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Prostate cancer and novel ways to deliver melatonin

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Prostate cancer is the major cause of cancer death in men and angiogenesis has been shown to play a critical role in the progression of the disease.

The anticancer activity of the indole melatonin (MT) has been explained to be due to its immunomodulatory, anti-prolferative and anti-oxidant effects, whereas at present no data are available about its possible influence on the angiogenesis in prostatic cancer, which has been shown to be one of the main biological mechanisms responsible for tumor dissemination [1].

Hence, this study tested whether MT is active in prostate cancer therapy and speculated about the possible mechanism underlying this activity. Moreover, alternative ways to deliver the indole molecule were also evaluated.

To this purpose, an in vivo model of human prostate tumor LNCaP cells xenografted into nude athymic mice was used. MT has been administered i.p. as saline (1 mg/kg, n=13) and encapsulated into solid lipid nanoparticles (SLN) (1mg/kg n=13) or transdermally by Criopass therapy (4 mg/kg, n=14). For all treatments the administration schedule was for 6 weeks, 3 treatments for week. For each treatment controls were also included. At the end animals were sacrificed and the tumors evaluated for size, morphology and biochemical markers.

The mean tumor volume/body weight (2.62±1.92 mm^3/g, n=49) of all MT-treated groups at sacrifice was significantly lower vs controls (5.98±1.56 mm^3/g, n=25). Vascularization was impaired in all MT treated tumors, and nuclear positivity for Ki 67, a cellular marker for proliferation, showed a decrease. Laser treatment alone showed a mild effect, magnified by MT addition.

In conclusion we confirmed the efficacy of MT in impairing cancer angiogenesis and proliferation and the efficacy of different alternative and novel ways to deliver MT on prostate tumor which use may be easily transferred also to clinical trials on humans.

References

[1] Kim et al. (2013) Melatonin suppresses tumor progression by reducing angiogenesis stimulated by HIF-1 in a mouse tumor model. J Pineal Res 54(3): 264-70.

Key words
Prostate, cancer, proliferation, angiogenesis.