

FREE RADICALS, ANTIOXIDANTS, and YOUR HEALTH

Will we ever be able prevent heart disease, cancer, Alzheimer's, and external aging with just pills, creams, and shots? Theories of disease and aging involve concepts of free radical interactions in body biochemistry. While most people have heard of "free radicals," what exactly are they, what do they do, and why are antioxidants are so important to fight these scavengers?

Free radicals are molecules that are atomically unstable and thus highly reactive due to lack of a complete electron subset in their outer orbit. They take an electron from a more vulnerable molecule thus rendering that latter substance unstable (oxidation reaction). Antioxidants, on the other hand, have the capability to donate an electron to help stabilize molecules (aka reduction). Luckily, we do have repair enzymes in our bodies to inhibit overzealous free radical interactions and promote effects of antioxidants.

Free radicals often involve the oxygen molecule, thereby forming reactive oxygen species, which oxidize and damage cell components such as DNA, lipids, and proteins. Free radicals can be in the form of air pollution, excess sunlight, alcohol, smoking, and even internal stress (from a rise in our adrenalin levels). In our bodies, there are complex cascades where both free radicals and antioxidants are necessary for maintaining health. It is imbalances that can cause disease.

For instance, theories of carcinogenesis conceptualize that free radicals prevent proper DNA repair mechanisms, thereby perpetuating DNA mutations, leading to a cascade that causes uncontrolled cell growth. Likewise, internal markers of aging, such as atherosclerosis, also involve oxidative stress on lipids, specifically low-density lipoproteins or LDLs, that cause plaques and ultimately blockage on artery walls. This blockage causes to heart disease and stroke. And lastly, external markers of aging such as skin wrinkling also involve free radical-induced collagen breakdown through excess sun exposure and smoking.

Antioxidants such as vitamin A,C,E, and polyphenols (often from green tea), as well as lutein, lycopene, and selenium, are some of the body's major antioxidants. While we have natural antioxidants and enzyme repair systems in our bodies, we also obtain much of our antioxidants from our diet, specifically diets rich in plant matter such as fruits and vegetables and legumes. Internal consumption and even topical placement through creams if they are able to penetrate deep enough into the skin, can slow down damage to our cells.

Foods with the highest antioxidant properties judged by the ORAC scale (aka, Oxygen Radical Absorbance Capacity) include: beans, berries (acai seems to be the berry of the moment), apples, green tea, dark chocolate/cocoa, red wine, certain nut and seeds, and green, leafy vegetables. Diets rich in these foods promote good health - not just through their high antioxidant levels, but also through their high fiber, relatively low-calorie, and nutrient-rich properties.

While the role of free radicals is not the only factor in disease and aging, it is part of the story, just as antioxidants may be part of the anti-aging and good-health panacea that we are all seeking.

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