

## ACTIVE COMPONENTS OF OXYGEN IN RELATION WITH MITOCHONDRIA

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Studies have provided strong evidence that mitochondria are not only the power house of the cell but they are the major source of reactive oxygen species. Mitochondrial activity is modulated by these reactive oxygen species by mitochondrial biogenesis, lipid peroxidation and mitochondrial membrane permeability transition.

**Aim.** Our aim is to enlighten the research in reactive oxygen species that facilitate the signaling pathway of cells and their role in influence on mitochondria fusion, fission and autophagy.

**Method.** Mitochondria consumes bulk volume of the cell oxygen concentration for ATP synthesis and oxidative phosphorylation. While mitochondria is consuming of oxygen, few amounts of superoxide's are instantly released and several pathways are used to neutralize this harmful anion. Mitochondrial matrix enzyme, manganese superoxide dismutase transforms superoxide to hydrogen peroxide. Various types of antioxidants, for example, glutathione, ascorbic acid (vitamin C) and  $\alpha$ -tocopherol (vitamin E) present in cells reduces reactive oxygen species. Large amounts of superoxide's are generated by damaged mitochondria which can damage lipids, proteins, nucleic acids are mitochondrial components. Autophagy start damaging vesicle nucleation and organelles (mitochondria) are separated to form an auto phagosome.

**Result:** Under normal conditions, harmful radical oxygen substances produced in low amount with the help of mitochondria are detoxified by anti-oxidants present in the cell. Mainly, superoxide's are appeared in the matrix or inner membrane of the mitochondria. Manganese superoxide dismutase gets oxidized if superoxide is present in excess amount and lodge the antioxidant ability of the mitochondria, thus increasing oxidative stress. Mitochondrial fragmentation is further seen when reactive oxygen species act as a messenger in signally process leading to long-lasting mitochondria fission and apoptosis.

**In conclusion** reactive components of oxygen are major mediators of cellular reaction to stress and perform through numerous mechanisms including, regulation of autophagy, signaling and apoptosis. Although, high amount of aggressive radical substances can grant to cell apoptosis and development of diseases. Nowadays, exist need to estimate the number of different reactive species generated during mitochondrial damage and their relative role in the pathogenesis of disease and development of the effective treatment.