POTENTIAL ROLE OF MELATONIN IN BREAST CANCER CELL LINES UNDER ACUTE ACIDOSIS

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Introduction: Cancer progression is a multistep process strongly influenced by the physical properties of the tumor microenvironment. Tumor cell survival relies upon adaptation to the acidic conditions of the tumor microenvironment, thus the control of these adverse conditions is a promising tactic in limiting cancer development. Melatonin, hormone naturally secreted by pineal gland, appears to play multiple roles in cancer and it is proposed as an extreme environment keeper, hindering the survival of these cells. Objectives: To investigate the potential use of melatonin in the acidosis survival mechanisms, it was evaluated its effect in low pH of estrogen receptor (ER) positive breast cancer cell line (MCF-7) and ER negative (MDA-MB-231). Materials and Methods: Cell lines were exposed to DMEM supplemented with 25 mmol/L buffer 2-(N-Morpholino) ethanesulfonic acid (MES) (pH 6.7) and treated with melatonin (1mM) for 12 and 24 hours. After treatment, cell viability was measured by MTT assay and immunoexpression of Ki-67.

Results: There was a decrease of both MCF-7 and MDA-MB-231 cell viability under acute acidosis conditions (p<0.05). Both melatonin treatment (12 and 24 hours) were more effective in reducing cell viability in acidosis conditions when compared with cells under acidosis without treatment (p<0.05). Immunohistochemical analysis showed that acidosis conditions did not alter the cellular proliferation (p>0.05) and melatonin treatment confirms the decrease the cell proliferation under acidosis in both cell lines (p<0.05). There are no difference when compared melatonin treatment for 12 hours and 24 hours (p>0.05).

Conclusions: Our results show that acute acidosis reduces the viability of breast cancer cell lines and melatonin treatment is effective, leading to decrease the cell viability and proliferation under acute acidosis. In addition, the effect of melatonin was also evaluated in chronic acidosis conditions in order to confirm its potential effectiveness in the extreme tumor microenvironment.

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