

Anti Proliferative and Apoptotic Effects of Ellagic Acid Functionalized Iron Oxide Nano Particles on Endometrial Cancer (AN3CA) Cells

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Nanotechnology has integrated with bioscience to offer several remedial actions against cancer. In this study, the known cancer inhibitory action of the ellagic acid (EA) was tested on chemo - endocrine resistant endometrial cancer cells AN3CA by coating EA on to magnetic iron oxide nanoparticles (IONPs). Synthesis of IONPS were carried out by co-precipitation method using Fe²⁺ and Fe³⁺ salts in the presence of polyethylene glycol (PEG). EA coated IONPs (EA-IONPs) were then prepared by post coating treatment. Synthesized nanoparticles were characterized using FTIR and TEM. Anti-proliferative effects of pure EA, IONPs and EA-IONPs on AN3CA cells were evaluated by Sulphorodamine B assay and induction of apoptosis was tested by evaluating morphological changes. Pro apoptotic effects of EA-IONPs on AN3CA cells were further confirmed by (a) assessing Acridine Orange / Ethedium Bromide staining under the fluorescent microscopy, (b) evaluating levels of caspase 3/7 in treated AN3CA at 48 h post incubation. EA-IONPs exerted a significant dose dependent cytotoxicity to AN3CA as evident from SRB assay (IC₅₀ = 6.6 µg/mL) while EA shows comparatively less cytotoxicity (IC₅₀ = 24.7 µg/mL). Characteristic morphological changes associated with apoptosis in EA-IONPs treated AN3CA cells were observed using phase contrast and fluorescent microscopy. EA-IONPs significantly (P<0.05) increased the caspase-3/7 levels dose dependently and has increased the mRNA expression (P<0.05) of tumor suppressor gene p53. The EA-IONPs may therefore mediate its anti-cancer effect, through modulation of cytotoxicity and apoptosis via, p53, caspase 3/ 7 mediated pathways in AN3CA. Based on overall results EA-IONPs exhibit an improved capacity to inhibit the growth of cancer cells.

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