REPPERGER RESEARCH INTERN PROGRAM

RESEARCH PROJECT #: AFRL-RHB-24-04

Profiling Cold Tolerance in Human Subjects through Circulating Molecular Biomarkers

PROJECT DESCRIPTION: As U.S. Arctic military activity increases, it is vital that warfighters are trained and acclimatized to the extreme cold environment to ensure optimal cognitive and physical performance. The goal of this project is to reveal and validate molecular biomarkers of cold exposure in human subjects. When combined with physiological measurements (such as core body temperature), we hope to see molecular biomarkers profile each subject based on their individual 'cold tolerance'. Whole blood will be collected from human subjects exposed to cool temperatures and then analyzed for differential expression of certain messenger RNA and microRNA molecules. The emphasis of this internship will be on wet-lab work; however, in-depth review and critical analysis of the primary scientific literature will be highly encouraged and supported. Under the guidance of a mentor, the student intern will collaborate with other interns in an Air Force Genomics laboratory. The mentor will guide the student in various molecular biology/wet-lab techniques, including RNA extraction from human subjects' blood, quantitative polymerase chain reaction (qPCR) assays, and Nanostring-based assays. Data generated by the student will support a cold exposure profiling project by validating molecular biomarkers identified in a previous Next Generation Sequencing study. The mentor encourages all interns to start a literature review on a research topic during the internship period to develop scientific writing skills and critical thinking.

ACADEMIC LEVEL: Undergraduate; Masters

DISCIPLINE NEEDED:

- Cellular and Molecular Biology
- Genetics Animal and Plant
- Biology (General)

RESEARCH LOCATION: Wright-Patterson Air Force Base, Dayton, Ohio

RESEARCH MENTOR: Reilly Clark, PhD
Molecular Biology, Wright State University, 2019

Dr. Reilly Clark is a Biological Research Scientist in the Biotechnology Branch at the 711th Human Performance Wing, Air Force Research Laboratory. She is a member of the RHBBA Genomics Team, which houses the Bioanalytics Genomics Core Facility. Her research is focused on molecular biomarkers of human performance in extreme environments in alignment with the Department of the Air Force Arctic Strategy. Dr. Clark earned her PhD in the Biomedical Sciences program at Wright State University in 2019. She is a recipient of two Science, Math, and Research for Transformation (SMART) Scholarships for Service, a SMART SEED grant, the 2022 AFRL Scholars Outstanding Mentor Award, and the 2023 Wright Scholar Research Assistant Program Mentor Award.

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