

Fiscal Year:	FY 2019	Task Last Updated:	FY 03/04/2019
PI Name:	Wyrobek, Andrew Ph.D.		
Project Title:	Variation in CNS Damage Signaling and Blood Sentinels of Neuropathology After Exposure to Space Radiation		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:			
Joint Agency Name:	TechPort:	No	
Human Research Program Elements:	(1) HFBP :Human Factors & Behavioral Performance (IRP Rev H)		
Human Research Program Risks:	(1) Cardiovascular :Risk of Cardiovascular Adaptations Contributing to Adverse Mission Performance and Health Outcomes (IRP Rev M) (2) HFBP Bmed :Risk of Adverse Cognitive or Behavioral Conditions and Psychiatric Disorders (IRP Rev J)		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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Zip Code:	94720-8099	Congressional District:	13
Comments:	For immediate assistance please contact my administrator Caron LaMarsh clamarsh@lbl.gov, 510.486.5317		
Project Type:	GROUND	Solicitation / Funding Source:	2017 HERO 80JSC017N0001-Crew Health and Performance (FLAGSHIP1, OMNIBUS). Appendix A-Flagship1, Appendix B-Omnibus
Start Date:	04/01/2019	End Date:	03/31/2021
No. of Post Docs:		No. of PhD Degrees:	
No. of PhD Candidates:		No. of Master' Degrees:	
No. of Master's Candidates:		No. of Bachelor's Degrees:	
No. of Bachelor's Candidates:		Monitoring Center:	NASA JSC
Contact Monitor:	Williams, Thomas	Contact Phone:	281-483-8773
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Flight Program:			
Flight Assignment:	NOTE: Period of performance changed to 4/1/2019-3/31/2021 per PI/NASA-LBL interagency agreement; previous information showed 11/28/18-11/27/20 (Ed., 9/5/19)		
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Peterson, Leif Ph.D. (The Methodist Hospital Research Institute)		
Grant/Contract No.:	80JSC019T0007		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	<p>Major objectives of the NASA space radiation research program are to enable human exploration of space without exceeding limits for immediate and persistent risks to the central nervous system (CNS) from space radiation. The proposed research will investigate the CNS subregions of rodents exposed to simulated space radiation for molecular indicators for vascular damage, inflammation, and neurological abnormalities after space radiation. This project will apply multi-omic technologies (proteomics, metabolomics, and bioinformatics) to archived CNS brain subregions from irradiated mouse and rat behavioral models.</p> <p>The specific aims are:</p> <p>Aim 1. Characterize the persistence of radiation-induced molecular abnormalities in cortex and hippocampus after low-dose exposures to ^{56}Fe particles, and compare the predictions for CNS tissue damage and late-onset neuropathologies in similarly irradiated mice and rats.</p> <p>AIM 2. Identify persistent bio-effect markers in peripheral blood and cerebrospinal fluid (CSF) that correlate with molecular damage in CNS vascular or immune functions. Our research plan will provide testable hypotheses of CNS tissue damage and identify molecular targets for susceptible pathways/functions of CNS damage.</p> <p>This project will also provide proof-of-principle whether CNS damage relevant bio-effect metabolites can be detected in CSF and blood. This project will also identify radiation-sensitive pathways, suitable for future development of biological countermeasures to reduce CNS risks from space radiation. The results of this research are designed to help NASA reduce the uncertainty associated with during mission behavior and CNS risk for astronauts on deep space exploration missions.</p>
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2019.
Bibliography Type:	Description: (Last Updated: 02/08/2018)