181 Effects of Low Dose Pre-Irradiation on the Process of Radiation-Induced Interphase Death

Kazuo SAKAI, Zhi-Yun CHEN, Ikuno SUZUKI and Futaba AMANO; Bio-Sci. Dept., Centl. Res. Inst. Electric Power Industry.

The effects of low dose pre-irradiation on the process of radiation-induced interphase death were investigated in MOLT-4 cells of human T cell lymphoma origin. The cells were irradiated with 0.1 Gy of X-rays (150 kVp). Four hours later the cells were exposed to the challenging dose (2.4 Gy). The appearance of dead cells were analyzed by a dye exclusion test using erythrosine B(0.2%). The conditioning dose accelerated the cell death process. With up to 0.2 Gy of the pre-irradiation the acceleration was obvious, while the cell death by the pre-irradiation itself was not significant. The interval of 4hr between the pre-irradiation and the challenging dose was most effective, suggesting that some kind of cell killing mechanism was induced by the pre-irradiation.

182 Low-Dose Irradiation Mediates Ca^{2+} Signaling in Cultured Rat Hepatocytes

Tetsuo NAKAJIMA, Bing WANG, Masako NOSE, Hiromi ITSUKAICHI, Harumi OHYAMA and Osami YUKAWA; Natl. Inst. Radiol. Sci., Anagawa 4-9-1, Inage-ku, Chiba-shi, 263-8555.

We have already demonstrated that radiation induced diacylglycerol(DAG) production by phosphoinoside-specific phosphgolipase C(PI-PLC) and protein kinase C activation in cultured rat hepatocytes. Since DAG production by PI-PLC is accompanied with production of inositol 1,4,5-trisphosphate(IP_3), which works in Ca^{2+} signaling, radiation might mediate Ca^{2+} signaling in the cells. On the other hand, it has been reported that, in cultured rat hepatocytes, low-dose irradiation(0.05-0.1Gy) induced increase of intracellular radical scavenging ability, which is related to adaptive response. In this study, effect of low-dose irradiation on Ca^{2+} signaling in rat hepatocytes was investigated in relation to adaptive response. Irradiation with 0.1 Gy of hepatocytes showed no change in the $[Ca^{2+}]i$. However, irradiation prolonged the time for restoration of ATP-induced $[Ca^{2+}]i$ uptake to the basal $[Ca^{2+}]i$ level in the cells compared to that in non-irradiated cells. The prolonged time in ATP-induced $[Ca^{2+}]i$ uptake suggests that low-dose irradiation might mediate Ca^{2+} signaling.

183 Phosphorylation of p53 by low dose X-ray irradiation

Kumio OKAICHI, Naoko MORITA, Aya USUI and Yutaka OKUMURA; Dept. Radiat. Biophys., Radiat. Effect Res. Unit, Atomic Bomb Disease Inst., Nagasaki Univ. School Med.

Low dose radiation may affect inducing cancer, but the mechanism of radiation inducing cancer was not clarified yet. We investigated about the phosphorylation of p53 by low dose radiation (0.5Gy) in human glioblastoma cell line, A172. The phosphorylation of p53 at ser-15 was induced by low dose irradiation after 1.5 h incubation. Wortmannin inhibited the phosphorylation of ser-15, but the kinetics of the inhibition by wortmannin was different from the case of high dose irradiation (4Gy). The cells accumulated p53 by low dose irradiation and induced Waf-1, Bax and GADD45. These results indicate that low dose radiation may affect the threshold of radiation inducing cancer.