CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)

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Project Number

S0510

Project Title

Identification of NUSAP1 as a Novel Therapeutic Target for Aggressive Prostate Cancer

Abstract

Objectives/Goals

One in 7 men are diagnosed with prostate cancer, and there is currently no viable treatment for aggressive, recurrent prostate cancer. Thus, there is a need to identify novel therapeutic targets for aggressive prostate cancer post radical prostatectomy. NUSAP1 has recently been identified as a biomarker for aggressive prostate cancer. I hypothesized that NUSAP1 overexpression would promote cancerous behavior by increasing cancer cell proliferation as NUSAP1 is involved with mitosis.

Methods/Materials

I evaluated cell invasion, migration, proliferation, and morphology in androgen sensitive and insensitive cell lines. The phenotypic behavior of 22RV1 (androgen sensitive) and DU145 (androgen insensitive) human prostate cancer cells was explored in tissue culture. RNA extraction, cDNA synthesis, and RT-qPCR were performed to verify the knockdown and overexpression of NUSAP1. Cell invasion, migration, and proliferation assays were performed and optimized per cell variant. Cell morphology was characterized qualitatively. Statistical significance was determined through hypothesis testing.

Results

NUSAP1 overexpression was stably supported by androgen insensitive cells. NUSAP1 overexpression induced a two fold increase in the invasion and a four fold increase in the migration of androgen insensitive cells. Cell proliferation and morphology remained unaffected in both cell lines.

Conclusions/Discussion

NUSAP1 appears to regulate the phenotypic expression of androgen insensitive prostate cancer. As NUSAP1 knockdown resulted in rapid cell death for both cell lines, NUSAP1 is a novel therapeutic target for aggressive prostate cancer. After clinical and in vivo evaluation of the effect of NUSAP1 overexpression, the development of a drug for targeted interference of NUSAP1 expression in prostate cancer cells may be commenced. In conjunction with cancer immunotherapies, this may present a novel therapy for aggressive prostate cancer.

Summary Statement

The evaluation of cell invasion, migration, proliferation, and morphology in androgen sensitive and insensitive cell lines to identify NUSAP1 as a novel therapeutic target for aggressive prostate cancer.

Help Received

I am grateful to Dr. James Brooks and Dr. Catherine Gordon from the Department of Urology, Stanford University for mentoring and providing laboratory resources.