



Role of Vitronectin as a potential Serum Biomarker for Breast Cancer Prognosis

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Abstract:

Introduction: Breast Cancer is the most common form of cancer in women worldwide, impacting nearly 2.1 million women each year. In 2018, nearly 627,000 women died of breast cancer, which accounts for 15% of all cancer deaths. Identification of new biomarkers could be key for early diagnosis and therefore, increase the survival. Vitronectin, a glycoprotein that is abundantly found in serum, extracellular matrix, and bone, binds to integrin alpha V beta 3, and promotes cell adhesion and migration. Current studies indicate that patients with amplified Vitronectin copy-number have lower survival rates than patients without amplified Vitronectin. In this study, we focused on the role of vitronectin in breast cancer survival and its functional role as a non-invasive biomarker for early stage and stage specific breast cancer detection.

Materials and Methods: To confirm that the expression of vitronectin is amplified in breast cancer, a total of 240 serum samples (n=240) from breast cancer patients were analyzed using the Reverse Phase Protein Array (RPPA) technique. Of the 240 samples, 120 samples were of African American descent, while the other 120 were of Caucasian American descent.

Results: Initial analysis of this data revealed that there were significant racial disparities in vitronectin levels. Specifically, we saw significant differences in HER2+ and LB2 IHC groups as well as recurrent samples. Next, we tried to uncover the underlying mechanism which plays critical role in Vitronectin expression to regulate breast cancer progression. We analyzed the expression of different proteins associated with vitronectin regulating



pathway in four breast cancer cell lines- MCF7, MB231, MB468, and HCC1599. Besides, we also performed a Vitronectin knockdown experiment in MB231 and MB468 cell lines to see the downstream effects. The data indicated that the PI3K/AKT axis is modulating the expression of vitronectin and the pathway is associated with cellular proliferation.

Conclusion: In this current study we characterized vitronectin as a potential serum biomarker for breast cancer progression. The differential level of vitronectin in serum is also associated with breast cancer racial disparities and recurrence of this disease.

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