A Plasma Protein Profile Predicts Breast Cancer Metastasis to Bone

S. Byrum[1], K. Leitzel[2], S. M. Ali[3], A. Lipton[2], L. J. Suva[1];
1. University of Arkansas for Medical Sciences, Little Rock, AR;
2. Penn State/Hershey Medical Center, Hershey, PA;
3. Penn State/Hershey Med. Center; VAMC, Lebanon, PA, Hershey, PA;

Background and Objective: Bone is a common site for the spread of breast cancer. The purpose of this study was to identify a discriminatory protein signature indicative of breast cancer metastasis to bone that could provide a means for the early detection of disease.
Methods: Plasma was obtained from 76 breast cancer patients treated with second-line hormone therapy: 38 patients with clinical evidence of bone metastasis and high levels of the resorption marker N-Telopeptide (NTx), and 38 patients with no clinical evidence of bone metastasis and low levels of NTx. Samples were analyzed using surface-enhanced laser desorption/ionization time-of-flight mass spectrometry (SELDI-TOF MS). All spectra were preprocessed and analyzed by analysis of variance (ANOVA), principle component analysis (PCA), random forest (RF), classification and regression trees (CART), and See5.
Results: SELDI-TOF-MS identified thirteen peaks (MW ranging from 4.1-39.1kDa) that separated the two groups with a high degree of significance ($p<0.05$). .
Discussion and Conclusions: SELDI-TOF MS identified a plasma protein profile that optimally distinguishes breast cancer patients with and without bone metastasis. Confirmation of the clinical utility of this plasma bone metastasis signature is needed in larger studies.

Grant support provided by Carl L. Nelson Chair of Orthopaedic Surgery.