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riscal year:	FY 2019	Task Last Updated:	FY 10/10/2019
Project Title:	Luderer, Ulrike M.D., Ph.D.		
rroject fille:	Ovarian Cancer and Space Radiation		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline Element/Subdiscipline:			
Joint Agency Name:		TechPort:	No
Human Research Program Elements:	(1) SR:Space Radiation		
Human Research Program Risks:	(1) Cancer: Risk of Radiation Carcino	ogenesis	
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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PI Organization Type:	UNIVERSITY	Phone:	949-824-8081
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Zip Code:	92697	<b>Congressional District:</b>	45
Comments:			
Project Type:	Ground	Solicitation / Funding Source:	2018 HERO 80JSC018N0001-Crew Health and Performance (FLAGSHIP, OMNIBUS). Appendix A-Flagship, Appendix B-Omnibus
Start Date:	08/20/2019	End Date:	08/19/2021
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:		<b>Contact Phone:</b>	
Contact Email:			
Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):			
Grant/Contract No.:	80NSSC19K1620		
Performance Goal No.:			
Performance Goal Text:			
	Thirty percent of astronauts are wome gynecological cancers remain poorly and premature menopause. Premature Alzheimer's disease. In addition, anin exposure increases the risk for ovariar gynecological cancer deaths in wome whether space radiation has similar ef Our prior pilot study showed that the of exposures in space. Exposure to ch	en, but the risks of space radiation understood. Radiation treatment f menopause increases women's ri- nal studies and studies of atomic l n cancer. Ovarian cancer has a hig n. To best protect the health of wo fects on the ovary as the types of ovary is highly sensitive to follicl arged iron and oxygen particles ro	to women's reproductive health and risks of or cancer is known to cause temporary infertility sks for cardiovascular disease, osteoporosis, and oomb survivors have shown that radiation the mortality rate and is the leading cause of omen astronauts, it is important to understand radiation exposure that are common on Earth. e destruction by charged particle radiation, typical esulted in dose-dependent follicle depletion and

Task Description:	premature ovarian failure. Exposure to charged iron particles induced epithelial ovarian tumors later in life; ovarian tissues from oxygen charged particle irradiated mice of two strains and charged iron irradiated mice of the second mouse strain were archived for future analysis for tumor endpoints. We propose to leverage these stored tissue and blood samples, together with ovaries from gamma-irradiated mice from the NASA tissue archive to 1) compare ovarian tumor prevalence and molecular characteristics after low dose charged particle irradiation (oxygen and iron ions) with gamma irradiation in adult female mice; 2) examine the persistence and types of ovarian oxidative damage after irradiation and evaluate serum concentrations of a clinically utilized biomarker of ovarian reserve, Anti-Müllerian Hormone (AMH), as a potential early biomarker of ovarian tumorigenesis. We will quantify the effects of charged particles on numbers of ovarian follicles and ovarian tumors. Our analyses will provide critical insights into whether preneoplastic changes in ovarian follicle numbers, serum AMH, as well as ovarian oxidative damage caused by exposure to charged particles demonstrate similar dose-response as ovarian tumor induction. The analyses will also examine the relative biological effectiveness of gamma versus charged particle irradiation for these endpoints. These studies will help to fill important gaps in our understanding of the effects of space radiation on ovarian function and ovarian carcinogenesis and will lead to better ways to prevent ovarian cancer and protect reproductive health in women astronauts.
Rationale for HRP Directed Research:	
<b>Research Impact/Earth Benefits:</b>	
Task Progress:	New project for FY2019.
Bibliography Type:	Description: (Last Updated: 06/20/2025)