

Fiscal Year:	FY 2020	Task Last Updated: FY 09/23/2019	
PI Name:	Crucian, Brian Ph.D.		
Project Title:	Pilot Assessment of Stress and Latent Herpesvirus Reactivation at Palmer, Antarctica – Platform for Validation of Immune Countermeasures?		
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) Immune: Risk of Adverse Health Event Due to Altered Immune Response		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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Zip Code:	77058-3607	Congressional District:	36
Comments:			
Project Type:	GROUND	Solicitation / Funding Source:	Directed Research
Start Date:	12/01/2018	End Date:	09/30/2021
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
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Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
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Task Description:	<p>Recent publications have characterized adverse health events potentially related to immune system dysregulation in some crewmembers onboard the International Space Station (ISS). An appropriate ground analog has yet to be validated, although several European bases are being characterized. This study seeks to collect low-cost pilot data assessing stress, immunity, and viral reactivation during winterover at the U.S. Palmer Station, Antarctica. The goal is to ascertain if Palmer may serve as a spaceflight analog option for ground validation of immune countermeasures. NASA currently has no relevant data from Palmer station. This study may be performed by simply returning frozen saliva samples, frozen plasma from a venous blood sample, a 3 cm hair sample, as well as a rapid fingerstick blood analysis on location from crewmembers performing winterover. The inclusion of a hand held fingerstick blood analyzer will enable the use of a neutrophil/lymphocyte ratio as an indicator of disease susceptibility. Returned saliva samples will be used to assess a variety of parameters including stress hormones, cytokines/inflammation, and latent herpesviruses (an excellent flight-validated biomarker of immune dysregulation). Returned plasma samples will be used to assess plasma cytokines/inflammation biomarkers.</p> <p>Aims</p> <ol style="list-style-type: none"> 1. Investigate the effect of coastal Antarctica winterover on salivary stress hormones, salivary cytokine profiles, plasma cytokines, and basic peripheral leukocyte distribution. 2. Investigate the effect of coastal Antarctica winterover on the reactivation and shedding of latent herpesviruses. 3. Characterize other adverse clinical outcomes, as voluntarily shared by crewmembers via a health survey, such that immune changes, viral reactivation, and clinical manifestations may be correlated to infer information regarding clinical risk from persistent immune dysregulation.
Rationale for HRP Directed Research:	<p>The justification for Directed Task is the highly constrained nature of this pilot study involving focused and constrained data gathering and analysis that is more appropriately obtained through a non-competitive proposal, which could include a follow on task to a solicitation. This is a low-cost pilot study that would have been classified as Discretionary if not for the use of an analog site (Antarctica).</p>
Research Impact/Earth Benefits:	<p>This study may be able to provide new insights into the relationship between immune function, stress, and adverse clinical events. In particular, as relates to confinement and deployment stress.</p>
Task Progress:	<p>The Institutional Review Board (IRB) for this study has been submitted and approved. Two HemoCue Diff systems have been purchased and will be shipped to Palmer station along with other necessary supplies. Several planning/logistics meetings have taken place comprised of the principal investigator, laboratory, National Science Foundation (NSF), and NASA Research Operations and Integration personnel.</p> <p>Palmer crewmembers will rally in Denver prior to entry to Palmer station in March/April 2020. Laboratory personnel plan to meet the crewmembers in Denver for training and informed consent briefings. Supplies for the study will be shipped to the NSF in California at least 90 days prior to crewmember entry to Palmer station.</p> <p>Two additional assays have been added to this study: (1) assessment of plasma cytokines, which entails centrifugation of a venous blood sample, and (2) a small hair sample collection to assess biomarkers of stress.</p>
Bibliography Type:	Description: (Last Updated: 09/15/2023)