

Fiscal Year:	FY 2023	Task Last Updated: FY 01/07/2024	
PI Name:	Sarma, Mallika Ph.D.		
Project Title:	Stress Response and Neurovestibular Compensation and the Potential Ameliorative Effects of Team Support		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:	TRISH--TRISH		
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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City:	Baltimore	State:	MD
Zip Code:	21287-0006	Congressional District:	7
Comments:			
Project Type:	GROUND	Solicitation / Funding Source:	2021 TRISH-RFA-2101-PD: Translational Research Institute for Space Health (TRISH) Postdoctoral Fellowships
Start Date:	08/01/2021	End Date:	07/31/2023
No. of Post Docs:	1	No. of PhD Degrees:	
No. of PhD Candidates:		No. of Master' Degrees:	1
No. of Master's Candidates:	1	No. of Bachelor's Degrees:	1
No. of Bachelor's Candidates:	3	Monitoring Center:	TRISH
Contact Monitor:	Contact Phone:		
Contact Email:			
Flight Program:			
Flight Assignment:	NOTE: End date changed to 07/31/2023 per TRISH. (Ed., 5/31/23) NOTE: End date changed to 08/31/2023 per TRISH. Original end date was 07/31/2022. (Ed., 8/4/22)		
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Shelhamer, Mark Sc.D. (MENTOR: Johns Hopkins University)		
Grant/Contract No.:	NNX16AO69A-P0601		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	<p>POSTDOCTORAL FELLOWSHIP</p> <p>Long-duration space flight will likely produce neurovestibular challenges that could have severe negative consequences on astronaut safety and mission success. Basic neurovestibular functions such as fine-motor and sensorimotor control are essential for vehicle control and operation of key scientific experiments. It is therefore imperative that astronauts are able to successfully adapt neurovestibular systems upon exposure to new challenging environments. However, the adaptation process can be adversely impacted by a variety of factors, including stressors from disruptions to sleep, the environment, having to perform, and engaging with new people, all of which are anticipated in a mission setting. The challenge to neurovestibular systems during space flight, compounded with other stressors, will impact the ability to maintain safe and effective space travel and eventual long-term habitation; yet this remains understudied.</p> <p>When experiencing these compounding stressors, the physiological stress response may influence neurovestibular responses. Specifically, the level of stress may impact how well the neurovestibular system adapts to change. In addition, any such mission will have a crew, where a team of individuals are dependent on each other. NASA has conducted substantial research about the negative stress associated with interpersonal issues in isolation and confinement that contribute to compounded stressors. However, the positive factors of team support may dampen the negative effects of a greater stress response, with positive implications on the function of other physiological systems, including the vestibular system.</p> <p>This project will study 1) how stress response can impact neurovestibular adaptation and 2) how social support may ameliorate the detrimental effects of stress response on neurovestibular adaptation. With these insights, we can develop countermeasures to mitigate space flight risks related to human health countermeasures and human factors and behavioral performance.</p>
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	<p>This research critically examines multiple stressors in a mission-relevant experimental setting. The benefits of this research include establishing a framework to better evaluate acceptable ranges of an easily collectable biomarker like salivary cortisol (CORT) for spaceflight specific work. It also introduces group dynamics as a potential countermeasure for multivariate negative effects -- e.g., introducing active social support protocols may have long-lasting impacts on stress reduction as well as downstream effects on vestibular function, improve crew satisfaction and performance, mitigate against social isolation effects etc. The translational clinical implications include developing therapeutic interventions for individuals struggling with vestibular lesions, pathologies such as vertigo, and other vestibular perturbations.</p>
Task Progress:	Several publications have been added to the Cumulative Bibliography for this project (Ed., 1/6/24).
Bibliography Type:	Description: (Last Updated: 01/07/2024)
Articles in Other Journals or Periodicals	Kim AW, Swana S, Sarma M. "Evaluating the buffering role of perceived social support and coping resources against the adult mental health impacts of COVID-19 psychosocial stress: a cross-sectional study in South Africa." medRxiv preprint server. Posted June 22, 2023. doi: https://doi.org/10.1101/2023.06.20.23291688 , Jun-2023
Articles in Peer-reviewed Journals	Niclou A, Sarma M, Levy S, Ocobock C. "To the extreme! How biological anthropology can inform exercise physiology in extreme environments." Comparative Biochemistry and Physiology Part A: Molecular & Integrative Physiology. 2023 Oct 1;284:111476. https://doi.org/10.1016/j.cbpa.2023.111476 , Oct-2023
Articles in Peer-reviewed Journals	Niclou A, Sarma MS. "The now and future of human biology at the extremes: An introduction to the special issue." Am J Hum Biol. 2023 Oct 26;e24006. https://doi.org/10.1002/ajhb.24006 ; PMID: 37885124 , Oct-2023
Awards	Sarma MS. "NASA Human Research Program Investigator's Workshop Postdoc Poster Award – 1st Place, February 2022." Feb-2022