Fiscal Year:	FY 2017	**Task Last Updated:**	FY 08/31/2017
PI Name:	Suzuki, Carolyn Ph.D.		
Project Title:	Tissue Sharing Project- Effects of Space Radiation on the Cardiac Mitochondrial Stress Response		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:	HUMAN RESEARCH--Radiation health		
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	(1) **SR**:Space Radiation		
Human Research Program Risks:	(1) **Cardiovascular**:Risk of Cardiovascular Adaptations Contributing to Adverse Mission Performance and Health Outcomes		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
PI Email:	suzukick@njms.rutgers.edu	**Fax:**	FY
PI Organization Type:	UNIVERSITY	**Phone:**	973-972-1555
Organization Name:	New Jersey Medical School- The State University of New Jersey Rutgers		
PI Address 1:	Department of Microbiology, Biochemistry and Molecular Genetics		
PI Address 2:	225 Warren St E450S		
PI Web Page:			
City:	Neward	**State:**	NJ
Zip Code:	07103-3535	**Congressional District:**	10
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2016-2017 HERO NNJ16ZSA001N-Crew Health (FLAGSHIP, OMNIBUS). Appendix A-Omnibus, Appendix B-Flagship
Start Date:	07/01/2017	**End Date:**	06/30/2019
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:	Simonsen, Lisa	**Contact Phone:**	
Contact Email:	lisa.c.simonsen@nasa.gov		
Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Azzam, Edouard Ph.D. (RUTGERS Biomedical and Health Sciences - New Jersey Medical School)		
Grant/Contract No.:	80NSSC17K0113		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	Mitochondria are the powerhouses of the cell, which make up ~30% of the volume of cardiac myocytes. They provide the crucial energy supply needed for the heart to beat and to provide blood and oxygen throughout the body. The goal of this ground-based Tissue Sharing project is to determine the effects of low dose/low fluence space ionizing radiation on the mitochondrial stress response in the heart. We will examine heart tissue collected by our collaborator Dr. Edouard Azzam, whose current NASA-funded project is investigating “Oxidative Stress and the Cancer Risk of Space Radiation." His study employs 10 month-old male mice, which is an age that is equivalent to active astronauts who are between 35-55 years old. These mice are exposed to low mean absorbed doses of isovelocity (1 GeV/n) protons or high atomic number, high energy (HZE) particles, which are a component of galactic cosmic rays. Another group of mice are exposed to 137Cs gamma rays as reference radiation. Using these heart samples, we will employ histological techniques, as well as biochemical and molecular biological approaches to measure biomarkers of the mitochondrial stress response in heart in response to HZE particles and reference radiation. Cardiac inflammation and fibrosis will be examined histologically. Radiation-induced changes in mitochondrial DNA copy number and damage and mitochondrial RNA and protein expression will be measured. Space radiation has been shown to induce reactive oxygen species, which oxidatively damage nucleic acids, proteins, and lipids. We will also determine the relative protein levels and activity of crucial mitochondrial stress response proteins, which are expected to mitigate cardiac injury that may be caused by radiation-induced oxidative damage. The results of these experiments will fill knowledge gaps about radiation-induced degeneration or injury to cardiac mitochondria, and the adaptive stress response mechanisms, which potentially promote or mitigate potential risks to the heart.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2017.
Bibliography Type:	Description: (Last Updated:)