Nordamnacanthal potentiates the cytotoxic effects of tamoxifen in human breast cancer cells

ABSTRACT

Tamoxifen (TAM) is the mainline drug treatment for breast cancer, despite its side effects and the development of resistance. As an alternative approach, in the present study a novel combination therapy was established through combining TAM with nordamnacanthal (NDAM) in order to investigate the additive effect of these drugs in MCF-7 human breast cancer cells. A significant dose-dependent reduction in cell viability and an increase in apoptosis were observed in the MCF-7 cells cotreated with TAM and NDAM compared with the untreated control cells or the cells treated with TAM and NDAM alone ($P<0.05$). The cytotoxic influence of the combination of TAM and NDAM was found to be two-fold that of the individual agents. Annexin V/propidium iodide double-staining revealed the typical nuclear features of apoptosis. Furthermore, an increase in the proportion of apoptotic, Annexin V-positive cells was observed with the combination therapy. Moreover, this apoptotic induction was associated with a collapse of the mitochondrial membrane potential and the generation of reactive oxygen species. To the best of our knowledge, the findings of the present study are the first to suggest that combining TAM with NDAM may be a potential combination therapy for the treatment of breast cancer and may have the potential to minimize or eliminate the side effects associated with high doses of TAM.

Keyword: Tamoxifen; Nordamnacanthal; MCF-7; Breast cancer; Combination treatment; Apoptosis