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MOLECULAR CHARACTERIZATION OF FREE RADICALS FUNCTION IN REDOX SIGNALLING AND EFFECT OF OXIDATIVE STRESS IN PATHOBIOLOGY OF ATHEROSCLEROSIS

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Free Radicals are molecules with an unpaired electron. Due to the presence of a free electron, these molecules are highly reactive. At moderate concentrations, free radicals play an important role as regulatory mediators in signalling molecules in a number of normal biochemical and physiological processes. At high concentrations, however, free radicals are hazardous for living organisms and damage all major cellular constituents such as lipids, proteins and DNA. The human body deals with the pathological effects of free radicals by utilizing both enzymatic and non-enzymatic antioxidant system. Although there are several sources of vascular ROS (reactive oxygen species), the enzyme NADPH oxidase is emerging as a strong candidate for the excessive ROS production that is thought to lead to vascular oxidative stress. A multitude of studies in experimental animals together with clinical data provide evidence that increased productions of ROS (reactive oxygen species) are involved in the development and progression of cardiovascular disease such as atherosclerosis. Atherosclerosis is a complex disease involving the arterial part of the vasculature and is characterized by the formation of intimal plaques consisting of lipid accumulations, smooth-muscle and inflammatory cells, connective tissue fibers and calcium deposits. Monitoring and rapid detection of free radical is necessary to combat the spread of various diseases . The most frequently studied oxidative stress markers are lipid peroxidation, DNA and protein oxidative damage. The implication of oxidative stress in the etiology of several cardiovascular diseases suggests that antioxidant therapy represents a promising avenue for treatment.

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