Fiscal Year:	FY 2009	**Task Last Updated:**	FY 07/13/2009
PI Name:	Paddon-Jones, Douglas Ph.D.		
Project Title:	An Integrated Low-Volume Nutritional Countermeasure to Maintain Muscle Mass and Function During Space Exploration		
Division Name:	Human Research		
Program/Discipline:	NSBRI		
Program/Discipline--Element/Subdiscipline:	NSBRI--Musculoskeletal Alterations Team		
Joint Agency Name:		**TechPort:**	Yes
Human Research Program Elements:	(1) **HHC**:Human Health Countermeasures		
Human Research Program Risks:	(1) **Aerobic**:Risk of Reduced Physical Performance Capabilities Due to Reduced Aerobic Capacity (2) **Muscle**:Risk of Impaired Performance Due to Reduced Muscle Mass, Strength and Endurance		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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PI Organization Type:	UNIVERSITY	**Phone:**	409-772-3073
Organization Name:	The University of Texas Medical Branch		
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PI Web Page:			
City:	Galveston	**State:**	TX
Zip Code:	77555-1124	**Congressional District:**	14
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2008 Crew Health NNJ08ZSA002N
Start Date:	07/01/2009	**End Date:**	06/30/2013
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):	Grady, James (University of Texas Medical Branch) Urban, Randall (University of Texas Medical Branch) Sheffield-Moore, Melinda (University of Texas Medical Branch) Protas, Elizabeth (University of Texas Medical Branch) Rasmussen, Blake (University of Texas Medical Branch)		
Grant/Contract No.:	NCC 9-58-MA02001		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	This project's long-term goal is to identify, prevent and remedy defects in the metabolic pathway that contribute to the loss of muscle mass and function during exposure to microgravity. Demographic data indicate that the average age of shuttle crew members has increased from 40.7 years in 1995 to 46.7 years in 2007, with an increasing number of astronauts over 50 years of age. Dr. Douglas Paddon-Jones and colleagues contend that the loss of muscle mass and function during spaceflight is facilitated by an age-associated, progressive impairment in the ability to mount an anabolic response to standard mixed-nutrient meals. The project seeks to determine if enriching daily meals with a low-volume leucine supplement will reduce the deleterious effects of microgravity on skeletal muscle and facilitate recovery during rehabilitation. The study will use an established 14-day bed-rest protocol to model the skeletal muscle unloading that occurs during microgravity. It will also examine recovery of muscle mass and functional capacity during a seven-day rehabilitation period. The researchers will study two groups: CON (Bed Rest/Recovery + Placebo; n=15) and LEU (Bed Rest/Recovery + Leucine; n=15). The study will assess the following: markers of translation initiation, muscle protein synthesis, muscle mass and body composition, and strength and aerobic capacity. Hypotheses 1) Bed rest will blunt the anabolic response to a mixed-nutrient meal, facilitating a loss of muscle mass and functional capacity that is only partially restored during rehabilitation. 2) Enriching daily meals with leucine will promote protein synthesis and maintain the anabolic response to mixed-nutrient meal ingestion. This will preserve lean muscle mass and function during bed rest and facilitate the recovery of functional and metabolic capacity during rehabilitation. This project builds on our recent series of bed-rest studies and seeks to provide a refined and practical countermeasure that is supported by comprehensive mechanistic evidence.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	0
Task Progress:	New project for FY2009.
Bibliography Type:	Description: (Last Updated: 09/28/2016)