Free Radicals in Biology and Medicine

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My laboratory works on three main areas; the role of free radicals, other reactive species, and antioxidants in human health and disease, the part played by oxidative damage in human neurodegenerative disease and “artefacts of cell culture”. I will reveal that oxidative damage, mitochondrial defects and failures to clear abnormal proteins are inter-related events that contribute to all human neurodegenerative disorders. Our use of biomarkers of oxidative damage in human volunteer studies suggests that supplements of the "classical" antioxidants (α-tocopherol, ascorbate, *β*-carotene) are of little or no effectiveness in decreasing oxidative damage in healthy human subjects, and recent studies on the effects of dietary changes on oxidative damage in human body will be presented. Many studies have examined actions of antioxidants on cells in culture, but these are readily confounded by chemical reactions in cell culture media that produce artefacts. Finally, our recent work on the role of metal ions in the development of atherosclerosis will be described.