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Growth inhibitory activity of extracts and purified components of black cohosh on human breast cancer cells.

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The purpose of this study was to determine whether black cohosh contains constituents that inhibit the growth of human breast cancer cells, and therefore might eventually be useful in the prevention or treatment of breast cancer. Black cohosh rhizomes were extracted with methanol/water and fractionated by solvent-solvent partitioning to yield three fractions: hexane, ethyl acetate and water. The ethyl acetate fraction displayed the highest potency in two cell-based assays, growth inhibition and cell cycle analysis. This fraction inhibited growth of both the ER+ MCF7 and ER-MDA-MB-453 human breast cancer cell lines with IC50 values of about 20 and 10 micro g/ml, respectively. It also induced cell cycle arrest at G1 when tested at 30 micro g/ml and at G2/M at 60 micro g/ml in MCF7 cells. This suggests that the extract contains a mixture of components with the more active (or more abundant) causing G1 arrest and the less active causing G2/M arrest. We then examined specific components in this extract. The triterpene glycoside fraction obtained by polyamide column chromatography, and the specific triterpene glycosides actein, 23-epi-26-deoxyactein and cimracemoside A, inhibited growth of the MCF7 human breast cancer cells and induced cell cycle arrest at G1. The most potent compound, actein, decreased the level of cyclin D1, cdk4 and the hyperphosphorylated form of the pRb protein and increased the level of p21cip1 in MCF7 cells, changes that may contribute to the arrest in G1. Further studies are in progress to identify the mechanisms by which actein and related compounds present in black cohosh inhibit growth of human breast cancer cells.

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