

THE PROTECTIVE EFFECTS OF ZHU-LING (POLYPORUS UMBELLATUS) AGAINST GENOTOXICITY AND OXIDATIVE STRESS INDUCED BY IRRADIATION IN VITRO AND IN MICE

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Aims : Polyporus umbellatus-derived polysaccharides of (PUPs) are the main active components of Zhu ling (Polyporus umbellatus), a precious medicinal fungus commonly used in Chinese Medicine. We determined the radioprotective effects of PUPs in human lymphoblastoid TK6 cells and in ICR mice.

Methods : Micronuclei, tk mutation, and COMET assays were used.

Results : In TK6 cells, when administered 30 min before irradiation with 1.5 Gy, PUPs at 100 or 300 µg/mL significantly reduced irradiation-induced micronuclei (MN) formation and tk mutant frequencies. In irradiated mice, pretreatments of PUPs at a dose of 50 mg/Kg by i.p. injection 30 min or 45 min before 6 Gy irradiation caused a significant decrease in the frequencies of MN in the peripheral blood reticulocytes. Comparative studies showed that PUPs may be a better radioprotective agent with a higher inhibition ratio of radiation-induced micronuclei and tk mutant frequencies than a well-known radioprotector WR-2721. Further mechanistic studies showed that PUPs significantly reduced DNA strand breaks as revealed by increased Comet tail length in the peripheral blood leucocytes, and decreased the formation of 8-hydroxy-2'-deoxyguanosine and lipid peroxidation in irradiated mouse liver.

Conclusion : These results suggest the pronounced radioprotective effects of PUPs may result from their antioxidant activities.

Keywords: Zhu-Ling, WR-2721, micronuclei, 8-hydroxy-2'-deoxyguanosine, Comet assay, lipid

peroxidation