Fiscal Year:	FY 2020	**Task Last Updated:**	FY 06/25/2019
PI Name:	Bowles, Dawn Ph.D.		
Project Title:	Awakening Endogenous Retroviruses with the Space Environment		
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:	Durham	**State:**	NC
Zip Code:	27710-0001	**Congressional District:**	4
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2018 HERO 80JSC018N0001-Crew Health and Performance (FLAGSHIP, OMNIBUS). Appendix A-Flagship, Appendix B-Omnibus
Start Date:	10/01/2019	**End Date:**	06/30/2021
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
Contact Monitor:	Norsk, Peter	**Contact Phone:**	
Contact Email:	Peter.norsk@nasa.gov		
Flight Program:			
Flight Assignment:	NOTE: End date changed to 6/30/2021; original end date was 9/30/2020 (Ed., 11/12/21)		
Key Personnel Changes/Previous PI:			
COI Name (Institution):			
Grant/Contract No.:	80NSSC19K1057		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	Approximately 8% of the human genome is composed of Endogenous Retrovirus (ERVs). These genetic elements have helped shape humans as they exist today. ERVs are normally maintained in a silenced state but non-specific activation of ERVs can occur through application of exogenous stressors, and may have detrimental consequences to the host. Indeed, within the last 5 years a number of studies have demonstrated ERVs to be associated with autoimmune diseases, cancer, and neurological diseases. Extended space travel will expose astronauts to the space radiation and microgravity environments; both of these stressors may influence genomic modifications that may result in non-specific activation of ERVs. Activation of ERVs may result in alterations to molecular pathways within different cell types that might influence negative pathogenic outcomes during space flight. The key central objective of this proposal is to understand how the physical space environment might influence activation of ERVs. We will accomplish this research objective in two aims. In the first aim we will utilize a bioreactor to grow cells in a microgravity environment and evaluate the cells by molecular and immunofluorescence techniques for evidence of ERV activation under this space stressor. The second aim will utilize an established tissue repository that contains multiple tissues from mice exposed to various types and doses of space radiation. We will examine these tissues molecularly and histologically for evidence of ERV activation. This project is significant in that identification of ERVs that respond to specific space conditions may function as early, surrogate markers of putative genomic change. Furthermore, expression of ERV-encoded proteins may be seen as foreign and elicit autoimmune responses.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2020.
Bibliography Type:	Description: (Last Updated: 07/11/2023)