208 Radiation-induced genetic instability in mouse m5S cells

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Evidence is now accumulating that genetic instability may play an important role during radiation carcinogenesis. More recently, it is known that chromosomal instability is also found in cells surviving after X-irradiation. To study the mechanism of radiation-induced genetic instability, we measured cloning efficiencies and chromosome aberrations in surviving colonies of mouse m5S cells after X-irradiaion. There was about 25% difference in cloning efficiency between the survivors irradiated in monolayer culture and those in spheroid culture. Dose-dependent decrease in the cloning efficiency in monolayer culture was seen in monolayer culture but not in spheroid culture. The percentage of colonies with giant cells was higher than that in spheroid culture. The results suggest that expression manner of delayed reproductive death by radiation is different between survivors derived from monolayer cells and spheroids.

209 Muc1 Mucin as a Radiation-Inducible Marker in Colon Carcinoma Cells

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MUC1 mucin is a large and extended glycoprotein that is expressed apically in a wide variety of epithelial tissues. We have established an ELISA assay using anti-MUC1 MoAb to determine the amount of mucin in the HT29 human colon carcinoma cell line. After irradiation with X-rays (200 kVp) or $^{12}C$ ions (290 MeV/u, 80 keV/mm) produced at Heavy Ion Medical Accelerator in Chiba (HIMAC), the level of MUC1 mucin increased in a dose dependent manner and the amounts of MUC1 mucin were correlated to the degree of cell killing. TNFβ potentiated the MUC1 mucin induction after irradiation. These results indicate that MUC1 mucin is a radiation-inducible glycoprotein, and suggest a possibility that the induction of this mucin may be used as an indicator to predict the radiation effect.

210 Effect of ionizing radiation on differentiation of cultured osteoblasts

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To investigate the effect of ionizing radiation on osteoblast differentiation, osteoblast-like cells isolated from newborn rat calvariae by emzymatic digestion were exposed to 0.5 - 4.0 Gy irradiation on culture day 3, 6 and 9, then alkaline phosphatase (ALP) avtivity and number of bone-like nodules were measured on day 12. Irradiation on day 3 and 6 dose-dependently inhibited ALP activity and the number of bone-like nodules. Irradiation on day 9 also inhibited ALP activity, but its effect was more smaller than that exposed on day 3 and day 6. In this case, the number of bone-like nodules was not inhibited by irradiation. These results suggest that irradiation inhibits osteoblast differentiation, but its effect is more prominent on immature osteoblasts than mature osteoblasts.