Fiscal Year:	FY 2022	**Task Last Updated:**	FY 04/23/2023
PI Name:	Marshall-Goebel, Karina Ph.D.		
Project Title:	Characterization of Jugular Venous Blood Flow during Acute Fluid Shifts		
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:	(1) **Cardiovascular**:Risk of Cardiovascular Adaptations Contributing to Adverse Mission Performance and Health Outcomes		
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:**	281-792-9996
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City:	Houston	**State:**	TX
Zip Code:	77058	**Congressional District:**	36
Comments:	New affiliation as of spring 2022: NASA Johnson Space Center; Human Physiology, Performance, Protection & Operations (H-3PO) Laboratory New affiliation as of fall 2018: KBR/NASA Johnson Space Center, Cardiovascular and Vision Laboratory, Houston; previously at Massachusetts General Hospital		
Project Type:	GROUND	**Solicitation / Funding Source:**	2019 HERO 80JSC019N0001-FLAGSHIP & OMNIBUS: Human Research Program Crew Health. Appendix A&B
Start Date:	08/01/2020	**End Date:**	11/01/2022
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:	NOTE: End date changed to 11/1/2022 per C. Ribeiro/HHC/JSC (Ed., 5/18/21)		
Key Personnel Changes/Previous PI:	June 2021 report: Millennia Young, Jason Lytle, Jessica Jasien, and Laura Pardon were added as co-investigators to this project; Nathaniel Mercaldo and Linda Loerch are no longer working on the project.		

COI Name (Institution):	Greenwald, Scott Ph.D. (KBR/NASA Johnson Space Center) Laurie, Steven Ph.D. (KBR/NASA Johnson Space Center) Lee, Stuart Ph.D. (KBR/NASA Johnson Space Center) Macias, Brandon Ph.D. (NASA Johnson Space Center) Martin, David M.S. (KBR/NASA Johnson Space Center) Young, Millennia Ph.D. (NASA Johnson Space Center) Lytle, Jaon Ph.D. (KBR/NASA Johnson Space Center) Jasien, Jessica Ph.D. (KBR/NASA Johnson Space Center) Pardon, Laura O.D., Ph.D. (KBR/NASA Johnson Space Center)
Grant/Contract No.:	Internal Project
Performance Goal No.:	
Performance Goal Text:	
Task Description:	Cerebral venous congestion leading to decreased cerebral venous outflow is hypothesized to contribute to the development of the spaceflight associated neuro-ocular syndrome (SANS) in astronauts. Recently, our team discovered that chronic exposure to weightlessness can result in stagnant or retrograde blood flow in the internal jugular vein (IJV) during long-duration missions onboard the International Space Station (ISS). While venous stasis was observed in the Fluid Shifts study after 50 days of spaceflight, it is unknown if this is an immediate effect of weightlessness. Characterizing the temporal profile of the headward fluid shift that occurs secondary to weightlessness is crucial as IJV blood flow stasis could be a significant risk for civilian commercial spaceflight, lunar missions, and exploration class missions in addition to ISS missions. Thus, we will utilize 2D and Doppler ultrasonography to investigate cerebral venous drainage pathways during acute weightlessness via parabolic flight to determine the temporal profile of cerebral venous congestion.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	Cerebral venous congestion leading to decreased cerebral venous outflow is hypothesized to contribute to the development of the spaceflight associated neuro-ocular syndrome (SANS) in astronauts. Recently, our team discovered that chronic exposure to weightlessness can result in stagnant or retrograde blood flow in the internal jugular vein (IJV) during long-duration missions onboard the International Space Station (ISS). While venous stasis was observed in the Fluid Shifts study after 50 days of spaceflight, it is unknown if this is an immediate effect of weightlessness. Characterizing the temporal profile of the headward fluid shift that occurs secondary to weightlessness is crucial as IJV blood flow stasis could be a significant risk for civilian commercial spaceflight, lunar missions, and exploration class missions in addition to ISS missions. In this study, we utilized 2D and Doppler ultrasonography to investigate cerebral venous drainage pathways during acute weightlessness via parabolic flight to determine the temporal profile of cerebral venous congestion. Updates in this reporting period: 13 subjects were enrolled in this parabolic flight study and underwent data collection preflight in the seated and supine postures, during 0-G parabolic flight, and during 1-G flight between parabolas.
Bibliography Type:	Description: (Last Updated: 04/15/2024)