

Histone Deacetylases and Histone Deacetylase Inhibitors: Molecular Mechanisms of Action in Various Cancers.

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Abstract

Epigenetic modifications such as histone modification play an important role in tumorigenesis. There are several evidence that histone deacetylases (HDACs) play a key role in cancer induction and progression by histone deacetylation. Besides, histone acetylation is being accessed as a therapeutic target because of its role in regulating gene expression. HDAC inhibitors (HDACIs) are a family of synthetic and natural compounds that differ in their target specificities and activities. They affect markedly cancer cells, inducing cell differentiation, cell cycle arrest and cell death, reduction of angiogenesis, and modulation of the immune system. Here, we summarize the mechanisms of HDACs and the HDACIs in several cancers. An online search of different sources such as PubMed, ISI, and Scopus was performed to find available data on mechanisms and pathways of HDACs and HDACIs in different cancers. The result indicated that HDACs induce cancer through multiple mechanisms in various tissues. This effect can be inhibited by HDACIs which affect cancer cell by different pathways such as cell differentiation, cell cycle arrest, and cell death. In conclusion, these findings indicate that the HDACs play a major role in carcinogenesis through various pathways, and HDACIs can inhibit HDAC activity by multiple mechanisms resulting in cell cycle arrest, cell growth inhibition, and apoptosis induction.

KEYWORDS:

Cancer; histone deacetylase; histone deacetylase inhibitors