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Update on the roles of regular daily rhythms in combating brain tumors

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Abstract

An endogenous time-keeping system found in all kingdoms of life, the endogenous circadian clock, is the source of the essential cyclic change mechanism known as the circadian rhythm. The primary circadian clock that synchronizes peripheral circadian clocks to the proper phase is housed in the anterior hypothalamus's suprachiasmatic nuclei (SCN), which functions as a central pacemaker. According to many epidemiological studies, many cancer types, especially brain tumors, have shown evidence of dysregulated clock gene expression, and the connection between clock and brain tumors is highly specific. In some studies, it is reported that the treatment administered in the morning has been linked to prolonged survival for brain cancer patients, and drug sensitivity and gene expression in gliomas follow daily rhythms. These results suggest a relationship between the circadian rhythm and the onset and spread of brain tumors, while further accumulation of research evidence will be needed to establish definitely these positive outcomes as well as to determine the mechanism underlying them. Chronotherapy provides a means of harnessing current medicines to prolong patients' lifespans and improve their quality of life, indicating the significance of circadian rhythm in enhancing the design of future patient care and clinical trials. Moreover, it is implicated that chronobiological therapy target may provide a significant challenge that warrants extensive effort to achieve. This review examines evidence of the relationship of circadian rhythm with glioma molecular pathogenesis and summarizes the mechanisms and drugs implicated in this disease.

Keywords: Brain tumor; Chronotherapy; Circadian rhythms; Mechanism; Therapeutic drug.