

## ABSTRACT

### **Reactive Oxygen Species (ROS) Generation, Impacts on Tissue Oxidation, and Dietary Management of Non-Communicable Diseases: A Review**

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Generation of reactive oxygen species (ROS) in biological systems has been reported to be a significant cause of inflammatory and metabolic diseases. More recently, ROS and in a particular ozone has also been implicated in the conversion of cholesterol to atherogenic compounds, secosterol A, and upon aldolization to secosterol-B. Secosterol-A is uniquely produced by cholesterol ozonolysis, while secosterol-B can also be generated through the reaction of cholesterol with singlet oxygen. On the other hand, lipid oxidation reactions generate hydroperoxides, which upon catalytic and/or enzymatic decomposition yields lipid peroxide products of significant importance to tissue health. The mechanism of formation of potent oxidants like ozone in biological systems has not been clearly demonstrated, with only a theory: That antibodies catalyze oxidation of water by singlet oxygen to yield a trioxidic species, like hydrogen trioxide, as an intermediate in hydrogen peroxide formation while a recent hypothesis indicates that ozone could also be an intermediate in the aforementioned pathway and could be generated from biological molecules in the presence of singlet oxygen. Similarly, there is new information being generated concerning the involvement of antioxidants and amino acids in either termination or propagation of oxidative processes in mammalian systems. This review explores mechanisms of ROS/ozone generation in tissues, lipid peroxidation, cholesterol oxidation and highlight dietary management of non-communicable diseases with a focus on the roles of antioxidants and amino acids.

**Key words:** Ozone, singlet oxygen, antibodies, secosterol aldehydes, antioxidants.