

DEPARTMENT OF INTERNAL MEDICINE
COLLEGE OF MEDICINE

SUMMER RESEARCH OPPORTUNITIES FOR UNDERGRADUATE WOMEN

FOR APPLICATION YEAR: 2021

PROJECT TITLE: Using ultrasound to prevent cardiac reperfusion injury

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Project Description

The Haworth laboratory is investigating a technology to be used in the reduction of cardiac reperfusion injury. This type of injury occurs after treatment for a heart attack. Current treatments cause a rapid reintroduction of oxygen to damaged and dying cardiac cells. This rapid reintroduction of oxygen to damaged tissues actually causes further injury through oxidative damage, including the generation of reactive oxygen species. While the typical surgical intervention for a heart attack involves removing the blockage and restoring blood flow, it does not take measures to reduce oxidative reperfusion damage. Therefore, we are studying the use of an oxygen-scavenging technology to determine whether a reduction in oxygen concentration during reperfusion translates to decreased tissue damage. In order to do this, we use ultrasound to convert injected droplets containing an inert liquid to expanded bubbles containing oxygen-scavenging gas. We have shown that this technology can reduce available oxygen content in buffers and in tissue culture, but we are currently working to expand into more physiologically-relevant conditions (i.e. oxygen scavenging in tissue). Our lab's work involves the amalgamation of several types of science, including physics, engineering, biology, and computer programming. It's a great place for undergraduates to experience a collaborative research environment in a successful laboratory.