Fiscal Year:	FY 2016	**Task Last Updated:**	FY 11/30/2015
PI Name:	Vose, Linnea Ph.D.		
Project Title:	Protection of Neurogenesis as a Neuroprotectant Strategy for Low-Dose Space Radiation Exposure (Postdoctoral Fellowship)		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:	NSBRI--Radiation Effects Team		
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	None		
Human Research Program Risks:	None		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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Zip Code:	10595	**Congressional District:**	17
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2015 NSBRI-RFA-15-01 First Award Fellowships
Start Date:	10/01/2015	**End Date:**	09/30/2016
No. of Post Docs:	1	**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):	Stanton, Patric Ph.D. (MENTOR/ New York Medical College)		
Grant/Contract No.:	NCC 9-58-PF04309		
Performance Goal No.:			
Performance Goal Text:			
	POSTDOCTORAL FELLOWSHIP Exposure to galactic cosmic radiation (GCR), such as that experienced by astronauts, impacts learning and memory, synaptic plasticity, neuronal function, and neurogenesis in animals. Impairments in memory and emotional state could be detrimental to astronauts in-mission performance. Neurogenesis continues in adulthood in the hippocampus, and thyroid hormone is necessary for hippocampal neurogenesis. We hypothesize that low dose thyroid hormone treatment may be protective of neurogenesis in mice exposed to GCR. We further propose that one exposure to low dose radiation will make newborn neurons resistant to damage and death from a second GCR exposure. We will test these hypotheses by treating mice with one longer or two shorter bouts of GCR. Mice will recover for 3-6		

Task Description:	months and be tested in four ways: 1) quantifying number of newborn neurons in each group to assess neurogenesis immediately after GCR exposure and months later; 2) behavioral tests to quantify learning, memory, depression-like behaviors, and anxiety; 3) measuring the strength of long-term activity-dependent synaptic plasticity that underlies learning and memory; and 4) patch-clamp recording to assess synaptic function of newborn neurons. Additionally, we will treat mice with thyroid hormone during GCR exposure to determine if supplementation can prevent radiation-induced impairments of neurogenesis, learning, memory, depression-like, and anxiety behaviors. These studies will advance our understanding of mechanisms underlying the effects of GCR on cognitive processes necessary for safe and productive long-range space missions. They are designed to determine if GCR produces long-term impairments in synaptic plasticity necessary for learning, memory, and mood stability, and if loss of neurogenesis contributes to impaired cognition. Understanding the interactions between GCR and neurogenesis, and their effects on cognition, mood, and executive function, is critical for rational assessment of long-term central nervous system risk and development of effective countermeasures for in-mission risks from GCR in long-duration human space travel.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2016.
Bibliography Type:	Description: (Last Updated: 03/01/2017)