166 Effect of protractive exposure of low-dose radiation on immunodeficiency diseases of MRL/gld mice.

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Makinodan et al. have reported that protractive exposure of whole-body gamma-rays radiation with 0.04 Gy/day for 20 days ameliorated conditions of lymphadenopathy and splenomegaly in lpr mice. The lpr mice are known to have the mutation within Fas gene and develop a nephritis and arthitis caused by immunodeficiency at about five months of age. To investigate the relationship between protractive exposure of low-dose radiation and amelioration of immunodeficiency, we have MRL/gld mice that developed the same diseases as lpr mice. MRL/gld mice don't have the same mutation, but they do have the mutation within FasL gene.

With dose of 0.2-0.5 Gy/day for 20 days, we found that the rate of $CD4^-CD8^-$ T cells obviously decreased compared with other subsets of T cells. We also found that this doses resulted in the remission of immunodeficiency diseases, lymphadenopathy and splenomegaly. Apoptotic cells were found in the white pulp of the spleen of gld mice after protractive exposure, but not found in treated and untreated MRL wild mice. It seems that the $CD4^-CD8^-$ T cells are more sensitive to radiation than the other subsets of T cells. The decreasing of rate of them by apoptoses leads to the amelioration of immunodeficiency in gld mice.

167 Effects of hypoxic condition on the tumor apoptosis induced by γ irradiation

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We have previously reported that the artificially hypoxic tumors reoxygenate more rapidly than the air tumors after γ ray irradiation. A possibility that apoptosis could be involved in this rapid reoxygenation is here examined and reported. The NFSa tumors transplanted and growing in the hind legs of syngeneic C3H mice received 30Gy of Cs-137 γ ray , with tumors being either clamped (i.e., hypoxic) or intact (i.e., air) . Histological examination with TUNEL stainings indicated that the frequency of apoptosis in the hypoxic tumors was 0.3 , 0.4 , 3.0 and 1.0% at 12,24,48 and 120 hours of irradiation , respectively .The apoptosis frequency in non-clamped tumors was 1.6 , 1-2 , 2 and 1.3% at 12, 24, 48 and 120 hours of irradiation, respectively.We conclude that the early apoptosis depends on oxygen status of he tumor while the late apoptosis does not depends on oxygen status.

168 Induction of Apoptosis in Mouse Thymus after Fractionated Exposure to Low Dose X-Rays

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Stimulation of immune response is the well-known example of radiation hormesis. Makinodan *et al.* reported that repeated daily low dose exposures of mice to radiation augmented the proliferative response of splenocytes. The mechanism responsible for the hormetic phenomenon is, however, still unknown. Among the possible mechanisms, a picture is emerging of the role of apoptosis in the immune organs as an altruistic cell dath leading to stimulation of the proliferation of healthy cells. In the present study, we examined apoptotic response in mouse thymus after protracted whole-body low dose irradiation (10 times) as compared to a single low dose irradiation. Using AKR mice (7-9 week old), apoptotic cells in thymus were detected and counted by *in situ* end-labelling method after fractionated low dose X-irradiation (0.05 Gy/day x 10 days). Number of apoptotic cells in thymus after fractionated irradiation (total 0.5 Gy) was lower than that after the single 0.5 Gy-irradiation. Time course of apoptosis induction was distincly different between these two irradiation protocols.