



A REVIEW

# Physiological and Pathological Role of Reactive Oxygen Species

■ KULDIP SINGH AND ARVIND PREET KAUR

See end of the paper for authors' affiliation

**Correspondence to :**

KULDIP SINGH  
Department of Biochemistry,  
Government Medical College  
Campus, AMRITSAR (PUNJAB)

INDIA

Email: drkuldip08@gmail.com

**ABSTRACT :** Reactive oxygen species occur continuously in all the cells as a part of normal cellular function. These reactive oxygen species are a potential double –edged sword in diseases prevention and promotion. The most common reactive oxygen species are hydrogen peroxide, superoxide ion and hydroxide radical are the compounds, when present in a high enough concentration, can damage cellular proteins, lipids and nucleic acids that may promote various diseases. Advances in research have shown that low to moderate concentrations of reactive oxygen species play crucial roles in normal physiological processes, such as through redox regulation of protein phosphorylation, ion channels and transcription factors etc. and are also required for biosynthetic processes, including thyroid hormone production and cross linking of extracellular matrix. Reactive oxygen species induced disease, can be either due to a lack of reactive oxygen species (e.g., chronic granulomatous disease, certain autoimmune disorders) or a surplus of reactive oxygen species (e.g., cardio-vascular and neurodegenerative diseases). The human body has several mechanisms to counteract the reactive oxygen species by producing antioxidants, which are either naturally produced in situ or externally supplied through foods and/or supplements. Antioxidant supplementation has proven largely ineffective in clinical studies, most probably because their action is too late, too little and too non-specific. This article reviews the basic chemistry, mechanisms of formation and catabolism of reactive oxygen species, their beneficial effects and the consequences of free radical induced diseases in the body.

**Key Words :**

Reactive oxygen species (ROS), Free radicals, Antioxidants, Cancer, Cardio-vascular disease (CVD)

**How to cite this paper :** Singh, Kuldip and Kaur, Arvind Preet (2013). Physiological and Pathological Role of Reactive Oxygen Species. *Internat. J. Med. Sci.*, 6(1) : 31-48.

**Paper History :**

Received : 10.02.2013;  
Accepted : 24.04.2013