Task Book Report Generated on: 04/19/2024

PI Name: Blargens, Alari R. Ph.D. Project Title: Spinal Structure and Function after 90 Days Long-Duration Simulated Space Flight and Recovery Division Name: Human Research Program/Dicipline: Program/Dicipline: Elements/Subdicipline: Elements/Subdicipline: Elements/Subdicipline: Elements/Subdicipline: UMAN RESEARCH-Biomedical countermeasures Elements/Subdicipline: Olinit Agency Name: TechPort: No Human Research Program Elements: (I) HHC-Human Health Countermeasures Human Research Program Elements: (I) HHC-Human Health Countermeasures Human Research Program Elements: (I) Bone Fracture Risk of Bone Fracture due in Spaceflight-induced Changes to Bione (2) Outer, Risk of Enaity Outer Outerpoorsia Due To Spaceflight Space Biology Element: None Space Biology Special Category: None Pi Email: None Space Biology Special Category: None Pi Email: In Space Biology Special Category: None Pi Email: In Space Biology Special Category: None Pi Cognalization Type: UNIVERSITY Phone: 858-534-7837 Organization Name: University of California, San Diego Pi Address 1: Altman Clinical and Translational Research Institute Pi Address 2: 9452 Medical Center Drive 0863 Pi Address 3: 9452 Medical Center Drive 0863 Pi Address 3: State: CA Zip Code: 2037-0863 Congressional District: 52 Comments: Project Type: GROUND Solicitation / Funding 2013 HERO NN1132SA002N-Crew Health Source: (FLAGSHIP & NSBRI) Source: (FLAGSHIP & NSBRI) No. of Post Desc: No. of Master' Degree: No. of Post Desc: No. of Master' Degree: No. of Bachelor's Candidates: No. of Master' Degree: No. of Bachelor's Candidates: No. of Master' Degree: Flight Torgam: Flight Torgam: Flight Assignment: Key Personnel Changes/Previous Pi: COI Name (Institution): Master, Mondal Bulb.) (University of California at San Francisco) Master, Mondal Bulb.) (University of California at San Francisco) Master, Mondal Bulb.) (University of California at San Francisco) Master, Mondal Bulb.) (University of California at San Francisco) Master, Mondal Bulb.) (University of	Fiscal Year:	FY 2014	Task Last Updated:	FY 09/18/2014
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Fitunan Research Program Risks: Space Biology Element: None Space Biology Cross-Element Discipline: None None None PI Email: aburgens@used.edu Fax: FY PI Organization Type: University of California, San Diego PI Address 1: Altman Clinical and Translational Research Institute PI Address 2: 9452 Medical Center Drive/0863 PI Web Page: City: La Jolla State: CA 2037-0863 Congressional District: 52 Comments: Project Type: GROUND Solicitation / Funding Source: (PLAGSHIP & NNRI)3ZSA002N-Crew Health Source: (PLAGSHIP & NSBRI) Start Date: 08-01/2014 Rand District: No. of PhD Candidates: No. of PhD Candidates: No. of Master's Candidates: No. of Master's Candidates: No. of Bachelor's Candidates: No. of Bachelor's Candidates: No. of Rachelor's Candidates: No. of Rachelor's Candidates: No. of Paschelor's Candidates: No. of Paschelor's Candidates: No. of Paschelor's Candidates: No. of Master's Candidate	Human Research Program Elements:	(1) HHC:Human Health Countermeasure	es	
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Discipline: Space Biology Special Category: None PI Email: aharpens@nesd.edu Fax: FY PI Organization Type: UNIVERSITY Phone: 858-534-7837 Organization Name: University of California, San Diego PI Address 1: Altman Clinical and Translational Research Institute PI Address 2: P452 Medical Center Drive/0863 PI Web Page: City: La Jolla State: CA Zip Code: O2037-0863 Congressional District: 52 Comments: Project Type: GROUND Solicitation / Funding Source: (FLAGSHIP & NSDRI) Start Date: 08/01/2014 End Date: 07/31/2017 No. of Post Does: No. of PhD Candidates: No. of Master' Degrees: No. of Master' Degrees: No. of Master's Candidates: No. of Master' Degrees: No. of Master's Candidates: No. o	Space Biology Element:	None		
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Task Book Report Generated on: 04/19/2024

Task Description:

The vertebral bodies and flexible intervertebral discs are important, weight-bearing tissues that have adapted to gravitational stress. Consequently, the absence of gravitational axial loads during exposure to microgravity likely disrupts normal spine physiology. Throughout longer space flight missions, deconditioning of the intervertebral discs and spinal muscles poses a serious injury risk upon re-exposure to upright posture in a gravitational environment. We will use state-of-the-art technologies to quantify morphology, biochemistry, and kinematics of spines (including the vertebrae, intervetebral discs, and spinal muscles) of rats at defined time points as described in the NASA research announcement. After successful completion of our investigation, we will deliver a comprehensive database of simulated microgravity-induced spinal adaptations (type and magnitude). The overarching goal of these proposed studies are to develop a long-duration space flight ground based model of spine function and structure. In addition, this research project will afford the opportunity to examine possible gender differences in spinal structure and function. Our research group is in a unique position to leverage our past rodent space flight experience on STS-131, STS-133, STS-135, and BION M-1 missions and directly compare to this ground based model of simulated microgravity. Moreover, we are also uniquely positioned to compare this 90-days hind-limb suspension model to those changes that occur in our currently-funded project to test crew members before and after 6-month ISS missions. Our project directly addresses Critical Path Roadmap Risks and Questions regarding disc injury (IRP Gap-B4): Is damage to joint structure, intervertebral discs, or ligaments incurred during or following microgravity exposure? Our research will improve understanding of the underlying pathophysiology of spinal deconditioning induced by simulated microgravity, and mechanisms of spinal adaptation following re-exposure to 1-G. Our long-term goal is to prevent such spinal deconditioning with exercise or other physiologic countermeasures. The goal of this research is to comprehensively characterize 90-days simulated space-flight and recovery induced changes in spinal tissue morphology, biochemistry, and biomechanics.

Rationale for HRP Directed Research:

Research Impact/Earth Benefits:

Task Progress:

New project for FY2014.

Bibliography Type:

Description: (Last Updated: 10/31/2023)