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44 Diethylmaleate inhibits expression of MnSOD gene induced by irradiation.

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Depletion of glutathione (GSH) in cells leads to oxidative stress and cellar damage. We have studied the effect of diethylmaleate (DEM), a GSH depleting agent on the expression of manganese superoxide dismutase (MnSOD) gene by irradiation in human monocytic cells THP1. Treatment with DEM or irradiation increased the generation of hydrogen peroxide (H_2O_2) and exogenously added H_2O_2 increased the level of MnSOD mRNA in these cells. In contrast, treatment of cells with DEM blocked the induction of MnSOD expression by irradiation or H_2O_2. Furthermore, DEM inhibited the activation of NFκB by irradiation. Our results suggest that DEM may block the pathway(s) initiated by irradiation or H_2O_2 in these cells.

45 Suppression of Radiation-Induced Mutation by an Anti-Oxidant Material

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It is widely accepted that induction of cell death, chromosome aberrations and gene mutation by radiation is due to free radicals such as hydroxyl radicals. In contrast to these short-lived radicals , recently, we found that radiation induces organic radicals that have long lifespan using an electron spin resonance (ESR) spectrometer and also that ascorbic acid efficiently scavenges the long-lived radicals. Interestingly, ascorbic acid reduces X-ray-induced mutation frequency without affecting cell death and chromosome aberrations. In the present study, we examined the effect of EGCG ((-)-epigallocatechin- 3-O-gallatte), the main constituent of green tea, on the induction of mutation at *HPRT* locus. Post-treatment of EGCG at 6 h after X-irradiation reduced the mutation frequency to 50% of that induced by X-irradiation. The result suggests that the long-lived radicals are involved in the induction of mutation by X-irradiation and that DNA replication in the presence of the long-lived radicals might be critical for the induction of mutation.

46 New Method for Determing Antioxidant Ability by Measuring the Reaction between Gallic Acid and Long-Lived Radicals in γ-ray Irradiated Mammalian Cells.

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Antioxidant ability of gallic acid in γ-ray irradiated Golden Hamster Embryo (GHE) cells is determined by the Electron Spin Resonance (ESR) measurement of long-lived radicals, which cause mutation and transformation in the cells. Gallic acid was added to the irradiated samples at 2 hrs after the irradiation, and decay rates of the long-lived radicals were measured by ESR. Gallic acids react with the long-lived radicals to reduce amount of the radicals, and the rate constant for the reaction was estimated as 3.7×10^{-3} dm^3 mol^{-1} s^{-1}. When radical generator of 2,2'-azobis-2-amidinopropane is added to mammalian blood, hemolysis is suppressed by adding gallic acid. Consequently, ESR measurement of long-lived radicals can be used for estimation of antioxidant ability.

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