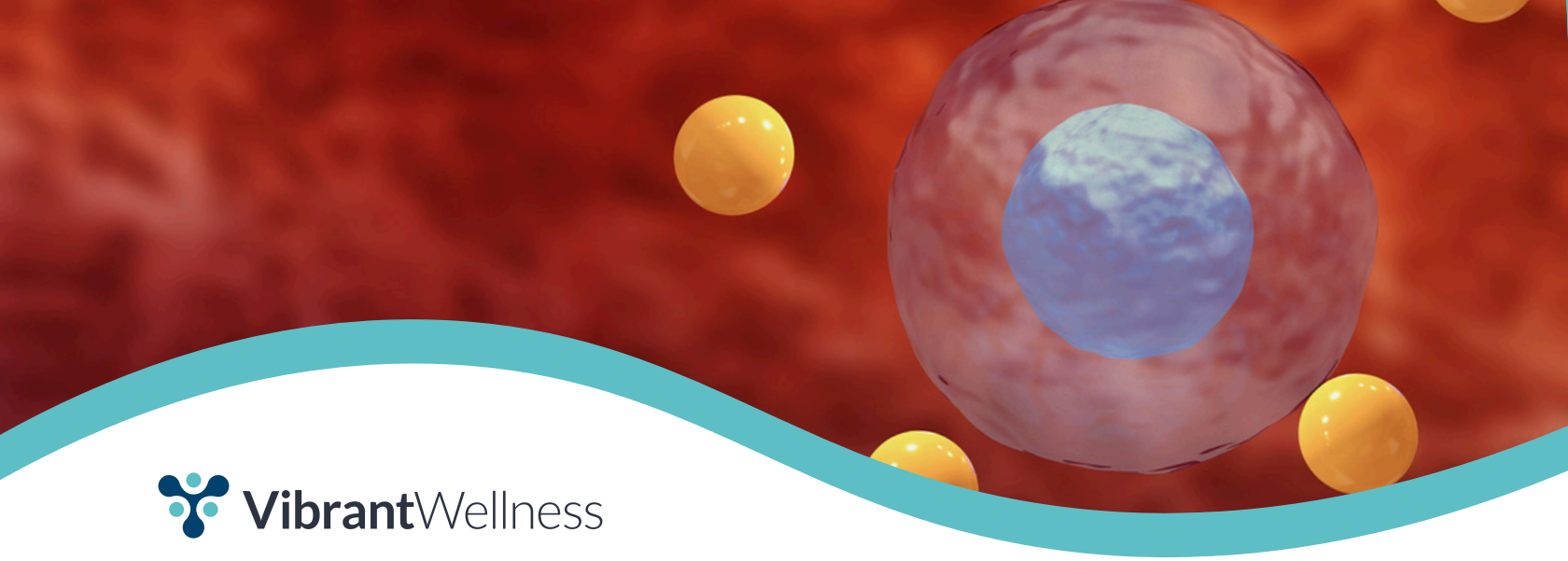


VibrantWellness

Oxidative Stress

Key Clinical Messages

What is the Oxidative Stress Profile?

Oxidative Damage Markers + Antioxidant Genetics

The Vibrant Oxidative Stress Profile measures **16 markers of cumulative oxidative damage** eliminated from the body in the urine, plus **32 genetic variants** that code for enzymes and antioxidants that can significantly impact oxidative stress response.

This profile measures more analytes than any other test on the market, providing robust insight into oxidative damage to DNA, RNA, lipids, and proteins.

What Is Oxidative Stress?

Oxidative stress is when the body is unable to keep up with the accumulation of ROS due to poorly functioning endogenous antioxidants, inadequate intake of exogenous antioxidants, and/or diet and lifestyle that generates excess ROS.

It's possible to be genetically predisposed to excessive oxidative stress but protected by a nutrient-dense diet. Conversely, it's possible to have fully functional endogenous antioxidants while being exposed to too many pro-oxidants from toxins, diet, and lifestyle for the body to keep up.

What Are Reactive Oxygen Species?

Reactive oxygen species (ROS) contain at least one oxygen atom and one or more unpaired electrons. This group includes oxygen free radicals such as superoxide anion radical ($O_2^{\bullet -}$), hydroxyl radical (OH), hydroperoxyl radical (HO_2), singlet oxygen (O_2), as well as free nitrogen radicals: nitrate (NO_3^-), nitrite (NO_2^-), peroxynitrite ($ONOO^-$).[1]

Small quantities of ROS are formed during normal cellular processes, such as aerobic respiration. They are also formed during inflammatory processes. For example, macrophages produce ROS (in addition to pro-inflammatory cytokines and lipid mediators) to kill invading pathogens.[2]

The body anticipates these two sources and has mechanisms in place to manage it. However, additional exposure to dietary and environmental oxidants tends to tip the scales in the direction of excess oxidative stress. For example, ROS are produced in response to ultraviolet radiation, cigarette smoking, alcohol, nonsteroidal anti-inflammatory drugs, ischemia-reperfusion injury, chronic infections, and inflammatory disorders.[3] [4]

The Vibrant Advantage

Vibrant's Oxidative Stress Profile measures more analytes than any other test on the market, providing robust insight into oxidative damage to DNA, lipids, and proteins.

It's the only test that pairs markers of oxidative stress with genetic predisposition towards oxidative stress, allowing you to create personalized treatment plans that support the body's own antioxidants with robust intake of supplemental antioxidants and the nutrients required for antioxidant creation and recycling.

What Are Antioxidants?

Antioxidants are compounds that play a critical role in protecting the body against the harmful effects of oxidative stress by neutralizing reactive oxygen species (ROS) and other free radicals. These compounds are found naturally in many foods, such as fruits, vegetables, nuts, and whole grains, as well as in some beverages like green tea and red wine. Antioxidants work by donating electrons to unstable ROS, thereby stabilizing them and preventing them from causing damage to cellular components like proteins, lipids, and DNA. Common antioxidants include vitamins C and E, beta-carotene, selenium, and various polyphenols.

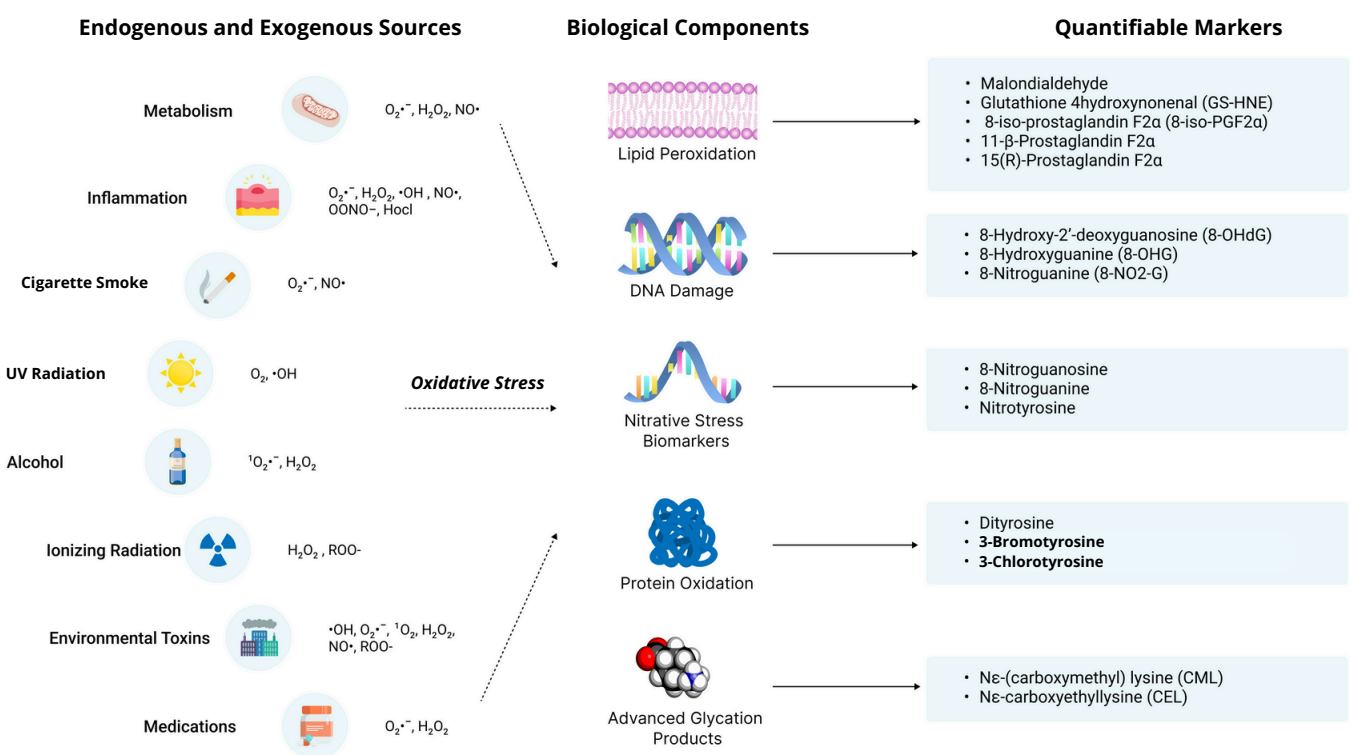
Why Order the Oxidative Stress Profile?

Comprehensive Assessment of Oxidative Stress
The Vibrant Oxidative Stress Profile offers a comprehensive evaluation of oxidative stress by assessing a broad range of markers that indicate damage caused by reactive oxygen species (ROS) and reactive nitrogen species (RNS) to lipids, DNA, RNA, and proteins. This detailed assessment provides valuable insights into the extent of oxidative damage, enabling tailored interventions for patients to mitigate oxidative stress-related health risks.

Personalized Antioxidant Genetics Insights
With the inclusion of the Antioxidant Genetics panel, the test provides personalized insights into the genetic predispositions that influence an individual's antioxidant enzyme activity and overall oxidative stress response. Identifying risk-associated genetic variations can help you tailor interventions to enhance antioxidant defense mechanisms, optimize treatment strategies, and promote better health outcomes for your patients.

Actionable Reporting for Informed Decision-Making
The Vibrant Oxidative Stress Profile report presents actionable information in a user-friendly format, including summary flowcharts, graphical representations of oxidative damage scores, and color-coded indicators for risk levels. This facilitates informed decision-making, allowing you to prioritize interventions based on areas of concern, track improvements over time, and empower patients to make proactive lifestyle and dietary choices to promote overall health and well-being.

Oxidative Stress Overview



Lab Methodology

We're a CLIA-certified and CAP-accredited lab that utilizes the most reliable methods for testing genetics:

- Genetic SNPs are measured using the Real Time-PCR (RT-PCR) technology platform. With 100% accuracy and 100% precision, RT-PCR provides highly accurate and reproducible results.
- Damage products are measured using chromatography (LC-MS/MS). The mass spectrum of the sample determines the concentration of each analyte measured. The analyte results are expressed by normalizing to the quantity of creatinine measured to account for urine dilution variations.

Test Prep for Saliva Collection

Collection: One (1) saliva specimen tube.

Hydration Restrictions: Rinsing mouth with water to remove food residue and waiting at least 10 minutes after rinsing to avoid sample dilution before collecting saliva.

Fasting: Not required.

Diet Restrictions: Avoid foods with high sugar or acidity, or high caffeine content, immediately before sample collection. For best test performance, avoid eating a meal within 60 minutes of sample collection.

Medication Restrictions: None.

Supplement Restrictions: None.

Test Prep for Urine Collection

Collection: One (1) urine tube. First morning void.

Hydration Restrictions: Do not drink more than 8 oz water 1 hour prior to urine collection. Samples may be rejected if the urine is too dilute.

Fasting: Not required.

Diet Restrictions: None

Medication Restrictions: None

Supplement Restrictions: Stop exercise and supplements 1 day prior

Conditions Associated with Oxidative Stress

An imbalance between the generation and buildup of ROS within cells and tissues, and the ability of innate biological systems and dietary antioxidants to eliminate these reactive byproducts, is linked to a wide range of conditions and chronic diseases, including:

- Cancer
- Cardiovascular disease
- Neurological conditions such as Alzheimer's
- Respiratory disease
- Rheumatoid arthritis
- Kidney disease

Moreover, oxidative stress can create a detrimental cycle where one condition exacerbates another, leading to further health complications.

By understanding an individual's oxidative stress, you can tailor treatment strategies to address potential weaknesses in the oxidative stress system, reduce buildup of ROS, and promote better health outcomes.

Complementary Testing

- **Total Tox Burden (Environmental Toxin, Mycotoxin, and Heavy Metals tests):** To assess an individual's specific level of toxins in the body.
- **PFAS Chemicals Test:** To assess an individual's specific level of per- and polyfluoroalkyl substances in the body.
- **Micronutrient Panel and NutriPro:** provides insights into intra- and extra- cellular micronutrient levels (Micronutrients) as well as detecting nutrition-related genetic SNPs (NutriPro).
- **Cardiac Health Panel:** Impaired oxidative stress antioxidants can cause increased inflammation, a known driver of cardiovascular disease risk.
- **Diabetes Panel:** Oxidative stress can increase inflammation, which drives development of diabetes.

How to Interpret Antioxidant Genetic Results

Vibrant reports results as either wild, heterozygous, or variant.

- **Homozygous Wild:** results indicate there's no genetic variant.
- **Heterozygous:** results indicate there's one copy of the genetic variant.
- **Homozygous Variant:** results indicate there are two copies of the genetic variant.

Risk Association: Risk-associated variants are indicated with red. Alleles with no risk are indicated with blue.

Homozygous Variant ++ | **Heterozygous +-** | **Homozygous Wild --**

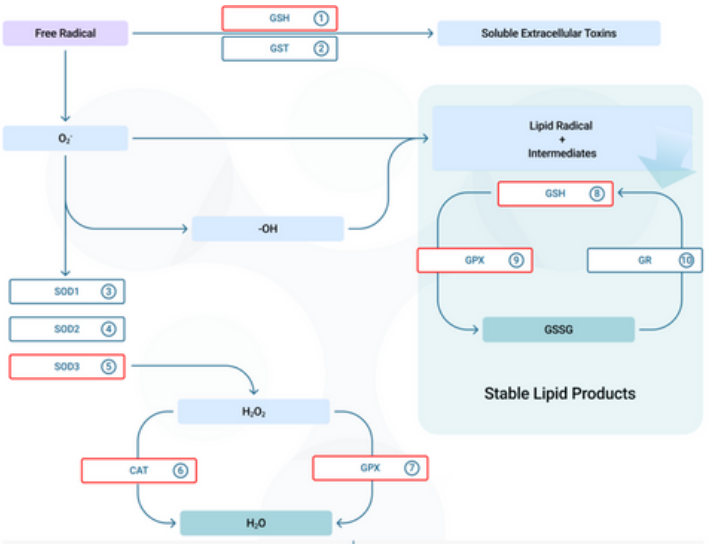
- The variant alleles are indicated by a (+) symbol
- Wild-type alleles are indicated by a (-) symbol

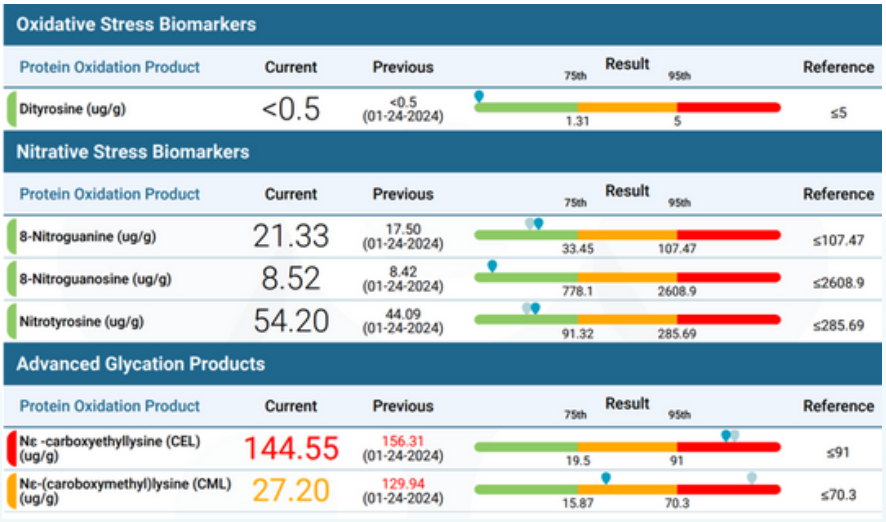
Antioxidant Genetics

The **summary page** of the Oxidative Stress Profile sample report presents a flowchart detailing the genetic variations impacting the body's antioxidant defense mechanisms against oxidative stress.

This visual display highlights areas of concern identified from the genetic results obtained.

Additionally, the report offers a succinct summary of analytes featuring risk-associated variants, providing a clear overview of the individual's oxidative stress profile and potential health implications.





Oxidative Stress Biomarkers				
Protein Oxidation Product	Current	Previous	Result (75th: 1.31, 95th: 5)	Reference
Dityrosine (ug/g)	<0.5	<0.5 (01-24-2024)		≤5
Nitrative Stress Biomarkers				
Protein Oxidation Product	Current	Previous	Result (75th: 33.45, 95th: 107.47)	Reference
8-Nitroguanine (ug/g)	21.33	17.50 (01-24-2024)		≤107.47
8-Nitroguanosine (ug/g)	8.52	8.42 (01-24-2024)	(75th: 778.1, 95th: 2608.9)	≤2608.9
Nitrotyrosine (ug/g)	54.20	44.09 (01-24-2024)	(75th: 91.32, 95th: 285.69)	≤285.69
Advanced Glycation Products				
Protein Oxidation Product	Current	Previous	Result (75th: 19.5, 95th: 91)	Reference
Nε -carboxyethyllysine (CEL) (ug/g)	144.55	156.31 (01-24-2024)		≤91
Nε-(caroboxymethyl)lysine (CML) (ug/g)	27.20	129.94 (01-24-2024)	(75th: 15.87, 95th: 70.3)	≤70.3

Oxidative Damage Markers

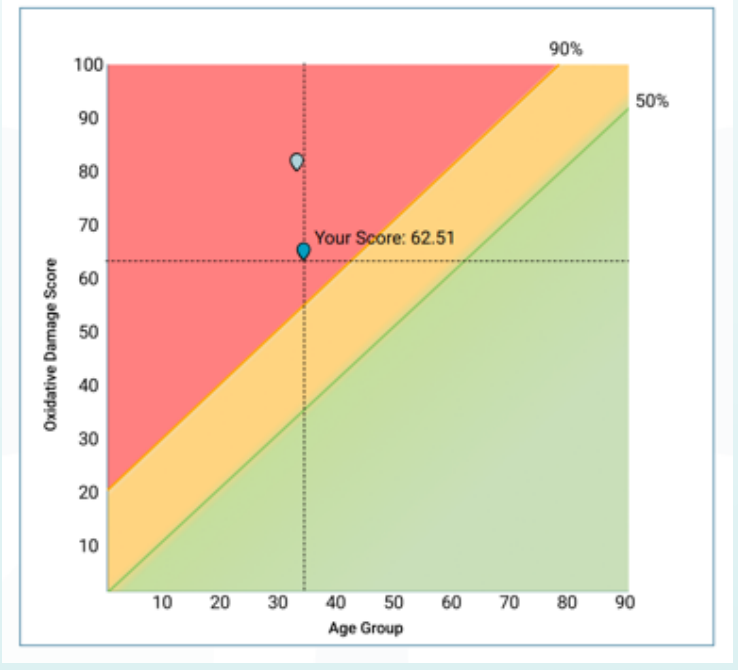
Each Oxidative Damage Marker is reported numerically with a reference range, and plotted on a scale so you can visualize the amount of free radical damage occurring to the DNA, RNA, lipids, and proteins.

Oxidative Damage Score

The **Oxidative Damage Score** in the report illustrates the overall level of oxidative damage based on a comprehensive analysis of various urine damage markers. This score is calculated using a linear regression model and is graphically presented relative to the patient's age group.

The scores are color-coded for clarity in the chart. A score depicted in green signifies a normal level of oxidative damage based on the 50th percentile of the population. Yellow indicates a moderate score based on the 90th percentile, while red signifies a high score compared to a relatively healthy population.

These reference ranges were established using urine samples collected from 1000 apparently healthy individuals, providing a robust basis for assessment and interpretation.



Which Markers Are Included in the Oxidative Stress Profile?

Antioxidant Genetics

SNP ID	Gene
rs2796498	PRKAA2
rs10789038	PRKAA2
rs1001179	CAT
rs7943316	CAT
rs4756146	CAT
rs20417	COX-2
rs916321	CYB5R3
rs1048943	CYP1A1
rs10911021	GLUL
rs1050450	GPX1
rs1987628	GPX1
rs4902346	GPX2
rs2071566	GPX2
rs713041	GPX4
rs366631	GSTM1
rs3754446	GSTM5
rs1695	GSTP1
rs121909307	GSS
rs8190955	GSR
rs2071746	HMOX1
rs4673	CYBA
rs9932581	CYBA
rs3877899	SELENOP
rs2234694	SOD1
rs4880	SOD2
rs1799895	SOD3
rs8192287	SOD3
rs7310505	TXNRD1
rs1548357	TXNRD2
rs4485648	TRXR2
rs206812	XDH
rs2073316	XDH

Oxidative Damage Markers

Lipid Peroxidation		
Malondialdehyde	Glutathione 4-hydroxynonenal (GS-HNE)	8-iso-prostaglandin F2α (8-iso-PGF2α)
11-β-Prostaglandin F2α	15(R)-Prostaglandin F2α	
DNA Damage		
8-Hydroxy-2-deoxyguanosine (8-OHdG)	8-Hydroxyguanine	8-Hydroxyguanosine
Protein Oxidation		
Dityrosine	3-Bromotyrosine	3-Chlorotyrosine
Nitrative Stress Biomarkers		
8-Nitroguanosine	8-Nitroguanine	Nitrotyrosine
Advanced Glycation Products		
Nε-(carboxymethyl) lysine (CML)	Nε-carboxyethyllysine (CEL)	

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