72 Relationship between cell killing and mutation induction by ionizing radiation in human lymphoblastoid cells

*Kouich TATSUMI, *Masahiko TAKAHAGI, *Ikuko FURUNO, **Akira TACHIBANA, ** Masao SASAKI, ***Tetsuo ITO, ***Kazuo FUJIKAWA, ***Sohei KONDO, ****Keizo TANO and ****Hiroshi UTSUMI; *Div. Biol., Nat. Inst. Rad.Sci., Chiba 263, **Rad. Biol. Center, Kyoto Univ., Kyoto 606, ***Atomic Energy Res. Inst., Kinki Univ., Osaka 577, ****Res. Reactor Inst., Kyoto Univ., Osaka 590-04

WIL2NS(NS) and TK6 human lymphoblasts are syngeneic but are phenotypically different in radiation responses. Relative to TK6 cells, NS cells has an enhanced X(gamma)-ray survival and an increased frequency of TG-resistant mutation induction. High LET irradiations including fission neutrons resulted in an approximately two-fold higher frequency of TG-resistant mutations per lethal hit than X(gamma) irradiation did for NS cells, whereas no difference in mutagenic effectiveness at equitoxic doses was noted between high LET and low LET irradiations of TK6 cells. In view of the reduced levels of homologous recombination in TK6 cells compared to NS cells, recombinational repair presumably plays major roles in handling DNA insults incurred by high LET radiations.

73 Germline Mutation of a Hypervariable Mouse Minisatellite Locus Induced by Ionizing Radiation

*Yi-Jun FAN, *Zhongwen WANG, *Seiji SADAMOTO, *Kenji KAMIYA, **Ryo KOMINAMI and *Ohtsura NIWA; *Res. Inst. Radiat. Biol. Med., Hiroshima Univ., Hiroshima 734, **Niigata Univ. Sch. Med., Niigata 951.

Germline mutation at the mouse hypervariable minisatellite locus, the Ms6hm,was detected in F1 mice born to male C3H/He mice exposed to ^{60}Co gamma-ray and mated with female C57BL/6N mice. Present data indicate that the mutation frequencies depend on radiation doses and stages of spermatogenesis. The control group had mutation frequency of 8.3% on the paternal allele. As for the spermatids irradiation, the paternal mutation frequencies were 19%, 26.8% and 28% following exposed to 1 Gy, 2 Gy or 3 Gy of ionizing radiation, respectively. These increases were statistically significant. In the spermatogonia irradiation groups, the paternal mutation frequencies showed slight increase to 13% at 2 Gy and 15% at 3 Gy.

These results demonstrate that the length change mutation at the hypervariable locus is induced in germ cell by ionizing irradiation.

74 **X ray-induced Mutation Frequency was reduced by post-treatments with L-ascorbic acid**

*Shinji KOYAMA, *Seiji KODAMA, **Tetsuro MIYAZAKI, **Shigeru NAGASAKA, **Toru YOSHIMURA, *Masami WATANABE, *Fac. of Pharm. Sci., Nagasaki Univ., Nagasaki 852, **School of Eng., Nagoya Univ., Nagoya 464-01.

We examined effects of L-ascorbic acid (AsA) or dimethyl sulfoxide (DMSO) on cell killing and mutation induction by X-irradiation in human embryo fibroblast cells. The cells were treated with AsA or DMSO for 2 hours before or after X-irradiation. Pre-treatment with DMSO increased cell survival and reduced X-ray induced mutation frequency. However, no effect was observed in both cell survival and X-ray induced mutation frequency by post-treatment with DMSO. On the other hand, both pre- and post-treatments with AsA markedly suppressed X-ray induced mutation frequency without changing cell survival. The results suggest that DNA damage leading to mutation differ from that leading to cell killing.