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Stress and sirtuins function on beta adrenergic signaling in the heart

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Stress affects at least 90% of the world population, as a result of the current lifestyle. In the heart, catecholamines released during the stress response activate beta adrenergic receptors (beta-AR), mainly beta 1 (beta1-AR) and beta 2 (beta2-AR) subtypes. Alterations in the proportion of beta-ARs subtypes, with a role played by beta2-ARs-Gi protein-PI3K-Akt signaling pathways, have been described in several cardiovascular disorders, including heart failure, aging, and in animal models of behavioral stress. This has been the focus of our research group. More recently, it has been shown that sirtuins play a role in several organic processes through the activation of the PI3K-Akt signaling. Sirtuins are involved in the modulation of the cellular stress response, by activating several downstream molecules, such as those involved in the control of p53, Akt, hypoxia inducible factor 1-alpha (HIF1-alpha), and NFkappa B. SIRT1 and SIRT3 are crucially related to the regulation of cardiomyocyte energy metabolism, production of reactive oxygen species. In the cardiac tissue, SIRT and beta2- ARs-Gi control signaling pathways of cell survival and death, with various roles in the regulation of energy production and oxidative stress, aging, autophagy, energy metabolism, oxidative stress and some diseases. Here, the role played by beta2-ARs and sirtuins during aging, heart fails and in the adaptation to stress is revised and a hypothesis is presented of an interplay between beta2-ARs and sirtuins in the heart.

Biography

Regina Celia Spadari is a full Professor of Physiology at the Federal University of Sao Paulo. She is the leader of the research group entitled "Group for the Study of Stress Biology" that investigates several aspects of the stress effects on peripheral systems, mostly the cardiac response to catecholamines and adrenergic signaling. The group also investigates the effects of stress hormones on behavior and on athletes' performance. She has published 63 scientific articles, supervised 34 master's degree thesis and 15 PhD thesis. She is a biologist (Paulista State University Júlio de Mesquita Filho, 1974), master in Biological Sciences / Physiology by the State University of Campinas (1978), PhD in Human Physiology by the University of São Paulo (1985) and associated professor by the State University of Campinas (1996). The title of full professor was obtained in 2007 at UNIFESP, where she is a research since 2005. She was the Director of the Campus Baixada Santista (2011-2015)

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