

12 Induction of Micronuclei and Chromosome Aberrations in Human Leucocytes Cultured from the Blood Irradiated with Himac Neon Ion Beams.

Norie OKAZAKI¹, Hiroshi OHARA¹, Munetoshi KANAYAMA¹,
Masako MINAMIHISAMATSU² and Yoshiya FURUSAWA³

; ¹Dept. Biol. Okayama Univ. , ² Dept. Radiat. Hazard. & ³ 3rd Res. Gr. NIRS.

Induction of micronuclei(MN) and chromosome aberrations were explored in the 1st division in human leucocytes after irradiation with neon ion beams (400 MeV/n, LET(98 KeV/m) of HIMAC at NIRS. For MN formation, it was found that the more MN were produced as the irradiation dose increased. X-rays, however, were found to render the response plateau after 4-5 Gy of irradiations. The RBEs on the slope of the dose effect curves appears to be less than 2.0. As MN formation was accelerated, RBEs at different levels were expected to be more than 2.0. For aberrant chromosome formation, it was found that those of dicentric and fragment types were remarkably increased as the irradiation dose increased. The formation of rings and dots were quite few so far tested. The interaction appears mainly to be inter chromosomal. The RBEs relative to the reference were found to be low, being less than 2.0. These results were noted to be different from those data on neon ion beams of RIKEN RCC with the same LET.

13 LET Dependence for Induction of *Drosophila* Somatic Mutations Irradiated with Heavy Ion Beams.

Toshihiro TAKATSUJI¹, Isao YOSHIKAWA¹, Masaharu HOSHI², Jyun TAKADA², Tatsuaki KANAI³, Yoshiya FURUSAWA³, Mitsuo IKENAGA⁴; ¹Nagasaki Univ., ²Hiroshima Univ., ³Natl. Inst. Radiol. Sci. & ⁴Kyoto Univ.

We used *Drosophila Melanogaster*, which has X-linked white ivory eye-color mutation *wⁱ* and trans-heterozygous two recessive genes of multiple wing hair (*mwh*) and flare hair (*flr*) on the third chromosomes. We scored mosaic spots in eye and wing of male flies irradiated at the period of larvae with ¹²C, ²⁰Ne (LET: 13.8-191.7 keV/μm), and X-rays. Dose-frequency relationships of eye and wing mosaic spots are both linear for these radiations. Frequency of eye-color mosaic spots is LET independent. On the other hand, RBE of wing mosaic spots increases about 5 folds with LET increasing from 13.8 to 148 keV/μm, and decreases a little from 148 to 191.7 keV/μm. From the LET dependence, the eye-color mutation seems to be derived from simple DNA damages by one event of interaction between the heavy ions and matter, and the wing-hair mutation seems to be derived from more complex DNA damages by multiple events.

14 Cell death on human cells by split dose irradiation with carbon-ion beams.

Yoko KASE, Masao SUZUKI, Tatsuaki KANAI and Koichi ANDO
National Institute of Radiological Sciences, Chiba 263

We have investigated the effects of cell death on human tumor cell lines and normal cells irradiated with split dose of X-rays and carbon-ion beams. The split dose irradiation was carried out under the conditions of the dose, which was obtained by 30 to 40% of surviving fraction, in 24hr interval. The results indicated that the sensitivity of cell death on human tumor cell lines didn't change with each split doses irradiated by carbon ions and X rays. In the case of normal human cells, however, it changed by X-ray-irradiation. The frequency of cell death by split-dose irradiation was 1.5 to 1.9 times higher for X-rays and 1.4 to 1.6 times higher for 13keV/μm carbon-ion beams than those by single-dose irradiation, but in the case of carbon-ion beams at 77keV/μm it was observed similar effects of cell death on all cell lines between single- and split-dose irradiation.