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# Cancer - Treatment Associated with Resveratrol Compound

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ABSTRACT

In today's developing world, cancer has become a widespread and dangerous disease that affects people of all ages. The treatable compound is always present in natural plants and medications. The resveratrol molecule, which is predominantly found in black grapes, helps cancer cells become more responsive to cancer treatments and reduces cancer/tumor risk. We can focus on the role of resveratrol molecule in cancer disorders in this short review essay.

**Key Words;** Cancer, Resveratrol, Ageing, Black grapes, Tumor.

## INTRODUCTION

Resveratrol belongs to the polyphenols family of chemicals. They're thought to act as antioxidants, protecting the body from damage that can increase your risk of cancer and heart disease. It can be found in the skin of red grapes, as well as peanuts, red wine, berries, and other foods and berries. It's gotten a lot of press because of its anti-aging and disease-fighting properties. Red wine's constituents have long been thought to provide health benefits by scientists. Experts began to focus on resveratrol, an antioxidant molecule found in red wine, in the 1990s. Since then, resveratrol has been found to have antiviral, anti-inflammatory, and anticancer properties in animal and laboratory tests. The SIRT1 gene is thought to be activated by resveratrol, according to researchers.

## EXPLANATION

Certain lifestyle choices are associated with an increased risk of cancer. Cancer can be caused by smoking, drinking more than one drink per day for women and up to two drinks per day for males, excessive sun exposure or frequent blistering sunburns, being fat, and having unsafe sex. Changes (mutations) in the DNA of cells are the cause of cancer. Each gene in the cell has a set of instructions that teach the cell what it does and how it grows and divides. If the instruction is incorrect, the cell will not function properly and can be malicious. Resveratrol has been shown in studies to have a deleterious impact on cancer at all stages of development. Most crucially, researchers have discovered that resveratrol improves the effectiveness of chemotherapy by inhibiting chemotherapy-resistant proteinsCancer is a condition in which some cells in the body get out of control and spread to other parts of the body. Cancer pain can infect nearby tissues and spread to other parts of the body, leading to the formation of new tumors (a process called metastasis). Malignant tumor is another name for cancer tumor. Many malignancies, including leukemia, cause solid tumors, but hematologic cancers do not. Benign tumors do not invade or spread to adjacent tissues. Benign tumours rarely reappear after being excised, although malignant tumours do. However, benign tumours can grow to be extremely enormous. Some, such as benign brain tumours, can produce serious symptoms or even be fatal. The protein or activity levels of a range of carcinogen-detoxifying enzymes, including as glutathione S-transferase and glucuronosyltransferase, were enhanced by resveratrol supplementation, but only when enzyme levels were low at baseline. Resveratrol supplementation appears to be well tolerated and may have the potential to change the metabolism of a range of drugs by inhibiting cytochrome P450 activity. It may also have a cancer-protective impact through increased detoxification of carcinogens.

As a result, the safety and benefit of resveratrol must be clarified, particularly in the context of co-administering it with pharmaceuticals. Resveratrol treatment significantly reduced the formation of large-sized ACF and boosted the production of Bcl2-associated X (Bax), a pro-apoptotic protein in precancerous cells, according to the researchers. Other research have employed the drug 1,2-dimethylhydrazine (DMH) to induce colon tumour development in rats in order to investigate resveratrol's chemopreventative properties.

Resveratrol has been shown to reverse multidrug resistance in cancer cells and to sensitise cancer cells to standard chemotherapeutic agents when administered in combination with clinically utilised medicines. When researchers discovered that topical administration of resveratrol inhibited tumour growth in a two-stage model, they hypothesised that it could work as a chemopreventative agent. Later research discovered that topical resveratrol inhibited tumour growth in animal models of skin carcinogenesis by increasing apoptosis, regulating the cell cycle, and decreasing COX activity and prostaglandin synthesis. Several new resveratrol analogues with better anti-cancer action, absorption, and pharmacokinetic profile have been discovered. The in vivo and in vitro effects of resveratrol in a range of malignancies, as well as intracellular molecular targets altered by this polyphenol, are the current focus of this review. This is supported by a thorough review of the many clinical trials that have shown it to be a potential

therapeutic and chemopreventive drug. A large body of evidence, including preclinical, clinical, and epidemiological studies, suggests that consuming polyphenols, which are abundant in cereals, pulses, vegetables, and fruits, may help to prevent the onset of a variety of diseases, including cancer. Normal cells acquire abnormalities in their genetic makeup, causing them to continuously multiply, colonise, and metastasis to other organs such as the liver, lungs, colon, and brain. Compounds that modulate these oncogenic mechanisms could be evaluated as possible anti-cancer medicines that could eventually reach the clinic. Resveratrol is a phytoestrogen that has anti-oxidant, anti-inflammatory, cardioprotective, and anti-cancer activities. Resveratrol has been shown to reverse multidrug resistance. Resveratrol has been shown to reverse multidrug resistance in cancer cells and to sensitise cancer cells to standard chemotherapeutic agents when administered in combination with clinically utilised medicines. Resveratrol has been discovered to suppress events linked to tumour initiation. In human leukaemia HL-60 cells, resveratrol therapy inhibited free radical production caused by 12-O-tetradecanoylphorbol-13-acetate (TPA). Resveratrol's anti-oxidant capabilities have already been discussed. Resveratrol is an excellent scavenger of hydroxyls and superoxides, as well as radicals generated by cells and stimulated by metals/enzymes. It also protects against lipid peroxidation in cell membranes and ROS-induced DNA damage. Multiple pathways involved in cell cycle, apoptosis, and inflammation are influenced by RES. RES has significant anticancer action in addition to its chemopreventive and chemoprotective properties. It is well recognised that a single treatment frequently exhibits low activity, inefficient efficacy, and medication resistance. Combination therapy, which was recently established by mixing more than two medications at the same time, generally results in superior therapeutic outcomes. Estrogens, being natural hormones, are mediated through oestrogen receptors (ERs). Estrogen exposure has long been recognised as a significant risk factor for a range of malignancies, particularly breast cancer and other estrogen-mediated cancers. The creation of estrogen-DNA adducts, which induce cancer, is the primary reason of this phenomenon. NAcCys and RES have been discovered to be effective inhibitors of the production of estrogen-DNA adducts.

## CONCLUSION

Plants and plant chemicals have an important role in the treatment of a variety of ailments. Concentrating on natural medicine that incorporates our advanced technology will undoubtedly improve the perception of medicines toward disease, and the value of traditional plants will be recognised by all in the future. Resveratrol has been discovered to have the ability to modulate cancer therapy by interacting with different molecular and signalling pathways. It has the potential to minimise the negative effects of cancer chemotherapy.

### REFERENCE


- Aziz, M. H., Kumar, R., and Ahmad, N. (2003). Cancer chemoprevention by resveratrol: in vitro and in vivo studies and the underlying mechanisms. *Int. J. Oncol.* 23, 17–28. doi: 10.3892/ijo.23.1.17
- Bhatt JK, Thomas S, Nanjan MJ. Resveratrol supplementation improves glycemic control in type 2 diabetes mellitus. Nutrition Research. 2012;32:537–541. doi: 10.1016/j.nutres.2012.06.003.
- Bishayee A, Dhir N. Resveratrol-mediated chemoprevention of diethylnitrosamine-initiated hepatocarcinogenesis: inhibition of cell proliferation and induction of apoptosis. Chemico-Biological Interactions. 2009;179:131–144. doi: 10.1016/j.cbi.2008.11.015.
- Crandall JP, Oram V, Trandafirescu G, Reid M, Kishore P, Hawkins M, Cohen HW, Barzilai N. Pilot study of resveratrol in older adults with impaired glucose tolerance. Journals of Gerontology. Series A, Biological Sciences and Medical Sciences. 2012;67:1307–1312. doi: 10.1093/gerona/glr235.
- Csaki C, Mobasheri A, Shakibaei M. Synergistic chondroprotective effects of curcumin and resveratrol in human articular chondrocytes: inhibition of IL-1β-induced NF-κB-mediated inflammation and apoptosis. Arthritis Research & Therapy. 2009;11:R165. doi: 10.1186/ar2850.
- Dennis T, Fanous M, Mousa S. Natural products for chemopreventive and adjunctive therapy in oncologic disease. Nutrition and Cancer. 2009;61:587–597. doi: 10.1080/01635580902825530.
- De Santi C, Pietrabissa A, Spisni R, Mosca F, Pacifici GM. Sulphation of resveratrol, a natural compound present in wine, and its inhibition by natural flavonoids. Xenobiotica. 2000;30:857–866. doi: 10.1080/004982500433282.
- Dey, A., Guha, P., Chattopadhyay, S., and Bandyopadhyay, S. K. (2009). Biphasic activity of resveratrol on indomethacin-induced gastric ulcers. *Biochem. Biophys. Res. Commun.* 381, 90–95. doi: 10.1016/j.bbrc.2009.02.027
- Effect of resveratrol, a natural polyphenolic compound, on reactive oxygen species and prostaglandin production.
- Jang, M., Cai, L., Udeani, G. O., Slowing, K. V., Thomas, C. F., Beecher, C. W., et al. (1997). Cancer chemopreventive activity of resveratrol, a natural product derived from grapes. *Science* 275, 218–220. doi: 10.1126/science.275.5297.218
- Jazirehi, A. R., and Bonavida, B. (2004). Resveratrol modifies the expression of apoptotic regulatory proteins and sensitizes non-Hodgkin's lymphoma and multiple myeloma cell lines to paclitaxel-induced apoptosis. *Mol. Cancer Ther.* 3, 71–84.
- Jee, J., Lim, J., Ong, Y. S., Oon, J., Gao, L., Choi, H. S., et al. (2016). An efficient strategy to enhance binding affinity and specificity of a known isozyme inhibitor. *Org. Biomol. Chem.* 14, 6833–6839. doi: 10.1039/c6ob01104g
- Screening of potential chemopreventive agents using biochemical markers of carcinogenesis. *Sharma S, Stutzman JD, Kelloff GJ, Steele VE*
- Wolk A. Diet, lifestyle and risk of prostate cancer. Acta Oncologica. 2005;44:277–281. doi: 10.1080/02841860510029572.

- Yang K, Popova NV, Yang WC, Lozonschi I, Tadesse S, Kent S, Bancroft L, Matise I, Cormier RT, Scherer SJ, et al. Interaction of Muc2 and Apc on Wnt signaling and in intestinal tumorigenesis: potential role of chronic inflammation. Cancer Research. 2008;68:7313–7322. doi: 10.1158/0008-5472.CAN-08-0598.
- Yoshino J, Conte C, Fontana L, Mittendorfer B, Imai S, Schechtman KB, Gu C, Kunz I, Rossi Fanelli F, Patterson BW, et al. Resveratrol supplementation does not improve metabolic function in nonobese women with normal glucose tolerance. Cell Metabolism. 2012;16:658–664. doi: 10.1016/j.cmet.2012.09.015.
- Yu C, Shin YG, Chow A, Li Y, Kosmeder JW, Lee YS, Hirschelman WH, Pezzuto JM, Mehta RG, van Breemen RB. Human, rat, and mouse metabolism of resveratrol. Pharmaceutical Research. 2002;19:1907–1914. doi: 10.1023/A:1021414129280.
- Ziegler CC, Rainwater L, Whelan J, McEntee MF. Dietary resveratrol does not affect intestinal tumorigenesis in Apc(Min/+) mice. Journal of Nutrition. 2004;134:5–10.