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Role of PLGA-Nanoparticles Formulation to Improve Drug Radioprotective Activity in Gamma-Irradiated Mice

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***SUMMARY*. Radioprotective agents are synthetic compounds or natural products that are immediately administrated before irradiation to reduce injuries caused by ionizing radiation. Toxicity, short duration, and the unfavorable routes of administration, have prevented the widespread use of most radioprotective agents in practice. This study aimed to evaluate the use of slowly release- long circulation biodegradable polymer Poly(lactide-co-glycolide) (PLGA) as carrier for radioprotective agents. Penicillamine and KI were selected as models for water soluble radioprotectors that can be used to protect against both internal radionuclide (chronic radiation exposure) and external-beam irradiation (acute radiation exposure). Emulsion-solvent evaporation method (ESE) was used to prepare hydrophilic-drug loaded PLGA Nanoparticles (PLGA- NPs) in an efficient and reproducible manner. The radioprotective efficacy was assessed by 30 days-survival percentage, relative body weights, and (liver & spleen) total cell counts. Results revealed that just single oral administration of Penicillamine-NPs or KI-NPs was as effective as free drug taken for 5 successive days which indicate that PLGA-NPs could be used to modulate radioprotective drug activity in biological system, and to improve drug efficacy in different body organs for longer duration than the equal dose of free drug.**

KEY WORDS: Biodegradable nanoparticles, Gamma-ray, Penicillamine, PLGA, Potassium iodide, Radioprotective drugs.

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