| | | | |
|---|---|---|---|
| **Fiscal Year:** | FY 2014 | **Task Last Updated:** | FY 01/10/2014 |
| **PI Name:** | Luderer, Ulrike M.D., Ph.D. | | |
| **Project Title:** | Charged Particle Effects on the Ovary | | |
| **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:** | None | | |
| **Space Biology Element:** | None | | |
| **Space Biology Cross-Element Discipline:** | None | | |
| **Space Biology Special Category:** | None | | |
| **PI Email:** | uluderer@uci.edu | **Fax:** | FY |
| **PI Organization Type:** | UNIVERSITY | **Phone:** | 949-824-8081 |
| **Organization Name:** | University of California - Irvine | | |
| **PI Address 1:** | Center for Occupational and Environmental Health | | |
| **PI Address 2:** | 856 Health Sciences Rd, Suite 3200, Zotcode 1830 | | |
| **PI Web Page:** | | | |
| **City:** | Irvine | **State:** | CA |
| **Zip Code:** | 92697 | **Congressional District:** | 45 |
| **Comments:** | | | |
| **Project Type:** | Ground | **Solicitation / Funding Source:** | 2013 Space Radiobiology NNJ13ZSA001N |
| **Start Date:** | 03/01/2014 | **End Date:** | 02/28/2015 |
| **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 |
| **Contact Monitor:** | Simonsen, Lisa | **Contact Phone:** | |
| **Contact Email:** | lisa.c.simonsen@nasa.gov | | |
| **Flight Program:** | | | |
| **Flight Assignment:** | | | |
| **Key Personnel Changes/Previous PI:** | | | |
| **COI Name (Institution):** | Limoli, Charles Ph.D. ( University of California, Irvine )<br>Shioda, Toshihiro M.D., Ph.D. ( Massachusetts General Hospital ) | | |
| **Grant/Contract No.:** | NNX14AC50G | | |
| **Performance Goal No.:** | | | |
| **Performance Goal Text:** | | | |
| | Fifteen 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 infertility and premature menopause. Premature menopause increases women's risks for cardiovascular disease, osteoporosis, and Alzheimer's disease. In addition, animal studies and studies of atomic bomb survivors have shown that radiation 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. We propose to test the effects of low dose charged particle radiation (low LET oxygen and high LET iron ions), typical of exposures in space, on ovarian follicles (the functional unit of the ovary) and on ovarian carcinogenesis in adult | | |

| | |
|---|---|
| **Task Description:** | female mice. We will use histomorphometric methods to quantify the effects of charged particles on numbers of ovarian follicles and ovarian tumor multiplicity and size. We will use in situ methods to assess apoptosis and proliferation, measure endpoints of ovarian oxidative stress, and conduct ovarian transcriptomic analyses to identify signaling pathways that are perturbed by charged particle radiation and which may play a role in ovarian tumorigenesis. Our previous studies have shown that oxidative stress plays a role in and the antioxidant glutathione is protective against radiation- and chemical-induced damage to ovarian cells and ovarian carcinogenesis. We will therefore also examine whether antioxidant supplementation is protective against and whether genetic deficiency in glutathione increases susceptibility to the adverse ovarian effects of charged particle radiation. Our analyses will provide critical insights into whether preneoplastic changes in ovarian gene expression caused by exposure to charged particles are biologically similar to those in other mouse models of ovarian cancers and identify potential targets for preventive or therapeutic intervention. These studies will help to fill important gaps in our understanding of the effects of space radiation on ovarian function and ovarian cancer 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 FY2014. |
| **Bibliography Type:** | Description: (Last Updated: 07/11/2025) |