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Major Types of Free Radicals and Antioxidants

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TYPE OF RADICAL

Superoxide radical

Hydrogen peroxide
(free radical generator)

Hydroxyl radical

Peroxyl radical

Singlet oxygen

Hypochlorous radical

Peroxynitrite radical
(oxygen-nitrogen radicals)

Ozone

QUENCHING ANTIOXIDANTS

Superoxide dismutases
Dihydro*lipoic* acid*

Glutathione peroxidase
Catalase

Vitamin C
Alpha-lipoic acid
Melatonin

Vitamin E
Coenzyme Q10
Beta-carotene
Lycopene
(Possibly other carotenoids)

Lycopene
Gamma-carotene
Astaxanthin
Canthaxanthin
Alpha-carotene
Beta-carotene
Zeaxanthin
Lutein
Cryptoxanthin
Alpha-lipoic acid
Glutathione
Vitamin E

Alpha-lipoic acid
Dihydro*lipoic* acid

Alpha-lipoic acid
Dihydro*lipoic* acid

Vitamin C

Notes: Free radicals (molecules with one electron too few or too many) contribute to disease and the aging process by reacting with normal (healthy) molecules. Antioxidants quench, or neutralize, these free radicals. Most antioxidants are either water or fat soluble, which means they work in different parts of the cell. However, a water-soluble antioxidant may have an indirect influence on a fat-soluble antioxidants, and vice versa. Research by Al L. Tappel, PhD, has demonstrated that a diversity of antioxidants is much more protective against free radical damage than are just a few antioxidants. In other words, the more antioxidants you have, the better. Some of these antioxidants, such as superoxide dismutase and glutathione compounds, are produced mostly in the body, though they are also found in some foods. Virtually all other major antioxidants must be obtained from the diet. When an antioxidant is "used up" in quenching a free radical, it becomes a very weak free radical itself. Don't worry about this, though: a diverse selection of antioxidants regenerates "used" antioxidants in what Lester Packer, PhD, has described as the "antioxidant network." *One final note: the body routinely converts alpha-lipoic acid (which can be supplemented) to dihydro*lipoic* acid (which is not available supplementally). Information compiled from various scientific sources.

Nutrition Books: Seven that are New and Noteworthy

Handbook Of Antioxidants, edited by Enrique Cadenas, MD, PhD, and Lester Packer, PhD. (Marcel Dekker Inc., 1996, \$150) □□□□

This is not a book for casual readers. Rather, this scientific and detailed discussion of antioxidants is intended for physicians and researchers who need a sound reference book on the chemical and biological activities of antioxidants and free radicals. Individual chapters discuss vitamins C and E, carotenoids, flavonoids, herbal antioxidants, coenzyme Q10, and lipoic acid, reflecting the current state of knowledge. We give it our highest recommendation.

Present Knowledge In Nutrition, 7th edition, edited by Ekhard E. Ziegler, MD, and L. J. Filer Jr., MD, PhD. (International Life Sciences Institute, 1996, \$50) □□□□

This book, also, is for the advanced reader on nutrition. It provides a comprehensive and detailed description of the nutrients generally considered essential in human nutrition, plus chapters on the nutritional aspects of heart disease, cancer, diabetes, and other diseases. For basic scientific information on nutrients, it cannot be surpassed. The book has two weaknesses, though. First, it takes a fairly conservative approach to the clinical use of nutrients, not sufficiently describing the burgeoning research on the therapeutic use of vitamins and minerals. Second, it completely ignores a number of vitamin-like nutrients and metabolites (e.g., choline, inositol, coenzyme Q10, lipoic acid) that play important roles in health. Still, we heartily recommend this book as a basic reference.

DHEA: A Practical Guide, by Ray Sahelian, MD. (Avery, 1996, \$9.95) □□

Sahelian has written one of the more balanced books on DHEA, at a time when it seems everyone is making wild life-extension and disease-curing claims for this hormone. He acknowledges that there are risks with DHEA, but in the book he tends to skip over the potential risk of breast and prostate cancer, based on animal studies. (In a phone interview for an article in the Dec. 1996 *Natural Health* magazine, he was much more concerned about these risks.) DHEA can benefit many people, particularly older people with low blood levels of this hormone, but it's probably best taken under the supervision of a physician. The book will help you decide whether you should ask your doctor about taking DHEA.

What Your Doctor May Not Tell You About Menopause, by John R. Lee, MD, and Virginia Hopkins. (Warner Books, 1996, \$12.99) □□□

For more than 20 years, Dr. John Lee has been practically a lone wolf promoting the benefits of natural progesterone cream to women who suffer from PMS, menopausal problems, osteoporosis, or are at risk of breast cancer. Lee sees much of the problem related to too

much estrogen relative to progesterone. Synthetic progesterone drugs don't work as well as the natural form—there is a difference. This is a good book for women, whether they're facing menopause or whether the change of life is still years away.

How To Raise A Healthy Child, by Lendon H. Smith, MD. (Evans & Co., 1996, \$24.95) □□□

Dr. Smith is the dean of nutritionally oriented pediatricians. In his latest book, he distills some of the key concepts from his earlier books. He covers the range from prenatal care through infancy and up to age seven. Dr. Smith also addresses the diseases common to childhood and gives parents good tips that conventional pediatricians might be oblivious to.

Hoffer's Laws of Natural Nutrition, by Abram Hoffer, MD. (Quarry Press, Kingston Ont., 1996, \$19.95). □□□□

How does Dr. Hoffer, at age 78, remains mentally sharp, physically indefatigable, practicing psychiatry, treating cancer patients, and lecturing around the world? You'll find a lot of the answers in this very fine, no-nonsense book about nutritional therapy. Hoffer, one of the pioneers and original thinkers in the therapeutic use of vitamins (he began treating patients with them in 1952), is about the only person who could write his own "laws" of medicine and healing and not be criticized for arrogance. He is a humble, perceptive man who has always clearly seen the difference between the rational and irrational in medicine. If you buy only one book this year, buy this one.

Our Molecular Nature, by David S. Goodsell, PhD. (Copernicus/Springer-Verlag, 1996, \$25) □□□

The real playing field of nutrition and biochemistry is molecular biology. The details of molecular biology are not easy to grasp, but this book explains the basics in easy to understand terms and illustrations by the author. It provides an excellent framework to understand breaking research on the molecular roles of vitamins.

Order these books through your local book store or health food store. □

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