearance of oxygen free radicals in body or cells.



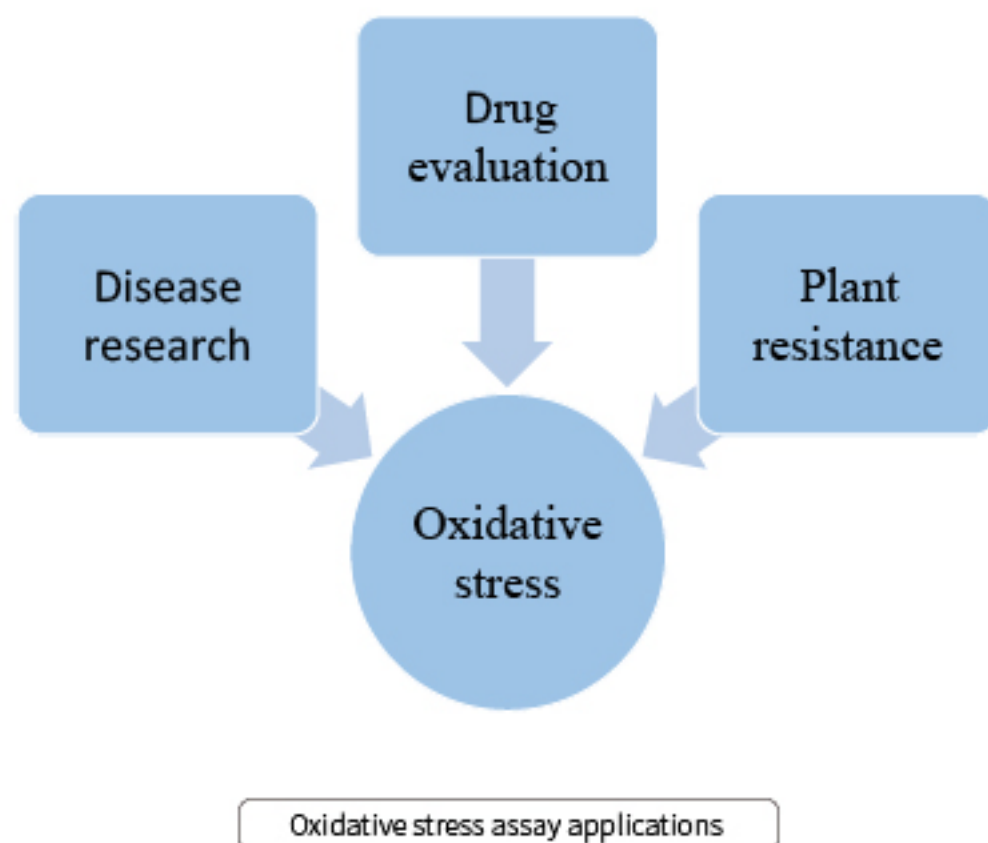
The occurrence and function of oxidative stress[1]

Oxidative stress promotes the occurrence and development of multiple diseases, such as cancer, cardiovascular disease and diabetes. Oxidative stress is widely used in medicinal and disease mechanism research.



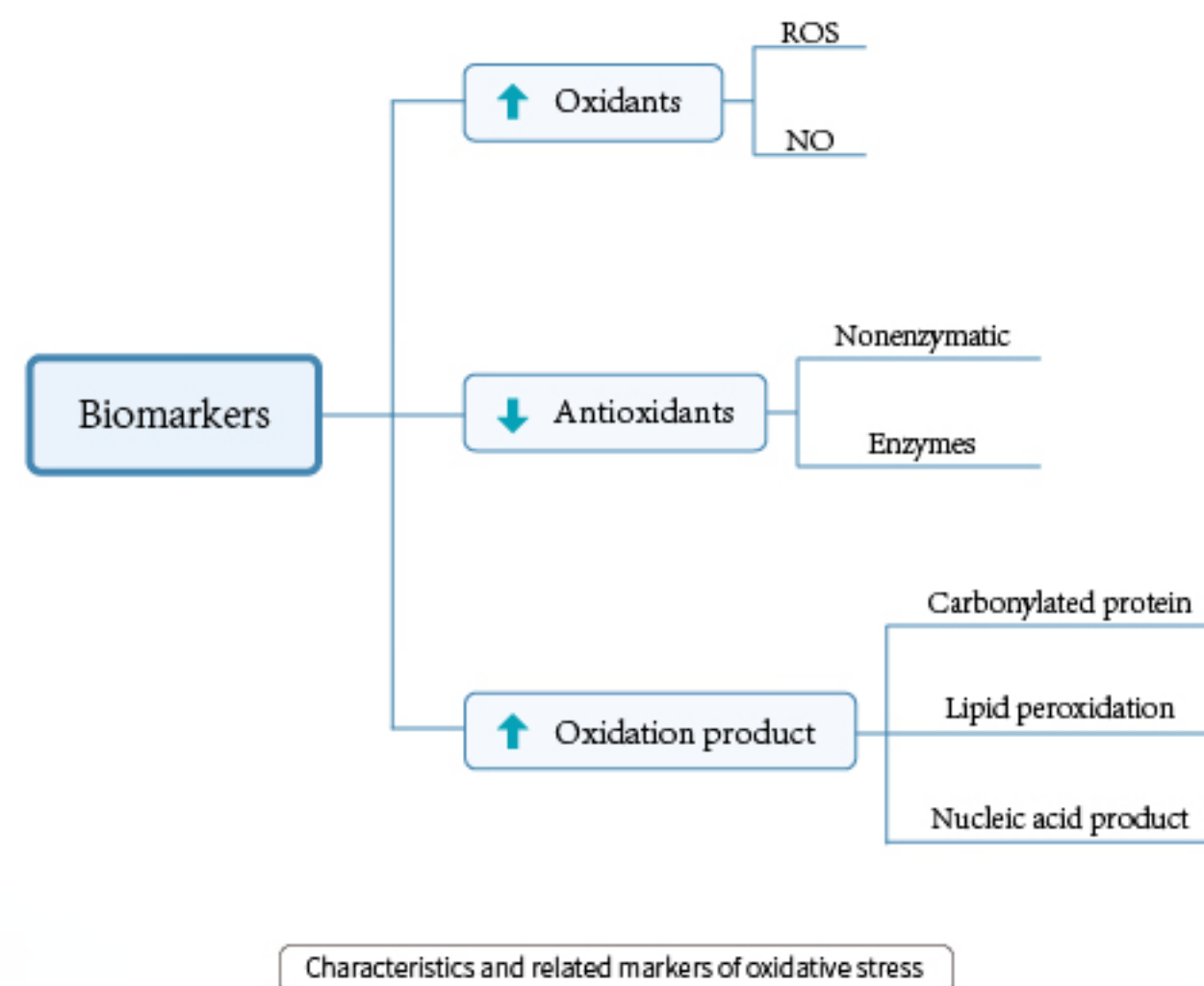
Oxidative stress and related diseases[2]





### OXIDATIVE STRESS ASSAY

When cells are subjected to oxidative stress, their oxidative capacity is enhanced while their antioxidant capacity is weakened. Oxidative stress can be evaluated by measuring the changes in the content of oxidants, oxidation products and antioxidant substances directly or indirectly. Elabsience has developed a variety of kits to accurately determine oxidative stress related metabolites such as reactive oxygen species, catalase and lipid peroxides.

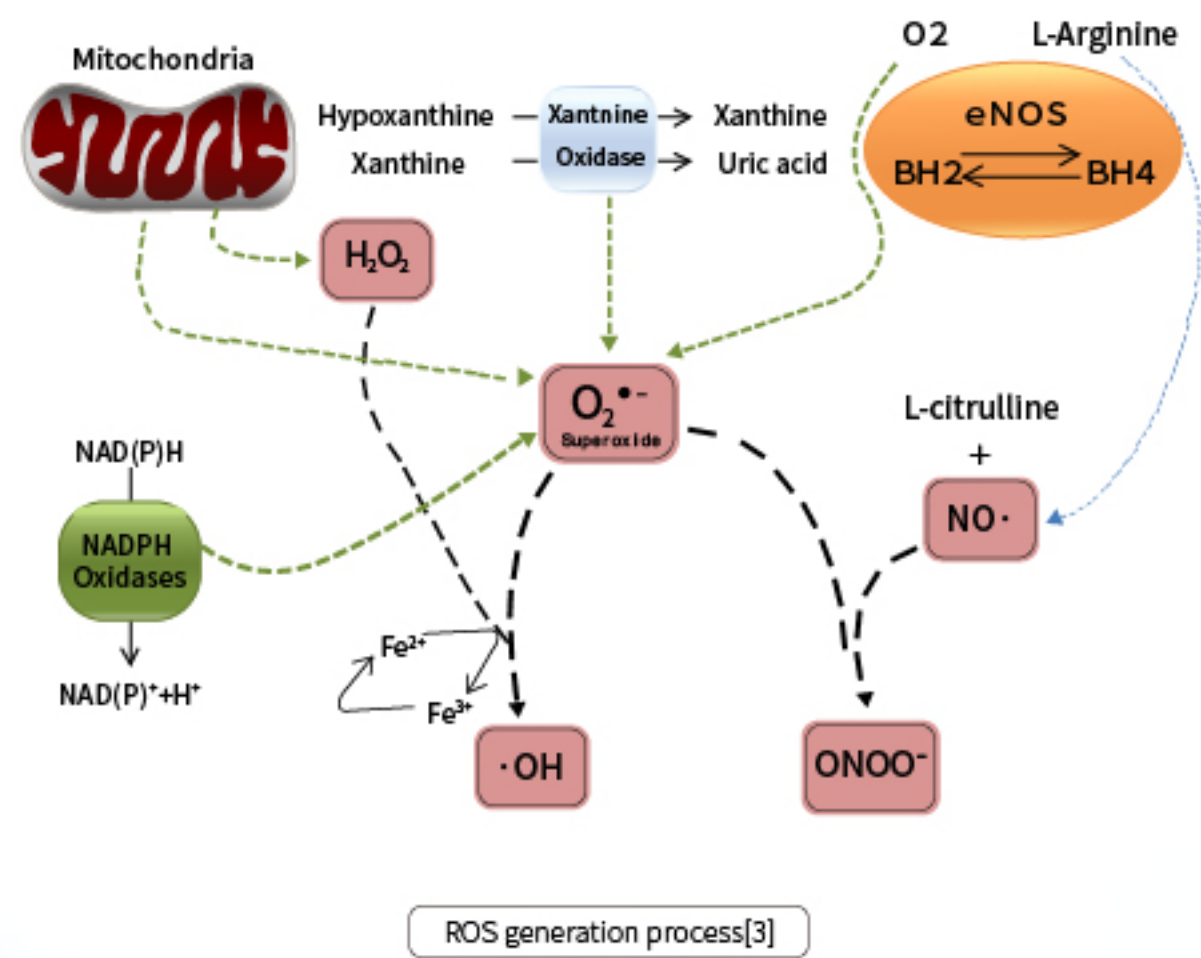


REACTIVE OXYGEN SPECIES

Reactive oxygen species (ROS) are some active chemicals produced in the process of metabolism, including oxygen free radicals and hydrogen peroxide. ROS is necessary to organisms but also harmful in certain circumstances. Excessive ROS is the main factor leading to oxidative stress, and so the related substances are the common indicators to evaluate oxidative stress.

ROS related kit

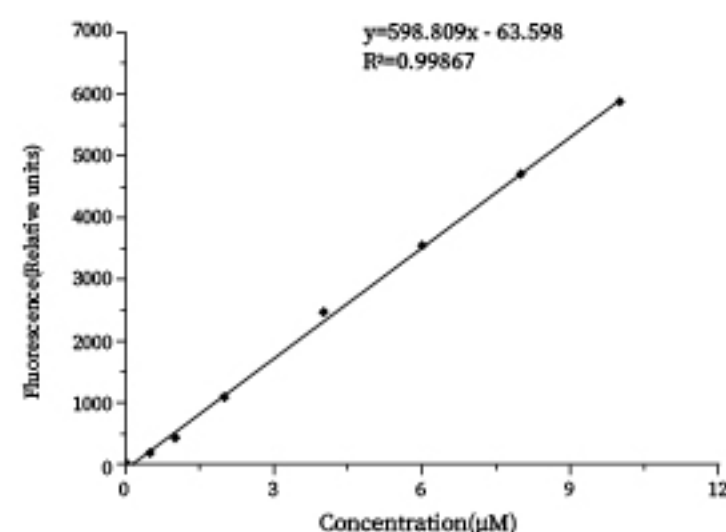
Marker	Product Name	Cat#
H <sub>2</sub> O <sub>2</sub>	Hydrogen Peroxide (H <sub>2</sub> O <sub>2</sub> ) Fluorometric Assay Kit	E-BC-F001
	Hydrogen Peroxide (H <sub>2</sub> O <sub>2</sub> ) Colorimetric Assay Kit	E-BC-K102-M
	Hydrogen Peroxide (H <sub>2</sub> O <sub>2</sub> ) Colorimetric Assay Kit	E-BC-K102-S
ROS	Reactive Oxygen Species (ROS) Fluorometric Assay Kit	E-BC-K138-F
·OH	Hydroxyl Free Radical Scavenging Capacity Assay Kit	E-BC-K527-M
TOS	Total Oxidant Status (TOS) Colorimetric Assay Kit	E-BC-K802-M
XOD	Xanthine Oxidase (XOD) Activity Fluorometric Assay Kit	E-BC-F019
O <sub>2</sub> <sup>·-</sup>	Inhibition And Production Of Superoxide Anionic Colorimetric Assay Kit	E-BC-K001-M
NO	Nitric Oxide (NO) Colorimetric Assay Kit	E-BC-K035-M
	Nitric Oxide (NO) Colorimetric Assay Kit	E-BC-K035-S



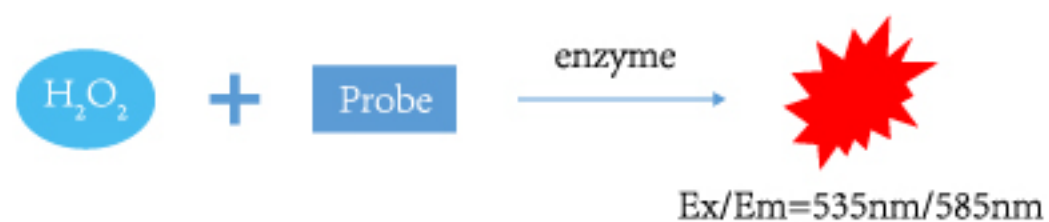
## Product presentation

◆ Hydrogen Peroxide (H<sub>2</sub>O<sub>2</sub>) Fluorometric Assay Kit (E-BC-F001) ◆

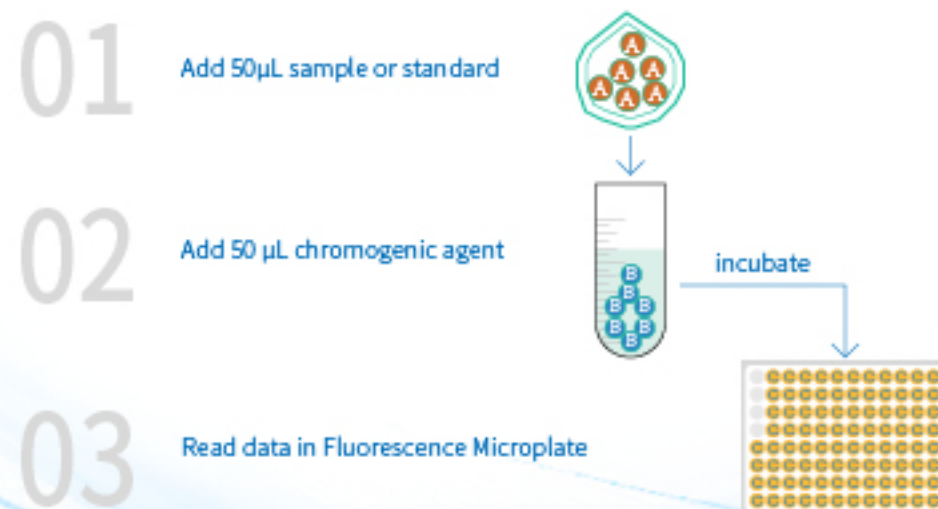
① Sensitivity: 0.02 μmol/L



② Specificity: detection principle of "Enzyme+ fluorescence probe"

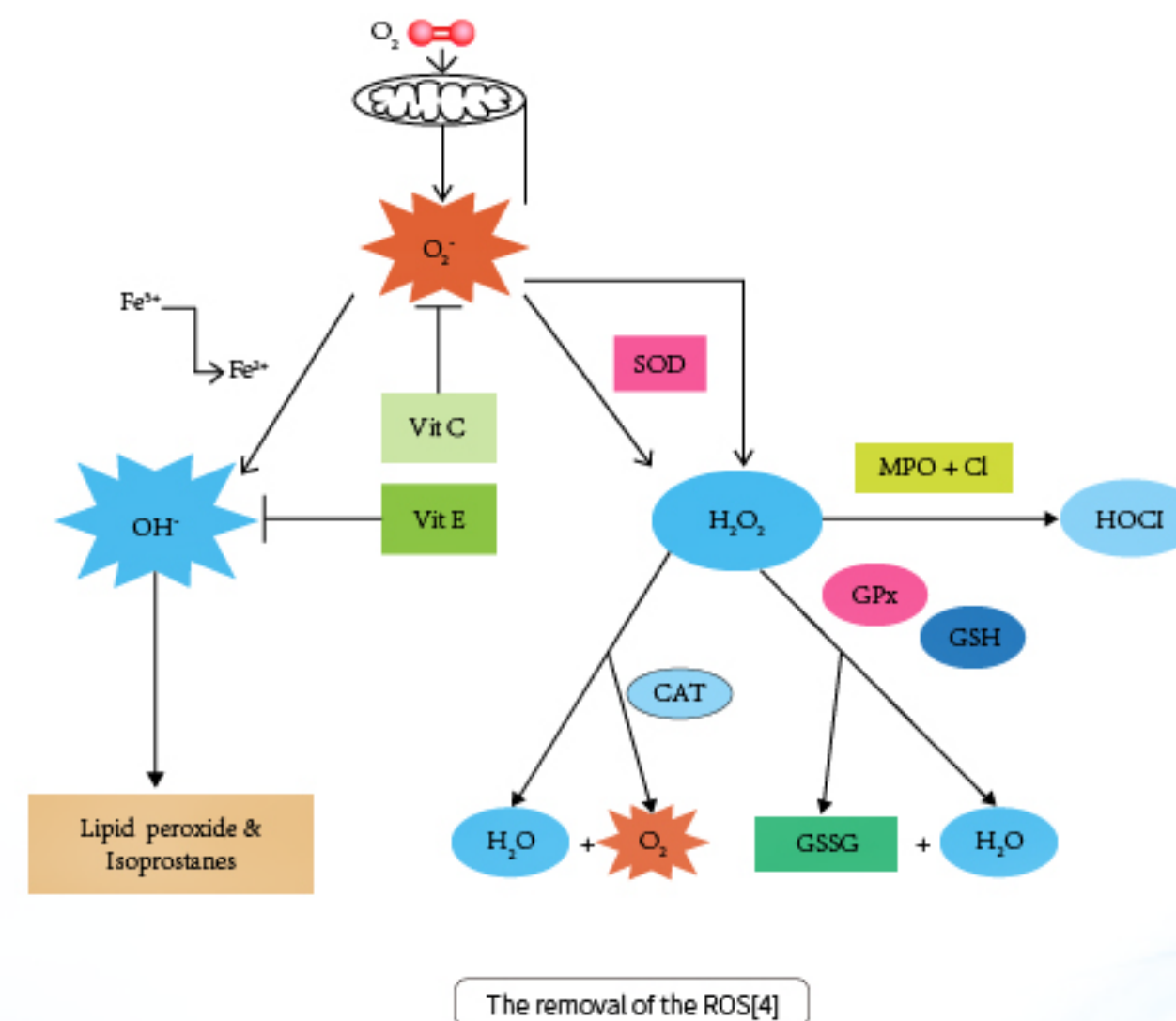


③ Operating steps: result can be detected after 2 steps



## ANTIOXIDANT CAPACITY

There is a set of antioxidant mechanisms in organism to maintain the balance of ROS in the body. The ROS clearance mechanisms can be roughly divided into enzymatic antioxidants and non-enzymatic antioxidants. Measuring the levels of antioxidant including superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase, and non-enzymatic antioxidants including glutathione, vitamins can assess the status of oxidative stress.





## Antioxidant capacity kit

Marker	Product Name	Cat#
CAT	Catalase (CAT) Activity Fluorometric Assay Kit	E-BC-F006
	Catalase (CAT) Activity Assay Kit	E-BC-K031-M
MPO	Myeloperoxidase (MPO) Peroxidation Activity Fluorometric Assay Kit	E-BC-F013
	Myeloperoxidase (MPO) Activity Assay Kit	E-BC-K074-M
T-SOD	Total Superoxide Dismutase Activity Assay Kit (WST-1 Method)	E-BC-K020-M
CuZn/Mn- SOD	CuZn/Mn Superoxide Dismutase Activity Assay Kit	E-BC-K022-M
POD	Peroxidase (POD) Activity Assay Kit (Plant Samples)	E-BC-K227-M
GSH	Reduced Glutathione (GSH) Colorimetric Assay Kit	E-BC-K030-M
APX	Ascorbate Peroxidase (APX) Activity Assay Kit	E-BC-K353-S
GSH-Px	Glutathione Peroxidase (GSH-Px) Activity Assay Kit	E-BC-K096-M
GR	Glutathione Reductase (GR) Activity Assay Kit	E-BC-K099-S
GST	Glutathione-S-Transferase (GST) Activity Assay Kit(DTNB method)	E-BC-K800-M
T-GSH	Total Glutathione (T-GSH) Colorimetric Assay Kit	E-BC-K097-M
Total Thiol	Total Sulfhydryl Group/Total Thiol (-SH) Colorimetric Assay Kit	E-BC-K265-M
VE	Vitamin E (VE) Colorimetric Assay Kit	E-BC-K033-M
VC	Vitamin C (VC) Colorimetric Assay Kit	E-BC-K034-M
T-AOC	Total Antioxidant Capacity (T-AOC) Colorimetric Assay Kit	E-BC-K136-M
	Total Antioxidant Capacity (T-AOC) Colorimetric Assay Kit (ABTS)	E-BC-K219-M
	Total Antioxidant Capacity (T-AOC) Colorimetric Assay Kit	E-BC-K225-M
	Total Antioxidant Capacity (T-AOC) Colorimetric Assay Kit (ABTS)	E-BC-K271-M
TAS	Total Antioxidant Status (TAS) Colorimetric Assay Kit	E-BC-K801-M
Flavonoids	Plant Flavonoids Colorimetric Assay Kit	E-BC-K284-M
Total Phenols	Total Phenols Colorimetric Assay Kit (Plant samples)	E-BC-K354-M

## Product presentation

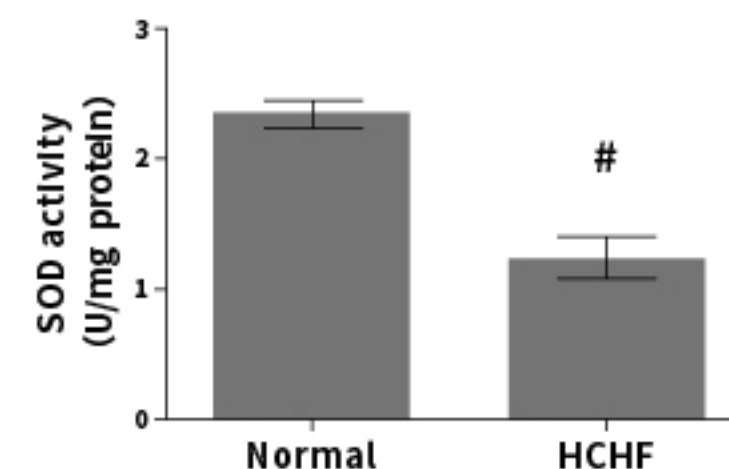
## ◆ Total Superoxide Dismutase(T-SOD) Activity Assay Kit (WST-1 Method) (E-BC-K020-M) ◆

## ① Product feature

- Sample volume: 0.02 mL/well ;
- Reaction time: 20 min
- Sample size: 92 sample/96T

## ② Application

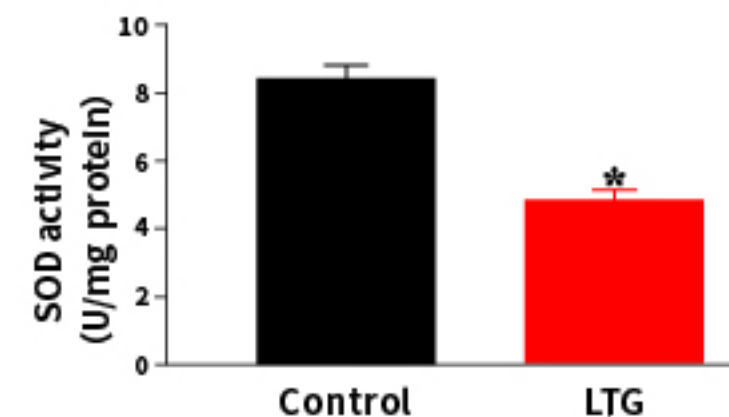
## a) Disease mechanism research



Sample type: Rat liver

Resources: Wong SK, Chin K, Ahmad F, et al. Biochemical and histopathological assessment of liver in a rat model of metabolic syndrome induced by high - carbohydrate high - fat diet[J]. Journal of Food Biochemistry, 2020, 44.

## b) Drug evaluation



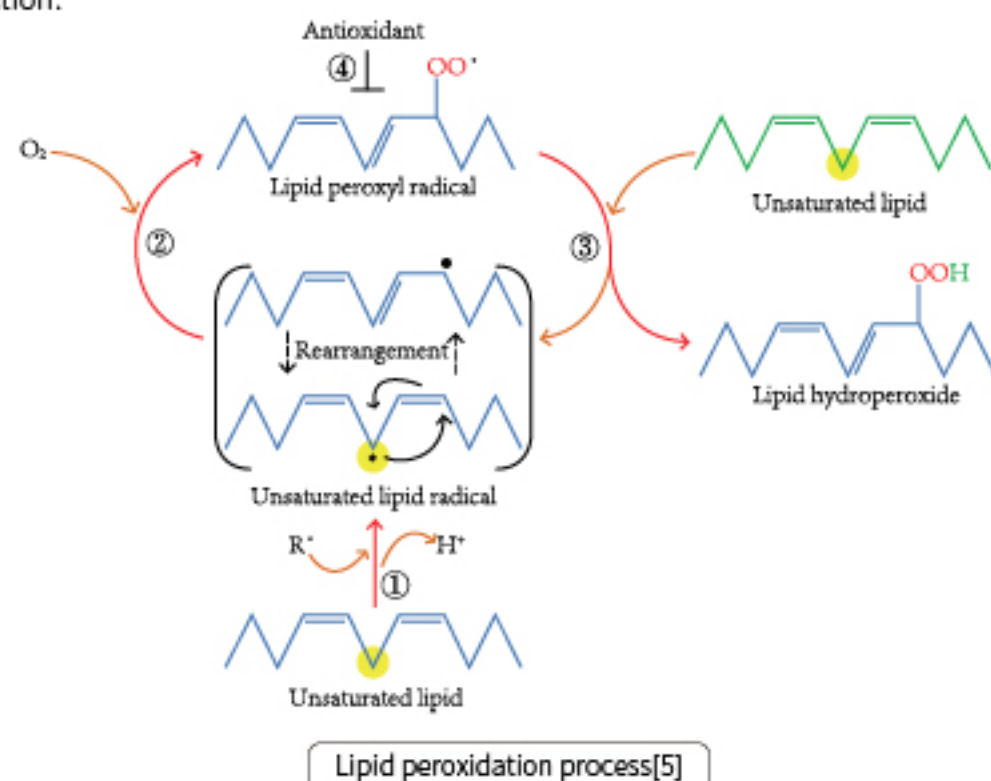
Sample type: mouse brain

Resources: Abubakar K, Mailafiya M M, Danmaigoro A, et al. Curcumin Attenuates Lead-Induced Cerebellar Toxicity in Rats via Chelating Activity and Inhibition of Oxidative Stress[J]. Biomolecules, 1801, 9(9).

## OXIDATION PRODUCTS

### Lipid peroxidation

Lipid peroxidation is the oxidation of carbon-carbon double bonds in lipids by reactive oxygen species to form unsaturated lipids. The products of lipid peroxidation are Malondialdehyde (MDA) and 4-hydroxynonenal (HNE). Lipid peroxidation damages the biofilm and its function by changes in cell membrane fluidity and permeability, and ultimate changes in cell structure and function.



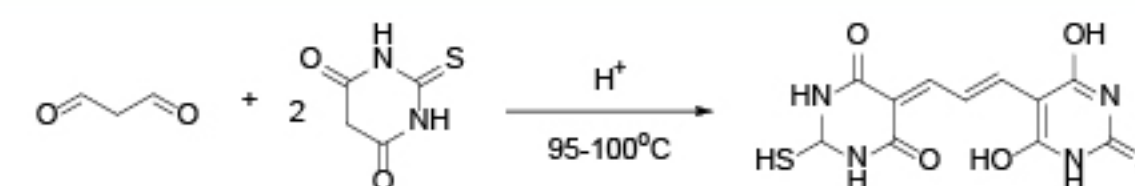
### Lipid peroxidation kit

Marker	Product Name	Cat#
MDA	Malondialdehyde (MDA) Colorimetric Assay Kit (TBA Method)	E-BC-K025-M
	Malondialdehyde (MDA) Colorimetric Assay Kit (TBA Method)	E-BC-K025-S
	Malondialdehyde (MDA) Colorimetric Assay Kit (Plant Samples)	E-BC-K027-M
	Malondialdehyde (MDA) Colorimetric Assay Kit (Plant Samples)	E-BC-K027-S
	Malondialdehyde (MDA) Colorimetric Assay Kit (Cell Samples)	E-BC-K028-M
TBARS	Thiobarbituric Acid Reactants (TBARS) Colorimetric Assay Kit	E-BC-K298-M
	Thiobarbituric Acid Reactants (TBARS) Colorimetric Assay Kit	E-BC-K298-F
LPO	Lipid Peroxide (LPO) Colorimetric Assay Kit	E-BC-K176-M

### Product presentation

#### ◆ Malondialdehyde (MDA) Colorimetric Assay Kit (TBA Method) (E-BC-K025-M) ◆

MDA is one of the final products of lipid peroxidation in cell membrane. TBA method is the classic principle for MDA determination.



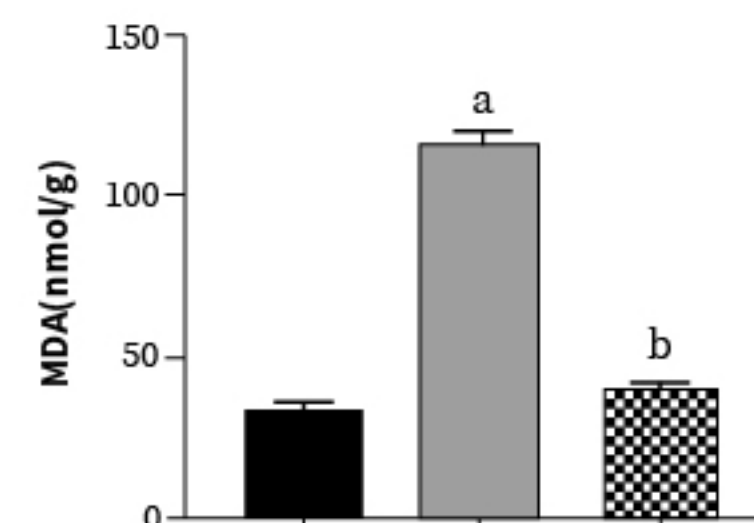
TBA method

#### ① Product Feature

- ☑ Sample volume: 20  $\mu$ L/well
- ☑ Sample processing: Supernatant can be determined directly after homogenization;
- ☑ Reaction time: 40 min

#### ② Application

Disease mechanisms



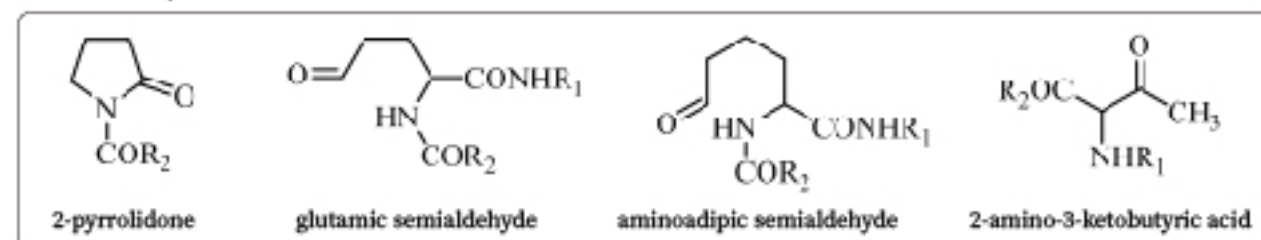
Sample type: Rats Hippocampal tissue

Resources: Messiha B, Ali M, Khattab MM, et al. Perindopril ameliorates experimental Alzheimer's disease progression: role of amyloid  $\beta$  degradation, central estrogen receptor and hyperlipidemic-lipid raft signaling[J]. Inflammopharmacology, 2020.



## Protein oxidation

Protein oxidation is the oxidation of amino acid side chains by free radical to produce proteins containing carbonyl groups. Protein carbonyl is a biological indicator of oxidative stress, and the degree of protein oxidation can be estimated indirectly by measuring the content of protein carbonyl.



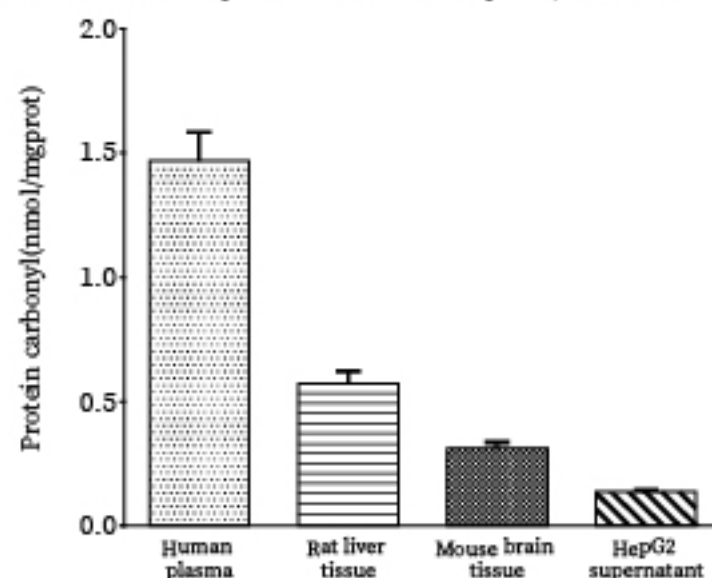
Carbonyl derivative structures produced by direct oxidation of amino acid side chains[6]

## Protein oxidation kit

Marker	Product Name	Cat#
Protein Carbonyl	Protein Carbonyl Colorimetric Assay Kit	E-BC-K117-M
	Protein Carbonyl Colorimetric Assay Kit	E-BC-K117-S

## Product presentation

## ◆ Protein Carbonyl Colorimetric Assay Kit (E-BC-K117-M) ◆



## Sample validation

Detect human plasma (dilute for 10 times, the concentration of protein in sample is 0.43 mgprot/mL), 10% rat liver tissue homogenate (dilute for 2 times, the concentration of protein in sample is 0.29 mgprot/mL), 10% mouse brain tissue homogenate (the concentration of protein in sample is 0.23 mgprot/mL) and HepG2 supernatant (the concentration of protein in sample is 0.35 mgprot/mL) according to the protocol.

## PUBLICATIONS



Marker	Cat#	Title
SOD CAT	E-BC-K020-M E-BC-K031-M	Wan Q, Cao R, Wen G, et al. Sequential use of UV-LEDs irradiation and chlorine to disinfect waterborne fungal spores: Efficiency, mechanism and photoreactivation [J]. J Hazard Mater, 2021.
Fe	E-BC-K139-S	Pan C, Yan M, Jin H, et al. Chronic exposure to MC-LR increases the risks of micro-cytic anemia: Evidence from human and mice [J]. Environmental Pollution, 2021.
GSSG	E-BC-K097-S	Liu P, Yin Z, Chen M, et al. Cytotoxicity of adducts formed between quercetin and methylglyoxal in PC-12 cells [J]. Food Chem, 2021.
MDA	E-BC-K025-M	Liu Z, Liu X, Yang Q, et al. Neutrophil membrane-enveloped nanoparticles for the amelioration of renal ischemia-reperfusion injury in mice [J]. Acta Biomaterialia, 2020.
H <sub>2</sub> O <sub>2</sub>	E-BC-K102-S	Yang Z, Wang J, Ai S, et al. Self-generating oxygen enhanced mitochondrion-targeted photodynamic therapy for tumor treatment with hypoxia scavenging [J]. Theranostics, 2019.
MPO	E-BC-K074-S	Yang Y, Yin B, Lv L, et al. Gastroprotective Effect Of Aucubin Against Ethanol-induced Gastric Mucosal Injury In Mice [J]. Life Sciences, 2017.



VC	E-BC-K034-S	Adhikari B, Adhikari M, Ghimiri B, et al. Cold plasma seed priming modulates growth, redox homeostasis and stress response by inducing reactive species in tomato ( <i>Solanum lycopersicum</i> ) [J]. <i>Free Radical Biology and Medicine</i> , 2020.
ROS	E-BC-K138-F	Rao M J, Xu Y T, Tang X M, et al. CsCYT75B1, a Citrus CYTOCHROME P450 Gene, Is Involved in Accumulation of Antioxidant Flavonoids and Induces Drought Tolerance in Transgenic <i>Arabidopsis</i> [J]. <i>Antioxidants (Basel)</i> , 2020.
APX	E-BC-K353-S	Lee H Y, Back K. Melatonin induction and its role in high light stress tolerance in <i>Arabidopsis thaliana</i> [J]. <i>Journal of Pineal Research</i> , 2018.
ROS	E-BC-K138-F	Jabbari N, Nawaz M, Rezaie J. Ionizing Radiation Increases the Activity of Exosomal Secretory Pathway in MCF-7 Human Breast Cancer Cells: A Possible-Way to Communicate Resistance against Radiotherapy [J]. <i>International Journal of Molecular Science</i> , 2021.
GPx	E-BC-K096-S	Zhao Y, Wang T, Li P, et al. <i>Bacillus amyloliquefaciens</i> B10 can alleviate aflatoxin B1-induced kidney oxidative stress and apoptosis in mice [J]. <i>Ecotoxicology Environmental Safety</i> , 2021.
MDA	E-BC-K025-S	Moustafa A. Effect of Omega-3 or Omega-6 Dietary Supplementation on Testicular Steroidogenesis, Adipokine Network, Cytokines, and Oxidative Stress in Adult Male Rats [J]. <i>Oxidative Medicine and Cellular Longevity</i> , 2021.
GPx	E-BC-K096-S	Mohamad N, Ima-Nirwana S, Chin K. Therapeutic potential of annatto tocotrienol with self-emulsifying drug delivery system in a rat model of postmenopausal bone loss [J]. <i>Biochemical &amp; Pharmacotherapy</i> , 2021.
NO CAT T-SOD TBARS	E-BC-K035-S E-BC-K031-S E-BC-K020-M E-BC-K298-M	Zhou D, Yang Q, Tian T, et al. Gastroprotective effect of gallic acid against ethanol-induced gastric ulcer in rats: Involvement of the Nrf2/HO-1 signaling and anti-apoptosis role [J]. <i>Biochemical &amp; Pharmacotherapy</i> , 2021.
Flavon	E-BC-K284-S	Tong Y, Liu S Y, Yi S C, et al. Bruceine D, the main active ingredient of <i>Brucea javanica</i> (L.) residue inhibits the germination of <i>Bidens pilosa</i> L. seeds by suppressing phenylpropanoid biosynthesis [J]. <i>Industrial Crops &amp; Products</i> , 2021.
GSH MDA	E-BC-K030-M E-BC-K025-M	Mohammed R, Mahmoud K, Amira A, et al. Perindopril ameliorates experimental Alzheimer's disease progression: role of amyloid $\beta$ degradation, central estrogen receptor and hyperlipidemic lipid raft signaling [J]. <i>Inflammopharmacology</i> , 2021.

ROS	E-BC-K138-F	Ahmed U, Rao M J, Qi C, et al. Expression Profiling of Flavonoid Biosynthesis Genes and Secondary Metabolites Accumulation in <i>Populus</i> under Drought Stress [J]. <i>Molecules</i> , 2021.
T-SOD	E-BC-K020-M	El-Baset S A A, El-Haleem M R A, Abdul- Maksoud R S, et al. Mesna ameliorates acute lung injury induced by intestinal ischemia-reperfusion in rats [J]. <i>Scientific Reports</i> , 2021.
MDA	E-BC-K025-M	Ghafariarsani H, Imani A, Niewold T A, et al. Synergistic toxicity of dietary aflatoxin B1 (AFB1) and zearalenone (ZEN) in rainbow trout ( <i>Oncorhynchus mykiss</i> ) is attenuated by anabolic effects [J]. <i>Aquaculture</i> , 2021.
ATP	E-BC-K157-S	Xu X, Cui Y, Li C, et al. SETD3 Downregulation Mediates PTEN Upregulation-Induced Ischemic Neuronal Death Through Suppression of Actin Polymerization and Mitochondrial Function [J]. <i>Molecular Neurobiology</i> , 2021.
ROS	E-BC-K138-F	ALTamimi J Z, BinMowyan M N, Alfari N A, et al. Fisetin protects against streptozotocin-induced diabetic cardiomyopathy in rats by suppressing fatty acid oxidation and inhibiting protein kinase R [J]. <i>Saudi Journal of Biological Science</i> , 2021.
MDA	E-BC-K025-S	Bilge S S, Gunaydin C, Onger M E, et al. Neuroprotective action of agmatine in rotenone-induced model of Parkinson's disease: Role of BDNF/cREB and ERK pathway [J]. <i>Behavioural Brain Research</i> , 2021.
ROS T-SOD CAT	E-BC-K138-F E-BC-K019-M E-BC-K031-M	Zhang L, Dong R, Wang Y, et al. The anti-breast cancer property of physcion via oxidative stress-mediated mitochondrial apoptosis and immune response [J]. <i>Pharmaceutical Biology</i> , 2021.
GPx	E-BC-K096-S	Marzocco S, Fazeli G, Di Micco L, et al. Supplementation of Short-Chain Fatty Acid, Sodium Propionate, in Patients on Maintenance Hemodialysis: Beneficial Effects on Inflammatory Parameters and Gut-Derived Uremic Toxins, A Pilot Study (PLAN Study) [J]. <i>Journal of Clinical Medicine</i> , 2018.
GPX	E-BC-K096-S	Kim J, Choung S Y. Pinus Densiflora Bark Extract Prevents Selenite-induced Cataract Formation In The Lens Of Sprague Dawley Rat Pups [J]. <i>Molecular Vision</i> , 2017
GPX T-AOC	E-BC-K096-S E-BC-K136-S	Alahmar A T, Calogero A E, Sengupta P, et al. Coenzyme Q10 improves sperm parameters, oxidative stress markers and sperm DNA fragmentation in infertile patients with idiopathic oligoasthenozoospermia [J]. <i>The World Journal of Men's Health</i> , 2020.



MDA	E-BC-K025-S	El-Shiekh RA, Hussein D, Atta A H, et al. Anti-inflammatory activity of <i>Jasminum grandiflorum</i> L. subsp. <i>floribundum</i> (Oleaceae) in inflammatory bowel disease and arthritis models [J]. <i>Biomedicine &amp; Pharmacotherapy</i> , 2021.
SOD GPX	E-BC-K020-M E-BC-K096-S	Siboto A, Sibiya N, Khathi A, et al. The Effects of <i>Momordica balsamina</i> Methanolic Extract on Kidney Function in STZ-Induced Diabetic Rats: Effects on Selected Metabolic Markers [J]. <i>Journal of Diabetes Research</i> , 2018.
SOD GPX T-AOC	E-BC-K022-S E-BC-K096-S E-BC-K136-S	Akinnuga A M, Siboto A, Khumalo B, et al. Ameliorative Effects of Bredemolic Acid on Markers Associated with Renal Dysfunction in a Diet-Induced Prediabetic Rat Model [J]. <i>Oxidative Medicine and Cellular Longevity</i> , 2020.
TBARS	E-BC-K298-M	Du Y, Qian Y, Tang X, et al. Chloroquine attenuates lithium-induced NDI and proliferation of renal collecting duct cells [J]. <i>American Journal of Physiology-Renal Physiology</i> , 2020.
GSH	E-BC-K030-M	Estébanez B, Rodriguez A L, Visavadiya N P, et al. Aerobic Training Down-Regulates Pentraxin 3 and Pentraxin 3/Toll-Like Receptor 4 Ratio, Irrespective of Oxidative Stress Response, in Elderly Subjects [J]. <i>Antioxidants</i> , 2020.
MDA NO	E-BC-K025-S E-BC-K035-S	Fang Z, Hu X, Chen Z, et al. <i>Radix pseudostellariae</i> of Danzhi Jiangtang capsule relieves oxidative stress of vascular endothelium in diabetic macroangiopathy [J]. <i>Saudi Pharmaceutical Journal: SPJ</i> , 2020.
GSH	E-BC-K030-M	He Y, Xu X, Qiu J, et al. <i>Bombyx mori</i> used as a fast detection model of liver melanization after a clinical drug-Acetaminophen exposure [J]. <i>Journal of Asia-Pacific Entomology</i> , 2020.

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- [1] Sharifi-Rad M, Kumar N V A, Zucca P, et al. Lifestyle, Oxidative Stress, and Antioxidants: Back and Forth in the Pathophysiology of Chronic Diseases[J]. *Frontiers in Physiology*, 2020, 2020(11):694.
- [2] D Stéphanie, S Séverine. The Protective Effect of Antioxidants Consumption on Diabetes and Vascular Complications[J]. *Diseases*, 2016, 4(4):24.
- [3] McElwee S K, Velasco A, Doppalapudi H. Mechanisms of Sudden Cardiac Death: Oxidants and Metabolism[J]. *Journal of Nuclear Cardiology*, 2016, 23(6):1368-1379.
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- [5] A Ayala, M F Munoz, S Arguelles. Lipid peroxidation: production, metabolism, and signaling mechanisms of malondialdehyde and 4-hydroxy-2-nonenal[J]. *Oxid Med Cell Longev*, 2014, 2014: 360438
- [6] I Dalle-Donne, R Rossi, D Giustarini, et al. Protein carbonyl groups as biomarkers of oxidative stress[J]. *Clinica Chimica Acta*, 2003, 329(1-2): 23-38.

## PRODUCTS EXPLANATION

## Product item



Spectrophotometer

**E-BC-K000-S**

In which the letter "S" is the initial letter of the Spectrophotometer, on behalf of the applicable instrument is UV-visible Spectrophotometer.

**ADVANTAGE:**

- ☐ Low operating cost;
- ☐ Widely wavelength range;
- ☐ High sensitivity.



Microplate reader

**E-BC-K000-M**

In which the letter "M" is the initial letter of the Microplate, on behalf of the applicable instrument is Microplate reader.

**ADVANTAGE:**

- ☐ Small sample volume;
- ☐ Simple to operate;
- ☐ Rapid detection.



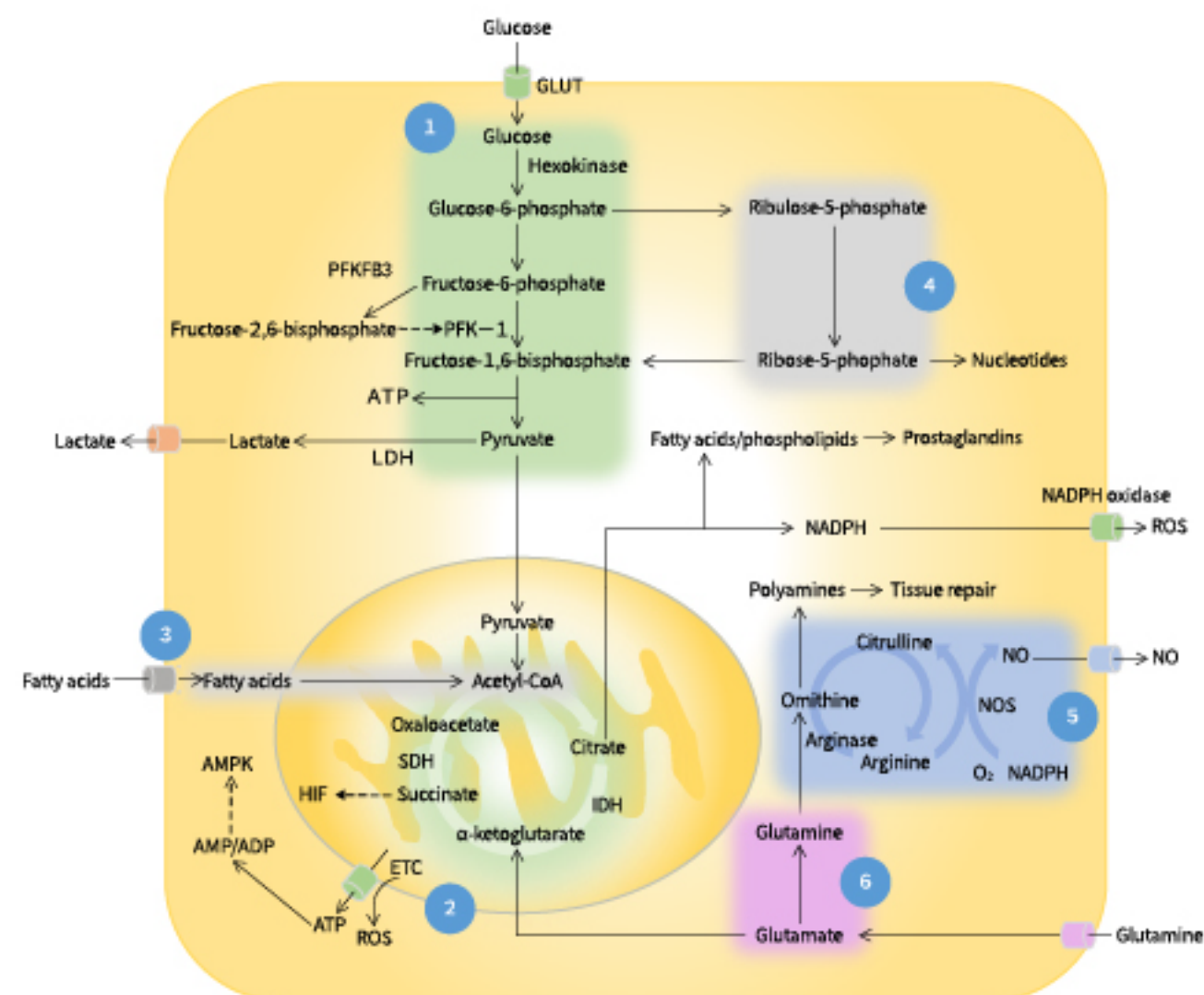
Fluorescence microplate reader

**E-BC-F000**

In which the letter "F" is the initial letter of the Fluorescence, on behalf of the applicable instrument is Fluorescence microplate reader.

**ADVANTAGE:**

- ☐ high specificity and sensitivity;
- ☐ small sample volume.



The interrelationship of carbohydrate, lipid, protein and nucleic acid metabolism

Resources: Tang C Y, Claudio M. Similarities in the Metabolic Reprogramming of Immune System and Endothelium[J]. Frontiers in Immunology, 2017, 8.