Fiscal Year:	FY 2007	**Task Last Updated:**	FY 10/15/2007
PI Name:	Blakely, Eleanor A Ph.D.		
Project Title:	Early Markers of Space-Radiation Induced Human Cataractogenesis		
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) **Cardiovascular**:Risk of Cardiovascular Adaptations Contributing to Adverse Mission Performance and Health Outcomes		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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City:	Berkeley	**State:**	CA
Zip Code:	94720	**Congressional District:**	13
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2007 Space Radiation NNJ07ZSA001N
Start Date:	09/04/2007	**End Date:**	07/31/2010
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
Contact Monitor:		**Contact Phone:**	
Contact Email:			
Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Chang, Polly (SRI International)		
Grant/Contract No.:	NNJ07HC79I		
Performance Goal No.:			
Performance Goal Text:			
Task Description:	The proposed project is a competitive renewal application with research emphasis focused on reducing the risk of radiation-induced cataract in human space travel. A clear understanding of the underlying mechanisms for cataractogenesis is necessary for early diagnosis and mitigation of cataract risks. The hypothesis driving our research is that particle radiation induces early molecular signaling alterations in the lens epithelial cells, which disrupt normal differentiation mechanisms necessary for the maintenance of lens clarity. In order to assess the time course of the expression and the natural history of the developing lesion, two experimental models of the lens are proposed in this application. Differentiating human lens cells in vitro will be used to extend the investigation of molecular mechanisms of action that follow particle radiation induced changes in key marker proteins using beams defined by NASA's operational parameters, eg. low doses and dose-rates of protons or heavy ions. Mice will be irradiated and early lenticular changes associated with molecular aggregation will be followed using an exquisitely		

	sensitive dynamic light scattering method to map the unique signatures of particle radiation-induced lens opacification. Information gathered from these measurements will be used to determine when the lenses will be harvested for protein identification. The results of the proposed research will improve mechanistic understanding underlying variability of dose-rate dependencies for cataract formation, and reduce the uncertainties in cataract risk assessment.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2007.
Bibliography Type:	Description: (Last Updated: 05/05/2021)