Overview of Kibo experiment candidates for around 2012

1. Experiment Title

Life time heritable effect of space radiation on mouse germ cells and embryos preserved for a long-term in ISS

2. Principal Investigator

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3. Outline of Experiment

One of major concerns of human health during prolonged stay in space environment, such as a manned flight and a stay in space platform, is carcinogenesis and transgenerational effects after exposure to space radiation. Therefore, the study of whole body effect of space radiation using mouse is indispensable means to provide the basic data for humans. However, at present the mouse cannot be launched to ISS. To research for whole body effect, we propose a new system that utilizes frozen germ cells of mice. Consequently, the following approaches are planned in present study to elucidate the influence of the space radiation.

1) Murine germ cells (ova and sperm) or fertilized eggs are installed in ISS for a certain period in frozen condition. After they return to Earth, they will be unfrozen to generate “Space mice” and be allowed to live throughout their lifetime. Then, longevity, cancer development, and the gene mutations (chromosome aberration and point mutations) will be analyzed. As a control group, ‘Earth mice” will be set, of which germ cells will be kept under an equal condition within ISS.
2) We are planning to use the several mice strains, including wild-type, DNA-repair-deficient mice and cancer prone knockout mice.
3) Since we have already established the methods for cancer analysis, it is possible to complete most of studies except lifespan within one year after returning to Earth.
4) We will analyze the consequence of the DNA damage induced by space radiation, which can be detected during fetal stage and after birth.