

Fiscal Year:	FY 2010	Task Last Updated:	FY 09/10/2009
PI Name:	O'Banion, Kerry M.D., Ph.D.		
Project Title:	Local CNS and Systemic Inflammatory Effects Following Proton and Mixed Particle Exposure		
Division Name:	Human Research		
Program/Discipline:	HUMAN RESEARCH		
Program/Discipline--Element/Subdiscipline:	HUMAN RESEARCH--Radiation 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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Zip Code:	14642-0001	Congressional District:	25
Comments:			
Project Type:	GROUND	Solicitation / Funding Source:	2008 Space Radiobiology NNJ08ZSA001N
Start Date:	11/01/2008	End Date:	10/31/2012
No. of Post Docs:	1	No. of PhD Degrees:	0
No. of PhD Candidates:	1	No. of Master' Degrees:	0
No. of Master's Candidates:	0	No. of Bachelor's Degrees:	0
No. of Bachelor's Candidates:	0	Monitoring Center:	NASA JSC
Contact Monitor:	Cucinott1a, Francis	Contact Phone:	281-483-0968
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Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Finkelstein, Jacob (University of Rochester School of Medicine) Williams, Jacqueline (University of Rochester) Olschowka, John (University of Rochester School of Medicine) Hurley, Sean (University of Rochester Medical Center)		
Grant/Contract No.:	NNX08BA09G		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	<p>This proposal continues our investigation of inflammatory responses following exposure to space radiation. In particular, we will explore the effects of protons and mixed particle radiation, at doses and fluences expected during space travel, in the brain and lung as well as the systemic circulation of mice. Dose and time dependent alteration in inflammatory indices will be correlated with brain and lung degenerative changes, including failure of hippocampal neurogenesis and alterations in hippocampal dependent learning. We will also explore whether space radiation influences Alzheimer's disease pathogenesis using a unique transgenic mouse model and lung inflammation following challenge with inhaled lipopolysaccharide. Together these studies will address specific gaps in our current knowledge about the acute and late effects of space radiation on vulnerable tissues.</p>
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	<p>In this first year of the grant we participated in NSRL Run 09A, carrying out proton beam exposures with 576 mice from May 4 to May 7. This experiment essentially represents Experiment 1.1 of Specific Aim 1 (dose and time effects of protons (1000 MeV/n) on inflammatory indices in brain and lung tissues) and Experiment 2.1 of Specific Aim 2 (dose and time effects of protons on neurogenesis and hippocampal dependent learning and memory). The experiment comprises early (6 and 48 h) time points for histological and mRNA measures as well as later time points (1, 6 and 12 months) for neurogenesis and behavioral studies. We have completed behavioral analyses for the 1 month time point and did not find any effect of radiation in our fear-conditioning paradigm. Interestingly, we have detected radiation effects on weight gain. Histological and mRNA analyses will be conducted of all tissues once the 6 and 12 month time points have been reached. We have no adverse outcomes (e.g. animals dying) to report at this time.</p> <p>Because of the late time points, specific conclusions arising from this study will have to wait. We anticipate completion of all analyses during year 2 of the award. With regard to additional studies, we are scheduled to participate in NSRL Run 09C, and will subject approximately 750 mice to proton and HZE exposures in early November 2009. In particular, we will be carrying out experiments 1.2 and 2.2 (Sex Differences) as well as 1.3 and 2.3 (Mixed particle exposure) during this run. This strategy helps conserve animal numbers since male animals with protons alone are common to both paradigms. Future anticipated runs include Specific Aim 4 (lung susceptibility) in Spring 2010 and the Alzheimer's mouse study (Specific Aim 3) in Fall 2010. Our efforts to get these exposures completed relates to the long time course of each experiment (12 months) and the time it takes to complete our behavioral, molecular and histological analyses.</p>
Bibliography Type:	Description: (Last Updated: 02/16/2024)