Task Book Report Generated on: 03/29/2024

PT Name: Luderer, Ulrike M.D., Ph.D. Project Title: Ovarian Cancer and Space Radiation Division Name: Iturian Research Program/Discipline: Ferogram/Discipline: For a state of Rediation Carcinogenesis Space Biology Cross-Element None Space Biology Special Category: None Space Biology Special Category: None Fax: FY Pl Organization Type: University of California - Irvine Pl Address 1: Conter for Occupationi and Environmental Health Pl Address 2: 100 Theory, Suite 100 Pl Web Puge: City: Ivine Sute: CA Zongressional District: 45 Comments: Project Type: GROUND Solicitation / Funding Zolis HERG SOUSCOISMOOI-Coew Health and Properous: No. of Phot Deserve: No. of Phot Deserve: No. of Phot Deserve: No. of Master' Degrees: No. of Master's Candidates: No. of Master' Degrees: No. of Master's Candidates: No. of Master's Degrees: No. of Master's De	Fiscal Year:	FY 2019	Task Last Updated:	FY 10/16/2019
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Thirty percent of astronauts are women, but the risks of space radiation to women's reproductive health and risks of gynecological cancers remain poorly understood. Radiation treatment for cancer is known to cause temporary infertilit and premature menopause. Premature menopause increases women's risks for cardiovascular disease, osteoporosis, an Alzheimer's disease. In addition, animal studies and studies of atomic bomb survivors have shown that radiation	Performance Goal No.:			
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exposure increases the risk for ovarian cancer. Ovarian cancer has a high mortality rate and is the leading cause of gynecological cancer deaths in women. To best protect the health of women astronauts, it is important to understand whether space radiation has similar effects on the ovary as the types of radiation exposure that are common on Earth. Our prior pilot study showed that the ovary is highly sensitive to follicle destruction by charged particle radiation, typic of exposures in space. Exposure to charged iron and oxygen particles resulted in dose-dependent follicle depletion and		gynecological cancers remain poorly and premature menopause. Premature Alzheimer's disease. In addition, anir exposure increases the risk for ovaria gynecological cancer deaths in wome whether space radiation has similar e. Our prior pilot study showed that the	understood. Radiation treatment for menopause increases women's rimal studies and studies of atomic but no cancer. Ovarian cancer has a high in. To best protect the health of wo ffects on the ovary as the types of ovary is highly sensitive to follicl	or cancer is known to cause temporary infertility sks for cardiovascular disease, osteoporosis, and comb survivors have shown that radiation the mortality rate and is the leading cause of comen astronauts, it is important to understand radiation exposure that are common on Earth. The destruction by charged particle radiation, typical

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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 tumor number and size. We will use in situ methods to assess oxidative damage and to molecularly characterize the 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:

Research Impact/Earth Benefits:

Task Progress:

New project for FY2019.

Bibliography Type:

Description: (Last Updated: 08/10/2022)