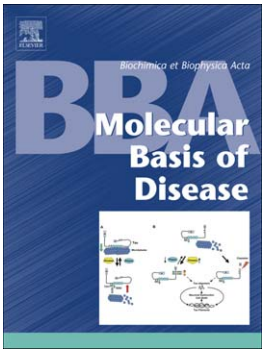

The role of post-translational protein modifications on heart and vascular metabolism

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The role of post-translational protein modifications on heart and vascular metabolism

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The emergence of metabolism as playing a crucial role in cardiovascular health has generated significant insights into cardiovascular disease development and potential new treatments. In order to provide a forum for the free exchange of ideas by investigators with a special interest in the multiple roles of intermediary metabolism in the cardiovascular system, in 2000 the Society for Heart and Vascular Metabolism (SHVM) was founded. Each year, the SHVM selects a theme for their annual meeting that focuses on some of the most recent research advances and emerging areas of importance in cardiovascular metabolism. The 2015 meeting, held in Tarrytown N.Y., U.S.A., focussed on novel scientific discoveries that provide mechanistic insight into cardiac metabolic dysregulation with an emphasis on translational and post-translational protein modifications, amino acid metabolism and protein catabolism. Based on this, a special issue of review articles that highlight the importance of protein and amino acid metabolism and the role of post-translational protein modifications on substrate metabolism has been created.

Post-translational protein modifications include phosphorylation, acetylation, glycation, and O-GlcNAcylation. For phosphorylation, the involvement of the energy sensing kinase, AMP-activated protein kinase (AMPK), has been reviewed by Jason Dyck and colleagues (REF) in the context of how AMPK controls cellular metabolism as well as other aspects of overall cellular health and survival. As our understanding of the post-translational regulation of proteins has grown, the involvement of acetylation is also reviewed. The review by Arata Fukushima and Gary D. Lopaschuk (REF), details the studies demonstrating how acetylation controls cardiac fatty acid β-oxidation in obesity, diabetes, and heart failure. In addition, the role of acetylation as a control mechanism for transcriptional regulation in the healthy and stressed hearts, is reviewed by Ravi Ramasamy and colleagues (REF), providing further evidence of the importance of acetylation in the control of a wide variety of cellular processes.

Adding to this growing list of post-translational protein modifications that regulate protein function are both O-linked attachment of the monosaccharide β-N-