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essentials of health

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## ANTIOXIDANTS TUTORIAL, PART 1: WHAT ARE ANTIOXIDANTS?

Free radicals (pro-oxidants) are atoms or molecules with unpaired electrons. These highly reactive substances can be formed in a number of ways, and once formed they may use their reactivity to damage important cellular components - such as the cell membrane - or macromolecules like DNA. This damage can lead to mutation, impaired function, and even cell death. To minimize potential damage from free radicals, the body utilizes a defense system of *antioxidants*.

Antioxidants are molecules that can safely interact with free radicals and terminate their reactivity before vital cellular components are damaged. Although there are several enzyme systems within the body that scavenge free radicals, the principle micronutrient (vitamin/mineral) antioxidants are vitamin E, beta-carotene, vitamin C, and selenium. The body cannot manufacture these micronutrients, so they must be acquired by diet. In addition, there are many plant-derived nutrients (phytonutrients) that can act as powerful antioxidants in the human body.

It is impossible to completely avoid damage from free radicals. Free radicals arise from sources both inside (endogenous) and outside (exogenous) our bodies. Oxidants that develop from processes within our bodies form as a result of normal breathing, metabolism, and inflammation. Exogenous free radicals form from environmental factors such as pollution, sunlight, strenuous exercise, smoking, and alcohol. Unfortunately, no antioxidant system is perfect, so cells and DNA damaged by oxidation accumulate as we age.

*< Next week - Part 2: Health Benefits of Antioxidants >*