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TITLE

Oxidative stress: Biology and biomarkers in the vascular system during

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Oxidative stress significantly affects multiple cellular pathways that can lead to the onset and progression of dysfunction in the vascular system and related disorders such as those that involve immune system function. It therefore is essential to understand the basis of the cellular components that can be targeted against oxidative stress in the vascular system and associated cellular pathways. In this regard, we investigated in vascular models of oxidative stress the role of the “O” class forkhead transcription factors that also are closely linked to the immune system. We show that forkhead is a necessary element in the control of early and late apoptotic injury programs that involve membrane phosphatidylserine externalization and nuclear DNA degradation. Furthermore, prior to the onset of apoptotic injury, forkhead leads to the activation and proliferation of inflammatory cells as early as 3 hours following oxidative stress that occurs in conjunction with the trafficking of the unphosphorylated and active post-translational form of forkhead transcription factors from the cytoplasm to the cell nucleus. Forkhead also controls apoptotic mitochondrial signal transduction pathways that involve the release of cytochrome c and the activation of caspase 3, 8, and 9. Interestingly, forkhead transcription factors function not only as therapeutic targets, but also as biomarkers of disease onset and progression. Here we present the exciting role of forkhead in the vascular system, but also outline the sometimes unexpected and detrimental outcomes for these transcription factors that highlight the need for future studies to develop safe and efficacious platforms for vascular disease.

Biography

Kenneth Maiese, MD is Professor and Chair as well as Chief of Service of the Department of Neurology and Neurosciences of UMDNJ - New Jersey Medical School. Dr. Maiese has been elected to America's Top Physicians and The Best of U.S. Physicians. His work is considered “High Impact Research and Potential Public Health Benefit” by the National Institutes of Health. Dr. Maiese holds several patents, has over 250 publications and has authored 5 books. He serves as the Editor-in-Chief, Associate Editor, or editorial board member for more than 45 journals as well as on multiple executive and scientific advisory councils.