James & Esther King Biomedical Research Program

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Molecular and Cellular Pharmacology
University of Miami

2010 Program
Postdoctoral Research Fellowship
(2-year project)

Project Title: High Throughput Screening to Discover New Compounds that Modulate Cardiac Muscle Contractility

Project Summary: In pathological hypertrophy (increase in the volume of an organ), the heart abnormally increases in size and mass in efforts to compensate for higher demands in workload, such as in hypertension due to smoking. Since smoking promotes hypertrophy and its many unwanted side effects, e.g., fibrosis, arrhythmia, and sudden cardiac death; there is an urgent need to improve the treatments of cardiovascular diseases. Current drug treatments focus on altering the force of muscle contraction in order to strengthen the failing heart or to slow the fast-paced hypertrophic heart. Typically these drugs alter the cellular calcium levels, which have desirable and undesirable side effects. Therefore, the discovery of new compounds that specifically interact with the contractile proteins of the muscle, rather than altering the cellular calcium level, could potentially improve contraction and become therapeutic. The goal of this project is to test ~ 250,000 compounds for the ability to modulate contractile protein activity using the resources of fully integrated and automated screening/testing centers. Using these approaches, we aim to uncover new compounds that can be studied in molecular detail and eventually in physiological systems for the investigation and treatment of hypertrophy, heart failure, and other cardiovascular diseases exacerbated by tobacco use.