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Identification and validation of the potential biomarkers Insulin-like growth factor-binding protein acid labile subunit and Vitamin D for breast cancer using Shotgun LC/MS and Western blot analysis

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Breast cancer is the most frequently diagnosed cancer in women, with an estimated 43,909 breast cancer deaths in the US and 70,218 in India for the year 2012. While a majority of breast cancer patients in the US are postmenopausal, more than 80% of Indian patients are younger than 60 years of age, presenting with larger tumor size, poor tumor grade, and low rates of hormone-receptor positive status much like the triple negative breast cancer among African American women who participated in the current study. Because of the aggressive nature of these tumors and current lack of targeted therapies, identification of novel relevant protein markers is of great importance. The purpose of this study was to validate serum proteins that were identified by serum proteomic profiling in 22 serum samples by 2D-DIGE/MS analysis and a subset of samples by shotgun LC/MS technology. This study included 15 African American breast cancer patients and 12 healthy controls. Patients were grouped into triple negative (TN), HER2 and Luminal A and B subtypes. Proteins of biological significance were validated using western blot analysis. For ceruloplasmin, and Insulin-like growth factor-binding protein acid labile subunit (IGFBP-ALS), one-way ANOVA was used to compare mean density among the three groups. For Vitamin D Binding protein (VDB), a two-sample t-test was used to compare the density between the groups. Due to the small sample size, we have also conducted nonparametric tests. IGFBP-ALS was significantly lower in triple negative breast cancer patients ($p=0.016$) and in HER2 ($p=0.025$) subtypes. There was no significant difference in VDB protein in the luminal A and B subtypes ($p=0.98$). Future efforts will focus on validating the identified panel of biomarkers to gain insight into their role(s) in the etiology of aggressive breast tumors in the Indian population. Funded by Susan G Komen for the Cure and SEED grant SPH.

Biography

Padma P. Tadi Uppala, PhD, is an Associate Professor in Environmental Toxicology in the School of Public Health at Loma Linda University, and the Program Director for Inland Empire Breast Cancer Research and Outreach Center, USA. Uppala earned her Ph.D. in Biology with a primary focus on environmental carcinogenesis from Loma Linda University in 1991 and obtained postdoctoral training in Environmental Toxicology at the University of California, Riverside, USA. She earned her MSc. in Parasitology from Kakatiya University, Warangal, India and B.Ed. from Osmania University, Hyderabad, India. She has authored several scientific publications in the area of pesticides and biomarkers for breast cancer. teaching Medical Biochemistry to D.O. students. He is interested in studying the effect of steroid hormones on cancer using mouse and human melanoma cell lines as model systems.

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