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Exploring the Mechanical Perspective of a New Anti-Tumor Agent: Melatonin

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ABSTRACT

Melatonin is a serotonin-derived pineal gland hormone with many biological functions like regulating the sleep-wake cycle, circadian rhythm, menstrual cycle, aging, immunity, and antioxidants. Melatonin synthesis and release are more pronounced during the night, whereas exposure to light decreases it. Evidence is mounting in favor of the therapeutic effects of melatonin in cancer prevention, treatment and delayed onset in various cancer subtypes. Melatonin exerts its anticancer effect through modification of its receptors such as melatonin 1 (MT1), melatonin 2 (MT2), and inhibition of cancer cell proliferation, epigenetic alterations (DNA methylation/demethylation, histone acetylation/deacetylation), metastasis, angiogenesis, altered cellular energetics, and immune evasion. Melatonin performs a significant function in immune modulation and enhances innate and cellular immunity. In addition, melatonin has a remarkable impact on epigenetic modulation of gene expression and alters the transcription of genes. As an adjuvant to cancer therapies, it acts by decreasing the side effects and boosting the therapeutic effects of chemotherapy. Since current treatments produce drug-induced unwanted toxicities and side effects, they require alternate therapies. A recent review article attempts to summarize the mechanistic perspective of melatonin in different cancer subtypes like skin cancer, breast cancer, hepatic cancer, renal cell cancer, non-small cell lung cancer (NSCLC), colon oral, neck, and head cancer. The various studies described in this review will give a firm basis for the future evolution of anticancer drugs.

Figures

KEY WORDS: cancer, melatonin, NSCLC, breast cancer, prostate cancer

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