TITLE: Molecular Mechanisms Underlying Heart Failure

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RESEARCH PROJECT DESCRIPTION

Background: The dynamics of cardiac contraction and relaxation are fundamentally related to actin- myosin interactions. A range of factors regulate this process and contribute to the adaptation of cardiac function to physiological or pathological stressors, in turn suggesting potential therapeutic strategies for heart failure. Phosphorylation of myosin light chain 2 (MLC2), bound to myosin heavy chain, been shown to facilitate actomyosin interactions leading to enhanced cardiac contraction. ***In humans with heart failure, the level of phosphorylation of MLC2 has been shown to decrease.*** In 2008, we identified cardiac myosin light chain kinase (cMLCK) encoded by the *Mylk3* gene. Our recent study suggests that cMLCK is a critical factor in preventing heart failure.

Methods: We will further characterize cMLCK's function using *in vitro* and *in vivo* mouse models.

Role of medical student: Medical students will participate in mouse genotyping using PCR, as well as analyses of mouse cardiac function using MRI, echocardiogram, left-ventricular pressure measurement with left-ventricular catheterization and electrocardiogram.

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References:

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Additional information is available at http://physiology.med.ufl.edu/faculty/kasahara/.