

## Refinement of the free radical theory of cancer: Dietary recommendations

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Two of the dietary tenets of the free radical theory of cancer, put forth by Denham Harman in 1962, require, in deference to newly accrued knowledge, refinement. The first was a recommendation for dietary reduction of vulnerable free-radical targets, e.g., polyunsaturated lipids. The second was the addition of one or more antioxidants to the diet. With respect to the first, it is now known that equivalent levels of dietary omega-6, -3 polyunsaturated fatty acids (PUFA) have opposite effects upon photocarcinogenesis. Increasing levels of omega-6 PUFA exacerbate photocarcinogenesis. Omega-3 PUFA inhibits photocarcinogenesis. Both exhibit about the same degree of unsaturation. It is almost certain that the action of these two types of PUFA rests with the intermediates that each generates through the lipoxygenase and cyclooxygenase pathways. The second recommendation requiring refinement, i.e., reducing cancer risk by addition of one or more antioxidants to the diet also represents a formidable task. Supplementation of an antioxidant into the complex milieu of the cell with its own intricate and complex defense system may result in untoward effects. Each antioxidant exerts its own specific mechanism(s) of radical scavenging and may exert its own specific physiological responses. This is apparent with  $\beta$ -carotene that has been shown to exacerbate photocarcinogenesis under certain dietary conditions. Consequently both dietary recommendations must be reassessed. It may be necessary to develop an algorithm for each antioxidant supplement based upon the benefit to be derived for a specific cancer and the potential risks to each individual for other forms of cancer.

### Biography

Homer S. Black, Ph.D., is Professor Emeritus of Dermatology, Baylor College of Medicine, Houston, Texas. From 1968 to 2003 he was a Research Physiologist and Director of the Photobiology Laboratory at the Veterans Affairs Medical Center in Houston. He was a Fulbright Scholar at the Univ. of Dundee, Scotland. His research interests have focused upon the chemopreventive or pro-carcinogenic effects of antioxidants and dietary fat in UV-carcinogenesis. The experimental studies culminated in a dietary intervention trial in which it was shown that a low-fat dietary intervention reduced the risk for subsequent skin cancers in skin cancer patients.

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