

Attachment 1 – DAGSI Research Topic Template

1. **Research Title:** Molecular signatures for recovery science
2. **Individual Sponsor:** List the AFRL research topic sponsor's contact information

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3. **Academic Area/Field and Education Level**

Molecular biology, biochemistry, genetics, physiology, psychology, engineering, computer science/data science, exercise science, or other biomedical science (MS or PhD level)

4. **Objectives:** The US Air Force Research Laboratory (AFRL) Human Effectiveness Directorate seeks Ohio University collaborators who will: 1) design human subjects research studies complementary to those executed by the US AFRL Signature Tracking for Optimized Nutrition and Tracking (STRONG) laboratory; 2) recruit ROTC, athletic, and other college-aged students into studies focused on recovery technologies/interventions aimed to enhance physical, mental, and cognitive effects, such as sleep/rest, meditation, photo biomodulation, nutrition/supplements, nerve stimulation, and hypo/hyperthermic exposure; and 3) employ research methods to assess and quantify interventions at the molecular level, e.g., MRI/CT, genomics/metabolomics, microbiome, physiological biomarkers from blood, sweat, or saliva.
5. **Description:** Readiness and resiliency are primary focus areas of the US DoD and are difficult to achieve in deployed environments. The field of recovery science may increase our understanding of protocols and interventions that can be used for both military personnel and civilians, achieving positive physical and mental outcomes related to readiness and resiliency. However, the emergent field requires human studies with empirical data to elucidate mechanisms that can be exploited for their benefits. For example, the energetic pathways of mitochondria in muscle tissue, neurons, and circulating blood cells may be influenced to achieve better rest, cognitive superiority, and fast recovery/repair of the musculoskeletal system. This study shall create a University managed satellite STRONG laboratory to recruit and study humans with a targeted focus on recovery technologies and interventions. Students and/or faculty involved in the effort will also participate in STRONG lab meetings and other activities at Wright-Patterson AFB to create a collaborative Government-University partnership. Universities with access to military type populations (e.g., ROTC and athletics) should aim to recruit these types of cohorts as a highly similar population to active-duty military personnel. Ideal intervention strategies for trial(s) should consider the deployed environment where access to typical medical care and resources are limited. Ideal research findings will demonstrate mechanisms that contribute to overall readiness, including, but not limited to, enhancing

cognitive performance/decision making, preventing/mitigating fatigue, reducing mental health events, and increasing overall physical health.

6. Research Classification/Restrictions: Unclassified

7. Eligible Research Institutions: The Ohio State U., Wight State U., U. of Cincinnati, U. of Dayton, Ohio U., Miami U.

NOTE: Topics submitted to DAGSI must be approved for public release. Need PA Approval #

PA Approval #: Case Number: AFRL-2023-4641. The material was assigned a clearance of CLEARED on 20 SEP 23