

<b>Fiscal Year:</b>	FY 2015	<b>Task Last Updated:</b>	FY 02/27/2015
<b>PI Name:</b>	Baker, John Ph.D.		
<b>Project Title:</b>	Determination of Risk for and Occurrence of Heart Disease from Space Radiation		
<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		
<b>PI Email:</b>	<a href="mailto:jbaker@mcw.edu">jbaker@mcw.edu</a>	<b>Fax:</b>	FY
<b>PI Organization Type:</b>	UNIVERSITY	<b>Phone:</b>	414-955-8706
<b>Organization Name:</b>	Medical College of Wisconsin		
<b>PI Address 1:</b>	Congenital Heart Surgery		
<b>PI Address 2:</b>	8701 W Watertown Plank Rd		
<b>PI Web Page:</b>			
<b>City:</b>	Milwaukee	<b>State:</b>	WI
<b>Zip Code:</b>	53226-3548	<b>Congressional District:</b>	5
<b>Comments:</b>			
<b>Project Type:</b>	GROUND	<b>Solicitation / Funding Source:</b>	2013-14 HERO NNJ13ZSA002N-RADIATION
<b>Start Date:</b>	01/08/2015	<b>End Date:</b>	01/07/2019
<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>	Simonsen, Lisa	<b>Contact Phone:</b>	
<b>Contact Email:</b>	<a href="mailto:lisa.c.simonsen@nasa.gov">lisa.c.simonsen@nasa.gov</a>		
<b>Flight Program:</b>			
<b>Flight Assignment:</b>			
<b>Key Personnel Changes/Previous PI:</b>			
<b>COI Name (Institution):</b>	Kronenberg, Amy D.Sc. ( Lawrence Berkeley National Laboratory )		
<b>Grant/Contract No.:</b>	NNX15AD69G		
<b>Performance Goal No.:</b>			
<b>Performance Goal Text:</b>			

<b>Task Description:</b>	<p>The objective of this application is to determine the increased risk of developing degenerative cardiac disease as a result of exposure to representative components of space radiation. Ground-based animal studies will be used to assess the increased risk for developing degenerative cardiovascular disease. A model of accelerated coronary fibrosis and the degeneration of heart morphology and function following exposure to ionizing radiation, in previously healthy rats, has already been developed and validated. In this rat model, whole body ionizing radiation with single doses of 6-10 Gy of X-rays resulted in clinically-relevant changes in cardiac function that can be measured, noninvasively. Our central hypothesis is that whole body exposure to space-relevant doses of solar particle event (SPE) protons and galactic cosmic rays (GCRs) will increase the risk for developing degenerative cardiovascular disease.</p> <p>Two Specific Aims are proposed to directly address the issue of cardiovascular risk using experimental approaches in a rat model and theoretical modeling of disease progression to apply the results from the rat studies to astronauts. The proposed investigations directly address important aspects of the NASA Human Research Program (HRP) Degenerative Tissue Gaps, as set forth in the Human Research Roadmap. HRP gaps are identified that are addressed by each Specific Aim. The proposed research will provide important information to help close these gaps.</p> <p>Specific Aim 1: Determine the progression rates, latency periods, and relative biological effectiveness (RBE) of iron ions, silicon, and protons compared with gamma rays of risk for and occurrence of degenerative disease in the cardiovascular system resulting from ground-based exposure to GCRs and SPEs. (HRP Gaps Degen-1, -2 and -3).</p> <p>Specific Aim 2: Develop a theoretical model of disease progression to extrapolate results on charged particle-induced cardiac risks in rats to degenerative cardiac disease in astronauts. (HRP Gaps Degen-1, -5).</p>
<b>Rationale for HRP Directed Research:</b>	
<b>Research Impact/Earth Benefits:</b>	
<b>Task Progress:</b>	New project for FY2015.
<b>Bibliography Type:</b>	Description: (Last Updated: 01/29/2024)