DEPARTMENT OF INTERNAL MEDICINE  
COLLEGE OF MEDICINE

SUMMER RESEARCH OPPORTUNITIES FOR UNDERGRADUATE WOMEN

APPLICATION DEADLINE: 03/01/2020

PROJECT TITLE: Making Gas to Remove Gas (and Save Tissue!)

Kevin J. Haworth, PhD  
Associate Professor

University of Cincinnati  
Internal Medicine, Division of  
Cardiovascular Health & Disease, Pediatrics, and Biomedical Engineering  
Cardiovascular Center 3939  
231 Albert Sabin Way  
Cincinnati, OH 45267-0586

513.558.3536 (Phone)  
513.558.6102 (Fax)

kevin.haworth@uc.edu  
http://med.uc.edu/ultrasound  
http://med.uc.edu/intmed/research/labs/haw

orth-lab

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 by dysfunctional cells. We are studying the use of ultrasound for converting perfluorocarbon droplets into gas microbubbles that can scavenge dissolved oxygen. We hypothesize that by reducing the amount of oxygen in blood we can reduce oxidative stress and thereby reduce tissue injury. We have demonstrated this effect in buffers and cell culture. This R01-funded project would systematically investigate the ability to scavenge oxygen from whole blood. The presence of hemoglobin modifies the scientific problem significantly from our past studies in buffers. 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.