PREVENTION OF BREAST CANCER BY DIETARY COMPONENTS TARGETING EPIGENOME

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Abstract: Aberrant epigenetic alterations in the genome such as DNA methylation and chromatin remodeling play significant role in breast cancer development. Since the epigenetic alterations are considered to be more easily reversible compared to genetic defects, epigenetic therapy is potentially very useful in reversing some of these defects. Methylation of CpG islands is an important component of the epigenetic code and a number of genes become abnormally methylated in breast cancer patients. Currently, several epigenetic-based synthetic drugs that can reduce DNA hypermethylation are undergoing preclinical and clinical trials. However, these chemicals are very toxic and do not have gene specificity. Epidemiological studies have shown that Asian women are less prone to breast cancer due to their high consumption of soy food than the Caucasian women of western countries. Moreover, complementary/and or alternative medicines are commonly used by Asian populations which are rich in bioactive ingredients known to be chemopreventive against tumorigenesis in general. The examples of such agents include dietary polyphenols, (-)-epigallocatechin-3-gallate (EGCG) from green tea, genistein from soybean, isothiocyanates from plant foods, curcumin from turmeric, resveratrol from grapes, and sulforaphane from cruciferous vegetables. These bioactive components are able to modulate epigenetic events and their epigenetic targets are known to be associated with breast cancer prevention and therapy. This approach could facilitate the discovery and development of novel drugs for the treatment of breast cancer. In this brief review, we will summarize the bioactive chemicals found in natural products and their potency to modulate the epigenetic disorders induced during breast cancer.