Fiscal Year:	FY 2012	**Task Last Updated:**	FY 10/05/2011
PI Name:	Globus, Ruth Ph.D.		
Project Title:	Simulated Space Radiation and Weightlessness: Vascular-Bone Coupling Mechanisms to Preserve Skeletal Health		
Division Name:	Human Research		
Program/Discipline:	NSBRI		
Program/Discipline--Element/Subdiscipline:	NSBRI--Musculoskeletal Alterations Team		
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	(1) **HHC**:Human Health Countermeasures		
Human Research Program Risks:	(1) **Bone Fracture**:Risk of Bone Fracture due to Spaceflight-induced Changes to Bone (2) **Osteo**:Risk Of Early Onset Osteoporosis Due To Spaceflight		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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PI Organization Type:	NASA CENTER	**Phone:**	650-604-5247
Organization Name:	NASA Ames Research Center		
PI Address 1:	Bone and Signaling Laboratory		
PI Address 2:	Space Biosciences Research Branch		
PI Web Page:			
City:	Moffett Field	**State:**	CA
Zip Code:	94035-1000	**Congressional District:**	18
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2010 Crew Health NNJ10ZSA003N
Start Date:	10/01/2011	**End Date:**	09/30/2015
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:**	NSBRI
Contact Monitor:		**Contact Phone:**	
Contact Email:			
Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Alwood, Joshua (NASA Ames Research Center) Castillo, Alesha (Veterans Affairs Palo Alto Health Care System) Delp, Michael (University of Florida) Limoli, Charles (University of California, Irvine)		
Grant/Contract No.:	NCC 9-58-MA02501		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	Astronauts develop bone loss as a result of spaceflight environmental conditions, including increased ionizing radiation, microgravity with ensuing fluid shifts and altered forces on muscles and bones, confinement, and stress. The objectives of our proposal are twofold; define the mechanisms and risk of bone loss in the spaceflight environment and facilitate the development of effective countermeasures, if needed. Our working hypothesis is that prolonged disuse and radiation together cause cumulative, adverse changes in the structure and function of bone and its vasculature resulting from oxidative stress, and prevent recovery from unloading by damaging the stem and progenitor cells needed for subsequent recovery. Our plan has three aims. AIM 1: Determine the functional and structural consequences of prolonged weightlessness and space radiation (simulated spaceflight) for bone and skeletal vasculature in the context of bone cell function and oxidative stress. AIM 2: Determine the extent to which an anti-oxidant protects against weightlessness and space radiation-induced bone loss and vascular dysfunction. AIM 3: Determine how space radiation influences later skeletal and vascular recovery from prolonged weightlessness and the potential of anti-oxidants to improve or prevent this recovery. This proposal addresses the current research announcement and NASA's HRP-Integrated Research Plan risks for the bone system by defining mechanisms and countermeasures designed to prevent the effects of combined unloading and radiation on bone, with the goal of enabling human space exploration.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2012.
Bibliography Type:	Description: (Last Updated: 09/17/2021)