

METHODS IN MOLECULAR BIOLOGY

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Vascular Effects of Hydrogen Sulfide

Methods and Protocols

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Preface

Hydrogen sulfide (H₂S) was first identified as the endogenous mediator (“gasotransmitter”) in 1996. Since that time, a lot of studies about the role of H₂S in the regulation of various physiological processes have been performed. The vascular system is one of the main H₂S targets. H₂S is synthesized in all parts of the vascular wall (endothelium, smooth muscle cells, periadventitial adipose tissue) and is involved in the regulation of vascular tone, although its exact effect (vasoconstriction vs. vasorelaxation) and mechanism of activity differ depending on experimental animal species and vascular preparation. Alterations of vascular H₂S generation/signaling may be involved in the pathogenesis of systemic and pulmonary arterial hypertension, ischemic heart disease, ischemic stroke, preeclampsia, and erectile dysfunction; all these conditions being associated with abnormal regulation of vascular tone. In addition, H₂S regulates many processes relevant for atherosclerosis such as endothelial activation, inflammatory reaction, uptake of oxidized low density lipoproteins by monocytes/macrophages, and platelet activity. H₂S emerges also as an attractive target for pharmacotherapy of cardiovascular diseases. The role of H₂S in the regulation of angiogenesis and endothelial barrier permeability extends far beyond the cardiovascular system since it is associated with pathologies such as cancer, wound healing, and diabetic retinopathy among others. In this book, some experimental protocols essential for vascular H₂S research are presented by the leading scientists in the field. I hope they will be useful for the researchers interested in this area.

Lublin, Poland

Jerzy Bętkowski

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