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Vitamin C, Vitamin E and Flavonoids

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Abstract

All inflammatory processes include oxygen-activating processes where reactive oxygen species are produced. Intrinsic radical scavenging systems or compounds administered with food warrant metabolic control within certain limits. Antioxidants, which in many cases are free radical scavengers or quenchers of activated states, comprise a vast number of classes of organic molecules including most prominently the phenolics. In this report, mechanisms of protection from oxidative damage by the antioxidants vitamin C and E and flavonoids, as present in most plant extracts used as natural drugs, are summarized. For this purpose the principle of oxygen activation during representative disease processes and the protective actions of antioxidants are outlined in short.

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Reactive Oxygen Species and the Eye

Reactive oxygen species (ROS) occur in the healthy metabolism as by-products of oxidative processes such as the respiratory chain in mitochondria. Their detoxification is maintained with antioxidant enzymes (e.g. superoxide dismutase, catalase, glutathione peroxidase) and antioxidants (e.g. ascorbic acid, glutathione, tocopherol) and marks only small problems for a healthy individual. Certain incidences, such as ageing, inflammation, ischemia, and smoking, cause a rise in the oxidative stress. Thus the metabolism has to cope with ROS and ROS metabolism plays a crucial role in pathogenesis [1–3].

ROS include superoxide radicals ($O_2^{\cdot-}$), hydrogen peroxide (H_2O_2), hydroxyl radicals (OH^{\cdot}), singlet oxygen (1O_2), peroxynitrite (ONNOH) and hypochloric acid (HOCl). A one-electron transfer onto oxygen generates superoxide radicals. They dismutate spontaneously to hydrogen peroxide and oxygen at neutral to slight acidic pH; whereas superoxide dismutases (SOD) catalyze