**Proapoptotic and antiproliferative activity of sodium orthovanadate and sodium ascorbate association**

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**INTRODUCTION**: Cancer cells often exhibit high levels of ROS and low antioxidant defense activity. Evidence demonstrates the possible involvement of vanadium in redox reactions associated with ROS generation. In addition, the overexpression of GLUT transporters in cancer cells may increase the uptake and accumulate ascorbate which have been described possess anticancer effects. The aim of this study was to evaluate sodium ascorbate ability to potentiate the toxicity of sodium orthovanadate (Na3VO4) in tumor cells. **MATERIAL AND METHODS**: T24 cells were used to evaluate cytotoxicity, inhibition of cell proliferation, generation of ROS and protein expression. Cells from Ehrlich ascites carcinoma-bearing mice were used to determine the tumor growth inhibition and the type of tumor cell death in vivo by flow cytometry analysis. **RESULTS AND DISCUSSION**: Na3VO4 was cytotoxic against T24 cells (IC50 = 5.8 µM at 24 h), but in the presence of ascorbate (100 µM) the IC50 fell to 3.3 µM. Na3VO4 plus ascorbate caused a strong inhibition of cell proliferation (up to 20%) and increased the generation of ROS. The tumor growth inhibition was superior by up to 80% when the animals’ treatment combined orthovanadate and ascorbate and potentiated apoptosis in tumor cells from mice treated with Na3VO4. Apoptosis induced by orthovanadate and ascorbate is closer related to inhibition on Bcl-xL and activation of Bax. Our data apparently rule out a mechanism of cell demise p53-dependent or related to Cdk2 impairment. **CONCLUSIONS**: The results indicate that ascorbate plus Na3VO4 caused proliferation inhibition, apoptosis induction and ROS generation could be involved in action mechanism of these effects.

Keywords: orthovanadate, ascorbate, antitumor, antiproliferative, apoptosis

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