

Fiscal Year:	FY 2016	Task Last Updated: FY 11/21/2014	
PI Name:	Zanello, Susana Ph.D.		
Project Title:	A Gene Expression and Histologic Approach to the Study of Cerebrospinal Fluid Production and Outflow in Hindlimb Suspended Rats		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:	HUMAN RESEARCH--Biomedical countermeasures		
Joint Agency Name:		TechPort:	No
Human Research Program Elements:	(1) HHC: Human Health Countermeasures		
Human Research Program Risks:	(1) SANS: Risk of Spaceflight Associated Neuro-ocular Syndrome (SANS)		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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Organization Name:	KBR/NASA Johnson Space Center		
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Zip Code:	77058	Congressional District:	36
Comments:	NOTE (January 2021): PI now at KBR/NASA JSC as of December 2020. Previously at imec USA from June 2019-November 2020; NASA JSC (KBRwyle) from August 2017 until spring 2019. Prior to August 2017, PI was with Universities Space Research Association.		
Project Type:	GROUND	Solicitation / Funding Source:	2013 HERO NNJ13ZSA002N-Crew Health (FLAGSHIP & NSBRI)
Start Date:	10/01/2015	End Date:	09/30/2018
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:	NASA JSC
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Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Rivera, Adreana M.D. (Houston Methodist Hospital) Theriot, Corey Ph.D. (University of Texas Galveston) Chevez-Barrios, Patricia M.D. (The Methodist Hospital Research Institute)		
Grant/Contract No.:	NNX15AW48G		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	<p>The etiology of the Visual Impairment and Intracranial Pressure (VIIP) syndrome is unknown. It is hypothesized that weightlessness-induced cephalad fluid shift, possibly associated with elevated intracranial pressure (ICP), may play a critical role. Cerebrospinal fluid (CSF) dynamics changes may be involved in the ICP increase. Leveraging on an existing hindlimb suspension (HS) analog in rats, we propose to study the molecular aspects of CSF production and outflow modulation as a result of HS in the tissues involved in these two processes of CSF dynamics, namely choroid plexus (CP) and arachnoid granulations (AG), respectively. On available tissue shared from the parent animal experiment (cohorts 3 and 4), we will perform differential gene expression profiling in the CP and AG of rats subjected to HS and their normal posture controls. In addition, we will compare the ultrastructure of the CP and AG and the histologic localization and distribution of putative targets implicated in CSF dynamics (aquaporins and cellular junction proteins) of the CP and the endothelial cell layer of the venous sinuses, in normal posture and in HR rats within each cohort. The research groups involved in this proposal have the necessary resources and techniques in place at their laboratories in order to maximize the likelihood of success in this project. An anticipated product of this study is the reduction of the uncertainty in the likelihood or consequence of the visual impairment risk by gaining a study tool (validated animal model) and knowledge on the molecular basis of the biological processes involved in CSF dynamics changes generated by HS.</p>
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2016.
Bibliography Type:	Description: (Last Updated: 09/04/2023)