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To my mentors
for their guidance and help
in the progression of my career
and
my wife Roop and children Rohit and Mona
for their love and patience always.

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PREFACE

Over two centuries ago, oxygen was discovered as “air vital”: the component of the earth’s atmosphere necessary for life. Less than five years after this discovery, it was found that oxygen was both a life-sustaining and life threatening inhalant as it plays a role in the two extremes of the animal kingdom: life and death. In the subsequent years, we have made major strides in understanding the role of oxygen in maintaining life and volumes of information are now available on this topic. Our knowledge of the contribution of oxygen in cellular dysfunction and cell death which for the most part had lagged behind has begun to catch up. The deleterious effects of oxygen radicals and activated oxygen species on a variety of biological systems have now been described. Recently attention has also been focused on the toxic effects of oxygen on the cardiovascular system. The major aim of the present treatise is to offer an integrated view of the pathophysiological aspects of oxygen toxicity in the heart and blood vessels coupled with a review of therapeutic approaches (hopes?) with free radical scavengers and antioxidants. Internationally known expert investigators provide a concise and critical review on the topic of their expertise which also contains data from their own research.

The book provides a description of: oxygen radicals and related activated species and their sources in biological systems; the cellular defense mechanisms against these toxic species; the process and the consequences of lipid peroxidation in heart and blood vessels and oxygen radical effects on hearts and subcellular elements. Detailed examples of the involvement of oxygen radicals and lipid peroxidation in various disease processes such as ischemia-reperfusion injury, arrhythmias, drug-induced heart disease, stress and heart disease, and diabetes are included. The beneficial effects of free radical scavengers and antioxidants in various cardiovascular disorders have also been described.

This book will be of great interest to a wide audience, from established investigators to fellows and graduate students in heart biology, from those whose main interest is cardiovascular science to those interested in clinical cardiology and cardiovascular surgery.

Pawan K. Singal

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