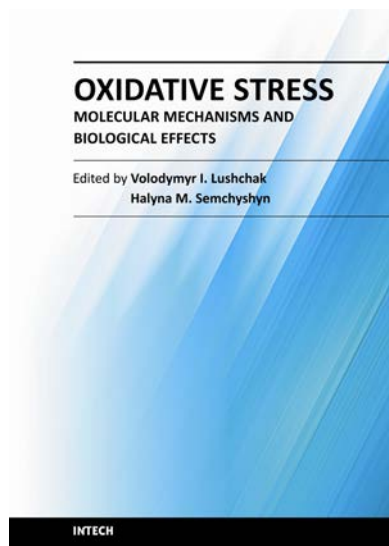


**VOLODYMYR LUSHCHAK,
HALYNA M. SEMCHYSHYN (EDITORS)
OXIDATIVE STRESS
MOLECULAR MECHANISMS AND BIOLOGICAL EFFECTS**



InTech

ISBN 978-953-51-0554-1

Hard cover

362 pages

April 2012

Since the discovery of free radicals in biological systems researchers have been highly interested in their interaction with biological molecules. Denoted in 1980, and due to fruitful results and ideas, oxidative stress is now appreciated by both basic and applied scientists as an enhanced steady state level of reactive oxygen species with wide range of biological effects. This book covers a wide range of aspects and issues related to the field of oxidative stress. The association between generation and elimination of reactive species and effects of oxidative stress are also addressed, as well as summaries of recent works on the signalling role of reactive species in eukaryotic organisms. The readers will gain an overview of our current understanding of homeostasis of reactive species and cellular processes they are involved in, as well as useful resources for further reading.

Open access book www.intechopen.com

Table of Contents

Preface	ix
Section 1 Introduction	1
Chapter 1 Introductory Chapter <i>Volodymyr I. Lushchak and Halyna M. Semchyshyn</i>	3
Section 2 General Aspects of Oxidative Stress	13
Chapter 2 Interplay Between Oxidative and Carbonyl Stresses: Molecular Mechanisms, Biological Effects and Therapeutic Strategies of Protection <i>Halyna M. Semchyshyn and Volodymyr I. Lushchak</i>	15
Chapter 3 Oxidative and Nitrosative Stresses: Their Role in Health and Disease in Man and Birds <i>Hillar Klandorf and Knox Van Dyke</i>	47
Chapter 4 Nitric Oxide Synthase and Oxidative Stress: Regulation of Nitric Oxide Synthase <i>Ehab M. M. Ali, Soha M. Hamdy and Tarek M. Mohamed</i>	61
Chapter 5 Iron, Oxidative Stress and Health <i>Shobha Udipi, Padmini Ghugre and Chanda Gokhale</i>	73
Chapter 6 Heme Proteins, Heme Oxygenase-1 and Oxidative Stress <i>Hiroshi Morimatsu, Toru Takahashi, Hiroko Shimizu, Junya Matsumi, Junko Kosaka and Kiyoshi Morita</i>	109

Chapter 7 Assessment of the General Oxidant Status of Individuals in Non-Invasive Samples <i>Sandro Argüelles, Mercedes Cano, Mario F. Muñoz-Pinto, Rafael Ayala, Afrah Ismaiel and Antonio Ayala</i>	125
Chapter 8 Hydrogen: From a Biologically Inert Gas to a Unique Antioxidant <i>Shulin Liu, Xuejun Sun and Hengyi Tao</i>	135
Chapter 9 Paraoxonase: A New Biochemical Marker of Oxidant-Antioxidant Status in Atherosclerosis <i>Tünay Kontaş Aşkar and Olga Büyükleblebici</i>	145
Section 3 Cellular and Molecular Targets	155
Chapter 10 Renal Redox Balance and Na⁺, K⁺-ATPase Regulation: Role in Physiology and Pathophysiology <i>Elisabete Silva and Patrício Soares-da-Silva</i>	157
Chapter 11 Effects of Oxidative Stress and Antenatal Corticosteroids on the Pulmonary Expression of Vascular Endothelial Growth Factor (VEGF) and Alveolarization <i>Ana Remesal, Laura San Feliciano and Dolores Ludeña</i>	173
Chapter 12 Protection of Mouse Embryonic Stem Cells from Oxidative Stress by Methionine Sulfoxide Reductases <i>Larry F. Lemanski, Chi Zhang, Andrei Kochegarov, Ashley Moses, William Lian, Jessica Meyer, Pingping Jia, Yuanyuan Jia, Yuejin Li, Keith A. Webster, Xupei Huang, Michael Hanna, Mohan P. Achary, Sharon L. Lemanski and Herbert Weissbach</i>	197
Chapter 13 Structural and Activity Changes in Renal Betaine Aldehyde Dehydrogenase Caused by Oxidants <i>Jesús A. Rosas-Rodríguez, Hilda F. Flores-Mendoza, Ciria G. Figueroa-Soto, Edgar F. Morán-Palacio and Elisa M. Valenzuela-Soto</i>	231
Section 4 Reactive Species as Signaling Molecules	253
Chapter 14 Signalling Oxidative Stress in <i>Saccharomyces cerevisiae</i> <i>Maria Angeles de la Torre-Ruiz, Luis Serrano, Mima I. Petkova and Nuria Pujol-Carrion</i>	255
Chapter 15 Role of the Yap Family in the Transcriptional Response to Oxidative Stress in Yeasts <i>Christel Goudot, Frédéric Devaux and Gaëlle Lelandais</i>	277
Chapter 16 The Yeast Genes ROX₁, IXR₁, SKY₁ and Their Effect upon Enzymatic Activities Related to Oxidative Stress <i>Ana García Leiro, Silvia Rodríguez Lombardero, Ángel Vizoso Vázquez, M. Isabel González Siso and M. Esperanza Cerdán</i>	297
Chapter 17 Complex Regulatory Interplay between Multidrug Resistance and Oxidative Stress Response in Yeast: The FLR₁ Regulatory Network as a Systems Biology Case-Study <i>Miguel C. Teixeira</i>	323
Chapter 18 ROS as Signaling Molecules and Enzymes of Plant Response to Unfavorable Environmental Conditions <i>Dominika Boguszewska and Barbara Zagdańska</i>	341