

Anti-Glutathione Peroxidase 4 antibody [EPNCIR144]

Anti-Glutathione Peroxidase 4 antibody [EPNCIR144] (ab125066) is a rabbit monoclonal antibody detecting Glutathione Peroxidase 4 in **Western Blot, Flow Cytometry (Intra), IHC-P, ICC/IF**. Suitable for **Human, Mouse, Rat**.

- Clone EPNCIR144 is the most cited clone to Glutathione Peroxidase 4
- KO validated for confirmed specificity
- Biophysical QC for unrivalled batch-batch consistency
- Over 560 publications

Lab Essentials

Recombinant

RabMAb

KO Validated

Key facts

Isotype	IgG
Host species	Rabbit
Storage buffer	pH: 7.2 - 7.4 Preservative: 0.01% Sodium azide Constituents: PBS, 40% Glycerol (glycerin, glycerine), 0.05% BSA
Form	Liquid
Clonality	Monoclonal
Immunogen	The exact immunogen used to generate this antibody is proprietary information.
Clone number	EPNCIR144
Purification technique	Affinity purification Protein A
Concentration	0.455 mg/mL The concentration of this product may be batch-dependent Batch concentration finder →

Reactivity data

IHC-P

Tested

Species	Human
Dilution info	1/50 - 1/250
Notes	Perform heat-mediated antigen retrieval before commencing with IHC staining protocol.

Expected

Species	Mouse, Rat
Dilution info	Use at an assay dependent concentration.
Notes	-

ICC/IF

Tested

Species	Human
Dilution info	-
Notes	-

Expected

Species	Mouse, Rat
Dilution info	Use at an assay dependent concentration.
Notes	-

WB

Tested

Species	Mouse
Dilution info	1/1000 - 1/10000
Notes	-

Species	Rat
Dilution info	1/1000 - 1/10000

Notes	-
Species	Human
Dilution info	1/1000 - 1/10000
Notes	-

Flow Cyt (Intra)

Tested

Species	Human
Dilution info	1/400
Notes	-

Expected

Species	Mouse, Rat
Dilution info	Use at an assay dependent concentration.
Notes	-

Target data

[See full target information Phospholipid hydroperoxide glutathione peroxidase](#) 

Function	Essential antioxidant peroxidase that directly reduces phospholipid hydroperoxide even if they are incorporated in membranes and lipoproteins (PubMed:40281343). Can also reduce cholesterol hydroperoxide and thymine hydroperoxide (By similarity). Plays a key role in protecting cells from oxidative damage by preventing membrane lipid peroxidation (PubMed:40281343). Required to prevent cells from ferroptosis, a non-apoptotic cell death resulting from an iron-dependent accumulation of lipid reactive oxygen species (PubMed:24439385, PubMed:40281343). The presence of selenocysteine (Sec) versus Cys at the active site is essential for life: it provides resistance to overoxidation and prevents cells against ferroptosis (By similarity). The presence of Sec at the active site is also essential for the survival of a specific type of parvalbumin-positive interneurons, thereby preventing against fatal epileptic seizures (By similarity). May be required to protect cells from the toxicity of ingested lipid hydroperoxides (By similarity). Required for normal sperm development and male fertility (By similarity). Essential for maturation and survival of photoreceptor cells (By similarity). Plays a role in a primary T-cell response to viral and parasitic infection by protecting T-cells from ferroptosis and by supporting T-cell expansion (By similarity). Plays a role of glutathione peroxidase in platelets in the arachidonic acid metabolism (PubMed:11115402). Reduces hydroperoxy ester lipids formed by a 15-
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lipoxygenase that may play a role as down-regulator of the cellular 15-lipoxygenase pathway (By similarity). Can reduce fatty acid-derived hydroperoxides (PubMed:11115402, PubMed:36608588). Can also reduce small soluble hydroperoxides such as H₂O₂, cumene hydroperoxide and tert-butyl hydroperoxide (PubMed:17630701, PubMed:36608588).

Storage

Shipped at conditions	Conditional Ambient
Appropriate short-term storage duration	1-2 weeks
Appropriate short-term storage conditions	+4°C
Appropriate long-term storage conditions	-20°C
Aliquoting information	Upon delivery aliquot
Storage information	Stable for 12 months at -20°C

Notes

Anti-Glutathione Peroxidase 4 antibody [EPNCIR144] (ab125066) was developed by Abcam using patented rabbit monoclonal antibody technology and is validated for use in Flow Cyt (Intra), ICC/IF, IHC-P and WB.

Anti-Glutathione Peroxidase 4 antibody [EPNCIR144] (ab125066) was first used in a scientific publication in 2012 and has been cited over 567 times in peer reviewed journals. It's performance in Western Blot and IHC in mouse and human samples is trusted by the scientific community.

Abcam's high quality manufacturing and validation processes ensure Anti-Glutathione Peroxidase 4 antibody [EPNCIR144] (ab125066) has high sensitivity and specificity alongside high lot-to-lot consistency and reproducibility.

The specificity of Anti-Glutathione Peroxidase 4 antibody [EPNCIR144] (ab125066) has been confirmed by Western Blot testing in Glutathione Peroxidase 4 knockout HeLa cells (ab262509).

Anti-Glutathione Peroxidase 4 antibody [EPNCIR144] (ab125066) has 12 independent reviews from customers.

Anti-Glutathione Peroxidase 4 antibody [EPNCIR144] (ab125066) specifically detects Glutathione Peroxidase 4 (UniProt ID: O70325; Molecular weight: 22kDa) and is sold in 100 µL and 1 mL selling sizes.

Conjugation-ready, carrier free format available for antibody clone EPNCIR144 - ab219592.

Antibody clone EPNCIR144 is also available pre-conjugated to a variety of labels for your convenience - Alexa Fluor® 488, Alexa Fluor® 647 (ab314333, ab314334).

Top cited antibody for this target with >1000 citations. Glutathione peroxidase 4 is a master regulator of ferroptosis

and lipid peroxidation. This antibody is crucial in cancer research, particularly in understanding GPX4's role in cell death and antioxidant defence and is widely used in studies of reactive oxygen species (ROS) and GPX4 inhibitors for therapeutic applications.

Patented technology

Our RabMAb® technology is a patented hybridoma-based technology for making rabbit monoclonal antibodies. For details on our patents, please refer to RabMAb® patents.

What are the advantages of a recombinant monoclonal antibody?

This product is a recombinant monoclonal antibody, which offers several advantages including:

- High batch-to-batch consistency and reproducibility
- Improved sensitivity and specificity
- Long-term security of supply
- Animal-free batch production

For more information, read more on recombinant antibodies.

Supplementary info

This supplementary information is collated from multiple sources and compiled automatically.

Activity summary

Glutathione Peroxidase 4 (GPX4) also known as GXP4 or 1B4 is an essential selenoprotein with a molecular weight of approximately 22 kDa. It acts mechanically by reducing lipid hydroperoxides to their corresponding alcohols and free hydrogen peroxide to water utilizing glutathione as a cofactor. GPX4 is ubiquitously expressed with high expression levels found in the testis indicating its importance in spermatogenesis.

Biological function summary

This enzyme protects cells from oxidative damage by maintaining cellular redox balance. GPX4 exists as a monomer and is not part of larger complexes. It enables cells to counteract the harmful effects of reactive oxygen species (ROS) safeguarding lipid membranes from peroxidation. The protective function extends to the nervous system and other tissues where oxidative stress might lead to cellular damage.

Pathways

This enzyme plays a critical role in the antioxidant defense system. It integrates with the glutathione pathway where it operates alongside glutathione reductase and glutathione synthetase to detoxify cells. The protein also interacts with lipid metabolism pathways maintaining membrane integrity and function. These pathways further link GPX4 with other oxidative stress-related proteins and cellular survival mechanisms.

Associated diseases and disorders

GPX4 has connections to neurodegenerative diseases like Parkinson's disease and cancer. In neurodegeneration low GPX4 levels can lead to increased lipid peroxidation highlighting its protective function against neuronal damage. In cancer altered GPX4 expression associates with the oxidative stress response affecting tumor progression. The protein's interactions with key oxidative stress regulators suggest potential targets for therapeutic intervention.

Product promise

Tested

We have tested this species and application combination and it works. It is covered by our product promise.

Expected

We have not tested this specific species and application combination in-house, but expect it will work. It is covered by our product promise.

Predicted

This species and application combination has not been tested, but we predict it will work based on strong homology. However, this combination is not covered by our product promise.

Not recommended

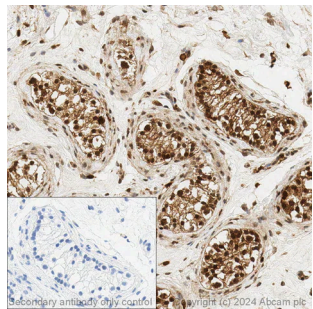
We do not recommend this combination. It is not covered by our product promise.

We are dedicated to supporting your work with high quality reagents and we are here for you every step of the way should you need us.

In the unlikely event of one of our products not working as expected, you are covered by our product promise.

Full details and terms and conditions can be found here:
Terms & Conditions.

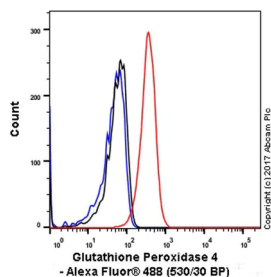
12 product images



Immunohistochemistry (Formalin/PFA-fixed paraffin-embedded sections) - Anti-Glutathione Peroxidase 4 antibody [EPNCIR144] (ab125066)

Glutathione Peroxidase 4 Immunohistochemistry (Formalin/PFA-fixed paraffin-embedded sections) staining of human testis using rabbit Anti-Glutathione Peroxidase 4 antibody

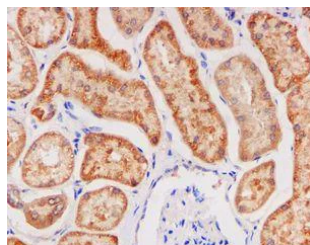
Immunohistochemical analysis of formalin fixed paraffin embedded human testis labelling Glutathione Peroxidase 4 with ab125066 at a concentration of 0.1 µg/ml. The immunostaining was performed on a Ventana DISCOVERY ULTRA (Roche Tissue Diagnostics) instrument with an OptiView DAB IHC Detection Kit. Heat mediated antigen retrieval was conducted for 32 mins at 100°C with ULTRA cell conditioning solution (CC1, pH 8.5). ab125066 anti-Glutathione Peroxidase 4 antibody [EPNCIR144] was incubated at 37°C for 16 mins. Sections were counterstained with Hematoxylin II. Image inset shows absence of staining in secondary antibody only control.



Flow Cytometry (Intracellular) - Anti-Glutathione Peroxidase 4 antibody [EPNCIR144] (ab125066)

Glutathione Peroxidase 4 Flow Cytometry (Intracellular) staining of HeLa (human cervix adenocarcinoma) cells using rabbit Anti-Glutathione Peroxidase 4 antibody

Intracellular Flow Cytometry analysis of HeLa (human cervix adenocarcinoma) cells labeling Glutathione Peroxidase 4 (red) with ab125066 at a 1/400 dilution. Cells were fixed with 4% paraformaldehyde and permeabilized with 90% methanol. A goat anti-rabbit IgG (Alexa Fluor® 488) ([ab150077](#)) was used as the secondary antibody at a 1/2000 dilution. Black - Rabbit monoclonal IgG ([ab172730](#)). Blue (unlabeled control) - Cells without incubation with the primary and secondary antibodies.

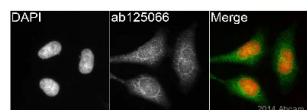


Immunohistochemistry (Formalin/PFA-fixed paraffin-embedded sections) - Anti-Glutathione Peroxidase 4 antibody [EPNCIR144] (ab125066)

Glutathione Peroxidase 4 Immunohistochemistry (Formalin/PFA-fixed paraffin-embedded sections) staining of human kidney tissue using rabbit Anti-Glutathione Peroxidase 4 antibody

Unpurified ab125066 at a 1/100 dilution staining Glutathione Peroxidase 4 in paraffin-embedded human kidney tissue by immunohistochemistry.

Perform heat mediated antigen retrieval before commencing with IHC staining protocol.

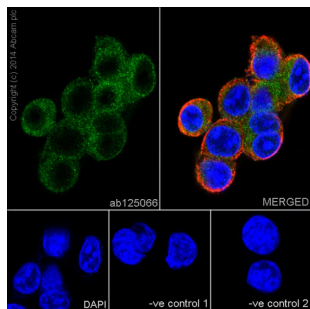


Immunocytochemistry/ Immunofluorescence - Anti-Glutathione Peroxidase 4 antibody [EPNCIR144] (ab125066)

Glutathione Peroxidase 4 Immunocytochemistry/ Immunofluorescence staining of HeLa cells using rabbit Anti-Glutathione Peroxidase 4 antibody

Unpurified ab125066 staining Glutathione Peroxidase 4 in the HeLa cell line from Human cervical cancer by ICC/IF (Immunocytochemistry/immunofluorescence). Cells were fixed with methanol. Samples were incubated with primary antibody (1/500 dilution in PBS) for 1 hour at 22°C. [ab150081](#) an Alexa Fluor® 488-conjugated Goat anti-rabbit IgG polyclonal (1/200 dilution) was used as the secondary antibody. Nuclear staining was carried out with DAPI.

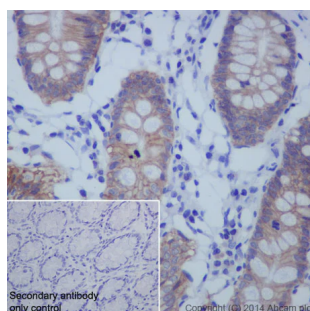
This image is courtesy of a customer review submitted by Kirk McManus



Immunocytochemistry/ Immunofluorescence - Anti-Glutathione Peroxidase 4 antibody [EPNCIR144] (ab125066)

Glutathione Peroxidase 4 Immunocytochemistry/ Immunofluorescence staining of HEK293 cells using rabbit Anti-Glutathione Peroxidase 4 antibody

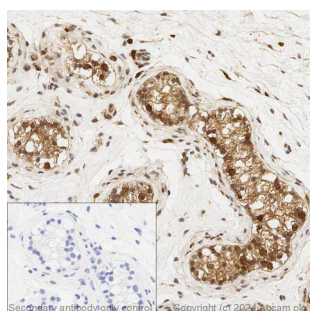
Immunofluorescence staining of HEK293 cells with purified ab125066 at a working dilution of 1/200 counter-stained with DAPI. The secondary antibody was Alexa Fluor® 488 goat anti-rabbit (ab150077) used at a dilution of 1/1000. ab7291 a mouse anti-tubulin antibody (1/1000) was used to stain tubulin along with ab150120 (Alexa Fluor® 594 goat anti-mouse 1/1000) shown in the top right hand panel. The cells were fixed in 4% PFA and permeabilized using 0.1% Triton X 100. The negative controls are shown in bottom middle and right hand panels - for negative control 1 purified ab125066 was used at a dilution of 1/500 followed by an Alexa Fluor® 594 goat anti-mouse antibody (ab150120) at a dilution of 1/500. For negative control 2 ab7291 (mouse anti-tubulin) was used at a dilution of 1/500 followed by an Alexa Fluor® 488 goat anti-rabbit antibody (ab150077) at a dilution of 1/400.



Immunohistochemistry (Formalin/PFA-fixed paraffin-embedded sections) - Anti-Glutathione Peroxidase 4 antibody [EPNCIR144] (ab125066)

Glutathione Peroxidase 4 Immunohistochemistry (Formalin/PFA-fixed paraffin-embedded sections) staining of human stomach tissue using rabbit Anti-Glutathione Peroxidase 4 antibody

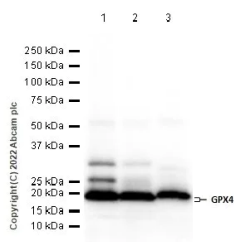
Immunohistochemical staining of paraffin embedded human stomach with purified ab125066 at a working dilution of 1/50. The secondary antibody used is HRP goat anti-rabbit IgG H&L (ab97051) at 1/500 dilution. The sample is counter-stained with hematoxylin. Antigen retrieval was performed using Tris-EDTA buffer pH 9.0. PBS was used instead of the primary antibody as the negative control and is shown in the inset.



Immunohistochemistry (Formalin/PFA-fixed paraffin-embedded sections) - Anti-Glutathione Peroxidase 4 antibody [EPNCIR144] (ab125066)

Glutathione Peroxidase 4 Immunohistochemistry (Formalin/PFA-fixed paraffin-embedded sections) staining of human testis using rabbit Anti-Glutathione Peroxidase 4 antibody

Immunohistochemical analysis of formalin fixed paraffin embedded human testis labelling Glutathione Peroxidase 4 with ab125066 at a concentration of 1 µg/ml. The immunostaining was performed on a Leica Biosystems BOND® RX instrument with a Bond™ Polymer Refine Detection kit. Heat mediated antigen retrieval was performed with Tris-EDTA buffer (pH 9.0, Epitope Retrieval Solution 2) for 20 mins. ab125066 anti-Glutathione Peroxidase 4 antibody [EPNCIR144] was incubated for 30 mins at room temperature. Sections were counterstained with Hematoxylin. Image inset shows absence of staining in secondary antibody only control.



Western blot - Anti-Glutathione Peroxidase 4 antibody [EPNCIR144] (ab125066)

Blocking buffer and concentration: 5% NFDM/TBST Diluting buffer and concentration: 5% NFDM/TBST This antibody can detect 19kda cytoplasmic form and 22kda mitochondrial isoform. All lanes:

Western blot - Anti-Glutathione Peroxidase 4 antibody [EPNCIR144] (ab125066) at 1/1000 dilution

Lane 1:

Rat testis tissue lysate at 20 µg

Lane 2:

Mouse testis tissue lysate at 20 µg

Lane 3:

Human testis tissue lysate at 20 µg

Secondary

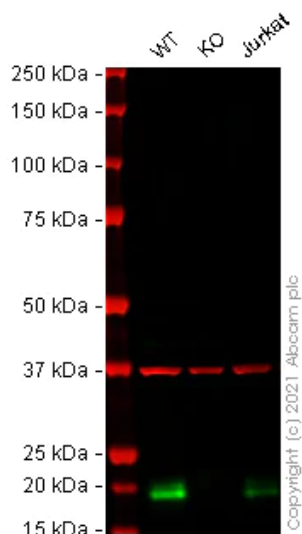
All lanes:

Goat Anti-Rabbit IgG (HRP) with minimal cross-reactivity with human IgG at 1/2000 dilution

Predicted band size: 22 kDa

Observed band size: 19 kDa, 22 kDa

Exposure time: 1s



Western blot - Anti-Glutathione Peroxidase 4 antibody [EPNCIR144] (ab125066)

Glutathione Peroxidase 4 Western blot staining using rabbit Anti-Glutathione Peroxidase 4 antibody

Lanes 1 - 3: Merged signal (red and green). Green - ab125066 observed at 20 kDa. Red - loading control [ab8245](#) (Mouse anti-GAPDH antibody [6C5]) observed at 37 kDa.

ab125066 was shown to react with Glutathione Peroxidase 4 in wild-type HeLa cells in Western blot with loss of signal observed in GPX4 knockout cell line [ab262509](#) (knockout cell lysate [ab263935](#)). Wild-type HeLa and GPX4 knockout cell lysates were subjected to SDS-PAGE. Membranes were blocked in 3 % milk in TBS-T (0.1 % Tween®) before incubation with ab125066 and [ab8245](#) (Mouse anti-GAPDH antibody [6C5]) overnight at 4 °C at a 1 in 1000 dilution and a 1 in 20000 dilution respectively. Blots were incubated with Goat anti-Rabbit IgG H&L (IRDye® 800CW) preabsorbed ([ab216773](#)) and Goat anti-Mouse IgG H&L (IRDye® 680RD) preabsorbed ([ab216776](#)) secondary antibodies at 1 in 20000 dilution for 1 h at room temperature before imaging.

All lanes:

Western blot - Anti-Glutathione Peroxidase 4 antibody [EPNCIR144] (ab125066) at 1/1000 dilution

Lane 1:

Wild-type HeLa (Human epithelial cell line from cervix adenocarcinoma) whole cell lysate at 20 µg

Lane 2:

GPX4 knockout HeLa (Human epithelial cell line from cervix adenocarcinoma) whole cell lysate at 20 µg

Lane 2:

Western blot - Human GPX4 knockout HeLa cell line ([ab262509](#))

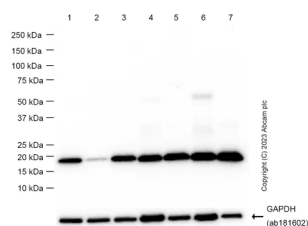
Lane 3:

Jurkat (Human T cell leukemia cell line from peripheral blood) whole cell lysate at 20 µg

Performed under reducing conditions.

Predicted band size: 22 kDa

Observed band size: 20 kDa



Western blot - Anti-Glutathione Peroxidase 4 antibody [EPNCIR144] (ab125066)

Blocking/Diluting buffer and concentration 5% NFDM/TBST. [ab181602](#) was used as GAPDH loading control.

All lanes:

Western blot - Anti-Glutathione Peroxidase 4 antibody [EPNCIR144] (ab125066) at 1/1000 dilution

Lane 1:

293T (Human embryonic kidney epithelial cell) whole cell lysate at 20 µg

Lane 2:

A549 (Human lung carcinoma epithelial cell) whole cell lysate at 20 µg

Lane 3:

HepG2 (Human hepatocellular carcinoma epithelial cell) whole cell lysate at 20 µg

Lane 4:

Rat heart lysate at 20 µg

Lane 5:

Mouse ovary lysate at 20 µg

Lane 6:

Mouse heart lysate at 20 µg

Lane 7:

Mouse lung lysate at 20 µg

Secondary

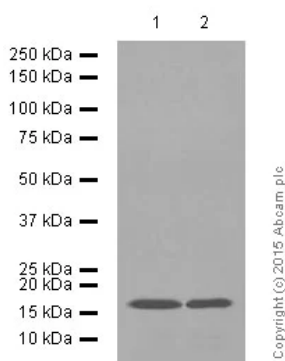
All lanes:

Western blot - Goat Anti-Rabbit IgG H&L (HRP) ([ab97051](#)) at 1/20000 dilution

Predicted band size: 22 kDa

Observed band size: 22 kDa

Exposure time: 20s



Western blot - Anti-Glutathione Peroxidase 4 antibody [EPNCIR144] (ab125066)

Glutathione Peroxidase 4 Western blot staining using rabbit Anti-Glutathione Peroxidase 4 antibody

Blocking buffer: 5% NFDM/TBST.

Dilution buffer: 5% NFDM/TBST.

All lanes:

Western blot - Anti-Glutathione Peroxidase 4 antibody [EPNCIR144] (ab125066) at 1/20000 dilution

Lane 1:

Mouse testis lysate at 20 µg

Lane 2:

Rat testis lysate at 20 µg

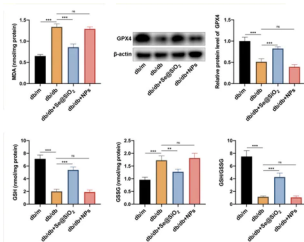
Secondary

All lanes:

HRP goat anti-rabbit IgG (H+L) at 1/1000 dilution

Predicted band size: 22 kDa

Observed band size: 17 kDa



Biochemical assay - Anti-Glutathione Peroxidase 4 antibody [EPNCIR144] (ab125066)

Niu et al used Lipid Peroxidation (MDA) Assay Kit [ab118970](#), GSH/ GSSG Assay Kit [ab138881](#), and Glutathione Peroxidase Assay Kit [ab125066](#) to investigate the use of porous Se@SiO₂ nanospheres to achieve controlled release of selenium, a scavenger of intracellular free radicals, in mouse eyes.

Male diabetic db/db and control db/m mice were injected in the eyes with porous Se@SiO₂ nanospheres, and porous SiO₂ nanospheres (NPs) without Se.

Porous Se@SiO₂ nanospheres inhibit diabetes-induced retinal lipid peroxidation and inflammation. Levels of MDA in retinal homogenates (n = 6). Expression levels of GPX4 in retinas were measured using western blotting; β-actin was used as a loading control (left panel). Band densities were assessed using the ImageJ software, and GPX4 expression levels are represented as their ratios to β-actin (right panel) (n = 3). Levels of GSH, GSSG, and the ratio of GSH to GSSG in retinal homogenates (n = 6). Data are represented as the mean ± SD. **p < 0.01, ***p < 0.001; ns, nonsignificant.

Retinal samples were harvested, washed, and lysed according to the manufacturer's instructions. Protein concentrations were determined using a bicinchoninic acid kit. MDA and glutathione concentrations were determined using a lipid peroxidation MDA assay kit, reduced glutathione (GSH) / oxidized glutathione (GSSG) Ratio Detection Assay kit ([ab118970](#), [ab138881](#); Abcam, MA, USA), and a microplate reader. The relative concentrations of MDA and glutathione were calculated by normalizing the measured concentrations to that of the total protein.

Please note: All products are 'FOR RESEARCH USE ONLY. NOT FOR USE IN DIAGNOSTIC OR THERAPEUTIC PROCEDURES'.