

What is Oxidative Stress?

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Oxidative Stress (OS) is not, in and of itself, a disease but a condition that can lead to or accelerate disease. OS occurs when the available supply of the body's **antioxidants** is insufficient to handle and neutralize **free radicals** of different types. ***The result is massive cell damage that can result in cellular mutations, tissue breakdown and immune compromise.***

What are free radicals? They are highly unstable molecules that interact quickly and aggressively with other molecules in our bodies to create abnormal cells. They are capable of penetrating into the DNA of a cell and damaging its "blueprint" so that the cell will produce mutated cells that can then replicate without normal controls. Free radicals are unstable because they have unpaired electrons in their molecular structure. This causes them to react almost instantly with any substance in their vicinity. Oxygen, or oxyl, free radicals are especially dangerous.

Free radicals destroy cellular membranes, enzymes and DNA. They accelerate aging and contribute to the development of many diseases, including cancer and heart disease.

It's important to note here that free radicals are also released in the body from the breaking down or detoxification of various chemical compounds. Additionally, certain foods contain free radicals which, when eaten, enter the body and damage it. The major sources of dietary free radicals are chemically-altered fats from commercial vegetable oils, vegetable shortening and all oils heated to very high temperatures.

If you are still using "foods" like refined vegetable oils, margarine or shortening (or "foods" made with them such as all commercial baked goods and "snack" chips), you need to remove them from your diet. Replace these harmful fats with natural, cold pressed oils such as olive oil (which can be used for cooking) and small amounts of flax oil or walnut oil (which should never be heated).

Excessive sugar intake can also contribute to free radical damage. White and brown sugars, and even sugar from so-called natural sources, such as fruit and fruit juices, maple syrup and honey, get converted into triglycerides by the liver and are subject to free radical damage. These damaged fats then promptly attack your arteries and directly contribute to cardiovascular disease. Additionally, cancer and tumor cells feed off of sugar. It is for this reason that excessive sugar intake correlates very strongly with heart disease, cancer and a host of other ailments.

Poor nutrition in general contributes to OS. When the body is fed poorly, it slowly starves and all of its systems suffer. Weak organ systems are prime targets for free radical attack.

Free radicals are also released in the body from the detoxification of drugs (whether legal or illegal), artificial food colorings and flavorings, smog, preservatives in processed foods, alcohol, cigarette smoke, chlorinated drinking water, pesticides, radiation, cleaning fluids, heavy metals such as cadmium and lead, and assorted chemicals such as solvent traces found in processed foods and aromatic hydrocarbons such as benzene and naphthalene (found in moth balls).

Even psychological and emotional stress can contribute to OS. When the body is

under stress, it produces certain hormones that generate free radicals. Moreover, the liver must eventually detoxify them and that process also generates free radicals.

Heightened OS has also been observed in athletes after intensive workouts due to the physical stress placed on the body. Both physical and emotional stress also prompt the release of endogenous cortisol, an adrenal hormone that reduces inflammation, but also suppresses the immune system.

It should be obvious that all of us are exposed to free radicals from a variety of sources. Those of us living in cities are exposed to very high levels due to increased smog and pollution. Certainly, all of us need to take preventive action. If not, we could face the following conditions in our futures.

Why is Oxidative Stress so Important to Your Health?

Oxidative damage causes a net stress on the normal body functions and may result in many specific diseases. It also appears to contribute to the general decline in the optimum body functions, that is commonly believed to occur as a result of “*aging process*”. Among the many *Oxidative Stress* mediated diseases are:

Alzheimer's Disease
Macular Degeneration
Autoimmune Disease
Multiple Sclerosis
Cancer
Muscular Dystrophy
Cardiovascular Disease
Pancreatitis
Cataractogenesis
Parkinson's Disease
Diabetes
Rheumatoid Arthritis
Iron Overload
Segmental Progeria Disorders
Ischemic-Reperfusion Injury

In general, the lower an individual's *oxidative stress* level, lesser is the probability of occurrence of these diseases at later stages in one's life.

Oxidative Stress Induced Dysfunctions and Diseases

Aging

- Accelerated aging processes
- Segmental progeria disorders
- Down's syndrome

Heart and Cardiovascular Disease

- Atherosclerosis
- Adriamycin cardiotoxicity

- Alcohol cardiomyopathy

Gastrointestinal Tract

- Inflammatory & immune injury
- Diabetes
- Pancreatitis
- Halogenated hydrocarbon liver injury

Eye

- Cataractogenesis
- Degenerative retinal damage
- Macular degeneration

Kidney

- Autoimmune nephrotic syndromes
- Heavy metal nephrotoxicity

Skin

- Solar radiation
- Thermal injury
- Porphyria

Nervous System Disorders

- Hyperbaric oxygen
- Parkinson's disease
- Neuronal ceroid lipofuscinoses
- Alzheimer's disease
- Muscular dystrophy
- Multiple sclerosis

Lung

- Lung cancer (cigarette smoke)
- Emphysema
- Bronchopulmonary dysphasia
- Asbestos carcinogenicity

Red Blood Cells

- Malaria & Sickle cell anemia
- Fanconi's anemia
- Hemolytic anemia of prematurity

Iron Overload

- Idiopathic hemochromatosis
- Dietary iron overload
- Thalassemia

Inflammatory-Immune injury

- Glomerulonephritis
- Autoimmune disease
- Rheumatoid arthritis

Ischemia Reflow States

- Stroke
- Myocardial infarction

Liver

- Alcohol-induced pathology
- Alcohol-induced iron overload injury
- Hepatitis B

Other Oxidative Stress Disorders

- Radiation-induced injuries (accidental and radiotherapy)
- General low-grade inflammatory disorders
- Inflamed rheumatoid joints

Why "Whole Food" Supplementation?

Studies have shown that antioxidants work best in combination. Although there can be some value in supplementing with extra amounts of one or two antioxidants for specific conditions, better results are always obtained when a "cocktail" is administered.

The reason for this is simple logic: different antioxidants neutralize different free radicals. If you take a combination, then more free radicals will be neutralized. You can, however, "slant" the antioxidant effect towards a particular ailment or organ if the nutrient has a particular affinity to them.

For example, glutathione would be recommended for hepatitis, Parkinson's, AIDS and liver disease; vitamins E and C would be recommended for arteriosclerosis; CoQ10 would be recommended for heart disease; and alpha lipoic acid would be recommended for diabetes.