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Targeting telomerase for its advent in cancer therapeutics

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Abstract

Telomerase has emerged as an important primary target in anticancer therapy. It is a distinctive reverse transcriptase enzyme, which extends the length of telomere at the 3' chromosomal end, and uses telomerase reverse transcriptase (TERT) and telomerase RNA template-containing domains. Telomerase has a vital role and is a contributing factor in human health, mainly affecting cell aging and cell proliferation. Due to its unique feature, it ensures unrestricted cell proliferation in malignancy and plays a major role in cancer disease. The development of telomerase inhibitors with increased specificity and better pharmacokinetics is being considered to design and develop newer potent anticancer agents. Use of natural and synthetic compounds for the inhibition of telomerase activity can lead to an opening of new vistas in cancer treatment. This review details about the telomerase biochemistry, use of natural and synthetic compounds; vaccines and oncolytic virus in therapy that suppress the telomerase activity. We have discussed structure-activity relationships of various natural and synthetic telomerase inhibitors to help medicinal chemists and chemical biology researchers with a ready reference and updated status of their clinical trials. Suppression of human TERT (hTERT) activity through inhibition of hTERT promoter is an important approach for telomerase inhibition.

Keywords: cancer; hTERC; hTERT; telomerase; telomerase inhibitors; telomere.

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