

<b>Fiscal Year:</b>	FY 2021	<b>Task Last Updated:</b>	FY 12/28/2020
<b>PI Name:</b>	Lu, Xiaohong Ph.D.		
<b>Project Title:</b>	Develop a Novel Single-Cell Biodosimetry for Brain Genomic Instability and Neurodegeneration to Predict Clinical Health Outcomes in Human Spaceflight Crews		
<b>Division Name:</b>	Space Biology		
<b>Program/Discipline:</b>			
<b>Program/Discipline--Element/Subdiscipline:</b>			
<b>Joint Agency Name:</b>		<b>TechPort:</b>	No
<b>Human Research Program Elements:</b>	None		
<b>Human Research Program Risks:</b>	None		
<b>Space Biology Element:</b>	(1) Animal Biology: Vertebrate		
<b>Space Biology Cross-Element Discipline:</b>	(1) Neurobiology		
<b>Space Biology Special Category:</b>	(1) Translational (Countermeasure) Potential		
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<b>Comments:</b>			
<b>Project Type:</b>	GROUND	<b>Solicitation / Funding Source:</b>	2018 Space Biology (ROSBio) NNH18ZTT001N-FG2. App D: Flight and Ground Space Biology Research
<b>Start Date:</b>	11/15/2020	<b>End Date:</b>	11/30/2023
<b>No. of Post Docs:</b>		<b>No. of PhD Degrees:</b>	
<b>No. of PhD Candidates:</b>		<b>No. of Master' Degrees:</b>	
<b>No. of Master's Candidates:</b>		<b>No. of Bachelor's Degrees:</b>	
<b>No. of Bachelor's Candidates:</b>		<b>Monitoring Center:</b>	NASA ARC
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<b>Flight Program:</b>			
<b>Flight Assignment:</b>	NOTE: End date is 11/30/2023 (incorrectly listed in NSSC as 11/14/2021) per F. Hernandez/ARC (Ed., 7/27/21)		
<b>Key Personnel Changes/Previous PI:</b>			
<b>COI Name (Institution):</b>	Cvek, Urska Sc.D. ( Louisiana State University, Shreveport ) Chancellor, Jeffery Ph.D. ( Louisiana State University and A&M College ) Harrison, Lynn Ph.D. ( Louisiana State University )		
<b>Grant/Contract No.:</b>	80NSSC21K0273		
<b>Performance Goal No.:</b>			
<b>Performance Goal Text:</b>			

<b>Task Description:</b>	As NASA plans future exploration missions to the Lunar and Martian surfaces, realistic ground-based analog studies and more predictive biodosimetry are needed to assess whether the space radiation poses a detrimental risk of brain genomic instability and neurodegeneration that leads to late-onset behavioral deterioration for spaceflight crews. Implementing a recently developed method of recreating the intravehicular (IVA) radiation environment expected on spaceflight vehicles and habitats and a novel genetic sensor, this proposal addresses Research Topic 3 – Animal Biology Studies in support of Human Space Exploration and Sub-topic AB1-A – Behavior and underlying neural function in Appendix D: Solicitation of Proposals for Flight and Ground Space Biology Research. We propose to determine how the space environment and sex affect brain genomic stability and consequent age-related brain structure and function changes. Our studies will support Human Space Exploration, by contributing the first biodosimetry for quantifying brain DNA instability and neurodegenerative changes to predict clinical health outcomes in human spaceflight crews and the utility of available ground-based analogs to realize basic mechanisms that can lead to the development of biologic counter-measures.
<b>Rationale for HRP Directed Research:</b>	
<b>Research Impact/Earth Benefits:</b>	
<b>Task Progress:</b>	New project for FY2021.
<b>Bibliography Type:</b>	Description: (Last Updated: 09/15/2022)