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Oxidative Stress

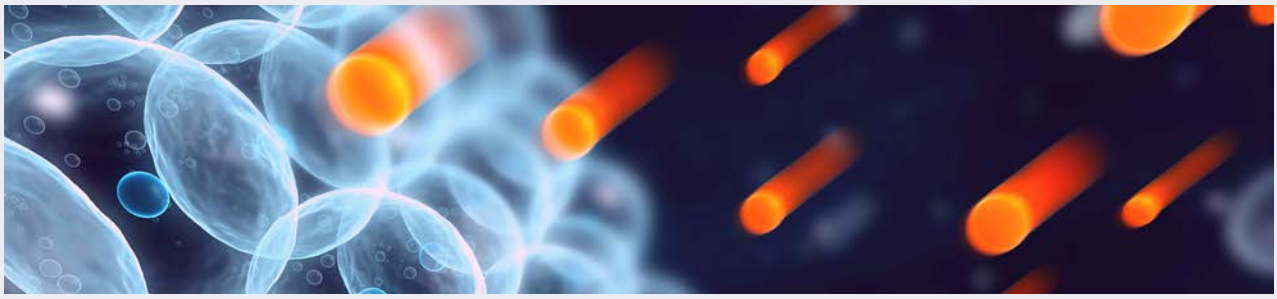
What is Oxidative Stress?

Unpaired electrons in an atom/molecule are known as Reactive Oxygen Species (ROS), or free radicals. ROS / free radicals are naturally produced in the cells of all aerobic organisms. Electrons prefer/need to be in pairs, unpaired electrons are highly reactive and therefore unstable. Free radicals cause damage as they scour tissues trying to find electrons to pair with.

Optimally, an organism maintains a balance between free radicals and the antioxidants that neutralize them. Oxidative stress occurs when the body's antioxidant defence mechanisms are unable to neutralize enough free radicals, there are too many for the cell/tissue to cope with and it becomes overwhelmed. Oxygen free radicals cause harm to proteins, lipids, DNA and other molecules. The result is oxidative damage in cells, tissues and organs.

What Causes Oxidative Stress?

Reactive Oxygen Species are created during normal life processes such as cellular respiration, lipid synthesis, phagocytosis of foreign bodies, metabolism of metals etc. We also introduce free radicals to our body in our diet (especially fried foods), water, medications, tobacco smoke, alcohol, pesticides and via pollutants in the air. Oxidative stress often occurs when our immune system is activated by invasion of microorganisms, or xenobiotics appear, or when the body is subjected to radiation (e.g. UV).



How Organisms Protect the Integrity of Cells and Tissues

Internal defence mechanisms such as antioxidant compounds and oxygen radical scavenging enzyme systems work to neutralize ROS. Superoxide dismutase, catalase, glutathione and ascorbic acid are just a few of the antioxidant mechanisms within cells and tissues. The immune system cleverly uses reactive oxygen species to attack invading pathogens. Oxidative stress also assists in the regulation of intracellular signal transduction and in physiologic adaptation.

Why Research Oxidative Stress?

Oxidative stress has a role to play in many diseases, research is increasing exponentially. Measuring the presence and effects of biomarkers increases our understanding of many lifestyle diseases and how to treat them effectively. Alongside an understanding of genetic profiles, analysing levels of oxidative stress allows us to tackle the problems it causes. Yearly, thousands of researchers study ways to reduce oxidative stress and therefore protect against: cancer, Alzheimer's disease, Parkinson's disease, Huntington's disease, atherosclerosis and many other diseases.

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Target	Monoclonal	Polyclonal	Protein	Kit
HO-1	X	X	X	X
HO-2		X	X	
Nitrotyrosine	X	X		X
DNA Damage	X	X		X
SOD1	X	X	X	X
SOD2	X	X	X	X
SOD3	X	X	X	X
SOD4		X		X
Mn SOD			X	
FIH	X	X		X
P53	X	X	X	X
HIF 1 alpha	X	X	X	X
HIF 2 alpha	X	X		X
DMPO	X			
MDC1	X	X	X	
Acrolein	X		X	
Dibromo-tyrosine	X		X	X
Hexanoyl-Lysine adduct	X		X	
4-Hydroxy-2-hexenal	X			
4-Hydroxynonenal	X	X	X	
7-Ketocholesterol	X			
Malondialdehyde	X	X	X	
Methylglyoxal	X	X	X	
Dityrosine	X			
Crotonaldehyde	X		X	
4-Hydroxy-2-hexenal	X		X	
BVR		X	X	X
Cyclooxygenase 1		X		X
NRF2	X	X		X
Cortisol	X	X	X	X