Oxidative Stress in Human Reproduction
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Shedding Light on a Complicated Phenomenon
Since the introduction of the concept of “oxidative stress” introduced into redox biology and medicine and coining of the term by Helmut Sies more than three decades ago in 1985 [1], it became very clear that oxidative stress is involved not only in the pathogenesis of many conditions ranging from aging, infections, inflammations, obesity, and cancer, but also in male and female factor infertility. A multitude of almost 157,000 PubMed entries in September 2016 for a general search of “oxidative stress” highlights the importance of research in this field. If one is only thinking of the significant impact oxidative stress has on sperm function, prevalence rates between 30 and 80% have been reported. One feature of this condition is that it is caused by either an excessive production of reactive oxygen species (ROS) and/or a deficiency in the antioxidative defenses in the body. Therefore, it is important to understand not only the pathophysiology of the respective medical condition but also the biochemistry behind as well as consequences and treatment options. Alongside with a better understanding of the implications of oxidative stress, particularly in an infertility clinical setting, the diagnostic tests of oxidative stress have evolved from very costly and insensitive tests into cheaper and more sensitive assays. These assays allow proper statistical evaluation with Receiver Operating Characteristics (ROC) curve analyses, providing useful information such as the ROC plot and full sensitivity/specificity reports, which are important in optimal counseling and advising patients in terms of options of treatment, be it options of assisted reproductive techniques or antioxidant treatment.

Oxidative Stress in Human Reproduction: Shedding Light on a Complicated Phenomenon is an excellent and up-to-date summary of the efforts made to understand the contribution of oxidative stress to male and female infertility and relevant treatment options. The authors of this book are well suited to report on this topic as they are affiliated to the World’s Number One Andrology laboratory of infertility care. The lead authors (Drs. Ashok Agarwal, Rakesh Sharma, and Sajal Gupta) are the authorities in the field who have contributed to the advancement of knowledge on various aspects of oxidative stress in male and female infertility in more than 750 scientific articles (includes original articles, reviews and invited book chapters) and have assembled renowned authors elaborating on the sources of reactive oxygen.
species (ROS) and methods to measure ROS. Further chapters review the physiological and pathological roles of ROS and oxidative stress in both the male and female reproductive systems as well as lifestyle, general health, and environment as extrinsic factors causing oxidative stress. In addition, various therapeutic options for the treatment of infertility as an important part of patient care are adequately dealt with. Finally, the current knowledge is summarized in a compendium of studies published on oxidative stress by the Cleveland Clinic in the past 24 years. The book is clearly structured, well written, and appropriately referenced.

For all these reasons, I am convinced that this book will be of great value to researchers, embryologists, infertility specialists, urologists, and practitioners involved in human infertility assessment and treatment. I am sure the reader will learn a lot from this book and I recommend it strongly.

Ralf Henkel
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Dr. Henkel studied Biology and Chemistry at the Philipps University of Marburg, Marburg, Germany, and obtained his PhD in Zoology also from the same university. After his further training in Andrology with Wolf-Bernhard Schill, MD, at the Justus-Liebig University of Giessen, Giessen, Germany, Thinus Kruger, MD, and Daniel Franken, PhD, at Tygerberg Hospital, Tygerberg, South Africa, he obtained his Habilitation (Second PhD) in Reproductive Biology at the Justus-Liebig University of Giessen. Dr. Henkel is a member of the German Society of Andrology. He is a Professor and the Head of the Department of Medical Bioscience at the University of the Western Cape, Bellville, South Africa. He developed and evaluated new tests for andrological diagnosis. Furthermore, Dr. Henkel extensively investigated the impact of oxidative stress on sperm function and DNA fragmentation. He has published 94 original research papers and review articles as well as 28 book chapters and graduated 49 MSc and PhD students. He is also member of editorial boards of several international journals, Associate Editor of the Journal of Reproductive Biotechnology and Fertility, and Co-Editor-in-Chief of Andrologia.

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