Fiscal Year:	FY 2018	**Task Last Updated:**	FY 10/30/2018
PI Name:	Grabham, Peter Ph.D.		
Project Title:	A Determination of Bioactive Proteins Secreted by the Human Vasculature in Response to Low Dose Space Radiation		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:			
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	(1) **SR**:Space Radiation		
Human Research Program Risks:	(1) **Degen-IRP Rev J**:Risk of Cardiovascular Disease and Other Degenerative Tissue Effects from Radiation Exposure and Secondary Spaceflight Stressors (IRP Rev J)		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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PI Organization Type:	UNIVERSITY	**Phone:**	646-761-1275
Organization Name:	Columbia University		
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PI Web Page:			
City:	New York	**State:**	NY
Zip Code:	10032-3702	**Congressional District:**	13
Comments:			
Project Type:	GROUND	**Solicitation:**	2017 HERO 80JSC017N0001-Crew Health and Performance (FLAGSHIP1, OMNIBUS). Appendix A-Flagship1, Appendix B-Omnibus
Start Date:	08/01/2018	**End Date:**	07/31/2020
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:	NOTE: End date changed to 7/31/2020 per NSSC information; original end date was 1/31/2020 (Ed., 1/29/2020)		
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Brown, Lewis Ph.D. (Columbia University)		
Grant/Contract No.:	80NSSC18K1492		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	The specific purpose of the research proposed here is to determine the proteins that are potentially released into the blood stream by the lining of the human vasculature in response to exposure to space radiation. This would create a useful database for radiobiology studies and comparisons with the proteins secreted in astronaut blood. Such proteins have the potential to cause pathological processes such as inflammation, they are also spread around the body in the blood, and are important factors in many pathologies. The microvasculature permeates all tissues at the microscopic level so the whole body is a target for charged particles. A single heavy ion particle would be expected to traverse many microvessels as it passes through the body causing a more widespread response. Studies on the effect of different charged particles on human 3D microvessel models shows that both developing and mature microvessels lose structure and function after exposure to very low doses of various charged particles. Mature microvessels lose structure detectible as low as 1.25 cGy. Angiogenesis, the growth of new vessels, is inhibited by light ions and heavy ions detectible at 1.25 cGy. Even more striking, the combined effect of each ion has a synergistic effect detectible as low as 0.6 cGy. The low fluence of these doses indicates a bystander effect where the response is transmitted to other cells and such a mechanism would involve the secretion of molecules by the target cell. We propose to use proteomics and other techniques to determine the proteins secreted by the human microvessel models. A database of these proteins secreted by human tissue models would not only be of great use to a number of researchers investigating a diverse number of pathologies related to space radiation but also provide insights into the mechanisms of the vascular response to charged particles.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2018.
Bibliography Type:	Description: (Last Updated: 07/19/2017)