Fiscal Year:	FY 2021	**Task Last Updated:**	FY 04/27/2021
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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City:	Houston	**State:**	TX
Zip Code:	77058-3607	**Congressional District:**	36
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	Directed Research
Start Date:	12/01/2018	**End Date:**	10/31/2022
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:	NOTE: End date changed to 10/31/2022 per PI (Ed., 4/23/21)		
Key Personnel Changes/Previous PI:			
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Grant/Contract No.:	Directed Research		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	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. Aims 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:	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).
Research Impact/Earth Benefits:	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.
Task Progress:	Laboratory members planned to rally in Denver in March 2020 to meet the winterover crewmembers for training, informed consent briefings, and BDC (baseline data collection) collections. Due to the COVID-19 pandemic, the plans had to be rapidly altered to give the training and informed consent briefing remotely. The Antarctic crewmembers were quarantined for 2 weeks on the ship off the coast of Chile. Training videos and handouts had to be made quickly in order to support the BDC collection that occurred during the quarantine period on the ship. All winterover collections were performed for the first winterover season and the plasma, saliva and hair samples were returned to Johnson Space Center (JSC) in February 2021. These samples will be analyzed soon. Sample collection supplies for the 2021 winterover season were shipped to Port Hueneme, CA in December 2020 and supplies for the BDC collection were shipped to San Francisco, CA in April 2021. The BDC collection will occur in April 2021 while the winterover crewmembers are isolated on the ship off the coast of Chile again. We expect to receive the second winterover samples in early 2022.
Bibliography Type:	Description: (Last Updated: 09/15/2023)