Fiscal Year:	FY 2014	**Task Last Updated:**	FY 10/09/2014
PI Name:	Grabham, Peter Ph.D.		
Project Title:	Combined Effects of Space Radiation and Microgravity on the Function of Human Capillaries and the Endothelial Barrier: Implications for Degenerative Disorders		
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		
PI Email:	pwg2@cumc.columbia.edu	**Fax:**	FY
PI Organization Type:	UNIVERSITY	**Phone:**	646-761-1275
Organization Name:	Columbia University		
PI Address 1:	Center for Radiological Research		
PI Address 2:	630W W 168th St, VC 11-243		
PI Web Page:			
City:	New York	**State:**	NY
Zip Code:	10032-3702	**Congressional District:**	13
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2013 HERO NNJ13ZSA002N-Crew Health (FLAGSHIP & NSBRI)
Start Date:	08/27/2014	**End Date:**	08/26/2016
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 ARC
Contact Monitor:	Ronca, April Elizabeth	**Contact Phone:**	650.400.6019
Contact Email:	april.e.ronca-1@nasa.gov		
Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Sharma, Preety Ph.D. (Columbia University)		
Grant/Contract No.:	NNX14AR22G		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	This proposal is aimed at determining the effects of space radiation combined with microgravity on the function of human blood vessels and capillaries. The average human body contains tens of thousands of miles of vessels that permeate every tissue down to the microscopic level, therefore, it is an important target for radiation and is also influenced by gravitational forces. The vascular system is crucial to healthy functioning of the tissues and its dysfunction is not only a primary event in a range of degenerative diseases but also an important influencing factor in many others. The two functions of the human vascular system that greatly affect human health and disease are, 1) angiogenesis - the growth of new vessels to replace damaged vessels, and 2) Barrier function – the process that allows nutritious molecules to cross from the blood to tissues and waste molecules to be cleared out from tissues. Disruption of these processes is known to cause degenerative disease. We have shown that space radiation inhibits angiogenesis and disrupts endothelial barrier function using human endothelial cells in 2 and 3-dimensional human tissue models. The doses and time course for radiation-induced events are now known which makes it possible to assay for joint effects with other environmental influences. Angiogenesis and barrier function are also affected by microgravity so there is a potential for further dysfunction of the human vasculature when applied in combination with radiation. Here, we propose a ground-based study using simulated microgravity to determine the combined effects of space radiation and microgravity on human blood vessel models and its impact on degeneration by testing for angiogenesis and endothelial barrier function using our established assays.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2014.
Bibliography Type:	Description: (Last Updated: 03/04/2024)