CYTOTOXIC EFFECTS OF BIO-SYNTHESIZED ZINC OXIDE NANOPARTICLES ON MURINE CELL LINES

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Zinc oxide nanoparticles (ZnO-NPs) are among the most appropriate metal oxide nanoparticles to exhibit significant potential for treatment properties in a broad spectrum of applications in biomedicine, such as in the treatment of various cancers. The aim of this study was to evaluate the *in vitro* cytotoxic activity and cellular effects of previously prepared ZnO-NPs using brown seaweed (*Sargassum muticum*) aqueous extract. Consequently, *In vitro* anticancer activity was demonstrated in murine cancer cell lines of breast cancer (4T1), lung adenocarcinoma (CRL-1451), colon cancer (CT-26), and acute myelocytic leukemia (WEHI-3). Treated cancer cells with ZnO-NPs for 72 hours demonstrated various levels of cytotoxicity based on calculated IC_{50} values using MTT assay as follows: 21.7 ± 1.3 µg /mL (4T1), 17.45 ± 1.1 µg /mL (CRL-1451), 11.75 ± 0.8 µg /mL (CT-26) and 5.6 ± 0.55 µg /mL (WEHI-3), respectively. On the other hand, ZnO-NPs treatments for 72 hours showed no toxicity against normal mouse fibroblast (3T3) cell lines. Furthermore, distinct morphological changes were found by utilizing flourescent dyes, as apoptotic population were increased via flowcytometry, while cell cycle block and stimulation of apoptotic proteins were also observed. Additionally, the present study showed that the caspase activations contributed to ZnO-NPs triggered apoptotic death in WEHI-3 cells. Thus, the nature of biosynthesis and the therapeutic potential of ZnO-NPs could prepare the way for further research on the design of green synthesis therapeutic agents, particularly in nanomedicine, for the treatment of cancer.