

## Oxidative Stress Analysis 2.0

The **Oxidative Stress Analysis 2.0** utilizes both blood or urine samples in order to evaluate the body's oxidative stress status and antioxidant reserve. This test can help practitioners identify underlying causes and perpetuating factors for many clinical disorders and to customize specific treatment programs.

### • Analytes:

#### Urine–

Lipid Peroxides  
8-hydroxy-deoxyGuanosine

OR

#### Blood–

Glutathione (GSH)  
Total Antioxidant Capacity (TAC)  
Cysteine (Cys-SH)  
Sulfate  
Cysteine/Sulfate Ratio  
Cystine (Cys-S-S-Cys)  
Cysteine/Cystine Ratio  
Glutathione Peroxidase (GPX)  
Superoxide Dismutase (SOD)  
Lipid Peroxides

### • Specimen Requirements:

#### Urine–

5ml unpreserved urine

OR

#### Blood–

2 SST (2 serum samples, 4ml each)  
and 1 EDTA (whole blood, 7ml)

### • Before Patient Takes this Test:

- Inform practitioner about health conditions and medications
- Fast 10 hours overnight (before urine collection or blood draw)
- See instructions inside test kit for details

### Free Radicals & Antioxidants

In the course of normal human activity – energy production, detoxification of pollutants and immunologic defense mechanisms, **free radicals** are produced. These free radicals are unstable molecules that can extract an electron from a neighboring molecule, causing damage in the process. Unchecked free radical production accelerates the pathogenesis of human disease and aging. These free radicals are counter-balanced by the anti-oxidants present in our foods (and supplements).

Dietary antioxidants (such as proanthocyanidins found in blueberries and bioflavonoids found in citrus fruits), as well as the antioxidant enzymes, superoxide dismutase and glutathione peroxidase, provide critical protection against free radical damage. Oxidative stress results when this delicate pro-oxidant/antioxidant equilibrium is disrupted in favor of the pro-oxidant (free radical) state.

Evidence is accumulating that oxidative stress is involved in many pathological processes, including:

- Rheumatoid arthritis
- Asthma
- Cancer
- Macular degeneration
- Inflammatory Bowel Disease
- Neurodegenerative diseases such as Parkinson's and Alzheimer's
- Arthritis
- Diabetes mellitus
- Atherosclerosis
- Chronic Fatigue Syndrome
- Environmental sensitivity

In a chain-like reaction, free radicals can cause cellular damage by oxidizing nucleic acids, proteins, and membrane lipids. Cellular mitochondria play an important role in aging and disease by being both a significant source of radicals and a primary site of free radical damage. Antioxidants blunt the production of compounds that create inflammation in the body.

### Oxidative Stress Testing

To assess equilibrium between oxidative damage and antioxidant reserve, it is necessary to address the **RESERVE** capacity that provides protection; the **ENZYMES** that quench the free radicals; and evaluate the **DAMAGE** that free radical production has already caused.

- A blood sample measures anti-oxidant reserve and enzyme function including: whole blood Glutathione, Total Antioxidant Capacity, and the enzymes Superoxide Dismutase and Glutathione Peroxidase. Additionally, blood markers of damage measure lipid peroxides (oxidative damage to cell membranes).
- A urine sample to measure free radical damage, including lipid peroxides (oxidative damage to cell membranes) and 8-hydroxy-deoxyGuanosine (oxidative damage to DNA).



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Improving Healthcare for Chronic Disease



Patient: **SAMPLE**  
**PATIENT**  
Age: 52  
Sex: F  
MRN:

**Order Number:**  
Completed: December 5, 2008  
Received: November 25, 2008  
Collected: November 25, 2008

**Oxidative Stress**

**Protection**

**Reference Range**

Glutathione (GSH)	526	>= 669 micromol/L
Total Antioxidant Capacity (TAC)	0.52	>=0.54 mmol/L
Cysteine (Cys-SH)	0.81	0.61-1.16 mg/dL
Sulfate	3.5	3.0-5.9 mg/dL
Cysteine/Sulfate Ratio	0.23	0.12-0.32
Cystine (Cys-S-S-Cys)	1.99	1.60-3.22 mg/dL
Cysteine/Cystine Ratio	0.35	0.23-0.53

**Enzymes**

**Reference Range**

Glutathione Peroxidase (GPX)	24.2	20.0-38.0 U/g Hb
Superoxide Dismutase (SOD)	14,967	5,275-16,662 U/g Hb

**Damage**

**Reference Range**

Lipid Peroxides	16.7	<= 10.0 micromol/L
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**This test reveals important clinical information about:**

- **Antioxidant reserve** is essential for scavenging of free radicals and for healthy function of the immunologic, neurologic, endocrine, and detoxification systems
- **Balance (or imbalance) between reduction and oxidation** - redox status - determines the level of oxidative stress, which has been linked to many disease.
- **Tissue damage** can be evaluated early on in the process to determine the degree of imbalance and to help drive specific antioxidant therapeutic recommendations.

For test kits, clinical support, or more information contact:

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More detailed publications with references are also available: [www.GDX.net](http://www.GDX.net)