

GMP, GCP & QUALITY CONTROL

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Investigation of the biochemical mechanism of action of antioxidants in the prevention of cancer

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Background: Cancer refers to a group of diseases that are associated with a disturbance in the control of cell growth and metabolism. Indeed, the unbalanced control of cellular proliferation is a primary characteristic of cancer cells and, as such, any molecule capable of inhibiting cancer cell proliferation may also be useful as a potential chemo-preventive agent. Throughout history, antioxidants have been the most significant source of anticancer and chemo preventing agents. More than 1,000 different phytochemicals are already proved to possess interesting chemo preventing activities. Antioxidants consist of a wide variety of biologically active phytochemicals including phenolics, flavonoids, carotenoids, etc. that have been shown to suppress early and late stages of carcinogenesis.

Objective: To review recent biochemical and molecular mechanisms in relation to natural and synthetic chemo preventing substances (antioxidants) for cancer control and management.

Methodology:

Major Findings: Antioxidants exert anticancer effects via a variety of mechanisms, including removal of carcinogenic agents, modulation of cancer cell signaling and cell cycle progression, promotion of apoptosis and modulation of enzymatic activities.

Conclusion: This review provides an updated and comprehensive overview on the anticancer effects of antioxidants *in vitro* and *in vivo* animal models including recent intervention studies. Finally, possible mechanisms of action involving antioxidant and pro-oxidant activity as well as interference with cellular functions are discussed.

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