

Fiscal Year:	FY 2023	Task Last Updated:	FY 05/01/2023
PI Name:	Ronca, April Elizabeth Ph.D.		
Project Title:	Rodent Research Standard Housing Mission: Multidisciplinary Approach to Understanding Spaceflight Responses		
Division Name:	Space Biology		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:			
Joint Agency Name:	TechPort:	No	
Human Research Program Elements:	None		
Human Research Program Risks:	None		
Space Biology Element:	(1) Animal Biology: Vertebrate		
Space Biology Cross-Element Discipline:	(1) Musculoskeletal Biology (2) Immunology		
Space Biology Special Category:	None		
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Comments:	November 2019: PI is located at NASA Ames Research Center and remains affiliated with Wake Forest University School of Medicine		
Project Type:	FLIGHT,GROUND	Solicitation / Funding Source:	Directed Research
Start Date:	05/01/2022	End Date:	04/30/2025
No. of Post Docs:	No. of PhD Degrees:		
No. of PhD Candidates:	No. of Master' Degrees:		
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No. of Bachelor's Candidates:	Monitoring Center: NASA ARC		
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Flight Program:	ISS		
Flight Assignment:			
Key Personnel Changes/Previous PI:			
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Task Description:	RR-26 is a NASA Space Biology (SB) Program funded study for the 2nd Rodent Habitat Flight Validation, following the addition of the Nest Box (NB) as the current solution to meet OCHMO-550 requirements and to provide adequate bedding substrate and/or structures for resting and sleeping of animals per The Guide to the Care and Use of Laboratory Animals (The Guide). The Flight Institutional Animal Care and Use Committee (FIACUC) and the science community share a common goal to advance the utility of the Rodent Research (RR) Habitat for conducting high quality, rodent spaceflight experiments. The NASA Chief Veterinarian and FIACUC are concerned that the RR Habitat without a Nest Box (NB), fails to meet animals' needs and the regulatory requirements to provide a dedicated structure that allows mice to sleep, nest, and thermoregulate. On the other hand, growing concerns have been raised in the RR flight investigator community (based on results obtained from some missions since 2017) that using the NB significantly alters the environment and may interfere with expected physiological responses to spaceflight that were identified previously and expected during long duration missions, thereby diminishing the scientific value of the RR animal model used to study biological effects of spaceflight. This mission is directed research by Space Biology and the plan was developed following extensive consultation and collaboration with the NASA Chief Veterinarian, Flight IACUC, the RR Science Working Group (SWG), welfare, and other science experts. This mission will provide reference data on animals' physiological systems and behavior within the Rodent Habitat to inform the NB's role in 1) supporting rodent health and welfare in space, and 2) to inform how the NB affects key tissues and science disciplines in both the space and ground environment. To accomplish mission objectives, adult wild-type female mice will be flown to the International Space Station (ISS) using RR Hardware. Groups of mice provided with the NB will be compared to those without the NB in the Rodent Habitat in both Flight and Ground. Comparison of Flight groups (FLT) to their respective Habitat Ground Control (HGC) groups will reveal if and how the NB affects major physiological systems relevant to the discipline of Space Biology.
Rationale for HRP Directed Research:	This research is directed because it contains highly constrained research, which requires focused and constrained data gathering and analysis that is more appropriately obtained through a non-competitive proposal. By performing directed research, Space Biology (SB) plans to conduct targeted ground and flight studies to obtain the required data and to enable critical, scientifically rigorous analyses of comparing the effects with and without the Nest Box on rodents during spaceflight.
Research Impact/Earth Benefits:	The Rodent Research Standard Housing Mission (RR-26) is a critical multi-disciplinary experiment designed to assess and improve translation of NASA rodent spaceflight studies with the goal of informing crew health on long duration missions. This will be accomplished by providing evidence to: (1) help define the role of a physical structure, or Nestbox, in supporting aspects of rodent health and welfare in space, and determine whether provision of the Nestbox limits the study of certain scientific disciplines.
Task Progress:	The Rodent Research Standard Housing Mission is in preparation for flight. Unique aspects include the first NASA in-orbit use of hi-resolution digital cameras and body temperature dataloggers that will be implanted within the abdominal cavity weeks prior to flight. Continuous tracking of mouse behavior and mouse body temperature will enable assessment of diurnal and circadian shifts in flight based upon time-locking of these measures as both activity and temperature follow characteristic patterns across light:dark phases of the daily cycle. Further, data will be collected in orbit.
Bibliography Type:	Description: (Last Updated: 09/08/2023)