BreastDefend enhances the effect of tamoxifen in estrogen receptor-positive human breast cancer in vitro and in animal models in vivo.

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RESULTS

In this study we evaluated the combined effects of the natural product/dietary supplement BreastDefend (BD) and tamoxifen (TAM) on MCF-7 estrogen receptor-positive (ER+) human breast cancer cells in vitro and an orthotopic mouse model in vivo. BD has been studied previously in preclinical models, and shown to exert significant effects on MDA-MB-231 triple-negative breast cancer cells. The proliferation of MCF-7 cells was evaluated using MTT assays, whereas the expression of genes involved in the molecular mechanisms of cancer was evaluated using DNA microarrays. MCF-7 cells were stimulated with estradiol (10 nM) and treated with TAM (1 µM), BD (10 µg/ml), and the combination of TAM and BD for 3 days and 6 days. Compared with control, BD enhanced the anti-proliferative activity of TAM significantly (P < 0.05), and the combination of BD and TAM induced apoptosis.

The results of DNA microarray analyses suggested that the pro-apoptotic activity of BD and TAM in MCF-7 cells was associated with the significant upregulation of BAX (an oncogene that can block proliferation and induce apoptosis) and downregulation of BCL2 (an apoptosis inhibitor) and FN1 (fibronectin, a glycoprotein involved in tumorigenesis and metastasis) expression. In the orthotopic model MCF-7 cells were implanted into the mammary fat pads of female ovariectomized nude mice (n = 12–13). The mice received subcutaneous pellets that released estradiol and treated with TAM (1 µM), BD (10 µg/ml), and the combination of TAM and BD for 3 days and 6 days. Compared with control, BD enhanced the anti-proliferative activity of TAM significantly (P < 0.05), and the combination of BD and TAM induced apoptosis.

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