James & Esther King Biomedical Research Program

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Medicine
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2010 Program
New Investigator Research
(3-year project)

Project Title: Nitrite-Mediated Neuroprotection After Cardiac Arrest

Project Summary: Cardiac arrest results in over 300,000 deaths annually in the U.S. Smokers are at significantly higher risk of cardiac arrest primarily due to a condition often resulting from heart and lung disease. Smoking results in endothelial dysfunction and diminished nitric oxide and nitrite availability, which is believed to contribute to worsening brain injury after lack of blood flow (ischemia). This project investigates nitrite therapy. Nitrite is emerging as a source of nitric oxide after ischemia that can protect organs such as the brain and heart from injury. Based on preliminary evidence that nitrite protects the brain from injury after cardiac arrest, this project seeks to optimize this therapy as its first aim and to study a promising and novel pathway whereby protection occurs as its second aim. The information gained from this research should provide needed information for bench to bedside translation of a novel therapy for a highly lethal tobacco-linked disease (cardiac arrest) where therapies are badly lacking. By targeting ischemia and tobacco-related endothelial dysfunction and nitrite/nitric oxide depletion, this therapy will potentially identify new pathways where additional ischemic brain injury therapies may be developed.