Abstract

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Curcumin as a regulator of epigenetic events.

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Abstract

Epigenetic alterations correspond to changes in DNA methylation, covalent modifications of histones, or altered miRNA expression patterns. These three mechanisms are interconnected and appear to be key players in tumor progression and failure of conventional chemotherapy. Dietary components emerged as a promising source of new epigenetically active compounds able to reverse these alterations and to actively regulate gene expression as well as molecular targets implicated in tumorigenesis. The polyphenolic compound curcumin (diferuloylmethane), a yellow spice that enters into the composition of curry, already described for its diverse and broad biological activities, is nowadays well described as an inhibitor of DNA methyltransferase so that it is considered as a DNA hypomethylating agent. It reestablishes the balance between histone acetyl transferase and histone deacetylase (HDAC 1, 3, 4, 5, 8) activity to selectively activate or inactivate the expression of genes implicated in cancer death and progression, respectively. Finally curcumin modulates miRNAs (miR-15a, miR-16, miR-21, miR-22, miR-26, miR-101, miR-146, miR-200, miR-203, and let-7) and their multiple target genes. In conclusion, this dietary compound is able to restore the epigenetic regulation balance and appears as an attractive preventive and/or therapeutic approach against human cancer.

KEYWORDS: Cancer; Curcumin; DNA methylation; Histone modifications; miRNA

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