

Modification of Gamma-radiation Response in Mice by Green Tea Polyphenols

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Abstract

We performed this study to determine the effect of water extracts of green tea (GT) and mixtures of green tea polyphenols (GTPs), epigallocatechin gallate (EGCG), epicatechin gallate (ECG), epigallocatechin (EGC) and epicatechin (EC) on jejunal crypt survival, endogenous spleen colony formation, and apoptosis in jejunal crypt cells of mice irradiated with high and low dose of gamma-irradiation. The radioprotective effect of green tea was compared with the effect of diethyldithiocarbamate (DDC). Jejunal crypts were protected by pretreatment of GT and ECG. GT, GTPs and EC administration before irradiation resulted in an increase of the formation of endogenous spleen colony. The frequency of radiation-induced apoptosis in intestinal crypt cells was also reduced by pretreatment of GT, GTPs, EGCG, ECG and EGC. The radioprotective effect on jejunal crypts and apoptosis in the DDC treated group appeared similar to that in the green tea treated groups. Treatment with DDC showed no significant modifying effects on the formation of endogenous spleen colony. In the experiment on the effect of catechins, the effects were partly contradicted in mice irradiated with high and low dose of radiation. The results indicated that the GT and GTPs may have a major radioprotective effect in mice irradiated with high and low dose of radiation. Each of catechins was much less effective radioprotectors, suggesting that total extract or mixture of polyphenols of green tea may be more effective than individual catechins. These results indicated that green tea might be a useful radioprotector, especially since it is a relatively nontoxic natural product.