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Growth inhibitory activity of extracts and compounds from Cimicifuga species on human breast cancer cells.

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Abstract

The purpose of this report is to explore the **growth inhibitory** effect of **extracts** and **compounds** from black cohosh and related **Cimicifuga species** on **human breast cancer cells** and to determine the nature of the active components. Black cohosh fractions enriched for triterpene glycosides and purified components from black cohosh and related Asian **species** were tested for **growth** inhibition of the ER(-) Her2 overexpressing **human breast cancer** cell line MDA-MB-453. **Growth inhibitory activity** was assayed using the Coulter Counter, MTT and colony formation assays. Results suggested that the **growth inhibitory activity** of black cohosh **extracts** appears to be related to their triterpene glycoside composition. The most potent **Cimicifuga** component tested was 25-acetyl-7,8-didehydrocimigenol 3-O-beta-d-xylopyranoside, which has an acetyl group at position C-25. It had an IC(50) of 3.2microg/ml (5microM) compared to 7.2microg/ml (12.1microM) for the parent compound 7,8-didehydrocimigenol 3-O-beta-d-xylopyranoside. Thus, the acetyl group at position C-25 enhances **growth inhibitory activity**. The purified triterpene glycoside actein (beta-d-xylopyranoside), with an IC(50) equal to 5.7microg/ml (**8.**4microM), exhibited **activity** comparable to cimigenol 3-O-beta-d-xyloside. MCF7 (ER(+)Her2 low) **cells** transfected for Her2 are more sensitive than the parental MCF7 **cells** to the **growth inhibitory** effects of actein from black cohosh, indicating that Her2 plays a role in the action of actein. The effect of actein on Her2 overexpressing MDA-MB-453 and MCF7 (ER(+)Her2 low) **human breast cancer cells** was examined by fluorescent microscopy. Treatment with actein altered the distribution of actin filaments and induced apoptosis in these **cells**. These findings, coupled with our previous evidence that treatment with the triterpene glycoside actein induced a stress response and apoptosis in **human breast cancer cells**, suggest that **compounds** from **Cimicifuga species** may be useful in the prevention and treatment of **human breast cancer**.

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