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Chemoprevention of experimental mammary carcinoma by *Trianthema portulacastrum* Linn., an Indian dietary and medicinal plant

Breast cancer is the most frequently diagnosed cancer and the primary cause of cancer-related death in women worldwide. Since there are limited treatment options for advanced-stage metastatic breast cancer, a high priority should be given to develop safe chemopreventive drugs. The value of various natural and dietary agents to reduce the risk of breast cancer development is well established. *Trianthema portulacastrum* Linn. (Aizoaceae), an Indian dietary and medicinal plant, has been found to exhibit antihepatotoxic and antihepatocarcinogenic activities in rodents. The current study was initiated to investigate mechanism-based chemopreventive potential of a well characterized ethanolic extract of *T. portulacastrum* (TPE) against 7, 12-dimethylbenz(a)anthracene (DMBA)-induced rat mammary carcinogenesis, an experimental breast tumor model that closely mimics human disease. Rats had free access to a basal diet supplemented with TPE to yield three dietary doses (i.e., 50, 100 and 200 mg/kg body weight) throughout the experimental period (18 weeks). Following 2 weeks of TPE treatment, mammary tumorigenesis was initiated by oral administration of DMBA (50 mg/kg body weight). At the end of the study (16 weeks after DMBA exposure), TPE has been shown to exert a drastic reduction of DMBA-induced mammary tumor incidence, total tumor burden and average tumor weight as well as reversed intratumor histopathological alterations. TPE dose-dependently reduced the expression of proliferating cell nuclear antigen and cyclin D1, induced apoptosis, upregulated proapoptotic protein Bax, downregulated antiapoptotic protein Bcl-2, diminished Wnt/ β -catenin signaling and suppressed nuclear factor- κ B-mediated inflammatory cascade in mammary tumors. Our results clearly provide the first experimental evidence that TPE affords chemopreventive effect in the classical DMBA model of breast cancer by impeding multiple oncogenic pathways during an early-stage breast cancer. These results may encourage further studies to develop *T. portulacastrum* phytoconstituents as breast cancer chemopreventive drugs.

Biography

Anupam Bishayee is a Professor and Founding Chair at Department of Pharmaceutical Sciences of Larkin Health Sciences Institute College of Pharmacy, Miami, Florida. Dr. Bishayee has 25 years combined experience in pharmaceutical education, research, teaching, and administration. Dr. Bishayee's research focuses on elucidation of the cancer preventive and therapeutic effects of medicinal plants, natural products, dietary, and synthetic agents using several pre-clinical models of cancer. Various projects of Dr. Bishayee are funded by the National Institutes of Health as well as private pharmaceutical/biotechnological companies. Dr. Bishayee has published more than 114 original research papers and authoritative review articles, mostly in high-impact, peer-reviewed journals, 10 book chapters, and presented nearly 30 papers at various national and international scientific events. Dr. Bishayee is serving as an editorial board member and reviewer of more than 50 reputed journals.

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