



Walterinnesia aegyptia venom combined with silica nanoparticles enhances the functioning of normal lymphocytes through PI3K/AKT, NF- κ B and ERK signaling.

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Abstract:

BACKGROUND: The toxicity of snake venom varies over time in some species. The venom of newborn and small juvenile snakes appears to be more potent than adults of the same species, and a bite from a snake that has not fed recently, such as one that has just emerged from hibernation, is more dangerous than one that has recently fed due to the larger volume of venom injected. Therefore, the potency of a snake's venom is typically determined using the LD50 or IC50 tests. In the present study, we evaluated the anti-tumor potential of snake venom from *Walterinnesia aegyptia* (WEV) on the human breast carcinoma cell line MDA-MB-231, as well as its effect on the normal mice peripheral blood mononuclear cells (PBMCs). **RESULTS:** This venom was used alone (WEV) or in combination with silica nanoparticles (WEV+NP). The IC50 values of WEV alone and WEV+NP in the MDA-MB-231 cells 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 human PBMCs. To investigate the *in vivo* effects of this venom further, three groups of mice were used (15 mice in each group): Group I was the control, Group II was subcutaneously injected with WEV, and Group III was injected with WEV+NP. Using flow cytometry and western blot analysis, we found that the blood lymphocytes of WEV-injected mice exhibited a significant increase in actin polymerization and cytoskeletal rearrangement in response to CXCL12 through the activation of AKT, NF- κ B and ERK. These lymphocytes also showed a significant increase in their proliferative capacity in response to mitogen stimulation compared with those isolated from the control mice (P

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