Fiscal Year:	FY 2011	**Task Last Updated:**	FY 02/08/2011
PI Name:	Wang, Ya M.D., Ph.D.		
Project Title:	NSCOR: Mechanisms underlying the risk of HZE particle-induced solid tumor development		
Division Name:	Human Research		
Program/Discipline:	HUMAN RESEARCH		
Program/Discipline--Element/Subdiscipline:	HUMAN RESEARCH--Radiation health		
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	(1) **SR**:Space Radiation		
Human Research Program Risks:	(1) **Cancer**:Risk of Radiation Carcinogenesis		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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Zip Code:	30322	**Congressional District:**	5
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2010 Space Radiation NSCOR/Virtual NSCOR NNJ10ZSA002N
Start Date:	01/01/2011	**End Date:**	12/31/2015
No. of Post Docs:		**No. of PhD Degrees:**	
No. of PhD Candidates:		**No. of Master' Degrees:**	
No. of Master's Candidates:		**No. of Bachelor's Degrees:**	
No. of Bachelor's Candidates:		**Monitoring Center:**	NASA JSC
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Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Doetsch, Paul (Emory University) Dynan, William (Medical College Of Georgia Research Institute, Inc.) Orloff, Gregg (Emory University) Sun, Shi-Yong (Emory University) Vertino, Paula (Emory University) Wang, Huichen (Emory University)		
Grant/Contract No.:	NNX11AC30G		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	The Emory University-Medical College of Georgia NSCOR will investigate the mechanisms by which high charge and energy (HZE) particles, a component of space radiation, induce lung cancer. HZE exposure elicits complex DNA damage, together with a broader cell/tissue stress response that likely includes changes in expression of tumor suppressor proteins, persistent elevation of reactive oxygen species, and alterations in the pattern of DNA methylation. The central hypothesis of this NSCOR is that this broader stress response amplifies the carcinogenic risk from a primary DNA damage event. Preliminary studies suggest that a small noncoding RNA, microRNA-21 (miR-21) plays a key role in coordinating the HZE particle-associated stress response. Center investigators will use genetic, epigenetic, and biochemical approaches to address the role of miR-21 dependent and independent stress responses in HZE particle-induced lung cancer. There are four projects: 1. Determine whether the lung cancer suppressors, Gprc5a and p53, protect against HZE particle-induced lung carcinogenesis, and whether miR-21 overexpression blunts this protective effect. 2. Determine whether HZE-particle radiation exposure results in hyper-reliance on error-prone DNA repair pathways, whether miR21 mediates this effect, and whether dysregulation of DNA repair contributes to lung carcinogenesis. 3. Determine the nature of the HZE-particle induced ROS stress response, whether it contributes to HZE particle-induced lung carcinogenesis, and the role of miR-21 in this process. 4. Determine the scope of HZE-particle radiation-induced alterations in DNA methylation patterns, whether these alterations contribute to lung carcinogenesis, and the role of miR-21-dependent targeting of DNA methyltransferase 1 (DNMT1) in this process. Lung cancer is the most common fatal cancer among men and women worldwide. Lung cancer is believed to be one of the major risks of HZE-particle exposure, although quantitative and mechanistic understanding of this risk is lacking. The Emory-MCG NSCOR will address this important knowledge gap.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2011.
Bibliography Type:	Description: (Last Updated: 07/07/2021)