Susan G. Komen for the Cure
Research Grants – Fiscal Year 2012

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**Hormone Receptor-Specific Cancer Risk Biomarkers in Benign Breast**

**Investigator(s):** Seema Khan, M.D.

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Awarded: $899,802.00

**Grant Mechanism:** Investigator Initiated Research

**Public Abstract:**
The prevention of breast cancer will contribute to the elimination of a source of suffering and death for women around the world. Since all prevention medications cost money and have side effects, accurate identification of high risk women is crucial. Current methods of breast cancer risk prediction are poor (about a tenth better than a coin toss). Moreover, present risk estimation methods cannot separate women who will develop hormone receptor (HR) positive breast cancer from those who will develop HR negative breast cancer. This is important because HR positive breast cancer can be prevented with medications like tamoxifen but tamoxifen and similar medications do not prevent HR negative breast cancer. We have discovered RNA and microRNA markers in the contralateral unaffected breasts (CUB) of women with breast cancer (compared to normal breast reduction tissue). The patterns of these markers in the CUB of women with HR positive breast cancer are different from those with HR negative breast cancer. We hypothesize that similar differences exist in the benign breast biopsy (BBB) samples of women who subsequently developed breast cancer (cases), compared to women who had a benign biopsy but never developed breast cancer (controls). We propose to use BBB samples of 300 cases and 300 controls to validate our candidate markers for the prediction of 1) overall risk of breast cancer and 2) risk of HR positive versus HR negative breast cancer. If we succeed, we can offer anti-hormonal prevention to women at risk for HR positive breast cancer, since they will benefit from it, and design additional studies to find medications for women who are unlikely to benefit from anti-hormone medications for breast cancer prevention. In future studies, we plan to test these validated markers in samples that are obtained from all women through minimally invasive methods such as fine needle biopsy and nipple aspiration, so that women who desire accurate risk assessment but do not need a diagnostic breast biopsy can also avail themselves of this information.