Fiscal Year:	FY 2017	**Task Last Updated:**	FY 01/22/2017
PI Name:	Lee, Stuart M.C. Ph.D.		
Project Title:	Defining the Relation Between Biomarkers of Oxidative and Inflammatory Stress and Atherosclerosis Risk in Astronauts During and After Long-Duration Spaceflight		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:	HUMAN RESEARCH--Biomedical countermeasures		
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	(1) **HHC**:Human Health Countermeasures		
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		
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City:	Houston	**State:**	TX
Zip Code:	77058-2749	**Congressional District:**	36
Comments:			
Project Type:	FLIGHT	**Solicitation / Funding Source:**	2010 Crew Health NNJ10ZSA003N
Start Date:	03/01/2016	**End Date:**	05/10/2022
No. of Post Docs:	0	**No. of PhD Degrees:**	0
No. of PhD Candidates:	0	**No. of Master' Degrees:**	0
No. of Master's Candidates:	0	**No. of Bachelor's Degrees:**	0
No. of Bachelor's Candidates:	0	**Monitoring Center:**	NASA JSC
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Flight Program:	ISS		
Flight Assignment:	ISS		
Key Personnel Changes/Previous PI:	January 2017: Remove Dr. Rob Ploutz-Snyder as CoInvestigator; Add: Dr. Alan Feiveson.		
COI Name (Institution):	Smith, Scott Ph.D. (NASA Johnson Space Center) Feiveson, Alan Ph.D. (NASA Johnson Space Center) Stenger, Michael Ph.D. (NASA Johnson Space Center)		
Grant/Contract No.:	Internal Project		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	NOTE: Continuation of "Defining the Relation Between Biomarkers of Oxidative and Inflammatory Stress and Atherosclerosis Risk in Astronauts During and After Long-Duration Spaceflight" ; previous Principal Investigator was Dr. Steven Platts until March 2016. Atherosclerosis is the major contributor to cardiovascular disease-related morbidity and mortality. Research indicates that many of the risk factors commonly associated with atherosclerosis contribute to endothelial dysfunction, a process which presents early in life before angiographic evidence of disease and precedes the clinical manifestation of many cardiovascular disease-related disorders. In an effort to compensate for the initial risk factor-related disruptions to homeostasis, there is a compensatory upregulation of atheroprotective mechanisms. However, in the absence of appropriate risk factor management, these defense mechanisms may become overwhelmed and less able to reestablish normal function. Key systems that help maintain vascular homeostasis and are susceptible to differential deleterious alterations include those that help balance levels of oxidative and inflammatory stress. New evidence suggests that long-duration spaceflight may promote oxidative and inflammatory stress through mechanisms such as radiation exposure, diet, physical inactivity, and psychological stress. However, there are no data supporting a causal link between biomarkers of oxidative and inflammatory stress and indices of vascular endothelial dysfunction in spaceflight. As such, we propose to examine the relation between biomarkers of oxidative and inflammatory stress and well-established measures of vascular endothelial dysfunction (flow mediated dilation (FMD)) and carotid intima-media thickness (cIMT) in astronauts before, during, and after long duration spaceflight.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	It is well known that inflammation is a key contributor to the development of atherosclerosis. There is also emerging work showing the link with oxidative damage. This work may contribute to general clinical science by showing the interactions of multiple stressors in a unique environment (spaceflight).
Task Progress:	Pre-, in-, and immediately post-flight data collection has been completed for all but one astronaut participating in this experiment. The final in- and immediate post-flight data collection will be completed in the spring of 2017. Five astronauts have completed R+1 yr testing but none have participated in R+3 yr tests. Data analysis is in progress. Data shared through required medical testing is being secured.
Bibliography Type:	Description: (Last Updated: 02/22/2024)
Abstracts for Journals and Proceedings	Lee SMC, Martin DS, Smith SM, Zwart SR, Laurie SS, Ribeiro LC, Stenger MB. "Defining the relationship between biomarkers of oxidative and inflammatory stress and the risk for atherosclerosis in astronauts during and after long duration spaceflight." 2017 NASA Human Research Program Investigators' Workshop, Galveston, TX, January 23-26, 2017. 2017 NASA Human Research Program Investigators' Workshop, Galveston, TX, January 23-26, 2017. , Jan-2017
Abstracts for Journals and Proceedings	Lee SMC, Martin DS, Laurie SS, Ribeiro LC, Smith SM, Zwart SR, Stenger MB. "Carotid artery structure during and after long-duration space flight." To be presented at Experimental Biology 2017: Transforming the Future through Science, Chicago, IL, April 22-26, 2017. Experimental Biology 2017, Chicago, IL, April 22-26, 2017. , Apr-2017