Induction of apoptosis and growth arrest in human breast carcinoma cells by a snake (Walterinnesia aegyptia) venom combined with silica nanoparticles: crosstalk between Bcl2 and caspase 3.

Al-Sadoon MK, Abdel-Maksoud MA, Rabah DM, Badr G.

Abstract:

e recently demonstrated that the snake venom extracted from Walterinnesia aegyptia (WEV) either alone or combined with silica nanoparticles (WEV+NP) enhanced the proliferation of mice immune cells and simultaneously decreased the proliferation of human breast carcinoma cell line (MDA-MB-231). However, the molecular mechanism of how this venom induced growth arrest of breast cancer cells has not been studied. In this context, we extended our study to evaluate the anti-tumor potential of WEV and WEV+NP on the human breast carcinoma cell lines MDA-MB-231 and MCF-7, as well as their effects on non-tumorigenic normal breast epithelial cells (MCF-10). The IC(50)values of WEV alone and WEV+NP in these cell lines were determined to be 50 ng/ml and 20 ng/ml, respectively. Interestingly, at these concentrations, the venom did not affect the viability of normal MCF-10 cells and treatment of all these cell lines with NP alone did not affect their viability. Using annexin-V binding assay followed by flow cytometry analysis, we found that combination of WEV with NP strongly induced apoptosis in MDA-MB-231 and MCF-7 cancer cells without significant effect on normal MCF-10 cells. Furthermore, we found that WEV+NP decreased the expression of Bcl2 and enhanced the activation of caspase 3 in MDA-MB-231 and MCF-7 cells. Most importantly, WEV+NP-treated breast cancer cells, but not normal MCF-10 cells, exhibited a significant (P

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