Fiscal Year:	FY 2019	**Task Last Updated:**	FY 04/11/2019
PI Name:	Mehta, Satish Ph.D.		
Project Title:	Varicella Zoster Virus Shedding After Antiviral Drug (Valacyclovir) Treatment in Antarctic Expeditioners		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:	HUMAN RESEARCH--Biomedical countermeasures		
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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PI Organization Type:	NASA CENTER	**Phone:**	281-483-5459
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City:	Houston	**State:**	TX
Zip Code:	77058-2720	**Congressional District:**	36
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2017 HERO 80JSC017N0001-Crew Health and Performance (FLAGSHIP1, OMNIBUS). Appendix A-Flagship1, Appendix B-Omnibus
Start Date:	07/10/2018	**End Date:**	06/30/2021
No. of Post Docs:	0	**No. of PhD Degrees:**	1
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
Contact Monitor:	Norsk, Peter	**Contact Phone:**	
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Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:	April 2019 report: none		
COI Name (Institution):	Crucian, Brian Ph.D. (NASA Johnson Space Center) Locke, James M.D. (NASA Johnson Space Center) Pierson, Duane Ph.D. (NASA Johnson Space Center)		
Grant/Contract No.:	Internal Project		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	Previous spaceflight studies indicate that reactivation of varicella zoster virus (VZV), particularly during longer duration spaceflights, can potentially lead to clinical disease including zoster, chronic neuropathic pain, vision loss, stroke, and cognitive impairment. Furthermore, continued viral shedding after spaceflight may cause clinical disease in crew contacts including uninfected or immunocompromised individuals, as well as newborn infants. Thus, it is essential to develop spaceflight countermeasures to prevent VZV reactivation and ensure the health of the crew, as well as the health of their contacts upon return. One such countermeasure is prophylactic administration of an antiviral drug (valacyclovir) against VZV. In order to determine the effectiveness of this countermeasure using a large population, we propose to study VZV shedding in Antarctic expeditioners who have similar patterns of VZV DNA shedding in saliva as astronauts. Countermeasure efficacy of the antiviral drug will be determined by measuring VZV reactivation and shedding in saliva as well as measuring the physiological stress biomarkers (cortisol, DHEA, and salivary amylase) and immune markers (inflammatory cytokines) before, during, and after the winter-over period. The proposed research team has extensive experience in ground-based studies including studies conducted in Antarctica, Aquarius undersea habitat, and artificial gravity, as well as the coordination and conduct of complex multi-laboratory studies. In addition, the research team has proven expertise and experience in immunology, virology, and medical expertise working with infectious diseases and spaceflight subjects. This proposal addresses the need for developing and validating countermeasures as identified in the new NASA Research Announcement (NRA) 80JSC017N0001-OMNIBUS NASA HERO Omnibus Opportunity.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	Our studies have demonstrated that reactivation of VZV, particularly during longer duration spaceflight, can potentially lead to clinical disease including zoster, chronic neuropathic pain, vision loss and cognitive impairment. Furthermore, continued viral shedding post-spaceflight may cause clinical disease in crew contacts including uninfected or immunocompromised individuals, as well as newborn infants. Thus, it is essential to develop spaceflight countermeasures to prevent VZV reactivation and ensure the health of the crew, as well as the health of their contacts upon return. One such countermeasure is prophylactic administration of an antiviral drug (valacyclovir) against VZV. In order to determine the effectiveness of this countermeasure with a relatively large population, we propose to study VZV shedding in Antarctic expeditioners who have had similar patterns of VZV DNA shedding in saliva as astronauts. These findings will indicate if valacyclovir treatment will reduce or stop viral reactivation and its shedding in saliva. This will enhance the selection and vetting of potential countermeasures to address clinical risks associated with reduced immune function. This will improve crew health care on International Space Station (ISS) missions, and will further enable exploration-class missions.
Task Progress:	Work has been done preparing for approvals from the National Science Foundation (NSF) and the NASA Johnson Space Center Committee for the Protection of Human Subjects (CPHS). The study is being reviewed by NSF for its implementation and we have applied for CPHS approval from JSC.
Bibliography Type:	Description: (Last Updated: 11/10/2023)