63 LET Effect on Golden Hamster Embryo Cells: The Relationship between Long-Lived Radicals and Biological Effects

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The long-lived radicals are produced in GHE cells by irradiation. The yields of the long-lived radicals and the survival rate of the cells by the irradiation of carbon ions at high LET are much lower than those by γ-irradiation at low LET. The result was explained by the track model theory of dose distribution around an energetic heavy ion. The carbon ion beam transfers its high energy around its track. The radicals, produced densely around the track, react with each other, giving critical damages to the cells. In the case of γ-irradiation, the energy deposition is distributed uniformly, resulting in the high yields of trapped radicals that can be repaired.

64 Difference in UV-irradiation effects between two cultivars of rice, Sasanishiki and Norin 1, as studied by observation of long-lived radicals with ESR

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Among Japanese lowland rice cultivars, Sasanishiki exhibits strong resistance against UV irradiation, while Norin 1 is less resistant. The reasons for the difference in UV-resistance of the two cultivars were not elucidated as yet. Recently, we have found that free radicals with a lifetime more than one day exist in biological systems,such as liver, mammalian cells, and seeds of plants, and that they relate to biological effects. In this study the difference in UV-resistance of the two rice cultivars was discussed by the observation of long-lived radicals with ESR.Two types of radicals, denoted as radical 1 and 2, are formed in both leaves of Sasanishiki and Norin 1. The ratio of the amounts of radical 1 to those of radical 2 in Sasanishiki that was grown with supplemental UVB radiation is the same as that grown without UVB radiation. The ratio of the radicals in Norin 1 that was grown with supplemental UVB radiation, however, is much smaller than that grown without UVB radiation.The small yields of radical 1 in UVB-irradiated Norin 1are probably related to the weak UV resistance of Norin 1.

65 Thioredoxin /ADF dependent suppression of TPA-induced lytic replication of EB virus.

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Various stresses including radiaation, UV and chemical substances, induce viral proliferation of latently virus-infected cells and expression of endogenous retrovirus. This replication of virus is cytopathic to the cells, and lead them to death. human thiredoxin (hTRX/ADF) was originally found in the supernatant of HTLV-1 infected cells. hTRX/ADF is homolog of bacterial thioredoxin, and anti-oxidant activity and play the important role in redox regulation. hTRX/ADF are also highly expressed in EB virus and human papiloma virus-infected cells. It is possible to study the role of hTRX/ADF in the regulation of virus in EB virus-infected clles, because lytic replication of EB virus by various stress such as TPA etc. is induced easily. hTRX/ADF prevented lytic replication of EB virus in latent-infected cells at very low dose(10^{-7}M), but did not affect the replication in the latent infection. Other typical anti-oxidants, GSH and N-acetyl-cystein could not prevented lytic replication at more than 1000 fold dose (10^{-4}M). These results indicated hTRX/ADF play important role in regulation of stress-induced gene expression.