Melatonin: adjuvant therapy of malignant tumors.

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Abstract

This review summarizes the most relevant data relating to the potential role of melatonin (pineal secretory product) as an adjuvant therapy of tumors. Results of clinical studies were preceded by a description of experiments conducted on tumor cell lines and on laboratory animals. Most of the reports unequivocally confirmed the antioxidative and immunostimulatory action of the pineal secretory product in both in vitro and in vivo experiments. Results of studies on cell lines of various tumors showed that the anti-proliferative effect of melatonin might involve a receptor-mediated mechanism. In experiments on animals, the cardio-, nephro-, and myelo-protective action of melatonin was confirmed in the course of application of various cytostatic drugs. A meta-analysis of clinical studies in which melatonin was applied as an adjuvant drug in the therapy of various tumors pointed to some effects of its administration. Therefore, the use of melatonin could offer hope in future antitumor therapy.

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Oncostatic action of melatonin: facts and question marks.

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Abstract

The paper presents the data concerning the in vivo effects of melatonin on experimentally-induced tumors in animals and the in vitro effects on animal and human tumor cells. The majority of experimental tumors responded to the melatonin treatment with growth inhibition. However, some negative or opposite results (i.e. stimulation of tumor instead of inhibition) were also reported. Some of the negative results can be attributed to the improper timing of melatonin administration. Melatonin was also shown to inhibit the growth of several animal and human tumor cell lines in vitro. On the basis of these experiments, a hypothesis of the oncostatic action of melatonin was put forward. The mechanism of the postulated action is complex and probably includes: 1) modulation of the endocrine system; 2) modulation of the immune system; 3) the direct oncostatic action of melatonin on tumor cells. The latter includes the recently discovered anti-oxidative action which probably plays an important role in the counterung the DNA damage during the radiation challenge or the exposure to chemical carcinogens. It also includes the antiproliferative and pro-apoptotic effects exerted via melatonin receptors expressed by tumor cells. The involvement of the membrane melatonin receptors is mainly assumed. However, the recent data from our and other laboratories suggest also the involvement of RZR/ROR receptors (the putative melatonin nuclear receptors) in both melatonin-induced proliferation inhibition and apoptosis.

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