

Anti-cancer effects of the novel curcumin nanoparticles: Induction of cell apoptosis through the caspase- and mitochondrial-dependent signaling pathways in human osteogenic sarcoma cell

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Abstract.

The aim of the present study was to discover the signaling pathways associated with curcumin-nanoparticles (Cu-NP)-induced apoptosis in human osteogenic sarcoma cells. Cu-NP induced cytotoxic effects, cell morphological changes, decreased the cell number, increased reactive oxygen species (ROS) production and loss of mitochondrial membrane potential ($\Delta\Psi_m$) in human osteogenic sarcoma cells. Cu-NP-induced apoptosis was confirmed by the terminal deoxynucleotidyl transferase dUTP nick end labeling (TUNEL) staining. Results from caspases assays and western blot analysis indicated that activities of caspase-3 and caspase-9 were increased in Cu-NP-treated human osteogenic sarcoma cells. Western blot analysis showed that the protein levels of intrinsic related proteins cytochrome c, Apaf-1, AIF and Endo G were increased in human osteogenic sarcoma cells after Cu-NP treatment. Cell apoptosis was significantly reduced after pre-treatment with N-acetylcysteine (NAC; a ROS scavenger). We conclude that Cu-NP induces intrinsic apoptotic pathways in human osteogenic sarcoma cells in vitro.

Keywords: curcumin nanoparticles; apoptosis; caspase; mitochondrial-dependent signaling pathways; human osteogenic sarcoma cell