Task Book Report Generated on: 04/26/2024

Project Title: Takinica Candies (rinn Ph.D. Project Title: Cardiovascular Responses to Standard Spacetlight: Molecular Signatures and Surrogate Outputs to Measure CVD Risk Division Name: Human Research Program/Dicipline: Program/Dicipline: Program/Dicipline- Element/Subdicipline: Joint Agency Name: TechPort: No Human Research Program Elements: (J) SRS/Space Radiation (I) Cardiovascular/Risk of Cardiovascular Adaptations Contributing to Adverse Mission Performance and Health Outcomes (2) Immune/Risk of Adverse Health Event Doe to Altered Immune Response Space Biology Element: None Space Biology Special Category: None Space Biology Special Category: None PI Email: Labirmogram/Reda Fax: FY PI Organization Type: UNIVERSITY Phone: 9046205629 PI Address 1: UNIVERSITY Phone: 9046205629 PI Address 2: 1 UNIVERSITY Phone: 9046205629 PI Address 2: 1 UNIVERSITY Phone: Program District 4 Comments: Project Type: Search Machanism Research Program Clew Health Source City: Jacksonville State: FL Zip Code: 32224 Congressional District 4 Comments: Project Type: GROUND Sulfetafion / Funding Source Research Program Clew Health. Start Date: No. of Master' Degrees: No. of PhD Candidates: No. of Master' Degrees: No. of Master' Degrees: No. of Master' Degrees: No. of Master' Candidates: No. of Master' Degrees: No. of Master' Degrees: No. of Master' Degrees: No. of Master' Candidates: No. of Master' Degrees: No. of Master' Degrees: No. of Master' Candidates: No. of Master' Degrees: No. of Master' Degrees: No. of Master' Degrees: No. of Master' Candidates: No. of Master' Degrees: No. of Ma	Fiscal Year:	FY 2021	Task Last Updated:	EV 03/08/2021	
Project Title: Cardiovascular Responses to Simulated Spaceflight: Molecular Signatures and Surrogate Outputs to Measure CVD Risk Division Name: Illuman Research Program/Discipline: Program/Discipline: Pengram/Discipline: Pengram/Discipline: Pengram/Discipline: Joint Agency Name: TechPort: No Human Research Program Element: Minima Research Program Risks: Closses Againstion Outcomes (2) Inmune Risk of Cardiovascular Adaptations Contributing to Adverse Mission Performance and Health Outcomes (2) Inmune Risk of Adverse Health Event Due to Altered Immune Response Space Biology Element: None Space Biology Special Category: None PE Email: Calabine@undeds Fax: FY I Corganization Type: UNIVERSITY Phone: 9046205629 Organization Type: UNIVERSITY Phone			Task Last Opuateu.	1 1 03/00/2021	
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Human Research Program Risks: Space Biology Element: None Space Biology Cross-Element: Space Biology Cross-Element: Space Biology Special Category: None PI Email: cathimic@unf.edu Fax: PY PI Organization Type: University of North Florida PI Address 1: Department of Biology PI Address 2: LUNF Drive PI Address 2: LUNF Drive PI Web Page: City: Asksonville State: Cloude: Space Biology Special Category: Asksonville State: GROUND Solicitation Funding Source: None Project Type: Ros Of Pab Decar Source: None of Pab Decar None of Bachelor's Candidates: None of Bachelor's Candidates: None of Bachelor's Candidates: None of Bachelor's Candidates: Ros Manitoring Center: Ros Manitoring Center: Ros Personnet Changes/Previous PI: Fight Assignment: Key Personnet Changes/Previous PI: Contact Changes/Previous	Human Research Program Elements:	(1) SR:Space Radiation			
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Task Description:

In this ground-based rodent study, we aim to systematically define molecular signatures of cardiovascular performance across doses of acute simulated galactic cosmic radiation (Five-ion GCR) at early and late timepoints post-exposure. We also will determine the contribution of biological sex and the combined effects of GCR and microgravity on clinically relevant and emerging measures of cardiovascular health. We hypothesize that exposure to space radiation alone or in combination with microgravity results in early and late changes in the structure, transcriptome, redox signaling, and cytokine milieu of cardiovascular tissue, some of which have known links to decreased performance, aging, and increased cardiovascular disease (CVD) risk. We further posit that other less invasive clinically relevant measures of immune, behavior, and neuromotor function will be informative towards extrapolating the effects of deep space missions on human cardiovascular health. To achieve the project goals and test the hypothesis, we will take advantage of a rare tissue sharing opportunity from a recently funded Human Research Program (HRP) study. The experiment design of this funded investigation includes a GCR dosing study on crew age-matched female and male mice (6 months old) as well as combined exposure study with simulated microgravity. A comprehensive panel of outcomes will be assessed in the funded study and includes measures of immune health, brain molecular and structural changes, behavior, anxiety, cognition, and neuromotor function. Our proposed approach is to measure clinically relevant indicators of cardiovascular performance and perform transcriptomic profiling by RNAseq to determine dose and time-dependency of cardiovascular responses. To further facilitate extrapolation of results to humans, rodent RNAseq data will be compared to publicly available human RNAseq datasets from aging and CVD progression studies. The results from analysis of rodent cardiovascular tissue also will be compared to corresponding blood data to link immune and cardiovascular changes. Further, cardiovascular findings will be interpreted in light of behavioral testing results to gain insight on any relationships between cardiovascular outcomes and changes in neuromotor, anxiety levels, and cognitive performance. The significance/impact of this study is that it contributes to increased understanding on the mechanisms of degenerative changes in cardiovascular tissue and the clinical endpoints they suggest. This study also is expected to provide insight on the latency period for radiation-induced cardiovascular changes and any sex differences in these outcomes. Lastly, our findings are expected to generate testable hypotheses for the development of countermeasures and less invasive surrogate biomarkers to monitor cardiovascular health in-flight and after return.

Rationale for HRP Directed Research:

Research Impact/Earth Benefits:

Task Progress:

New project for FY2021.

Bibliography Type:

Description: (Last Updated:)