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Cancer prevention and treatment by natural products: Current evidence and future opportunities

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Abstract

An aging population coupled with adoption of a sedentary lifestyle, including smoking, Western-style diet and limited physical activity, are contributing to a rapid surge in the global cancer burden. Currently, cancer represents the third leading cause of death worldwide with nearly 8 million cancer deaths estimated to have occurred in 2008 and this toll is expected to reach more than 17 million per year by 2030. Hence, novel approaches are urgently needed to prevent and treat this killer disease. The cancer preventive effects of various natural products have been attributed to the constituent phytochemicals. An impressive number of cellular and animal studies have confirmed the cancer preventive and therapeutic potential of dietary as well as non-dietary phytochemicals as they interfere with multistage carcinogenesis, i.e., initiation, promotion and progression. These bioactive compounds protect cellular systems from oxidative damage and inflammatory insult, induce cell cycle arrest and apoptosis, inhibit cell proliferation, modulate enzyme activities involved in carcinogen detoxification, stimulate immune system, regulate hormone metabolism, suppress invasion, angiogenesis and metastasis as well as modulate a plethora of signaling pathways. This presentation will highlight comprehensive, up-to-date information on cancer preventive and therapeutic studies of highly promising natural agents, including those conducted in author's own laboratory with resveratrol from grapes, anthocyanins from black currants, gallic acid from pomegranate and novel triterpenoid from a medicinal plant from the Indian subcontinent. The current limitations, challenges, innovative approaches and future prospects of natural products to prevent and treat human malignancies will also be critically discussed.

Biography

Dr. Bishayee is the Chair and Associate Professor of Pharmaceutical Sciences, American University of Health Sciences, Signal Hill, CA. Dr. Bishayee's research focuses on elucidation of the cancer preventive and therapeutic effects of medicinal plants, natural products, dietary and synthetic agents using various pre-clinical models of cancer. The ongoing projects of Dr. Bishayee are funded by the National Institutes of Health as well as private pharmaceutical/biotechnological institutions. Dr. Bishayee has published more than 86 original research papers and review articles in high-impact, peer-reviewed journals, 9 book chapters, and presented over 25 papers at various national and international scientific meetings.