Paclitaxel Induces Apoptosis in Human Osteosarcoma Cells (143B)

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INTRODUCTION:

Osteosarcoma is the most common form of primary bone malignancy. It is characterized by the production of defective osteoid, or immature bone. Osteosarcoma most commonly develops in regions around long bones, especially in the lower extremity. We studied the effect of paclitaxel (Taxol) on the human 143B osteosarcoma cell line.

Paclitaxel, originally isolated from the Pacific Yew tree *Taxus brevifolia*, is a chemotherapeutic agent with cytotoxic affects in a wide range of cancers. The drug is currently used alone or in combination with other drugs to treat many human malignancies, such as breast cancer, ovarian cancer, lung cancer, and head and neck cancer. The drug can also be used with radiation therapy to create a stronger antitumor effect.

We found that paclitaxel treatment induced apoptosis of the 143B cells. We also treated the 143B cells with PD98059 (PD), a MEK inhibitor, and a combination of paclitaxel and PD.

PD is a pharmacologic inhibitor of the MAPK/ERK 1/2 pathway. This pathway is important in controlling cell growth and differentiation.

MATERIALS AND METHODS:

Cell Line and Cell Culture

Human 143B osteosarcoma cells were kindly provided by Drs. Hue H. Luu, Rex C. Handon, and Tong-Chuan He, University of Chicago Medical Center, IL. The 143B cell line is a transformation of the HOS osteosarcoma cell line with Ki-ras. The 143B cells were cultured in low-glucose Dulbecco’s Modified Eagle Medium (DMEM) with 10% fetal bovine serum (FBS) and 1% Penicillin/ Streptomycin (PS).

Cell Viability Assay

After treatment of the 143B cells with paclitaxel for 24 hours, the MTT Cell Proliferation Assay was performed. Absorbance values were measured and normalized cell viability (%) was calculated.

Treatment of 143B Cells with Paclitaxel and PD

Paclitaxel was purchased from Sigma-Aldrich. Stock solutions were dissolved in dimethyl sulfoxide (DMSO). PD was purchased from Calbiochem, and was also dissolved in DMSO. We treated the 143B cells with paclitaxel, PD and a combination of paclitaxel and PD for 6, 24 and 48 hours.

RESULTS:

Treatment of 143B cells with paclitaxel for 24 hours resulted in decreased cell viability, as determined by the MTT assay (see Fig. 1). This effect was seen with concentrations as low as 0.5µM paclitaxel.

![Figure 1. Percent viable cells after treatment with 0.5-50µM paclitaxel for 24 hours.](image)

DISCUSSION:

In our study, we found that treatment with the chemotherapeutic agent paclitaxel induced apoptosis in the human 143B osteosarcoma cells. We also observed apoptosis when paclitaxel treatment was combined with PD treatment. Future studies will investigate the effect of treatment of osteosarcoma cells with paclitaxel and the combination of paclitaxel and PD.

Paclitaxel is an important antitumor drug used in the treatment of a variety of cancers. Further research is necessary to characterize the drug’s cytopathologic effects in osteosarcoma cells. These studies may spark the development of new phase II clinical trials to test the efficacy of paclitaxel in the treatment of human osteosarcoma.

REFERENCES: