2020 USAISR Summer Scholars Program

Research Project #: ISR-TECRD-02

Effects of High Levels of Ionizing Radiation Exposure on Vascular Integrity and Survival

Project Synopsis: The aim of this research project is to investigate how high dose radiation exposure directly affects endothelial barrier function, hemodynamics and survival of rats subjected to acute radiation (ARS group). Cardiovascular and endothelial functions will be assessed by in vivo physiological monitoring (hemodynamics measurements in rats), blood analysis, coagulation tests, cytokines and glycocalyx components in plasma, as well as endothelial dysfunction and tissue damage (small intestine). Other tasks also include updating data spreadsheets, on-line and off-line data analyses, graph plotting, results interpretation and statistical analysis.

Specifically, students will learn about acute radiation syndrome (ARS) and combined injury (CI), with ionizing radiation + trauma, due to a nuclear disaster which can result in massive casualties. Current medical capabilities and clinical gaps for treatment of trauma and ARS will be discussed. Students will learn and have hands-on experience on animal care/handling, in vivo monitoring, lab techniques, data collection, data analysis and interpretation, scientific writing, as well as poster preparation and presentation. Overall, this research may help students to clarify their educational goals and enable them in reaching those goals.

Students are expected to contribute to the project by actively participating during the experiments, keeping a lab notebook organized and legible, complying with lab rules and safety, and communicating with investigator and mentor regularly. Students must be self-driven and dedicated to completion of the program. They are expected to read scientific papers and give a presentation on a paper associated with their research. Upon the end of the program, students will prepare a conference proceeding abstract for publication, and a poster for presentation.

Academic Level: Undergraduate