

eRadiator™

Neutralize Free Radicals That Can Damage (and Age) Your Body

eRadiator

THE NUMBERS

- ❑ Cancer is the second leading cause of death in the U.S.
- ❑ There were more than half a million U.S. deaths from cancer in 2001, according to the CDC
- ❑ Cancer costs in the U.S. alone run close to \$190 billion (which includes healthcare expenses and lost productivity)
- ❑ About 70% of all deaths in the U.S. annually are caused by chronic diseases such as cancer, heart disease, stroke, and diabetes
- ❑ Age-related macular degeneration is the leading cause of blindness in people over 65

FREE RADICALS RUNNING RAMPANT

Think of them as a bunch of wild singles from the personals section of the newspaper, alone, lonely, and seeking the perfect mate. Then make them very dangerous and tremendously desperate. That's free radicals in a nutshell. But to understand how they wreak havoc in our bodies, we'll have to turn back time and revisit some of our high school chemistry.

In fact, let's go back to the basis of it all -- the atom. As you may recall, atoms are the tiny building blocks of all matter (or whatever has mass and weight). Almost like miniature solar systems, atoms have a nucleus (made up primarily of protons and neutrons) around which a number of electrons

circle. Each of these particles has an electrical charge -- the neutrons are neutral, protons positive, and the electrons are negatively charged. Every atom seeks balance -- the positive charge should equal the negative charge. When there is an imbalance, the atom will naturally seek to correct it by gaining or losing electrons from its outer shell, or by sharing electrons with other atoms, forming chemical bonds. In this way molecules, or groups of atoms are formed. It's a perfectly normal process, and it's how we're all made.

But sometimes those chemical bonds -- especially the weak ones -- are hard to maintain, and they break, leaving unbalanced atoms in their wake. In addition, electrons in the outer shell of atoms are particularly hard to hang on to, and they are subject to being stripped away. When this happens, the atom does what comes naturally and seeks to replace its lost electrons. It will find the nearest available electron and steal it. What we call "free radicals" are atoms that have lost electrons through physical or chemical actions. They are electrically imbalanced, high energy particles, on the prowl to carry out some thievery of their own.

THEY'RE JUST LOOKING FOR CLOSURE

So if this is all part of a natural, normal process of matter building, why do free radicals get such a bad rap? What's wrong with electron-deprived atoms looking for a little

closure? Well, as the Russian dissident writer Alexander Solzhenitsyn phrased it, "the line dividing good from evil runs through the heart of every human being, and who is willing to destroy a piece of his own heart?" Just so with the human body: the line between healthy functioning and damaging metabolic processes is a thin one. And in the case of free radicals, the normal matter-building process degenerates into an electron-seeking rampage.

Free radicals are so intent on filling their deficient electron shells that they will beg, borrow and steal electrons from any atoms they come across. This theft of electrons from other atoms can actually turn those atoms into more free radicals which then return the favor to other nearby atoms. Once in motion, the whole deadly process begins to cascade through normal healthy cells, destroying everything in its path and creating more and more "killer" atoms along the way. Just one free radical is capable of disrupting strands of DNA (the genetic "blueprint" for all life processes) or even killing an entire cell

While there are a number of different types of free radicals, there are a few that stand out above the crowd. Superoxide radicals seek to replace their missing electrons (they actually need 3 to fill the gaps in their outer shell, which is one reason they are so destructive) from the mitochondria of cells. Mitochondria, as you may recall from high school biology classes, are the energy production sites in

cells, where food is converted into energy packages that the cells can use for their daily workings. When enough mitochondria are damaged by free radicals, the cells containing them will die. Hydroxyl radicals wreak havoc by attacking enzymes, proteins, and unsaturated fats in cell membranes. Lipid peroxy radicals can start a chemical chain reaction in cell membranes so deadly that the cells will actually burst open and die.

ANTIOXIDANTS: THE FIRST LINE OF DEFENSE

So how do normal atoms turn renegade in the first place? There are a number of factors that play a role in that change. They include such things as environmental toxins (smog, cigarette smoke, car exhaust, drugs, herbicides and pesticides), ionizing radiation, and even certain types of food substances, like partially hydrogenated oils. Internally, our bodies regularly create free radicals as by-products of normal metabolic processes. Oxidative metabolism, the use of oxygen to help fuel chemical reactions in our bodies, produces a steady stream of free radicals, or oxidants. We are fully equipped to deal with these in normal circumstances, but stressors -- like aging, trauma, disease and medications - usually lead to more free radical production than our bodies can handle.

Antioxidants are powerful free radical fighters that neutralize electron imbalances in free radicals by donating their own electrons to the cause. They have an inherent stability that allows them to do this without themselves becoming electron-stealing free radicals, and this characteristic helps them break the destructive chain reaction of free radical generation. Antioxidants come in many forms - vitamins, minerals, enzymes

and phytonutrients (specialized plant chemicals). They have varying distribution in the body - some are water-soluble, some fat-soluble, some cross the blood-brain barrier, some don't, and some are target tissue specific (brain, retina, liver, blood cells, etc).

STRENGTHENING THE DEFENSES

Many scientists and medical experts feel that much of what we attribute to "aging" is actually the cumulative effect of free radical damage to our bodies over the course of many years. The damage caused by free radicals weakens our very cells, altering DNA structure in some cases, and makes us much more prone to disease, which results in even more free radical production. When there is enough damage to cellular DNA, the result can be transformation into cancerous cells. Even strenuous exercise, for all its other health benefits, tends to increase free radical production in tissues.

The body has a number of antioxidant systems designed to fight off the free radicals we can never seem to be "free" of. Unfortunately, in today's world, we are exposed to levels of environmental pollution, radiation, toxins and stress that we were never really intended to have to deal with. These create free radical loads that overwhelm our innate defenses. An antioxidant supplement containing a wide variety of component antioxidants with diverse targets, like eRadiator, can play a vital role in helping the body adequately defend itself against damaging free radicals. Let's look at the important antioxidants in eRadiator to see how it can help:

Vitamin A

Found in such foods as liver and kidney, egg yolks, butter, cod liver

oil, and fortified dairy products, vitamin A is a fat-soluble vitamin that is part of a family of compounds including beta-carotene and retinol, the carotenoids. It is needed by all body tissues for healthy growth and the repair of damage. It helps boost the immune system, create healthier skin, and improve eye health through its antioxidant activity.

Selenium

An important trace mineral, selenium functions as part of the human antioxidant enzyme system called glutathione peroxidase. It helps the body protect itself against exposure to mercury and works to strengthen the immune system in general. It also works synergistically with Vitamin E, enhancing its effectiveness.

Sodium Citrate

Also known as citric acid, sodium citrate revitalizes collagen and elastin fibers in the skin and arterial walls. It is also an antioxidant that works most effectively in a synergistic mode, augmenting the work of the primary powerhouse antioxidants.

N-Acetyl-Cysteine

N-Acetyl-Cysteine (NAC) comes from the amino acid cysteine. The body produces it, but it can also be found in food sources. NAC works with glutamic acid and glycine to help convert cysteine into glutathione, perhaps the body's most powerful cellular antioxidant. NAC also boosts immune function and, as such, has generated a lot of interest from AIDS and HIV researchers.

L-Methionine

One of the essential amino acids the body must obtain from food sources, L-Methionine helps protect us from a variety of toxic threats. In particular, it is a heavy metal chelator, which means it binds such toxic metals as lead, cadmium and mercury, and then helps the body eliminate

them. It is also a lipotropic agent, helping the liver process fats and preventing fatty build-ups in the liver and arteries.

Superoxide Dismutase

Superoxide Dismutase (SOD) works with glutathione to neutralize reactive oxygen molecules, specifically targeting the superoxide radical and helping deter destruction of mitochondria in cells. The body produces SOD for every cell to fight off free radicals, but, as we age, that production diminishes and supplementation becomes increasingly necessary. Superoxide dismutase also targets the hydroxyl radical.

Quercetin

Quercetin is a plant chemical antioxidant known as a bioflavonoid. It is particularly helpful in shoring up cell membranes against free radical attack.

Ginkgo

You've probably heard of ginkgo or ginkgo biloba in connection with brain function, particularly memory. A lot of work has been done on ginkgo supplementation for Alzheimer's disease, and it appears to help those with the disease combat both memory loss and depression. In fact, ginkgo helps stimulate blood flow to the brain to maintain a good oxygen supply in tissues there, and it also acts as a powerful antioxidant, protecting brain cells from free radical damage.

Bilberry Extract

Famed for its support of healthy vision, bilberry contains antioxidants called anthocyanadins that particularly target free radical damage to the retina, especially the small capillaries found there. It also helps reduce free radical damage to the lens of the eye.

EGCG (Green Tea Extract)

Green tea is one of the most frequently consumed beverages in the world, second only to water. Its

health benefits have been recognized for centuries throughout Asia. There are a number of active compounds in green tea, including tannins. Another is EGCG -- short for Epigallocatechin Gallate, a powerful antioxidant found in particularly high concentration in green tea. EGCG is over 200 times more potent than vitamin E in taking out the free radicals that destroy lipids (or fats) in the brain. It has many other health benefits as well, and scientists are looking at its potential to help a range of conditions, from cardiovascular disease to cancer.

Curcumin

While you may have turmeric on your kitchen shelf, you probably don't know that the substance that gives this spice its yellow color is the powerful antioxidant called curcumin. In much of the world turmeric is used occasionally to spice up a particular savory dish, but in India, it is a key ingredient in the many curries that characterize the national cuisine. The centuries-long, widespread use of turmeric for seasoning and for its health benefits in traditional Ayurvedic medicine has prompted much modern-day Indian medical research. It has powerful antioxidant properties and has been shown to work particularly well in conjunction with green tea in scavenging free radicals. Studies have shown it to offer health benefits in regard to infection, arthritis, heart disease, liver dysfunction and even cancer.

Alpha Lipoic Acid

This is a sulfur-containing fatty acid found in spinach and animal protein. Alpha-lipoic acid is a universal antioxidant -- sometimes called the "mother" antioxidant - that can scavenge free radicals from throughout the body. It is both water and fat-soluble, which gives ALA the ability to fight free radicals in all body areas. It is found in the mitochondria of all cells, where it works

to help break down sugars for use as energy. Alpha lipoic acid also helps regenerate the antioxidant activity of Vitamins E and C, and it promotes liver health. Studies have shown that it improves insulin function and it can help lower glucose levels by as much as 10-30 %.

Tocotrienol (Rice Bran Extract -- Vitamin E)

Tocotrienol is a unique Vitamin E fraction that is 40 times stronger than standard Vitamin E. Vitamin E is a fat-soluble antioxidant -- one of the most potent in the body. It is particularly helpful in protecting cell membranes from free radical damage. It also helps reduce free radical damage in LDL or "bad" cholesterol, which is important in that it is oxidized (free radical damaged) LDL that participates in buildup of blockages in heart and vascular disease.

Grape Seed Extract

The antioxidants in grape seed extract are similar to those in green tea. In fact, the proanthocyanidins found in grape seeds are some of the most potent antioxidants found in nature, and they have been of particular interest to cancer prevention research. In addition to its free radical scavenging duties, grape seed extract works heavily in assisting and defending the circulatory system. It enhances collagen function in arterial walls and in the skin. Plus it works well with vitamin C to help re-energize the powerful antioxidant function of vitamin E in the body.

Grape Skin Extract

Red grape skin is rich in several important antioxidants -- particularly polyphenols and anthocyanidins, as well as vitamins C and E.

Lutein

Lutein has received a lot of interest in recent years for its usefulness in strengthening eye function and helping to stave off macular degeneration. It is one of the carotenoids found in

high concentration in the light-receptor tissue at the back of the eye, the retina. There, along with another carotenoid, zeaxanthin, it helps filter damaging blue light and prevent free radical damage to eye tissue.

Lycopene

Lycopene is a powerful antioxidant that has been linked to helping reduce the growth of cancer cells. It is the carotenoid responsible for the red color of tomatoes, and lycopene's bioavailability -- how readily it can be assimilated and used by the body -- appears to increase with cooking. As a result, processed tomato products like pizza sauce and tomato juice and soup have more bioavailable lycopene than fresh tomatoes.

Zeaxanthin

Like lutein, zeaxanthin is a carotenoid that is particularly important for eye health, especially in helping reduce the risk of macular degeneration. It helps protect eye tissue from the oxidizing radiation of sunlight, which can cause extensive free radical damage.

Nordihydroguaiaretic Acid (Chaparral Extract)

Long known as a blood purifier, chaparral has been used in traditional Native American medicine to help ease cramping and joint pains as well as allergic problems. Chaparral has potent anti-inflammatory qualities and is rich in antioxidant flavonoids. In particular, the most powerful antioxidant in chaparral, Nordihydroguaiaretic Acid (NDGA for short), has been shown to target the herpes virus in various forms. It also works to control damage caused by radiation-induced free radical activity.

Catalase

Catalase is an important enzyme for many body functions and is one of the most potent catalysts known. It speeds up the conversion of hydrogen peroxide into water and oxygen.

It is particularly important as a participant in SOD (superoxide dismutase) production. If catalase and glutathione are not present in sufficient quantities during SOD production, there can be a build-up of hydrogen peroxide that, in turn, is converted into the damaging hydroxyl radical.

eRADICATING FREE RADICALS

It's impossible to live our human lives without some level of exposure to free radicals - our own bodies produce them through the processes of daily living. Plus, the load of toxic, noxious stuff we are exposed to almost continually produces more free radicals than we are naturally equipped to deal with. But it is possible to work to minimize the threat of these tiny killers, to reduce and even prevent a lot of the damage they can cause. Aging, cancer, and chronic illnesses are all part of the wreckage often left in the wake of the free radical barrage on our cells and tissues. Antioxidant supplements are an excellent way to replenish and reinforce our natural arsenals, thus making our bodies stronger and more impervious to the daily onslaught of free radicals. Particularly helpful are those, like eRadiator, that contain beneficial amounts of a wide variety of component antioxidants.

CAUTIONS

These statements have not been evaluated by the FDA. This product is not intended to diagnose, treat, cure, or prevent any disease, but rather is a dietary supplement intended solely for nutritional support.

SOURCES

Balch JF. *The Super Antioxidants: Why They Will Change the Face of Health Care in the 21st Century*. M. Evans and Co. 1998.

Smythies JR. *Every Person's Guide to Antioxidants*. Rutgers Univ Press. 1998.

Ames BN, Shigenaga MK, Hagen TM. Oxidants, antioxidants, and the degenerative diseases of aging. *Proc Natl Acad Sci* 1993;90:7915-22.

Lampe JW. Spicing up a vegetarian diet: chemopreventive effects of phytochemicals. *Am J Clin Nutr*. 2003 Sep;78(3 Suppl):579S-583S. Review.

Finley JW. The antioxidant responsive element (ARE) may explain the protective effects of cruciferous vegetables on cancer. *Nutr Rev*. 2003 Jul;61(7):250-4. Review.

Prior RL. Fruits and vegetables in the prevention of cellular oxidative damage. *Am J Clin Nutr*. 2003 Sep;78(3 suppl):570S-578S. Review.

Fariss MW, Zhang JG. Vitamin E therapy in Parkinson's disease. *Toxicology*. 2003 Jul 15;189(1-2):129-46. Review.

Bounous G, Molson JH. The antioxidant system. *Anticancer Res*. 2003 Mar-Apr;23(2B):1411-5. Review.

De la Fuente M. Effects of antioxidants on immune system aging. *Eur J Clin Nutr*. 2002 Aug;56 Suppl 3:S5-8. Review.

Johnson EJ. The role of carotenoids in human health. *Nutr Clin Car*. 2002 Mar-Apr;5(2):56-65. Review.

Weiss JF, Landauer MR. Protection against ionizing radiation by antioxidant nutrients and phytochemicals. *Toxicology*. 2003 Jul 15;189(1-2):1-20. Review.

Bastianetto S, Quirion R. Natural Extracts as possible protective agents of brain aging. *Neurobiol Aging*. 2002 Sep-Oct;23(5):891-97.

Benzie IF, Szeto YT, Strain JJ, Tomlinson B. Consumption of green tea causes rapid increase in plasma antioxidant power in humans. *Nutr Cancer*. 1999;34(1):83-7.

Hamilton-Miller JM. Anti-carcinogenic properties of tea (*Camellia sinensis*). *J Med Microbiol*. 2001 Apr;50(4):299-302. Review.

Mares-Perlman JA, Millen AE, Ficek TL, Hankinson SE. The body of evidence to support a protective role for lutein and zeaxanthin in delaying chronic disease. Overview. *J Nutr*. 2002 Mar;132(3):518S-524S. Review.