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### **Quercetin enhances sensitivity of MDA-MB231 cells to doxorubicin by negative regulation of Nrf2 pathway**

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**N**uclear factor erythroid 2-related factor 2 (Nrf2) is a transcription factor that regulates expression of a battery of cytoprotective genes. Overexpression of Nrf2 was found in many types of cancers, and created an environment advantageous for cancer cell survival. At physiological concentrations, quercetin as a flavonoid compound can inhibit Nrf2 and sensitize cancer cells to chemotherapeutic agents. We reported quercetin loaded in phytosomes as advanced nanoparticles carrier killed cancer cells by more specific when combined with doxorubicin. In this study, we prepared nanophytosomes of quercetin to enhance the bioavailability of quercetin and improve passive targeting in breast cancer cells. Our results showed that co-treatment of the cells with nano particles containing quercetin and doxorubicin has the highest percentage of cell death in MDA-MB 231 cells ( $p < 0.05$ ). Furthermore, quercetin-loaded nanoparticles reduced Nrf2 gene expression at mRNA level in the cells higher than quercetin alone ( $p < 0.05$ ). Similarly, expression of downstream genes for Nrf2 including NQO1 and MRP1 were reduced significantly ( $p < 0.05$ ). Taken together, these results suggest that phytosome technology can improve the efficacy of chemotherapy by overcoming resistance and enhances permeability cancer cells to chemical treatment and may thus be considered as a potential delivery system to increase the therapeutic protocols in cancer patients.

#### **Biography**

Nasser Samadi is currently an Assistant Professor and Head of the Department of Biochemistry, Faculty of Medicine at Tabriz University of Medical Sciences. His doctorate degree is in Medical Laboratory Sciences from Tabriz University of Medical Sciences. He received his PhD in Clinical Biochemistry and Postdoctoral Fellowship in Cancer Biotechnology from University of Alberta, Canada. Nasser is an active educator and trainer and is the PI of several training grants and programs. His research is in the field of cancer biotechnology and chemo-resistance. He has authored over 20 articles and book chapters in the field of cancer and breast cancer research.

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