Synergistic anti-cancer activity of the combination of dihydroartemisinin and doxorubicin in breast cancer cells

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Abstract:
Background: Dihydroartemisinin (DHA) exhibits potent anti-malarial and anti-cancer activities. This study aimed to investigate the anti-proliferative effects of a combination of DHA and doxorubicin (DOX) on human breast cancer cells.

Methods: MTT assay and the combination index (CI) were used to show the anti-proliferative effects and calculate the synergism potential, respectively. Flow cytometry assay was used to detect apoptosis and the intracellular accumulation of DOX. JC-1 staining was used to determine the mitochondrial membrane potential. Western blot analysis was used to detect the protein expression of some apoptosis-related molecules.

Results: A synergistic anti-proliferative effect was found, and the enhanced anti-cancer activity was observed to be accompanied by the prompt onset of apoptosis in MCF-7 cells. The combinative treatment remarkably decreased the mitochondrial membrane potential and activated caspase cascades more than the mono-treatment. Pretreatment with DHA also did not influence the accumulation of DOX in MCF-7 cells.

Conclusion: This study presented a new opportunity to enhance the effectiveness of future treatment regimens of breast cancer using DOX.

Key words: dihydroartemisinin, doxorubicin, synergistic, anti-tumor, apoptosis; MCF-7