Fiscal Year:	FY 2015	**Task Last Updated:**	FY 10/07/2014
PI Name:	Raykin, Julia Ph.D.		
Project Title:	Effects of Intracranial Pressure and 1-Carbon Metabolites on the Optic Nerve Sheath in VIIP Syndrome (Postdoctoral Fellowship)		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:	NSBRI--Sensorimotor Adaptation 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:	30318	**Congressional District:**	5
Comments:			
Project Type:	GROUND	**Solicitation:**	2014 NSBRI-RFA-14-02 First Award Fellowships
Start Date:	11/01/2014	**End Date:**	10/31/2016
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):	Ethier, Christopher Ph.D. (MENTOR/ Georgia Institute of Technology)		
Grant/Contract No.:	NSBRI 9-58-PF04102		
Performance Goal No.:			
Performance Goal Text:			
	POSTDOCTORAL FELLOWSHIP Visual Impairment/Intracranial Pressure (VIIP) syndrome refers to the loss in visual function that occurs in astronauts following long-duration spaceflights, accompanied by ophthalmic changes including optic disc edema, posterior globe flattening, choroidal folds, and distension and kinking of the optic nerve (ON)/optic nerve sheath (ONS). These changes tend to occur after a few weeks or months following exposure to microgravity. Many astronauts do not regain their preflight visual acuity, suggesting that permanent structural changes occur during spaceflight. While the exact causes are not yet known, it is hypothesized that increases in intracranial pressure (ICP) drive the remodeling (tissue reorganization or renovation) of the ONS, which leads to compression of the ON, ON compartmentation, altered cerebrospinal fluid (CSF) clearing and recycling and optic cell death resulting in reduced visual acuity. Recent evidence		

Task Description:	indicates that the development of VIIP is correlated with inter-individual variations in the 1-carbon metabolic pathway. The goal of this research is to elucidate the mechanisms that lead to the remodeling of optic nerve and develop a predictive model of these changes that can identify VIIP risk factors and possible interventions. This study will use a novel ex vivo ONS culture device to test the following hypotheses: i) Increased ICP induces remodeling of the ONS, ii) Increased concentrations of 1-carbon metabolites – specifically homocysteine – contribute to ONS remodeling, and iii) Increased ICP and homocysteine levels will have a synergistic effect on ONS remodeling. Our major expected outcome is the development of a predictive framework for ONS remodeling that can identify VIIP risk factors and possible interventions. The model can then be customized for each astronaut prior to spaceflight to predict individual microgravity-induced outcomes.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	0
Task Progress:	New project for FY2015.
Bibliography Type:	Description: (Last Updated: 07/26/2018)