

Fiscal Year:	FY 2017	Task Last Updated:	FY 11/06/2016
PI Name:	Zanello, Susana Ph.D.		
Project Title:	Evaluation of Hindlimb Suspension as a Model to Study Ophthalmic Complications in Microgravity: Ocular Structure and Function and Association with Intracranial Pressure		
Division Name:	Human Research		
Program/Discipline:	HUMAN RESEARCH		
Program/Discipline--Element/Subdiscipline:			
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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PI Organization Type:	NASA CENTER	Phone:	832-576-6059
Organization Name:	KBR/NASA Johnson Space Center		
PI Address 1:	Human Research Program Chief Scientist Office		
PI Address 2:			
PI Web Page:			
City:	Houston	State:	TX
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:	2011 Crew Health NNJ11ZSA002NA
Start Date:	02/01/2013	End Date:	09/30/2019
No. of Post Docs:	0	No. of PhD Degrees:	0
No. of PhD Candidates:	0	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:	Norsk, Peter	Contact Phone:	
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Flight Program:			
Flight Assignment:	NOTE: End date changed to 9/30/2019 per HRP (Ed., 11/19/18) NOTE: This project had some delays and is still underway with an end date now of 9/30/2018. It moved from an Internal Project to Grant NNX15AW48G starting 10/1/2015, per A. Allcorn/HRP (Ed., 8/31/16)		
Key Personnel Changes/Previous PI:	January 2014 report: Addition of Patricia Chevez-Barrios (collaborator, The Methodist Hospital, Houston) for ocular pathology		
COI Name (Institution):	Parsons-Wingerter, Patricia Ph.D. (NASA Glenn Research Center) Vizzeri, Gianmarco M.D. (University of Texas Medical Branch) Chevez-Barrios, Patricia M.D. (The Methodist Hospital Research Institute)		
Grant/Contract No.:	NNX15AW48G ; Internal Project		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	<p>An animal ground-analog is proposed for validation as a model to induce cephalad fluid shifts and evaluate ocular structural changes similar to those produced in humans after exposure to a microgravity environment. In vivo ocular measures and tissue analysis will be performed in hindlimb suspension (HS) and normal posture control rats. Intraocular pressure (IOP), intracranial pressure (ICP), fluorescein angiography (FA), optical coherence tomography (OCT) scans of the retina, and ultrasound of the optic nerve will be evaluated before, during, and after HS. Retinal microvascular changes will be evaluated by computerized quantitative analysis of FA and retinal flat mounts. In order to study cellular responses that are possibly associated with the stress of variations in translaminal pressure in the retina due to cephalad fluid shift, markers of oxidative stress, hypoxia, and cellular death will be investigated by gene expression analysis and immunohistochemistry. This study will lead to better characterization and problem definition of the Visual Impairment and Intracranial Pressure (VIIP) risk, and in turn, it will evaluate the need for countermeasures to mitigate this risk.</p> <p>NOTE (Ed., 8/31/16): This project had some delays and is still underway with an end date now of 9/30/2018. It moved from an Internal Project to Grant NNX15AW48G starting 10/1/2015, per A. Allcorn/Johnson Space Center Human Research Program</p>
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	<p>Mechanical and oxidative stress anticipated to occur due to the fluid shift caused by hindlimb suspension are thought to be common occurrences in ophthalmic conditions on Earth, namely glaucoma, diabetic retinopathy, macular degeneration. Molecular pathways implicated in the histopathology of VIIP may shed light on common mechanisms shared with the above mentioned Earth-bound diseases, and thus, in future therapies to prevent and/or ameliorate these diseases conditions.</p>
Task Progress:	<p>The progress in this study has been consistent and centered on running the animal study. This stage is very involved, as it requires many animals, some of which are maintained in the study for a long period of time (up to 180 days). These activities are being performed at another facility (University of California Davis, Laboratory of Dr. Charles Fuller). There have been some delays in this process that have affected our ability to proceed with the analysis of samples. However, samples are being frequently received at our laboratory and analysis will begin during the course of FY17.</p>
Bibliography Type:	Description: (Last Updated: 09/04/2023)