Fiscal Year:	FY 2019	**Task Last Updated:**	FY 10/03/2019
PI Name:	Ford, Andrew Ph.D.		
Project Title:	Investigating the Combinatorial Effects of Intraocular Pressure and Hypobaric Hypoxia on Corneal Function		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:	TRISH--TRISH		
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	None		
Human Research Program Risks:	None		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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Zip Code:	02155	**Congressional District:**	5
Comments:			
Project Type:	Ground	**Solicitation / Funding Source:**	2019 TRISH RFA-1901-PD Translational Research Institute for Space Health (TRISH) Postdoctoral Fellowships
Start Date:	08/01/2019	**End Date:**	07/31/2021
No. of Post Docs:	1	**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:**	TRISH
Contact Monitor:		**Contact Phone:**	
Contact Email:			
Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Kaplan, David Ph.D. (Mentor: Tufts University)		
Grant/Contract No.:	NNX16AO69A-P0406		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	POSTDOCTORAL FELLOWSHIP Spaceflight Associated Neuro-ocular Syndrome (SANS) is thought to be caused by cephalad shifts in fluid during microgravity exposure resulting in increased intracranial pressure (ICP) and symptoms such as optic disc edema, globe flattening, choroidal folds, cotton wool spot, or hyperopic shifts. In addition to increased ICP, as much as a 100% increase in intraocular pressure (IOP) can also occur, potentially affecting neuro-ocular functions. Due to its prevalence and potential mission impact, SANS is considered one of the top human system risks in the International Space Station (ISS) Program. Currently, the underlying mechanisms and symptoms associated with SANS are poorly understood with the potential for long-lasting harm to the ocular and central nervous system. Furthermore, SANS occurs as a result of microgravity exposure; however, it is thought that the mildly hypoxic environment of the ISS may exacerbate neurological symptoms. Thus, there is a need to investigate the individual and combined effects of IOP and hypoxia on ocular function. The long-term objective of this project is to develop a tissue system to enable the study of the simultaneous effects of increased IOP and hypoxia on corneal tissue/cell function. This increased understanding will lead to the development of methods to alleviate symptoms associated with spaceflight and maintain ocular health and vision stability of astronauts. We propose to utilize our established, unique, 3D corneal tissue models, containing a neuronal component, in combination with a custom built bioreactor and hypoxia chamber to investigate tissue response to both short (days) and long-term (weeks, months) exposure to high IOP and a hypoxic environment in vitro. We hypothesize introduction of elevated IOP and hypoxia will result in increased neuronal sensitization, as well as morphological and organizational changes to the individual cell components and extracellular matrix components within our cornea tissue models.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2019.
Bibliography Type:	Description: (Last Updated:)