

Take a Closer Look . . .

at How Antioxidants Minimize Free Radicals

More and more, oxidative stress—the damage caused in our bodies by free radicals—is being implicated in aging and disease processes. So what is oxidative stress, what are free radicals, and how do antioxidants help prevent the damage that free radicals can cause?

What is oxidative stress?

As we all know, oxygen is an essential ingredient for energy production inside the human body. Within the mitochondria of every cell, oxygen provides the catalyst for the fuel for all the basic activities of the body, including digestion, metabolism, cellular repair, immune function, nervous system responses, and reproduction. However, because oxygen causes things to activate, energize, metabolize, and burn, without some kind of counterbalance or protection, the result can be abnormal oxidative stress. When the production of damaging oxidative molecules exceeds the capacity of the body's antioxidant defenses to neutralize them, the result is negative oxidative stress. And when unnatural and possibly harmful oxidants exist without the necessary counterbalancing and protecting influences, a new category of destructive and potentially disease-causing agents appear on the scene: free radicals.

What are free radicals?

A free radical is a molecule that is unbalanced at the molecular level, leading to a very destabilizing and destructive effect when these molecules interact with cells. The protective outer layer of the cell can be damaged, made brittle and less flexible. Gradually the cell wall can be completely destroyed. Inside the cell, basic cellular structures and functions can be impaired, enzyme systems stop working, and the precious genetic material, DNA, can be damaged and altered.

There are several kinds of free radicals, but the one that tends to cause the most damage is the oxygen free radical. Oxygen free radicals are especially unstable and aggressive molecules, and in order to become balanced each one seeks to bind with another molecule. When we experience undue stress, we begin to produce more of these free radicals than our bodies can dispose of or use. This stress can be from many different sources, including elements in the environment such as pollution, bad water, chemicals, and bacteria or viruses. One of the most harmful sources of oxidative stress is ultraviolet (UV) light from sun exposure and some forms of artificial light, including tanning lights. Highly processed foods and oils in the diet as well as sugar may also be major sources of free radical production in the body, as can a diet that does not have the variety of vitamins and essential nutrients that are necessary to help our bodies fight free radical damage.

How do antioxidants help prevent the damage that free radicals cause?

In order for healthy oxidation to take place, other biochemical factors and agents must be present, such as enzymes, trace minerals, amino acids, fats, and carbohydrates. These various nutritional co-factors are called antioxidants. Antioxidants allow for a balanced amount of combustion (oxidation) to take place within the cells, and for a normal and healthy amount of energy production. Antioxidants are the natural and organic partners of the normal, healthy oxidant co-factors of metabolism.

A number of antioxidants are known to neutralize free radicals, including CoQ10, vitamin E, vitamin C, and beta-carotene. Where do these vital elements come from? While some antioxidant compounds are manufactured inside the body, most come from natural, organic foods, herbs, and supplements that help to protect the body from harmful free radical activity. These antioxidant compounds are always made up of different combinations of a variety of micronutrients: vitamins, minerals, trace minerals, amino acids, essential fatty acids, phytochemicals, and pigments. Like most other groups of micronutrients, antioxidant compounds work synergistically, and this means that using foods or supplements with even trace amounts of several different antioxidants will always be more effective than taking a large amount of a food containing just one.

In other words, individual antioxidants will neutralize specific free radicals, but not all of them. When we are under a lot of stress, whether from inside the body or from the environment, it is difficult for the body's defenses to catch all the free radicals before they can do real damage. By using a variety of antioxidants foods and supplements, as well as topical applications, we enable our bodies to neutralize a variety of destructive free radical forms, from the outside and from within, and thus protect our cells and ourselves.

The more antioxidants found in the body, the longer an individual's life will be. In order to live a long and healthy life, antioxidants should be a staple of any nutritional program.

—Richard G. Cutler, gerontology researcher

