Fiscal Year:	FY 2014	**Task Last Updated:**	FY 04/04/2014
PI Name:	Lawley, Justin Ph.D.		
Project Title:	Microgravity Induced Visual Alterations and Intracranial Pressure		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:	NSBRI--Cardiovascular Alterations Team		
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		
PI Email:	JustinLawley@texashealth.org	**Fax:**	FY
PI Organization Type:	UNIVERSITY	**Phone:**	214-345-4729
Organization Name:	The University of Texas Southwestern Medical Center at Dallas		
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PI Web Page:			
City:	Dallas	**State:**	TX
Zip Code:	75231-5129	**Congressional District:**	5
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2013 NSBRI-RFA-13-01 Postdoctoral Fellowships
Start Date:	10/01/2013	**End Date:**	09/20/2015
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:**	NSBRI
Contact Monitor:		**Contact Phone:**	
Contact Email:			
Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Levine, Benjamin M.D. (MENTOR/ University of Texas Southwestern Medical Center at Dallas)		
Grant/Contract No.:	NCC 9-58-PF03501		
Performance Goal No.:			
Performance Goal Text:			
Task Description:	POSTDOCTORAL FELLOWSHIP Humans have been travelling in space for more than 40 years without clear evidence of visual impairment in astronauts. However very recently, it has been identified that some astronauts on the International Space Station seem to be at risk for visual changes that may be due to elevated pressure inside the head (intracranial pressure). It is well known that there is a relative shift in fluid towards the head in humans during space flight (microgravity) and therefore these changes may increase intracranial pressure to a greater degree than previously appreciated. Intracranial pressure may also be exacerbated or transiently elevated by small increases in the partial pressure of carbon dioxide in the International Space Station atmosphere and during strength training exercise that is employed to try and maintain astronaut's muscle mass. Therefore, the primary aim of this project will be to provide novel data about the impact of microgravity induced central		

	fluid shifts on directly measured intracranial pressure, and the associated inflow and outflow of blood to the brain, accompanied by simultaneous assessment of structural changes in the eye. Furthermore, we will examine the above factors during small changes in atmospheric carbon dioxide and during strength training exercise in microgravity. This information is entirely unknown and absolutely essential to establishing the pathophysiology of the recently identified visual impairments in some long duration astronauts, so as to develop appropriate countermeasures.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	This project will have implications for public health and will provide a better understanding of the regulation of intracranial pressure in normal healthy individuals and thus will offer an improved knowledge base to provide effective treatments for a wide range of intracranial disorders.
Task Progress:	New project for FY2014.
Bibliography Type:	Description: (Last Updated: 04/09/2019)
Articles in Peer-reviewed Journals	Petersen LG, Lawley JS, Lilja-Cyron A, Petersen JC, Howden EJ, Sarma S, Cornwell WK 3rd, Zhang R, Whitworth LA, Williams MA, Juhler M, Levine BD. "Lower body negative pressure to safely reduce intracranial pressure." J Physiol. 2019 Jan;597(1):237-48. Epub 2018 Nov 20. https://doi.org/10.1113/JP276557 ; PubMed PMID: 30286250; PubMed Central PMCID: PMC6312426 , Jan-2019
Articles in Peer-reviewed Journals	Lawley JS, Levine BD, Williams MA, Malm J, Eklund A, Polaner DM, Subudhi AW, Hackett PH, Roach RC. "Cerebral spinal fluid dynamics: Effect of hypoxia and implications for high-altitude illness." J Appl Physiol (1985). 2016 Jan 15;120(2):251-62. Review. Epub 2015 Oct 22. http://dx.doi.org/10.1152/japplphysiol.00370.2015 ; PubMed PMID: 26494441 , Jan-2016