



Increased Susceptibility to Apoptosis and Growth Arrest of -Human Breast Cancer Cells Treated by a Snake Venom Loaded Silica Nanoparticles.

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Abstract:

Background: The development of effective treatments against metastatic cancers, including breast cancer, is among the most important challenges in current experimental and clinical cancer research. We recently demonstrated that Walterinnesia aegyptia venom (WEV), either alone or in combination with silica nanoparticles (WEV+NP), resulted in the growth arrest and apoptosis of different cancer cell lines. **Aims:** In the present study, we evaluated the impact of WEV alone and WEV+NP on human breast cancer cells isolated from cancer biopsies. **Methods:** The potential effects of WEV alone and WEV+NP on the proliferation, induction of apoptosis and generation of free radicals in breast cancer cells isolated from 80 patients clinically diagnosed with breast cancer were evaluated by flow cytometry and ELISA. **Results:** WEV alone and WEV+NP inhibited the proliferation, altered the cell cycle and enhanced the induction of apoptosis of the breast cancer cells by increasing the activities of caspase-3, caspase-8 and caspase-9. In addition, the combination of WEV and NP robustly sensitized the breast cancer cells to growth arrest and apoptosis by increasing the generation of free radicals, including reactive oxygen species (ROS), hydroperoxide and nitric oxide. The combination of WEV with NP significantly enhanced the anti-tumor effect of WEV in breast cancer cells. **Conclusion:** Our data indicate the therapeutic potential of the nanoparticle-sustained delivery of snake venom for the treatment of breast cancer. © 2014 S. Karger AG, Basel.

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