Oxidative Stress in Applied Basic Research and Clinical Practice

Stephen Bondy
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Editors

Aging and Age-Related Disorders

Humana Press

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Editor-in-Chief
Donald Armstrong

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Note from the Editor-in-Chief

All books in this series illustrate point-of-care testing and critically evaluate the potential of antioxidant supplementation in various medical disorders associated with oxidative stress. Future volumes will be updated as warranted by emerging new technology, or from studies reporting clinical trials.

Donald Armstrong
Editor-in-Chief

Preface

Some of the features that characterize the aging process include the gradual accumulation of damage to cells consequent to prolonged exposure to oxidative and inflammatory events over a lifetime. In addition to the accretion of lesions that often cannot be resolved, the intrinsic levels of pro-oxidant and aberrant immune responses are elevated with age. These adverse events are often further enhanced in the chronic and slow-progressing diseases that characterize the senescent brain and cardiovascular system. The incidence of some disorders such as Alzheimer's disease and vascular diseases becomes sufficiently prevalent in the extreme elderly so that these disorders can arguably be considered "normal." The chapters of this volume examine the interface between normal and pathologic aging and illustrate how this border can sometimes be diffuse. In organs with a very low rate of cell division such as cardiac and nervous tissues, the immune "memory" of early insults can be very prolonged. This can lead to poor reversibility of heightened inflammatory responses in such tissues, leading to oxidative stress and cell death. This volume explores and illustrates the processes underlying the means by which aging becomes increasingly associated with inappropriate levels of free radical activity and how this can serve as a platform for the progression of age-related diseases.

With these observations that oxidative stress plays an important role during aging and age-related disorders, it becomes imperative to gain further knowledge into the pathways that may regulate aging. This volume, *Aging and Age-Related Disorders*, relies on the knowledge of internationally recognized experts and provides chapters that examine the interactive relationship between systems in the body, such as the nervous system and vascular system, that can enhance or sometimes even limit cellular longevity. In addition, specific redox mechanisms in cells are discussed that ultimately influence the development of disorders, such as diabetes and cardiovascular insufficiency. With this, energy mechanisms that rely upon proper mitochondrial function are seen as key players during both normal physiologic processes and during age-related disorders. Another important aspect for aging that this volume describes is the close relationship between the systems of the body and exposure to environmental influences of oxidative stress that can affect both cellular senescence and destruction of a cell's nuclear DNA. What may be even more interesting to note is that these external stressors are not only confined to illnesses usually associated

with aging but also can be evident early in maturing and young individuals. As the editors, we are extremely enthusiastic about this volume and honored by the breadth of collaborators that have worked with us to highlight emerging knowledge and therapy for the understanding of the basis and development of age-related disorders.

Irvine, California — Stephen Bondy
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General Aspects of Aging