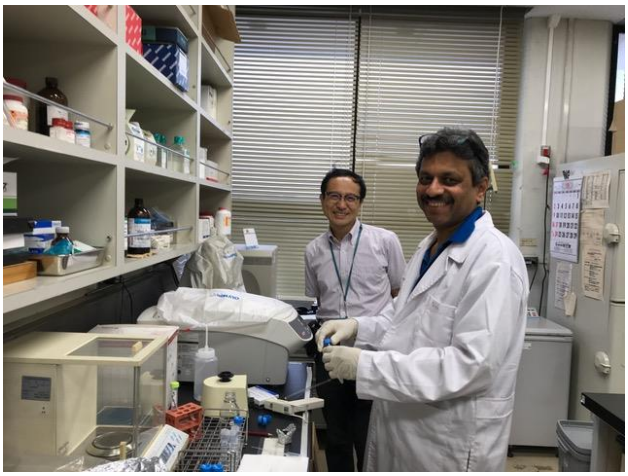
Prof Prakash Hande and Dr. Akira Fujimori collaborate on mouse studies using Fe ions

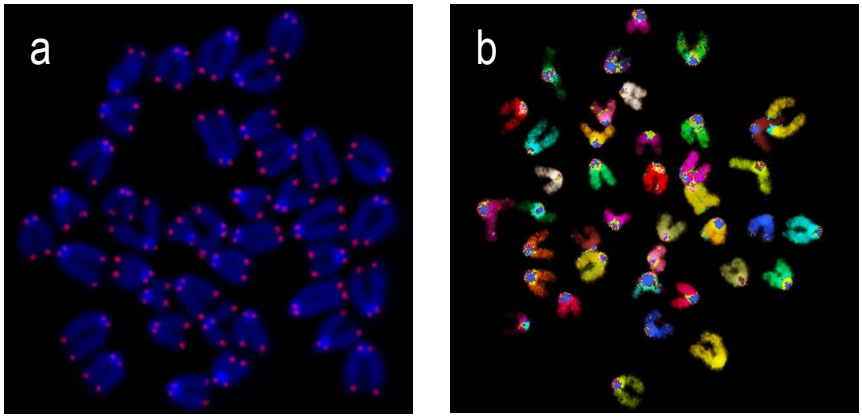
(A03-1) "Multidisciplinary Analysis of the Effect of Low Fluence Particle Radiation on Animals and Biological Adaptations"
Research Group Leader: Mitsuru Nenoi
Visit duration: 18th to 28th of September,2018

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) would be very important.



Dr. Hande visited and conducted collaborative experiments with Dr. Akira Fujimori at the Molecular and Cellular Radiation Biology Team Department of Basic Medical Sciences for Radiation Damages from September 18 to 28, 2018. During his work at NIRS, mice from Atm-/- were exposed to different doses of Fe ions. Spleen lymphocytes were isolated from the irradiated and control mice from different genetic background and metaphase chromosomes were prepared to determine the persistent chromosome aberrations (genomic instability) in mice. Multicolour fluorescence in situ hybridization (mFISH) will be performed to analyze the chromosomal changes (both structural and numerical) and telomere specific PNA-FISH will be conducted to determine the dicentrics and telomere dynamics. These studies will identify persistence of genome instability in vivo in mice as well as highlight the genetic susceptibility of DNA repair deficiency in mice (Dr. Akira Fujimori). Examples of using mFISH and PNA-FISH on mouse chromosomes is illustrated here below.

a) PNA FISH using telomere probe and b) multicolour FISH on mouse metaphase spreads.



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