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An Ayurvedic antihypertensive formulation prevents cardiac remodeling in spontaneously hypertensive rats (SHR) by inhibition of ERK and PKCε signaling pathways

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According to WHO, among non-communicable diseases, cardiovascular diseases (CVD) are the leading cause of death in the world. Hypertension ranks among the first risk factors for CVD. The sustained hemodynamic load imposed by hypertension on the heart leads to cardiac remodeling and ultimately heart failure. Remodeling includes hypertrophy, fibrosis and functional changes. Pharmacological intervention in hypertension should be directed towards prevention of remodeling also. Ayurveda is a traditional Indian system of medicine. Despite clinical efficacy, lack of scientific validation has limited the use of Ayurvedic drugs. An Ayurvedic drug composed of crude powders of 6 medicinal plants was formulated by Nagarjuna Herbal Concentrates Ltd., Kerala. The aim of the study was to scientifically characterize the cardiovascular response to the drug and delineate the mode of action. The drug was able to reduce blood pressure in SHR, which was supported by the finding of vasorelaxation in isolated aortae. Vasorelaxation was associated with calcium antagonistic action, thereby enhancing endothelium-derived relaxing factor availability. ERK and calcineurin signaling pathways were involved in vasorelaxation by the drug. The drug attenuated cardiomyocyte hypertrophy and interstitial fibrosis in SHR through downregulation of ERK and PKCε pathways, possibly mediated by the antioxidant property of the drug. Reduced expression of 3-nitrotyrosine in treated SHR was also demonstrated. Cardiac output in treated SHR was improved, and ECG alterations were relatively lower. Moreover, toxicity was not observed. The study is the first of its kind to extensively and systematically evaluate an Ayurvedic antihypertensive, and this will go a long way in their popularization and better acceptance.

Biography

Vandana Sankar has completed her PhD in Life Science from Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram, Kerala, India. She obtained her Post-doctoral studies at CSIR-National Institute for Interdisciplinary Science and Technology (CSIR-NIIST), India. She is presently working as DST Young Scientist at Agro-processing and Natural Products Division of CSIR-NIIST. She has published 18 papers in reputed journals and has received Kerala State Young Scientist Award in 2014 for her contributions to research. She has also presented papers in national and international conferences. Her major research area includes cardiovascular disease biology, natural products, green synthesized nanoparticles, etc.

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