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**“Current achievements and future perspectives in
medical and biomedical research”**

BOOK OF ABSTRACTS

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Oxidative stress, oxidative DNA damage and prostate cancer

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Abstract

Production of reactive oxygen species (ROS) is an element of normal cellular metabolism, which have their physiological functions. The problem occurs when the balance is disturbed and the body enters the zone of increased oxidative stress. The state of increased reactive oxygen species (ROS) is a result of either increased ROS generation or a loss of antioxidant defense mechanisms. A growing body of evidence suggests that the increased production of ROS is linked to the aging process and the etiopathogenesis of age-related diseases, such as cancer, heart disease, atherosclerosis and other cardiovascular diseases, degenerative brain damage (e.g. Parkinson's and Alzheimer's disease). Excess ROS is harmful to normal cells.

The purpose is to show the relationship between the oxidative stress, oxidative DNA damage and the development of prostate cancer. In prostate cancer (PC), oxidative stress, natural key event characterized by supraphysiological ROS concentrations, has been identified as one of the pillars/basis of the phenotype of aggressive disease. Specifically, oxidative stress is connected to PC development, progress and response to therapy. Prostate cancer is mainly a disease of aging, with in most cases, occurs in men over the age of 55. Therefore, progressive inherent or acquired changes in cellular metabolism occurring over the years may play a very important role in the development of this disease. Many factors like diet, environmental carcinogens, and other inflammatory diseases have been linked to an increased risk of prostate cancer. The main focus is on the free radicals, their endogenous and exogenous sources, DNA damage (both nuclear and mitochondrial), damage to lipids and proteins by free radicals, the oxidative stress phenomenon, cancer, and the mechanisms of carcinogenesis.

The potential role of ROS in the regulation of cellular processes, controlling the malignant transformation suggests understanding of the etiology and progression of cancer in general and prostate cancer in particular. It can open the door for development of new treatments for prevention and cure of cancer. Because of the fact that the cells of prostate cancer are undergoing oxidative stress, strategies that can take advantage of this increased oxidative stress may also provide improvements in therapies. Measurements of oxidative stress stand a challenge, due to the instability of the

compounds and the variability of the mechanisms involved. Thus, although there is a strong correlation between oxidative stress and PC, clinical data are lacking.

Keywords

Cancer, DNA damage, oxidative stress, prostate, reactive oxygen species.