



Enhanced susceptibility to apoptosis and growth arrest of human breast carcinoma cells treated by silica nanoparticles loaded with monohydroxy flavone compounds

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Abstract:

The treatment of drug-resistant cancer is a clinical challenge, hence screening for novel anticancer drugs is critically important. In the present study we investigated the anti-tumor potential of three plant-derived flavone compounds 3-hydroxy flavone (3-HF), 6-hydroxy flavone (6-HF) and 7-hydroxy flavone (7-HF) either alone or combined with silica nanoparticles (3-HF+NP, 6-HF+NP and 7-HF+NP) on the human breast carcinoma cell lines MDA-MB-231 and MCF-7, as well as on non-tumorigenic normal breast epithelial cells (MCF-10). The IC₅₀ values of these flavone compounds loaded with NP (flavones+NP) in these cell lines were determined to be 1.5µg/ml without affecting the viability of normal MCF-10 cells. Additionally, we found that combination of flavones with NP significantly induced apoptosis in MCF-7 and MDA-MB-231 cancer cells using annexin-V/PI double staining followed by flow cytometry analysis. Furthermore, flavones+NP increased the expression of cytochrome C and caspase 9 mediating growth arrest of these cancer cells. Most importantly, combination of flavones with NP significantly abolished the expression of ATF-3, which in turn is responsible for the proliferation and invasion of bone metastatic breast cancer cells. Our data revealed the potential therapeutic effects of these flavones in fighting breast cancer cells and provided the first insight concerning the underlying molecular mechanisms.

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