Fiscal Year:	FY 2013 Task Last Update	: FY 04/03/2013
PI Name:	Rabin, Bernard M. Ph.D.	
Project Title:	Individual Differences in the Neurochemical and Behavioral Response to Exposure to Protons	
Division Name:	Human Research	
Program/Discipline:	HUMAN RESEARCH	
Program/Discipline Element/Subdiscipline:	HUMAN RESEARCHRadiation health	
Joint Agency Name:	TechPort:	No
Human Research Program Elements:	(1) SR:Space Radiation	
Human Research Program Risks:	(1) BMed:Risk of Adverse Cognitive or Behavioral Conditions and Psychiatric Disorders	
Space Biology Element:	None	
Space Biology Cross-Element Discipline:	None	
Space Biology Special Category:	None	
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Comments:		
Project Type:	Ground Solicitation / Funding Source	: 2007 Space Radiation NNJ07ZSA001N
Start Date:	05/18/2008 End Dat	: 01/31/2013
No. of Post Docs:	No. of PhD Degree	
No. of PhD Candidates:	No. of Master' Degree	:
No. of Master's Candidates:	No. of Bachelor's Degree	: 2
No. of Bachelor's Candidates:	4 Monitoring Cente	: NASA JSC
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Flight Program:		
Flight Assignment:	NOTE: Gap changes per IRP Rev E (Ed., 3/27/14) NOTE: new end date is 1/31/2013 (previoulys 5/17/2012) per NSSC information (Ed., 12/21/2011) NOTE: new end date is 5/17/2012 per NSSC information (Ed., 5/31/2011)	
Key Personnel Changes/Previous PI:		
COI Name (Institution):	Shukitt-Hale, Barbara (USDA, HNRCA)	
Grant/Contract No.:	NNX08AM66G	
Performance Goal No.:		
Performance Goal Text:		
Task Description:	Long-term exploratory class missions will increase the risk that astronauts will be exposed to significant doses of protons resulting from solar flares. Evaluating these risks requires knowledge of the potential effects of proton irradiation on a variety of endpoints, including central nervous system (CNS) functioning. However, the effects of exposure to protons on CNS function and on behavior have not been the subject of significant amounts of research. Limited research has produced equivocal results about the consequences of exposure to protons on neurochemical and behavioral endpoints, with some data suggesting an effect of exposure to protons on CNS function and behavior and to characterize the role of individual differences, such as gender and age, in modulating the effects of exposure on neurocognitive endpoints.	
Rationale for HRP Directed Research:		
Research Impact/Earth Benefits:		
Task Progress:	The key findings are: 1. Exposure to 4He particles produces deficits in cognitive performance at doses of 0.1 to 0.5 eGy. These results are consistent with previous observations which indicate that as particle linear energy decreases, there is a concomitant decrease in the dose needed to disrupt cognitive performance. 2. Ovariectomized female rats given implants of estradiol in sesame oil alone (vehicle) prior to exposure to 12C particles. In contrast to the results obtained following exposure to 56Fe particles, there were no differences in cognitive performance as a function of hormonal status at the time of irradiation. The reasons for the differences in the effects of estradiol following exposure to different HZE particles. The performance is used to the development of neurofibrillary tangles, this data may link exposure to HZE particles. The development of neurofibrillary tangles, this data may link exposure to the development of neurofibrillary tangles, this data may link exposure to the development of neurofibrillary tangles. These results indicate: (1) a causal relationship between radiation-induced oxidative stress and neurochemical changes in the changes in the changes in the changes in the changes in autophagy and the development of neurofibrillary tangles. These results indicate: (1) a causal relationship between radiation-induced oxidative stress and neurochemical changes in the changes in the changes in autophagy and the autophagy and the development of neurofibrillary tangles. These results indicate: (1) a causal relationship between radiation-induced oxidative stress and neurochemical changes in the changes in the changes in duphagy and the development of neurofibrillary tangles. These results indicate: (1) a causal relationship between radiation-induced oxidative stress and neurochemical changes in the central nervous system; and (2) that antioxidant diets may be able to function to reduce the possibility of nervous system dysfunction of exploratory class missions.	
Bibliography Type:	Description: (Last Updated: 05/08/2025)	
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Abstracts for Journals and Proceedings	Radiation Investigators' Workshop, Durham, NC, July 8-11, 2012. 23rd Annual NASA Space Radiation Investigators' Workshop, Durham, NC, July 8-11, 2012. , Jul-2012	

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