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## Multi-targeted therapy of cancer by genistein.

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### Abstract

Soy isoflavones have been identified as dietary components having an important role in reducing the incidence of breast and prostate cancers in Asian countries. Genistein, the predominant isoflavone found in soy products, has been shown to inhibit the carcinogenesis in animal models. There is a growing body of experimental evidence showing that the inhibition of human cancer cell growth by genistein is mediated via the modulation of genes that are related to the control of cell cycle and apoptosis. It has been shown that genistein inhibits the activation of NF-kappaB and Akt signaling pathways, both of which are known to maintain a homeostatic balance between cell survival and apoptosis. Moreover, genistein antagonizes estrogen- and androgen-mediated signaling pathways in the processes of carcinogenesis. Furthermore, genistein has been found to have antioxidant properties, and shown to be a potent inhibitor of angiogenesis and metastasis. Taken together, both in vivo and in vitro studies have clearly shown that genistein, one of the major soy isoflavones is a promising agent for cancer chemoprevention and further suggest that it could be an adjunct to cancer therapy by virtue of its effects on reversing radioresistance and chemoresistance. In this review, we attempt to provide evidence for these preventive and therapeutic effects of genistein in a succinct manner highlighting comprehensive state-of-the-art knowledge regarding its multi-targeted biological and molecular effects in cancer cells.

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