Fiscal Year:	FY 2020	**Task Last Updated:**	FY 07/16/2020
PI Name:	Huang, Alex M.D., Ph.D.		
Project Title:	Exercise Countermeasure to Prevent Ocular Structural and Functional Changes in a Terrestrial Model of SANS		
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) **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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Zip Code:	92093-0946	**Congressional District:**	52
Comments:	The PI moved from Doheny Eye Institute to University of California, San Diego in 2023.		
Project Type:	GROUND	**Solicitation / Funding Source:**	2018-2019 HERO 80JSC018N0001-SANS: Spaceflight Associated Neuro-ocular Syndrome Countermeasures. Appendix C
Start Date:	07/01/2020	**End Date:**	06/30/2023
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):	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) Marshall-Goebel, Karina Ph.D. (KBR/NASA Johnson Space Center) Sadda, Srinivas M.D. (Doheny Eye Institute) Loerch, Linda M.S. (NASA Johnson Space Center)		
Grant/Contract No.:	80NSSC20K1034		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	Optic disc edema develops in about 16% of astronauts during long-duration spaceflight and is of high concern to the NASA medical community and a target of therapeutic treatment given risk of vision loss. Currently, there is not a reliable method to predict which crewmembers will develop disc edema. Moreover, it was previously believed that only the spaceflight environment could produce optic disc edema in normal healthy subjects. Recently our research team developed a novel ground-based spaceflight analog that reproduced disc edema in healthy test subjects that can be used to test novel pathophysiological hypotheses and possible Spaceflight Associated Neuro-ocular Syndrome (SANS) countermeasures. The research outlined in this proposal will use this new ground-based spaceflight analog advanced by NASA to elucidate the structural and functional impact of optic disc edema and to evaluate alterations to retinal and optic nerve blood flow to understand their contributions to the etiology of SANS. Further, a novel countermeasure will be tested to prevent the development of disc edema, functional decline in ganglion cell function, and vascular alterations associated with this ground-based spaceflight analog. This proposal will (1) determine combined structural and functional ocular alterations caused by the development of optic disc edema in this spaceflight analog, (2) determine the role of altered vascular blood flow in the development of optic disc edema in this spaceflight analog, and (3) determine if daily aerobic exercise in combination with veno-occlusive thigh cuffs can be used as a preventative countermeasure for the formation of optic disc edema. Thus, this proposal utilizes a newly developed spaceflight analog and will allow us to test novel hypotheses for predicting, characterizing, and preventing the development of optic disc edema.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2020.
Bibliography Type:	Description: (Last Updated: 06/07/2023)