Epigenetic Events Associated with Breast Cancer and Their Prevention by Dietary Components Targeting the Epigenome.

Khan SI, Aumsuwan P, Khan IA, Walker LA, Dasmahapatra AK.

Source

National Center for Natural Products Research, †Department of Pharmacognosy, and §Department of Pharmacology, School of Pharmacy, University of Mississippi, University, Mississippi 38677, United States.

Abstract

Aberrant epigenetic alterations in the genome such as DNA methylation and chromatin remodeling play a significant role in breast cancer development. Since epigenetic alterations are considered to be more easily reversible compared to genetic changes, 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 and histone deacetylation are undergoing preclinical and clinical trials. However, these chemicals are generally 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. 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 epigenetic events associated with breast cancer and the potential of some of these bioactive dietary components to modulate these events and thus afford new therapeutic or preventive approaches.

PMID:

21992498