



ANTIOXIDANTS

Glutathione Peroxidase | Glutathione Reductase |
Superoxide Dismutase | Total Antioxidant Status (TAS)



Fortress
Diagnostics

Advancing Global Diagnostics

Fortress Diagnostics is a well-established, multi award-winning IVD manufacturer based in the United Kingdom, supplying an extensive portfolio of products to over 100 countries worldwide.

We have been providing our distributors and end users with high quality products for over 20 years. The objective of Fortress Diagnostics is to provide the highest level of diagnostic solutions, globally, through continued investment in research and development.

Why choose Fortress Diagnostics?



Our proven product performance, matched with our selection of reputable distribution partners, has been instrumental in our continued success and growth. Built on a culture of quality and performance, we are committed to providing our customers with a reliable service and results they can trust.



Our ISO 13485:2016 certification for the design, development, manufacturing and distribution of in vitro diagnostics medical reagents and instrumentation endorses our product range and ensures that the highest quality standards are constantly maintained.



Through our global distribution network, we provide highly accurate medical testing solutions to immunology, haematology and serological laboratories in hospitals, medical centres, clinics, blood banks and research institutions in over 100 international markets.



Hosting an in-house Research and Development team, we are committed to creating the next innovative IVD solutions to exceed our customer's requirements and advance the healthcare industry. We reinvest over 30% of our turnover in R&D every year.

What are antioxidants?

Antioxidants are molecules that protect our body from damage caused by free radicals, which are unstable molecules that can lead to various diseases.

- Antioxidants are naturally found in various forms, including dietary vitamins, plant compounds such as wine polyphenols, and enzymes produced within the human body.
- Excessive oxidative activity and the resulting inflammation are widely recognised as contributing factors to many health conditions.
- Oxidation generates highly reactive molecules known as free radicals, which can disrupt normal cellular function.
- Antioxidants help defend cells by neutralising these free radicals and limiting potential cellular damage.

Why is clinical antioxidant testing important?

Assessing antioxidant levels can be valuable for individuals who are worried that their diet may not provide sufficient antioxidant support, or who feel their lifestyle may increase exposure to free radical damage, such as smoking, intense physical activity, stress, or frequent sun exposure.

Growing scientific evidence indicates that oxidative stress is linked to the development and progression of numerous health conditions, including:

Rheumatoid arthritis
Asthma
Cancer
Macular degeneration

Inflammatory bowel disease (IBD)
Neurodegenerative diseases such as
Parkinson's and Alzheimer's
Arthritis

Diabetes mellitus
Atherosclerosis
Chronic fatigue syndrome

Antioxidants are also considered to play a significant role in the ageing process. Measuring antioxidant levels can help determine whether a patient's status falls within the recommended range.

Glutathione Peroxidase

Glutathione peroxidase refers to a group of enzymes that help defend the body against oxidative damage. These enzymes act as protective antioxidants by neutralising free radicals formed within the body.

Measuring glutathione peroxidase activity can also provide insight into selenium status, as the enzyme is closely linked to selenium levels. Selenium is an essential trace mineral that supports immune health, contributes to normal thyroid function, and helps protect cells through its antioxidant properties.

Clinical Applications

- Selenium deficiency has been associated with increased risks such as recurrent miscarriage, muscle weakness or degeneration, and reduced male fertility.
- Adequate selenium levels may help provide protective support against conditions such as certain tumours, arthritis, and cardiovascular disorders.
- Excessive selenium intake can be harmful, making it important to maintain balanced levels.
- Monitoring selenium levels can also help assess the effectiveness of treatments or supplementation strategies.

Research

- To evaluate the antioxidant capacity and therapeutic effectiveness of newly developed medications.
- To investigate the relationship between glutathione peroxidase activity and various disease conditions.

Sports

- Supporting the identification and management of athletes who may be at risk of selenium deficiency.

Fortress Glutathione Peroxidase

- Enzymatic assay designed to provide precise and reliable measurement of glutathione peroxidase activity
- **High sensitivity at 75 U/L**, allowing detection of low levels of glutathione peroxidase
- **Application protocols** available with instrument-specific parameters for a broad range of clinical chemistry analysers
- **Dedicated glutathione peroxidase controls and calibrators available to support assay performance**

Glutathione Reductase

Glutathione reductase (GR) is an enzyme present in red blood cells that plays an essential role in protecting cells from oxidative stress. As a key component of the body's antioxidant defence system, it is widely distributed and supports cellular protection against free radical damage.

Glutathione exists in two forms:

- Reduced Glutathione
- Oxidised Glutathione

Glutathione reductase works alongside G-6-PDH to help reduce oxidative stress in erythrocytes. Its primary function is to convert oxidised glutathione back into its active, reduced form, enabling it to continue functioning as an antioxidant.

Clinical Applications

- Assessment of glutathione reductase deficiency, a rare genetic disorder, which presents with clinical symptoms similar to those seen in G-6-PDH deficiency.

Research

- To investigate the relationship between glutathione reductase activity and various disease conditions.

Sports

- Can be used to evaluate nutritional status, including riboflavin levels.

Fortress Glutathione Peroxidase

- Shows a strong correlation (**r = 0.988**) with other commercially available methods
- **High linearity up to 387 U/L**, eliminating the need for sample dilution
- Working reagent remains stable for 2 days when stored at +2 to +8°C
- **Instrument-specific application protocols available for a wide range of clinical chemistry analysers**

Superoxide Dismutase

Superoxide dismutase (SOD) is an essential antioxidant enzyme found in nearly all living cells, playing a critical role in protecting the body from oxidative stress by neutralizing harmful superoxide radicals.

Function and Importance

Superoxide dismutase catalyses the conversion of superoxide radicals, which are by-products of oxygen metabolism, into less harmful molecules.

Superoxide dismutase (SOD) is a key internal antioxidant enzyme that plays a critical role in defending the body against oxidative stress, which is linked to conditions such as atherosclerosis and other serious diseases.

SOD catalyses the conversion of the highly reactive superoxide radical into oxygen and hydrogen peroxide, neutralising one of the most harmful free radicals in the body. By doing so, it helps prevent lipid peroxidation, a process where free radicals damage cell membrane lipids, leading to cellular injury. Most aerobic cells contain this enzyme, highlighting its essential protective role.

Hydrogen peroxide produced by SOD is further broken down by glutathione peroxidase, while ferritin binds iron to prevent free iron ions from reacting with hydrogen peroxide to form dangerous hydroxyl radicals. Together, these systems make SOD a vital part of the body's natural defence against oxidative damage, acting as a scavenger for toxic superoxide radicals.

Clinical Applications

- Superoxide dismutase deficiency is associated with diseases such as the familial dominant form of amyotrophic lateral sclerosis and Alzheimer's disease
- Superoxide dismutase has therapeutic applications in conditions such as arthritis, burns, and inflammatory diseases. Measuring its activity can help assess the effectiveness of treatments aimed at modulating SOD levels.

Research

- To evaluate the antioxidant activity and therapeutic effectiveness of newly developed medications.
- To investigate the relationship between superoxide dismutase activity and various disease conditions.

Sports

- The superoxide dismutase test enables research on how physical activity affects free radical production and the protective role of SOD.

Fortress Superoxide Dismutase

- **Lyophilised reagents** for improved stability
- Kit includes a standard, simplifying the ordering process
- Suitable for multiple applications: **clinical, veterinary, sports, cosmetics, and pharmaceutical testing**
- Instrument-specific application protocols available for a wide range of clinical chemistry analysers
- **Colorimetric assay method**
- **Superoxide dismutase control available upon request**



Total Antioxidant Status (TAS)

Total Antioxidant Status (TAS) is a measure of the body's overall ability to neutralize free radicals and combat oxidative stress. It reflects the total antioxidants available for defence in biological fluids like blood and serum. TAS levels can vary depending on health conditions and treatments, indicating the body's antioxidant capacity.

TAS is determined through laboratory tests that assess a sample's ability to neutralize free radicals or reduce oxidizing agents. Common assay types include the Oxygen Radical Total antioxidant measurement considers the cumulative effect of all antioxidants present.

Measuring TAS considers not only the activity of known antioxidants but also the contributions of other factors or components that may not be traditionally recognised as dietary antioxidants.

Clinical Applications

- Measuring the total non-enzymatic antioxidant status (TAS) in biological fluids and other samples provides an overall indication of the body's ability to neutralise reactive oxygen species, resist oxidative damage, and protect against diseases linked to oxidative stress.

Research

- TAS has been associated with a range of conditions, including cancer, cardiovascular disease, rheumatoid arthritis, and diabetic retinopathy. Monitoring TAS can therefore help assess the effectiveness of treatments for these conditions.

Sports

- Total antioxidant research can help determine the association of TAS with a variety of pathological diseases. TAS level determination can also be a helpful indicator in sporting activities.

Fortress Total Antioxidant Status

- Compatible with automated clinical chemistry platforms, the **Fortress TAS assay** offers greater convenience and efficiency compared with other commercially available products that rely on ELISA technology.
- Fortress TAS** is based on colourimetric measurement with an excellent measuring range of **0.20-2.95 mmol/l**
- The kit is supplied with a calibrator. Control is also available on request. Applications available detailing instrument-specific settings for a comprehensive range of clinical chemistry analysers.

Ordering Information

Description	Method	Format	Cat No.	Size	Storage
Glutathione Peroxidase	Cumene Hydroperoxide	Lyo	BXC0551A	R1: 1 x 70ml R2: 5 x 5ml R3: 1 x 1ml R6: 2 x 200ml R7: 1 x 200ml	2-8°C
Glutathione Reductase	UV	Lyo	BXC0853A	R1: 1 x 50ml R2: 5 x 5ml R3: 5 x 3ml	2-8°C
Superoxide Dismutase	Xanthine	Lyo	BXC0531A	R1: 5 x 20ml R2: 1 x 100ml R3: 3 x 10ml R4: 5 x 10ml R6: 2 x 125ml	2-8°C
Total Antioxidant Status (TAS)	Enzymatic Colorimetric	LS	BXC0553A	R1: 1 x 50ml R2: 1 x 10ml R4: 1 x 1ml	2-8°C



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BR019FORJAN26

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