

DEPARTMENT OF INTERNAL MEDICINE  
COLLEGE OF MEDICINE

SUMMER RESEARCH OPPORTUNITIES FOR UNDERGRADUATE students

FOR APPLICATION YEAR: 2024

PROJECT TITLE: Improving the efficacy of a cardioprotective therapy

Kevin Haworth  
College of Medicine  
Cardiovascular Center, Room 3939  
Cincinnati, OH 45208  
hawortkn@ucmail.uc.edu  
Phone: 513.558.3536

**Project Description**

Our laboratory is investigating a novel therapy for reperfusion injury, a type of injury that happens when blood is returned to tissue after a lack of blood flow (such as occurs after intervention for a heart attack). One of the primary causes of reperfusion injury is oxidative stress (e.g., superoxide and hydrogen peroxide) formed due to cellular dysfunction. We are studying the use of an ultrasound-activated emulsion that can sequester oxygen. We hypothesize that by reducing the amount of oxygen available in the blood at the site of the heart attack, we can reduce oxidative stress and thereby reduce tissue injury. We have demonstrated this effect in buffers, blood, and cell culture. This R01-funded project would investigate different approaches for increasing the amount of oxygen being scavenged. This research area has many potential directions ranging from biological effects to mechanical system characterization to developing mathematical models of oxygen scavenging. Students from all areas of science are welcome to the project. Past undergraduates on this project have used their research to present at regional and national conferences.