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The role of membrane phospholipids in development of male-specific cardiac hypertrophy and hypertension

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Phospholipids play an indispensable role in heart function via their structural and metabolic roles, and serve as a barrier that protects the intracellular cell environment. The first evidence of mammalian heart dysfunction in relation to deregulated phospholipid synthesis by the CDP-ethanolamine Kennedy pathway came from our recent study with CTP: phosphoethanolamine cytidyltransferase (*Pcyt2*) heterozygous mice ETKO. ETKO mice of both genders have reduced phosphatidylethanolamine (PE) synthesis and turnover the accumulated plasma and tissue triglycerides and developed insulin resistance. However, only ETKO males developed age-related cardiac hypertrophy and hypertension. The underlying mechanism for the male specific dysfunction was identified in the accumulation of arachidonic acid and other n-6 elongation/desaturation pathway intermediates in the male heart membranes and reduced circulating testosterone levels. There is a clear sexual dimorphism in the heart phospholipids and the sex-related differences that expand to the heart neutral lipids but not cardiolipin. Dysfunctional *Pcyt2* gene (reduced PE synthesis and turnover) causes insulin resistance in both males and females, however specifically perturbs membrane metabolism protecting the female heart and causing the male-specific diabetic cardiomyopathy. We explored the nature of those differences to show what role *Pcyt2* plays in cardiac cell function, signaling, and gene expression and how they contribute the male-specific hypertension and heart pathology.

Biography

Marica Bakovic has completed her BSc in Chemistry and PhD in Biological Chemistry at the University of Alberta. She has received her Post-doctoral awards from Medical Research Council and Alberta Heritage Foundation. Before coming to the University of Guelph, she worked in the area of Molecular and Cell Biology of Lipid Metabolism at the Faculty of Medicine, University of Alberta. Currently, she is a Professor in the Department of Human Health and Nutritional Sciences at the University of Guelph. She has a long-lasting interest in Lipid Metabolism and Nutrition, especially, in the area of Regulation of Membrane Phospholipids, Fatty Acids, and Methyl-Group Donors.

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