CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)

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Project Number

34559

Project Title

Biomarkers in Risk Prediction Model (RPM) Predicting Recurrence in Patients with Ductal Carcinoma in situ (DCIS)

Abstract

Objectives/Goals

DCIS is heterogeneous without clear prognostic indicators for recurrence defined in terms of DCIS or IC. While the Van Nuys Prognostic Index (VNPI) has been used clinically for predicting recurrence, there has been no good biomarker(s) that predict outcome in DCIS patients. Cancer Genome Atlas Network (Perou et al, Nature 2012) have identified specific novel gene mutations in GATA 3 and FOX A1 which exhibited strong association with Luminal A subtype. The purpose of study is to build a model that is based on a set of highly relevant biomarkers that could be used in predicting recurrence in DCIS patients.

Methods/Materials

Tumor blocks of 291 patients with DCIS were retrieved from tumor registry database. Out of these only 219 cases that had complete (clinical, radiological, treatment) follow up information were chosen for the study. The equipment used for study included microtome, Leica Bond Max Autostainer and Antibody kits. Formalin fixed, paraffin-embedded tumor blocks of tissue samples were cut by microtome to obtain blank sections. Immunohistochemistry (IHC) staining method was performed on these slides. IHC is the process of detecting antigen (protein) binding to antibody.

Netica and Graph Pad Prism were used for statistical analysis.

Results

We are reporting the results of biological marker expression in terms of recurrence and ER status. We have stratified patients into ER (+) and ER (-) groups since patients with ER (+) invasive cancers have exhibited longer disease free interval and overall survival than ER (-) patients. ER (-) patients have expressed lower GATA-3 expression ($p<0.05$), higher HER2 expression ($p<0.05$), and higher proliferation rate for Ki-67 ($p<0.05$) along with higher recurrence rate either as DCIS or IC.

Conclusions/Discussion

Our study was the first to analyze novel transcription factors FOX A1 and GATA 3 biomarkers in a large cohort of cases with 15+ years of follow up to predict recurrence in DCIS patients. The predictive model can be used (1) by physicians and patients in monitoring and aggressively pursuing treatment options without waiting for the onset of recurrence. (2) In developing targeted therapies for FOX A1 and GATA 3 biomarkers in patients.

Summary Statement

The goal of my project is to build a model to predict recurrence based on a set of highly relevant biomarkers and subsequently develop potential therapeutic targets in precancerous progression of breast cancer.

Help Received

Used lab equipment at Hospital under the supervision of Dr Chivukula