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The study of retinoic acids and Rhodiola as potential chemopreventional and chemotherapeutic reagents of breast cancer

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Abstract

According to the National Cancer Institute, breast cancer is second only to lung cancer in cancer-related deaths for women in the United States (American Cancer Society). Despite a gradual decline in deaths due to breast cancer (likely attributable to increased screening), there is a rise in the incidence of newly-diagnosed breast cancer. Thus protective therapies for breast cancer are a new arena which will become of increasing importance. The work presented in this dissertation demonstrated the possible treatments which might be effective in the fight against breast cancer and the pathways involved in the prevention and therapy. ^ An early full-term pregnancy imparts a significant protection for women from getting breast cancer. In animals, this protection can be mimicked by a short-term exposure to physiological doses of ovarian hormones. In my dissertation, I investigated the ability of retinoids, such as 9-cis retinoic acid, all-trans retinoic acid, and N-4-hydroxyphenylretinamide (4-HPR), to sensitize the ductal epithelial cells of virgin mammary glands to DNA damage responses using a whole-organ culture system. My data suggest that sensitization of the mammary epithelium to p53-dependent apoptosis is a common pathway, which is engaged by retinoids as well as ovarian hormones. ^ I went on to investigate the effect and mechanism of another possible chemopreventive and chemotherapeutic agent, *Rhodiola Crenulata*. *Rhodiola* is a perennial plant which grows in the high Tundra regions of Tibet and Siberia. Though it has been used for a long time in the eastern traditional medicine, *Rhodiola* has never been used in the treatment of breast cancer. In this dissertation, I showed that dietary *Rhodiola* is effective in increasing the survival time of mice bearing tumor grafts. *In vitro* analysis shows that *Rhodiola* is capable of reducing proliferation and increasing death of certain breast cancer cells. *Rhodiola* is

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demonstrated to inhibit the motility and invasion of breast cancer cells. Caspase-dependent and-independent pathways as well as Akt and p53 pathways were shown to be involved in the chemoprevention and chemotherapeutic action of *Rhodiola* on breast cancer. ^

Subject Area

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