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Recent histone deacetylase inhibitors in cancer therapy

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Abstract

Cancer metastasis increases the complexity of the disease and escalates patient mortality. Traditional chemotherapy has been associated with low efficacy and marked side effects. Studies pivot toward histone deacetylase (HDAC) enzymes and inhibitors because they are critical for chromatin structure, gene regulation, and cellular activities that are linked to metastasis and cancer progression. HDAC inhibitors (HDACi) can alter gene expression patterns and can lead to cell-cycle arrest and apoptosis in neoplastic cells. Several HDACi drugs like vorinostat, romidepsin, panobinostat, and belinostat are approved by the Food and Drug Administration. China and Japan have approved the use of tucidinostat, a new subtype-selective HDACi that inhibits class 1 HDAC1, HDAC2, HDAC3, as well as class 2b HDAC10. These drugs have shown promising results in the treatment of multiple carcinoma including cervical cancer, T-cell lymphoma, brain cancer, and breast cancer. This review highlights the HDACi classes, the mechanism of action of these inhibitors, their preclinical and clinical efficacy, and the latest clinical trials and patents used in cancer therapeutics. Overall, this review focuses on patents and clinical trials data from 2019 onward to give a better viewpoint on current trends in HDACis as chemotherapy agents.

Keywords: HDAC inhibitors; HDACi drugs; PTCL; cancer; combinational therapy; patents.