

Targeting Histone Deacetylases for Cancer Therapy: From Molecular Mechanisms to Clinical Implications

Zhiming Li^{1,2*}, Wei-Guo Zhu^{1,2,3?}

1. Key Laboratory of Carcinogenesis and Translational Research (Ministry of Education), Beijing 100191, China. 2. Department of Biochemistry and Molecular Biology, Peking University Health Science Center, Beijing, 100191, China. 3. Peking-Tsinghua University Center for Life Sciences, Peking University, Beijing 100871, China. Current address: Department of Biochemistry and Molecular Biology, School of Basic Medical Sciences, Peking University Health Science Center, Beijing, China. * Corresponding author: Wei-Guo Zhu, Key Laboratory of Carcinogenesis and Translational Research, Department of Biochemistry and Molecular Biology, Peking-Tsinghua University Center for Life Sciences, Peking University, Beijing, 100871 Tel: 86-10-82202235 Fax: 86-10-82805079 E-mail: zhuweigu@bjmu.edu.cn.

Abstract :

Genetic abnormalities have been conventionally considered as hallmarks of cancer. However, studies over the past decades have demonstrated that epigenetic regulation also participates in the development of cancer. The fundamental patterns of epigenetic components, such as DNA methylation and histone modifications, are frequently altered in tumor cells. Acetylation is one of the best characterized modifications of histones, which is controlled by histone acetyltransferases (HATs) and histone deacetylases (HDACs). HDACs are a group of enzymes which catalyze the removal of the acetyl groups of both histones and non-histone proteins. HDACs are involved in modulating most key cellular processes, including transcriptional regulation, apoptosis, DNA damage repair, cell cycle control, autophagy, metabolism, senescence and chaperone function. Because HDACs have been found to function incorrectly in cancer, various HDAC inhibitors are being investigated to act as cancer chemotherapeutics. The primary purpose of this paper is to summarize recent studies of the links between HDACs and cancer, and further discuss the underlying mechanisms of anti-tumor activities of HDAC inhibitors and clinical implications.

Key Word :

HDAC, HDAC inhibitor, epigenetic therapy, cancer

Volume 10, Number 7, - 2014, ISSN 1449-2288