Prof Prakash Hande and Dr. Akira Fujimori collaborate on mouse studies using Fe/C ions

(A03-1) “Multidisciplinary Analysis of the Effect of Low Fluence Particle Radiation on Animals and BiologicalAdaptations”
Research Group Leader: Mitsuru Nenoi(National Institutes for Quantum and Radiological Science and Technology
Visit duration:Visit from February 12, 2020 to February 21, 2020

Dr. Manoor Prakash Hande is an Associate Professor at the National University of Singapore. Dr. Hande has been working in the fields of radiation biology, genome stability, telomere biology for the last 30 years. His seminar contribution is in the understanding the role of telomeres in the protection of genome stability and in ageing and cancer. Telomeres are the tips of chromosomes whose dysfunction drives the cells towards chromosome-genomic instability resulting in either ageing and/or cancer. Using mouse models, Dr. Hande and his collaborators have established that telomere-mediated chromosome-genome instability facilitates transformation of cells into cancer. These findings were instrumental in identifying the all-important role of DNA damage response or repair factors in telomere length maintenance to prevent genomic instability and cancer progression. Dr. Hande has developed a mouse model for retrospective biological dosimetry for ionising radiation exposure that has helped identification of a genomic signature in a human population occupationally exposed to plutonium. His laboratory has been working on the multiparametric approach to identify bioindicators of radiation exposures. Such biomarkers are useful in identifying the biological effects of radiation exposure in accidental scenario or occupational exposure to space radiation in astronauts or cosmonauts. In that direction, study of biological effects of heavy ions (such as Fe and C) would be very important.

Dr. Hande conducted collaborative experiments with Dr. Akira Fujimori at the Molecular and Cellular Radiation Biology Team Department of Basic Medical Sciences for Radiation Damages during the following visits:

Visit 1: September 18 to 28, 2018 – Fe ion experiments with normal and DNA repair deficient mice (Atm+/+, Atm+/- and Atm-/- mice)

Visit 2: March 07, 2019 to March 18, 2019 – Fe ion experiments with DNA repair deficient mice (Atm+/+, Atm+/- and Atm-/-mice)

Visit 3: September 11, 2019 to September 22, 2019 – C ion experiments with DNA repair deficient mice (wild type, Scid+/- and Scid+/+ mice)

Visit 4: November 12, 2019 to November 21, 2019 – Annual Meeting of the Japanese Radiation Research Society, Kyoto University, Kyoto, Japan and sample preparation at NIRS, Chiba, Japan.

The visit details were provided in the earlier reports. Chromosome aberration and micronuclei analyses are being done for the samples from the above experiments.

During the current visit (Feb 12 to 21, 2020), chromosome and micronuclei preparations were made from splenocytes derived from mice which were exposed previously to 1 or 2 Gy γ-rays. Atm+/+ and Atm-/- mice (aged between 6 to 10 weeks) were exposed to 1 or 2 Gy γ-radiation. The animals were sacrificed one month post irradiation.

Chromosome and micronuclei preparations were made from all the 16 samples. They will be analysed for micronuclei induction as well as for chromosome aberrations as described in the previous reports.

Dr. Hande had a discussion with Dr. Fujimori and his laboratory for the future collaborative studies.

Fig 1. a) Dr. Hande preparing the splenocyte cultures from mice.b) Dr. Akira Fujimori and his laboratory members in a discussion with Dr. Hande.

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