Fiscal Year:	FY 2023	**Task Last Updated:**	FY 02/20/2023
PI Name:	Seidler, Rachael D. Ph.D.		
Project Title:	Effect of Head-Down Tilt +/- CO2 on Human Glymphatic Function		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:			
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	(1) **HHC**:Human Health Countermeasures		
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:	32611-8205	**Congressional District:**	3
Comments:	NOTE: PI moved to University of Florida in July 2017; previous affiliation was University of Michigan.		
Project Type:	GROUND	**Solicitation / Funding Source:**	2020 HERO 80JSC020N0001-FLAGSHIP, OMNIBUS1 Human Research Program: Crew Health Appendix A; Omnibus1-Appendix B
Start Date:	01/06/2023	**End Date:**	01/05/2024
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
Contact Monitor:	Stenger, Michael	**Contact Phone:**	281-483-1311
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Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Richmond, Sutton Ph.D. (University of Florida, Gainesville) Roy, Arkaprava Ph.D. (University of Florida, Gainesville)		
Grant/Contract No.:	80NSSC23K0365		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	Spaceflight Associated Neuro-ocular Syndrome (SANS) is a potentially mission-limiting condition for astronauts, yet its underlying pathophysiology is poorly understood. It has been proposed that impairment of the glymphatic system in response to fluid shift or venous congestion could be an underlying cause of SANS. However, there have been no studies to date evaluating human glymphatic function in response to simulated microgravity. While our team is currently evaluating the effect of elevated carbon dioxide (CO_2) on human glymphatic function (awards from NASA and the Office of Naval Research), we have yet to evaluate the spaceflight-relevant combination of CO_2 and simulated microgravity. (Ed. Note: See related Grant #80NSSC17K0021--PI: Seidler). The latter can be achieved via 6° head-down tilt (HDT), simulating the headward fluid shifts of microgravity. Here, we propose to conduct glymphatic magnetic resonance imaging (MRI) in human subjects over a span of several hours while they are either supine or lying on a 6° foam wedge with head-down tilt. They will also be breathing elevated CO_2 to better mimic the conditions on the International Space Station. We will measure the effects of HDT positioning on human glymphatic function (Aim 1) and the combined effects of breathing elevated CO_2 and HDT on human glymphatic function (Aim 2). Thus, we will quantify the acute effects HDT with and without elevated CO_2.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2023.
Bibliography Type:	Description: (Last Updated: 08/10/2023)