

<b>Fiscal Year:</b>	FY 2018	<b>Task Last Updated:</b>	FY 11/13/2018
<b>PI Name:</b>	Chung, Caroline M.D.		
<b>Project Title:</b>	Imaging and Serum Biomarkers to Predict and Identify Early Cardiac Injury from Radiation Exposure		
<b>Division Name:</b>	Human Research		
<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>	(1) <b>SR:</b> Space Radiation		
<b>Human Research Program Risks:</b>	(1) <b>Cardiovascular:</b> Risk of Cardiovascular Adaptations Contributing to Adverse Mission Performance and Health Outcomes		
<b>Space Biology Element:</b>	None		
<b>Space Biology Cross-Element Discipline:</b>	None		
<b>Space Biology Special Category:</b>	None		
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<b>PI Web Page:</b>			
<b>City:</b>	Houston	<b>State:</b>	TX
<b>Zip Code:</b>	77030	<b>Congressional District:</b>	9
<b>Comments:</b>			
<b>Project Type:</b>	GROUND	<b>Solicitation / Funding Source:</b>	Directed Research
<b>Start Date:</b>	08/23/2018	<b>End Date:</b>	08/22/2021
<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 JSC		
<b>Contact Monitor:</b>	<b>Contact Phone:</b>		
<b>Contact Email:</b>			
<b>Flight Program:</b>			
<b>Flight Assignment:</b>	NOTE: Period of performance is now 8/23/2018-8/22/2021 per NSSC information since now goes through NSSC (Ed., 5/29/19)		
<b>Key Personnel Changes/Previous PI:</b>			
<b>COI Name (Institution):</b>	Dabaja, Bouthaina M.D. ( Co-PI: University of Texas MD Anderson Cancer Center ) Lopez-Mattei, Juan M.D. ( University of Texas MD Anderson Cancer Center ) Swamique, Yusuf M.D. ( University of Texas MD Anderson Cancer Center ) Gladish, Gregory M.D. ( University of Texas MD Anderson Cancer Center ) Lin, Steven M.D., Ph.D. ( Co-PI: University of Texas MD Anderson Cancer Center ) Gandhi, Saumil M.D., Ph.D. ( University of Texas MD Anderson Cancer Center ) Layman, Rick Ph.D. ( University of Texas MD Anderson Cancer Center )		
<b>Grant/Contract No.:</b>	80NSSC18K1639		
<b>Performance Goal No.:</b>			
<b>Performance Goal Text:</b>			

<b>Task Description:</b>	<p>[ED. NOTE November 2018: Principal investigator (PI) changed to Dr. Caroline Chung, from Dr. Sarah Milgrom, due to Dr. Milgrom's change in institution. Period of performance also revised due to PI change; original period of performance was 7/18/2018-9/30/2021.]</p> <p>Within the “Risk of Cardiovascular Disease and Other Degenerative Tissue Effects from Radiation Exposure and Secondary Spaceflight Stressors,” the gaps Degen-2 and -3 involve identification of adverse outcome pathways, progression rates and latency periods, and early surrogate markers for radiation-induced cardiovascular disease. To date, no tasks have included human radiotherapy cohorts to assess those parameters and identify biomarkers. The proposed work will acquire data on cardiovascular impairments and associated biomarkers observed in patients undergoing cardiac exposure to ionizing radiation with emphasis on non-invasive imaging modalities to quantify predictive changes linked to late impairment. Prompt identification of damage may enable interventions to prevent progression to cardiac dysfunction. Furthermore, study of cardiac changes that occur during and soon after radiotherapy would grant insight into the pathophysiology, which may lead to novel therapeutic interventions. The results may then be correlated with other studies performed in animals or in human cohorts with different types of radiation exposure such as astronauts. Research deliverables from this work will help close gaps Degen-2 and -3 as well as feed into countermeasure development and validation in animal studies with space radiation exposures. Results will also drive predictive model development (Degen-5). Specific Aims for the work include: 1) Assess for cardiac toxicity in patients treated with radiotherapy to the chest. 2) Assess for an association between 3D imaging findings suggestive of cardiac injury and radiation dosimetry. 3) Explore the association of radiation exposure with serum biomarker levels.</p> <p>Research Deliverables</p> <ol style="list-style-type: none"> <li>1. Evaluation of MRI as noninvasive imaging modality for detection of early indicators of cardiotoxicity following radiotherapy, compared with electrocardiograms.</li> <li>2. Evaluation of serum markers and other cardiovascular parameters for detection of early indicators of cardiotoxicity following radiotherapy.</li> </ol>
<b>Rationale for HRP Directed Research:</b>	<p>There is insufficient time for competitive solicitation through an NRA (NASA Research Announcement) due to Degen Risk accelerated schedule and milestone delivery. This work is also highly constrained research involving a pilot study with human radiotherapy cohorts and the advanced imaging expertise available at MD Anderson. The findings from this pilot study are expected to inform future solicited animal studies. Retrospective studies are not possible because the biomarkers are newly identified and are not yet fully validated, which this study will help to do.</p>
<b>Research Impact/Earth Benefits:</b>	
<b>Task Progress:</b>	<p>New project for FY2018.</p>
<b>Bibliography Type:</b>	<p>Description: (Last Updated: 08/07/2023)</p>