CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
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Project Number
S1515

Project Title
The Effects of a Fatty Acid Synthase Inhibitor on Multi-drug Resistant Ovarian Cancer Cells

Abstract

Objectives/Goals
The objective is to determine the effect of a fatty acid synthase inhibitor on multi-drug resistant ovarian cancer cells compared to drug sensitive ovarian cancer cells.
Hypothesis: Multi-drug resistance reduces the endoplasmic reticulum stress response in ovarian cancer cells after treatment with Orlistat.

Methods/Materials
Cell viability was tested with the drug Orlistat to both the drug resistant and drug sensitive cancer cells with a trypan blue exclusion. The SRB assay was then conducted to compare cell viability after treatment with Orlistat. Finally a Coomassie stain was conducted to qualitatively assess the proteins in both ovarian cancer cell lines before and after Orlistat treatment.

Results
Treatment of ovarian cancer cells with Orlistat dramatically reduces cell proliferation as determined by the trypan blue exclusion assay. After a 72 hr orlistat treatment, the multi-drug resistant ovarian cancer cells, NCI/ADR, showed growth recovery, while the sensitive cells, OVCAR-8 continued to decline.

Conclusions/Discussion
As shown by the trypan blue exclusion and the SRB assay, there was resistance to Orlistat in the multi-drug resistant ovarian cancer cells. The Coomassie stained gel showed obvious differences in protein profiles between the two cell lines and between the treated and untreated cells. A Dual-Luciferase Reporter Assay will be performed with a DNA plasmid that responds to endoplasmic reticulum stress (GRP78-Luc). This will be compared to a control plasmid (pGL3) and a standard unit our internal control (Renilla plasmid) by measuring the amount of luminescence in a luminometer. The plasmids will be transfected into the both drug resistant and drug sensitive ovarian cancer cells. The luciferase reporter would be able to compare GRP78, which will show endoplasmic reticulum stress, activity between drug resistant and drug sensitive cells after Orlistat treatment.

Summary Statement
To determine the effect of a fatty acid synthase inhibitor (Orlistat) on multi-drug resistant ovarian cancer cells compared to drug sensitive ovarian cancer cells through several approaches.

Help Received
Jason Bush PhD, California State University Fresno