Dr. Robin A. Bernhoft, MD
FOR CHRONIC ILLNESS & ALLERGY

1200 Maricopa Hwy • Suite A • Ojai, CA 93023 • 2128 Pico Blvd • Santa Monica, CA 90405 • Tel 805-640-0180 • Fax 805-640-0181

OXIDATIVE STRESS AND INFLAMMATION

By Dr. Robin Bernhoft, MD, FACS, DABEM, FAAEM

Medicine is slowly changing its perspective, from treating specific diseases as isolated entities and suppressing symptoms, to correcting the underlying physiological processes which initiate disease.

Recent investigations – some of which have been covered in the popular press – make clear that a common set of features underlies much chronic disease: the biochemical events included under the headings of oxidative stress and inflammation. Diseases propagated by oxidative stress and inflammation include most forms of heart disease, obesity, diabetes, high blood pressure, neurodegenerative disease, asthma, autism, depression, cancer, arthritis, pancreatitis and aging, to mention only a few. New approaches to therapy address the underlying physiology: "put out the fire" and you may be able to alter the disease for the better.

So what, in layman's terms, are oxidative stress and inflammation?

Oxidative stress is an exaggeration of normal biochemical events. The processing of oxygen in the mitochondria (the energy-producing units within cells) is not 100% efficient. About 4% of oxygen molecules, under healthy conditions, spin off as "free radicals" – dangerously charged oxygen particles which damage cell membranes, proteins, liver enzymes, DNA, wreaking havoc at the subcellular level.

The body has antioxidants poised to neutralize free radicals, and in health this process works pretty well. (Not perfectly – that is one reason people age.) But the antioxidant systems can be overwhelmed by excessive oxidative stimuli (e.g. toxins, heavy metals or other stressors), or by nutritional or genetic deficiencies in antioxidant production. Then one experiences oxidative stress: uncontrolled free radicals damaging vital cellular structures. In time, this can produce clinical disease, as above.

When sufficient damage has occurred to vital structures, the body mounts an inflammatory response. We are all familiar with the redness and pain that accompanies a cut, or an infection. With cuts, inflammation is part of the healing response. This same process can occur at the cellular level. Inflammatory chemicals (called cytokines) produce a cascade of immune responses which in excess can become destructive, producing clinical diseases of the types mentioned above.

Functional medicine focuses on dealing with the underlying oxidative stress and inflammation, and not just on suppressing the symptoms of disease. Depending on how advanced the disease may be, sometimes "putting out the fire" solves the problem. Sometimes not. This is, however, the direction medicine is moving in the 21st century – towards addressing the basic biochemical and physiological problems, and not just suppressing symptoms.