

COMPLETE
ANTIOXIDANTS
Vitamin C (VitC)
VitC/ascorbyl radical
Vitamin E (Vit E)
VitE/cholesterol ratio
VitC/VitE ratio
Vitamin A (VitA)
β-carotene
Total glutathione (GSHT)
Reduced glutathione (GSH)/oxidised glutathione (GSSG)
Superoxide dismutase (SOD)
Glutathione peroxidase (GPx)
Thiol proteins
Hydrophilic and lipophilic total antioxidant capacity (respectively CATH and CATL)
Uric acid
Ubiquinone
TRACE ELEMENTS
Selenium (Se)
Copper (Cu)
Zinc (Zn)
Cu/Zn ratio
OXIDATIVE STRESS MARKERS
Lipid peroxides
Oxidised LDL
Antibodies against oxidised LDL
Oxidised DNA (8OHdG)
Oxidised proteins
IRON METABOLISM
Free iron
Serum iron
Ferritin
Transferrin
Iron saturation capacity of transferrin
MISCELLANEOUS
Myeloperoxidase
Fatty acid profile (37 assays)
Homocysteine
Glucose



DEFINITION OF OXIDATIVE STRESS

Oxygen, although indispensable to life, is constantly producing reactive oxygen species (ROS) in our organism: free radicals, hydrogen peroxide, singlet oxygen... These species play a physiological role (for instance, in regulating apoptosis), but they are very unstable, strong oxidants capable of reacting, in the medium where they are produced, with a wide range of biological substrates (lipids, lipoproteins, proteins, DNA, glucose). To regulate ROS production, the organism has developed defence systems consisting of antioxidants (enzymes, proteins, and small molecules), trace elements, and proteolytic enzymes whose role is to prevent the accumulation of oxidised proteins, lipids, and DNA in cells and to degrade their toxic fragments.

Oxidative stress is defined as an imbalance between pro-oxidants (or reactive oxygen species) and these defence systems (antioxidants) in favour of the former and resulting in cell damage that can sometimes be irreversible.

Oxidative stress is involved in ageing and also in the development of over a hundred diseases, ranging from cardiovascular diseases to cancer, inflammatory and degenerative diseases, diabetes, and AIDS.

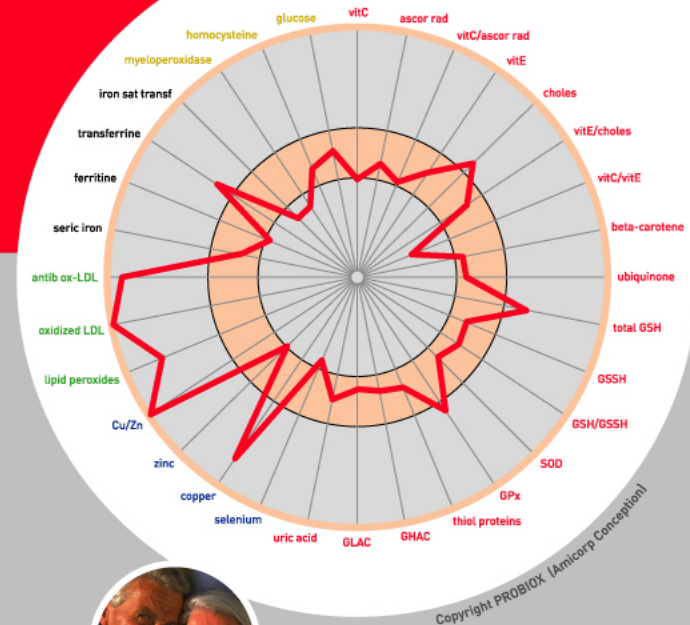
DETECTING OXIDATIVE STRESS

A person's stress profile is evaluated on blood samples on the basis of four types of analysis: (i) measurement of antioxidant levels, (ii) determination of trace elements; (iii) analysis of the blood iron status and (iv) detection of oxidative damage to various biological substrates. These measurements are grouped together in the **Oxidative Stress Rosette®**. In addition, a fatty acid profile is obtained.

No single analysis is sufficient for detecting oxidative stress, because each method has its specificities and limitations. Only an appropriately chosen battery of tests can give an optimal estimate of an individual's oxidative stress status. Scientific studies show that certain markers, among the 80 or so currently available, are more pertinent than others, depending on the physiological or pathological situation considered. In this context, one of the missions of the scientists at PROBIOX, a spin-off of the University of Liège, has been to develop **oxidative stress profiles specially adapted to diverse pathologies or physiological conditions** in which oxidative stress is likely to be involved (heavy exercise, cardiovascular disease, cancer, diabetes, dialysis, ageing...).

PROBIOX emphasises quality and the adequate treatment of blood samples. This notably means maintaining a cold chain, indispensable to obtaining interpretable results.

Oxidative Stress® Rosette



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SPORT / SPORT+	S	S+
ANTIOXIDANTS		
Vitamin C (VitC)	✓	✓
Vitamin E (Vit E)	✓	✓
VitE/cholesterol ratio	✓	✓
VitC/VitE ratio	✓	✓
β-carotene		✓
Total glutathione (GSHT)		
Reduced glutathione (GSH)/oxidised glutathione (GSSG)	✓	✓
Superoxide dismutase (SOD)	✓	✓
Glutathione peroxidase (GPx)	✓	✓
Hydrophilic and lipophilic total antioxidant capacity (respectively CATH and CATL)	✓	✓
Uric acid	✓	✓
Ubiquinone		**
TRACE ELEMENTS		
Selenium (Se)	✓	✓
Copper (Cu)		✓
Zinc (Zn)		✓
Cu/Zn ratio		✓
OXIDATIVE STRESS MARKERS		
Lipid peroxides		✓
Oxidised LDL	✓	✓
Antibodies against oxidised LDL	✓	✓
IRON METABOLISM		
Free iron	✓	✓
Serum iron		✓
Ferritin	✓	✓
Transferrin	✓	✓
Iron saturation capacity of transferrin	✓	✓
DIVERS		
Myeloperoxidase		✓
Fatty acid profile [37 assays]		✓

FITNESS / FITNESS+	F	F+
ANTIOXIDANTS		
Vitamin C (VitC)	✓	✓
VitC / ascorbyl radical	✓	✓
Vitamin E (Vit E)	✓	✓
VitE/cholesterol ratio	✓	✓
VitC/VitE ratio	✓	✓
β-carotene		✓
Total glutathione (GSHT)		
Reduced glutathione (GSH)/oxidised glutathione (GSSG)		✓
Glutathione peroxidase (GPx)	✓	✓
Thiol proteins	✓	✓
Hydrophilic and lipophilic total antioxidant capacity (respectively CATH and CATL)	✓	✓
Uric Acid	✓	✓
Ubiquinone		**
TRACE ELEMENTS		
Selenium (Se)	✓	✓
Copper (Cu)		✓
Zinc (Zn)		✓
Cu/Zn ratio		✓
OXIDATIVE STRESS MARKERS		
Oxidised LDL	✓	✓
Antibodies against oxidised LDL		✓
Oxidised DNA (8OHdG)		✓
IRON METABOLISM		
Free iron		✓
Serum iron		✓
Ferritin		✓
Transferrin		✓
Iron saturation capacity of transferrin		✓

** : complementary ubiquinone analysis upon request

CARDIO / CARDIO+	C	C+
ANTIOXIDANTS		
Vitamin C (VitC)	✓	✓
VitC / ascorbyl radical	✓	✓
Vitamin E (Vit E)	✓	✓
VitE/cholesterol ratio	✓	✓
VitC/VitE ratio	✓	✓
Total glutathione (GSHT)		
Reduced glutathione (GSH)/oxidised glutathione (GSSG)		✓
Hydrophilic and lipophilic total antioxidant capacity (respectively CATH and CATL)		✓
Ubiquinone		**
TRACE ELEMENTS		
Selenium (Se)	✓	✓
Copper (Cu)		✓
Zinc (Zn)		✓
Cu/Zn ratio		✓
OXIDATIVE STRESS MARKERS		
Lipid peroxides		✓
Oxidised LDL	✓	✓
Antibodies against oxidised LDL	✓	✓
MISCELLANEOUS		
Myeloperoxidase		✓
Fatty acid profile [37 assays]		✓
Homocysteine	✓	✓

NEO / NEO+	N	N+
ANTIOXIDANTS		
Vitamin C (VitC)	✓	✓
VitC/ascorbyl radical	✓	✓
Vitamin E (Vit E)		✓
VitE/cholesterol ratio		✓
VitC/VitE ratio		✓
Reduced glutathione (GSH)/oxidised glutathione (GSSG)	✓	✓
Thiol proteins	✓	✓
Hydrophilic and lipophilic total antioxidant capacity (respectively CATH and CATL)	✓	✓
TRACE ELEMENTS		
Selenium (Se)	✓	✓
Copper (Cu)	✓	✓
Zinc (Zn)	✓	✓
Cu/Zn ratio	✓	✓
OXIDATIVE STRESS MARKERS		
oxidised DNA	✓	✓

DIAL / DIAL+	Di	Di+
ANTIOXIDANTS		
Vitamin C (VitC)	✓	✓
VitC/ascorbyl radical	✓	✓
Vitamin E (Vit E)		✓
VitE/cholesterol ratio		✓
VitC/VitE ratio		✓
β-carotene		✓
Total glutathione (GSHT)		
Reduced glutathione (GSH)/oxidised glutathione (GSSG)		✓
Superoxide dismutase (SOD)		✓
Glutathione peroxidase (GPx)		✓
Hydrophilic and lipophilic total antioxidant capacity (respectively CATH and CATL)	✓	✓
TRACE ELEMENTS		
Selenium (Se)	✓	✓
OXIDATIVE STRESS MARKERS		
Oxidised LDL	✓	✓
Antibodies against oxidised LDL	✓	✓
Oxidised proteins	✓	✓
MISCELLANEOUS		
Homocysteine	✓	✓

DIAB / DIAB+	D	D+
ANTIOXIDANTS		
Vitamin C (VitC)	✓	✓
VitC/ascorbyl radical	✓	✓
Vitamin E (Vit E)		✓
VitE/cholesterol ratio		✓
VitC/VitE ratio		✓
Total glutathione (GSHT)		
Reduced glutathione (GSH)/oxidised glutathione (GSSG)		✓
Hydrophilic and lipophilic total antioxidant capacity (respectively CATH and CATL)	✓	✓
Uric acid		✓
TRACE ELEMENTS		
Selenium (Se)	✓	✓
OXIDATIVE STRESS MARKERS		
Lipid peroxides		✓
Oxidised LDL	✓	✓
Antibodies against oxidised LDL	✓	✓
Oxidised proteins	✓	✓
MISCELLANEOUS		
Glucose	✓	✓

RHUMA / RHUMA+	R	R+
ANTIOXIDANTS		
Vitamin C (VitC)	✓	✓
Vitamin C / ascorbyl radical	✓	✓
Vitamin E (Vit E)		✓
Total glutathione (GSHT)		
Reduced glutathione (GSH)/oxidised glutathione (GSSG)		✓
Superoxide dismutase (SOD)		✓
Glutathione peroxidase (GPx)		✓
Hydrophilic and lipophilic total antioxidant capacity (respectively CATH and CATL)	✓	✓
TRACE ELEMENTS		
Selenium (Se)	✓	✓
Copper (Cu)	✓	✓
Zinc (Zn)	✓	✓
Cu/Zn ratio	✓	✓
OXIDATIVE STRESS MARKERS		
Oxidised proteins	✓	✓
MISCELLANEOUS		
Myeloperoxidase	✓	✓

BASIC		
ANTIOXIDANTS		
Vitamin C (VitC)		
VitC/ascorbyl radical		
Vitamin E (Vit E)		
VitE/cholesterol ratio		
VitC/VitE ratio		
Total glutathione (GSHT)		
Reduced glutathione (GSH)/oxidised glutathione (GSSG)		
Thiol proteins		
Hydrophilic and lipophilic total antioxidant capacity (respectively CATH and CATL)		
Uric acid		
OXIDATIVE STRESS MARKERS		
1 marker from a selection*		

* Lipid peroxides or oxidised LDL or oxidised proteins or oxidised DNA or antibodies against oxidised LDL

