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Protective effects of ursolic acid against gamma irradiation induced injury through NF-κB pathway

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A sustained use of nuclear energy in modern world has simultaneously increased the probability of exposure to radiation in human beings and hence the development of safe and effective radioprotectors has become an expeditious issue. This study was aimed to evaluate the possible protective effects of ursolic acid (UA) against gamma radiation induced damage both *in vitro* and *in vivo*. UA, a triterpene, exists in various medicinal herbs and fruits. The anticancer and anti-wrinkle effects of UA and its related derivatives have been clinically tested. However, very little literature is available regarding the functions of UA in gamma radiation protection. We found that the exposure to gamma radiation dose- and time-dependently caused a significant decrease in the cell viability, while the treatment of UA attenuated this cytotoxicity. The production of free radicals increased significantly post-irradiation and further induced lipid peroxidation and oxidative DNA damage in cells. These deleterious effects could be effectively blocked by UA treatment. In addition, UA also reversed gamma irradiation induced inflammatory responses, as indicated by the decreased production of TNF-α, IL-6 and IL-1β. Our results further demonstrated that gamma radiation dose-and time-dependently enhanced NF-κB DNA binding activity, which was significantly attenuated upon UA treatment. The post-irradiation increases in the expression of both phospho-p65 and phospho-IκBα were blocked by UA. The treatment of UA was also found to significantly prolong overall survival in mice exposed to whole body gamma irradiation and reduce the excessive inflammatory responses. These protective effects of UA were proved to be through the blocking of NF-κB pathway. Given its radioprotective efficacy as described here, UA as an antioxidant and NF-κB pathway blocker, may function as an important pharmacological agent in protecting against gamma irradiation-induced injury.

Biography

Wang Hong has extensive experiences in studying the molecular and biological mechanisms underlying the radioprotectors against radiation-induced damage. She has not only tested the functions of several natural products in human skin cells, but also investigated their applications in animal models.

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