

208            Effects of fractionated X-ray irradiation to whole body of rats on the bone metabolism.

Haruzo IIDA<sup>1</sup>, Satoshi FUKUDA<sup>1,2</sup>; <sup>1</sup>Div. Radiotoxicol. and Protect. & <sup>2</sup>Space and Particle Radiat. Sci. Res. Group, Natl. Inst. Radiol. Sci.

Effects of fractionated X-ray irradiation to whole body of rats on the bone metabolism were examined. Twenty-five male Wistar rats, at the age of three months, were divided into five groups(G), and total dose of 5Gy was irradiated to rats of four of them within five days; G1: One fractionated(5Gy), G2: two-fractionated(2.5Gy/day x 2 times), G3: four-fractionated(1.25Gy/day x 4 times), G4: five-fractionated(1Gy/day x 5 times) and control G. Bone and serum analyses were three months after irradiation. The values of bone strength by three points bending method, and calcium and phosphorus contents of the femur were lowest in G1 and then G2, G3, G4. In the histomorphometric analyses, bone volume decreased, and trabecular separation increased, and bone formation rate decreased, and serum calcium and phosphorus concentrations decreased, as the fraction numbers become less. The results indicated that the fragility with the decrease of mineral contents and loss of bone mass by the decrease of bone metabolism by at least more than 1Gy of X-ray irradiation to the whole body of young adult rats and the magnitude of bone damages might depend on the dose that received at one time and the damages remained for a long term.

209            Radiation Effects on Preimplantation Stage on Hybrid Mouse Embryos of Heiligenberger and ICR Strains

Y.Kikuchi, M.Ogawara and T.Kusama; Department of Radiological Health, Faculty of Medicine, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113, Japan

In order to investigate the sensitivities of malformations on preimplantation stage to radiation, we observed malformations in hybrid mouse embryos of ICR and Heiligenberger strains. The Heiligenberger mice, which were susceptible for gastrosis, were served from the Essen University in Germany. The Hybrid mice embryos of Heiligenberger for mother and the ICR for father(HIL/ICR) and those of ICR for mother and Heiligenberger for further(ICR/HIL) were irradiated by gamma radiation at 2 hpc. Frequencies of malformations, embryonic death and so on were observed on 18 day of gestation. Preimplantation death and embryonic death rates showed statistically significant increase in both hybrid mouse embryos. Incidence of malformation in only the hybrid embryos of the HIL/ICR, which were gastrosis, brain hernia and cleft palate, was increased, however this showed no statistical significance.

210            Role of Neutrophil in Radiation-Induced Colonic Ulcer in SHR and WKY.

Yuji IKEDA, Masahiro ITO, Shinji NAITO, Mutsumi MATSUU, Kazuko SHICHIJO, and Ichiro SEKINE ; Dept. of Molecule. Path., Nagasaki Univ.

It has been indicated that oxygen free radicals have been invoked as mediators of tissue injury in gastrointestinal disease including radiation induced enteritis. To investigate the role of the autonomic nervous system and neutrophils which generate oxygen free radicals in the healing of radiation-induced colonic ulcer, spontaneously hypertensive rat (SHR) which have a genetic hyperfunction of sympathetic nervous system and normotensive control Wistar-Kyoto rat (WKY) were examined. Male SHR/Izm and WKY/Izm were performed laparotomy. Distal colon were exposed 22.5 Gy of focal radiation as one shot. Macroscopically, it was obvious that ulcer healing was delayed in SHR compared with WKY on 10 days after irradiation. Microscopically, it was also showed that process of ulcer healing was prolonged in SHR. The number of myeloperoxidase (MPO) positive cells were remarkably increased in SHR compared with WKY on 4 and 6 days after irradiation. RT-PCR, Northern blotting and Western blotting revealed strong expression of intercellular adhesion molecule-1 (ICAM-1) in SHR and WKY after irradiation. These results suggest that inflammation around radiation-induced ulcer is prolonged in SHR, in addition, that overexpression of oxygen free radicals and proteases produced by activated neutrophils cause severer damage in SHR compared with WKY.