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TARGETING THE INSULIN RECEPTOR SUBSTRATE SIGNALING FOR PREVENTION OF TYPE 2 DIABETES MELLITUS AND HEART FAILURE

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The heart is an insulin-dependent and energy consuming organ in which insulin and nutritional signaling integrates to the regulation of cardiac metabolism, growth, and survival. Heart failure is highly associated with insulin resistance and heart failure patients suffer from the cardiac energy deficiency, structural and functional dysfunction. Recent studies demonstrated that insulin receptor substrate-1, -2 (IRS-1, -2) are major mediators of both insulin and insulin-like growth factor-1 (IGF-1) signaling responsible for myocardial energetics, structure, function, and organism survival. Importantly, the insulin receptor substrates (IRS) play an important role in activation of the phosphatidylinositide-3 dependent kinase (PI-3K) that controls Akt and Foxo1 signaling cascade, regulating the mitochondrial function, cardiac energy metabolism, and the renin-angiotensin system. Dysregulation of this branch in signaling cascades by insulin resistance in the heart through the endocrine system promotes heart failure, providing a novel mechanism for diabetic cardiomyopathy.

Biography

Dr. Shaodong Guo is Associate Professor with tenure the Department of Nutrition and Food Science at Texas A&M University College. Dr. Guo received his Ph.D in Physiology in the Department of Biology at Peking University, China in 1995. Then he completed his postdoctoral research training in Genetics, Biochemistry, and Medicine in the Institute of Genetics and Developmental Biology of Chinese Academy of Sciences, the University of Illinois at Chicago, and Harvard University, respectively. Dr. Guo was an Instructor in Medicine at Children's Hospital Boston and Harvard Medical School for two years prior to joining the faculty at Texas A&M Health Science Center. Dr. Guo serves as senior editor for the Journal of Endocrinology (IF 4.7) and Journal of Molecular Endocrinology (IF 3.6), and he is the textbook chapter writer for Metabolic Syndrome edited by Ahima published by Springer. Dr. Guo's research interests include the mechanisms of diabetes, diabetic cardiomyopathy, and the action of fuel hormones, focusing on insulin signal transduction, insulin resistance, gene transcriptional control of nutrient homeostasis, and cardiac dysfunction in diabetes. Dr. Guo has been working on the gene transcriptional regulation of metabolic homeostasis by insulin receptor substrate proteins (IRS) and Forkhead FoxO transcription factors with the hope of understanding how the signaling from insulin via IRS to FoxO proteins plays a key role in many fundamental cellular processes, including cellular growth and metabolism. His work has been published in a number of journals including the JBC, Endocrinology, Hypertension, Diabetes, Circulation Research, AJP, MCB, and Nature Medicine, receiving 4,800 citations with an h-factor of 30 based on Google Scholar Citation. Dr. Guo's research has been funded by American Diabetes Association (ADA), American Heart Association, and the National Institute of Health. He is a recipient of ADA junior faculty award, career development award, and Research Excellence Richard R. Lee Award.

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