Task Book Report Generated on: 03/29/2024

PI Name: Lau, Authony G PLD. Project Title: Effects of Acute and Protincted Galactic Cosmic Radiation on Bone Strength Division Name: Human Research Program/Divicipline- Effects/Subdivicipline- Effects/Subdivicipline	Fiscal Year:	FY 2021	Task Last Updated:	FY 09/09/2021
Project Title: Effects of Acute and Protracted Galactic Cosmic Radiation on Bone Strength Division Name: Human Research Program/Discipline: Program/Discipline: Program/Discipline: Strength State Strength Strengt	PI Name:	Lau, Anthony G Ph.D.		
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### Program Discipline— Element Subdiscipline	Division Name:	Human Research		
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Human Research Program Rislas: \$pace Biology Element: None Space Biology Special Category: None PI Email: JandAriteniech Programization Type: UNIVERSITY Phone: 609-771-2644 Organization Type: UNIVERSITY Phone: 609-771-2644 Organization Type: UNIVERSITY Phone: 609-771-2644 Organization Name: College of New Jersey PI Address 1: Department of Biomedical Engineering PI Address 2: Department of Biomedical Engineering PI Web Page: City: Ewing State: NJ Zip Code: O8618-1104 Congressional District: 12 Omments: Hill while NSBRI postdoe. Project Type: GROUND Solicitation / Funding Source Performance-Appendix E. Omnibus/Appendix F. Omnibus/Appendix Performance-Appendix E. Omnibus/Append	Human Research Program Elements:	(1) SR:Space Radiation		
Space Biology Cross-Element Discipline: Space Biology Special Category: None PI Email: LauA@teni.edu Fax: FY Pl Organization Type: UNIVERSITY Phone: 609-771-2644 Organization Name: College of New Jersey PI Address 1: Department of Biomedical Engineering PI Address 2: Dopartment of Biomedical Engineering PI Address 2: Dopartment of Biomedical Engineering PI Web Page: City: Ewing State: NJ Comments: NOTE: As of Fall 2015, Dr. Lau is at The College of New Jersey. Previously at University of North Carolina at Chapel Hill while NSBRI postdoc. ROOTE: As of Fall 2015, Dr. Lau is at The College of New Jersey. Previously at University of North Carolina at Chapel Hill while NSBRI postdoc. ROOTE: As of Fall 2015, Dr. Lau is at The College of New Jersey. Previously at University of North Carolina at Chapel Hill while NSBRI postdoc. ROOTE: As of Fall 2015, Dr. Lau is at The College of New Jersey. Previously at University of North Carolina at Chapel Hill while NSBRI postdoc. ROOTE: As of Fall 2015, Dr. Lau is at The College of New Jersey. Previously at University of North Carolina at Chapel Hill while NSBRI postdoc. ROOTE: As of Fall 2015, Dr. Lau is at The College of New Jersey. Previously at University of North Carolina at Chapel Hill while NSBRI postdoc. ROOTE: As of Fall 2015, Dr. Lau is at The College of New Jersey. Previously at University of North Carolina at Chapel Hill while NSBRI postdoc. ROOTE: As of Fall 2015, Dr. Lau is at The College of New Jersey. Previously at University of Meadle Health Human Factors and Behavioral Performance-Appendix E; Omnibus-Appendix F Start Date: No. of Master' Degrees: No. of Bachelor's Candidates: No. of Master' Degrees: No. of Mast	Human Research Program Risks:	(2) Bone Fracture: Risk of Bone	Fracture due to Spaceflight-induce	
Discipline: None	Space Biology Element:	None		
PI Email: LauAo/iteni.edu Fax: FY PI Organization Type: UNIVERSITY Phone: 609-771-2644 Organization Name: College of New Jersey PI Address 1: Department of Biomedical Engineering PI Address 2: 2000 Pennington Rd, P.O. Box 7718 PI Web Page: City: Ewing State: NJ Zip Code: 08618-1104 Congressional Distric: 12 Comments: MOTE: As of Fall 2015, Dr. Lau is at The College of New Jersey. Previously at University of North Carolina at Chapel Hill while NSBRI postdoc. Project Type: GROUND Solicitation / Funding Source: Proformance-Appendix E; Omnibus/Appendix F Start Date: 06/30/2021 End Date: 06/20/2022 No. of Post Docs: No. of PhD Candidates: No. of Master' Degrees: No. of Master's Candidates: No. of Master' Degrees: No. of Master's Candidates: No. of Master' Degrees: No. of Master's Candidates: No. of Bachelor's Degrees: No. of Master's Candidates: No. of Master's Candidates: No. of Master's Degrees: No. of Master's Candidates: No. of Master's Candidates: No. of Master's Degrees: No. of Master's Candidates: No. of Master's Degrees: N		None		
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Task Book Report Generated on: 03/29/2024

The exposure to ionizing space radiation can lead to damage of multiple biological tissue systems. The proposed work investigates degeneration of the central nervous system (CNS) and bone tissues from exposure to different does of simulated space radiation. Radiation is known to affect biological pathways that regulate both the CNS and bone. The objective of the proposed work to is to investigate the relationship between declines in cognitive function and declines from exposure to simulated space radiation, as well as to quantify these changes. The objectives will be addressed through animal studies exposing rats to acute and protracted (or fractionated) simulated galactic cosmic radiation and investigating the relationship between neurobehavioral deficits and bone degradation 7, 30, 90, and 180 days after radiation exposure.

Task Description:

This tissue sharing proposal is part of an on-going collaboration between Dr. Catherine Davis at Uniformed Services University, who is currently funded by NASA to investigate the cognitive degradation in rats exposed to space radiation. Our lab has been collecting the hind limbs from her studies to investigate the corresponding bone strength changes in these rats. Neurobehavioral assessments include odor recognition memory tests and sustained attention tests. A multi-length scale approach will be performed to assess the corresponding bone health changes. Bone health assessments include microstructural (microCT scans), material property (micro-indentation), and whole bone (3-point bending) evaluations of bone strength. Analysis will be performed on CNS and bone endpoint measurements to determine whether the neurobehavioral deficits are predictive of declines in bone strength. The work is significant to NASA's goal for astronaut health during long duration spaceflight. Establishing a relationship between the CNS and bone response to radiation can provide valuable information for potential mechanisms and countermeasure targets for both systems.

Rationale for HRP Directed Research:

Research Impact/Earth Benefits:

Task Progress:

New project for FY2021.

Bibliography Type:

Description: (Last Updated: 03/30/2016)