Oxidants and Antioxidants in Medical Science, 2022
VOL 11, NO. 3, PAGE 01

COMMENTARY

Open Access

Biochemistry and Biological Source of Reactive Oxygen Species

Jin Biao*
Department of Chemistry, Jiangxi University of Science and Technology, Ganzhou, China

ARTICLE HISTORY
Received: 01-Mar-2022, Manuscript No. EJMOAMS-22-55949;
Editor assigned: 03-Mar-2022, PreQC No. EJMOAMS-22-55949(PQ);
Reviewed: 17-Mar-2022, QC No. EJMOAMS-22-55949;
Revised: 22-Mar-2022, Manuscript No. EJMOAMS-22-55949 (R);
Published: 29-Mar-2022.

Description

Reactive Oxygen Species (ROS) generation may occur as a product of biochemical reactions, mitochondria, peroxisomes, cytochrome P450, and other cellular components. ROS is mainly produced by the mitochondrial ETC. Almost all cells, and tissues are constantly changing a small fraction of the oxygen in the ROS cells in the ETC. Alternatively produced ROS, including respiratory effluents from activated phagocytes, ionizing harmful radiation effect on cell membranes, and products of several cellular enzymes (NADPH oxidase, xanthine oxidase, nitric oxide synthase) . The formation of ROS is a natural result of aerobic metabolism and is essential for maintaining tissue oxygen homeostasis. When oxygen homeostasis is neglected, there is an increase in oxidative stress on the cell surface. Superoxide, hydrogen peroxide and hydroxyl radicals are common metabolic products continuously produced by mitochondria in growing cells. Microsomal cytochrome P450 enzymes, flavoprotein oxidase and peroxisomal enzymes are other important intracellular sources of ROS.

ROS plays an important role in both health and disease. ROS also plays an important role in a number of physiologic processes such as normal vascular cell function and maintenance of vascular range of motion. ROS performs this function by activating the immune system, activating the signalling molecules and regulating the absorption of glucose by skeletal muscle. They play a role in responding to the growth factor and regulating inflammatory responses. They participate in the regulation of differentiation, proliferation, growth, apoptosis, cytoskeletal regulation, migration, and contraction.

ROS contributes to a variety of pathologies and a host of other diseases leading to death, such as chronic inflammation and autoimmune diseases (diabetes, rheumatoid arthritis, lupus), sensory impairment (eye disease, deafness), cardiovascular disease (atherossteosis, hypertension, ischemia/reperfusion damage), cancer (breast, kidney, lung), fibrotic disease (pulmonary and liver fibrosis, and diabetes prophylaxis), obesity, insulin resistance, neurological disorders (Parkinson's, Alzheimer's, ALS, schizophrenia) and infectious diseases (septic shock, flu, hepatitis, HIV).

ROS generation is usually a reaction series that begins with superoxide production. Superoxide rapidly converts to hydrogen peroxide automatically, especially at low pH or produced by SOD (Superoxide Dismutase). Other generations include the reaction of NO superoxide containing NO to form peroxynitrite, the formation of peroxidase-catalyzed hypochlorous acid from hydrogen peroxide, and the iron-containing Fenton reaction leading to the production of hydroxyl radical.

ROS work with large amounts of biomolecules (proteins, lipids, carbohydrates, and nucleic acids). ROS can irreparably damage and alter the function of these molecules after contact with them. As a result, they have become increasingly visible in living things that cause catastrophic damage. Harman demonstrated the role of ROS in the aging process, after which these ROS became cell damaging agents in the aging process. ROS also plays an important role in host protection because ROS generation deficiency reduces leukocyte killing capacity. However, in recent decades, a second important concept of ROS has been emerging. In addition, ROS has a regulatory mechanism that reverses almost all cells and tissues.

Biological Source

In mammals' cells the sources of ROS biological are as follows; mitochondria, endoplasmic reticulum, peroxisomes, cytosol, plasma membranes and outer cell space. Major sources of ROS include metabolic processes and cellular respiratory processes. During metabolic processes the peroxisome digests biomolecules that remove hydrogen from the oxidative reaction that produces H_2O_2. While the oxygen for cellular respiration is reduced intermediate with abnormal electrons can escape the chain.

Contact: Biao J, E-mail: Jin22448@qq.com