Melatonin inhibits breast cancer cell invasion through modulating DJ-1/KLF17/ID-1 signaling pathway

Gamal H El-Sokkary, Ismail Ahmed Ismail, Saber H Saber

Abstract:

Breast cancer is the most common neoplastic disorder diagnosed in women. The main goal of this study was to explore the effect of melatonin against breast cancer metastasis and compared this with the actions of taxol (a well-known chemotherapeutic drug), and the impact of their combination against breast cancer metastasis. Melatonin showed no cytotoxic effect while taxol showed antiproliferative and cytotoxic effects on MCF-7 and MDA-MB-231 cells. Furthermore, melatonin inhibited the generation of reactive oxygen species. Melatonin and taxol clearly decreased cell migration and invasion at low doses, especially those matching the normal physiological concentration at night. Melatonin and taxol markedly reduced DJ-1 and ID-1 and increased KLF17 messenger RNA and protein expression levels. The present results also showed that melatonin and taxol induced GSK-3β nuclear and Snail cytosolic localization. These changes were accompanied by a concurrent rise in E-cadherin expression. The above data show that normal levels of melatonin may help in preventing breast cancer metastasis through inhibiting DJ-1/KLF17/ID-1 signaling pathway. The combination of melatonin and taxol is a potent candidate against breast cancer metastasis, better than using melatonin or taxol as a single drug.

Keywords:

breast cancer invasion - DJ-1 - KLF17 - melatonin - taxol

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