

P36

Resveratrol Inhibits Proliferation and Induces Apoptosis of Human Breast Carcinoma Cells

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Resveratrol, which is found in grapes and wine, has been reported to have a variety of important pharmacological effects including anti-inflammatory, anti-platelet, and anti-carcinogenic effects. In this study, using the human breast cancer cell line MCF-7, we have analyzed a possible mechanism by which resveratrol could interfere with cell cycle control and induce cell death. Resveratrol treatment of MCF-7 cells resulted in a dose dependent inhibition of the cell growth and the cells accumulated at the S phase transition of the cell cycle at low concentration, but high concentrations do not induce S phase accumulation. The anti-proliferative effects of resveratrol were associated with a marked inhibition of cyclin D and cyclin-dependent kinase (Cdk) 4 proteins and induction of p53 and Cdk inhibitor p21WAF1/CIP. Growth suppression by resveratrol was also due to apoptosis as seen by the appearance of a sub-G1 fraction and chromatin condensation. The apoptosis cascade up-regulated Bax, down-regulated Bcl-2 and activated caspase-9. Taken together, these findings suggest that resveratrol could be a promising anti-cancer agent for human breast cancer and contribute to clarify the complex chemopreventive and anti-proliferative properties of resveratrol.