METHODS AND KITS FOR BREAST CANCER PROGNOSIS (Ramot)

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THE NEED

Despite the overall good prognosis of luminal breast cancers, risk of recurrence rises substantially if the cancer had already metastasized to nearby lymph nodes by the time of diagnosis. While lymph node negative patients may benefit from endocrine therapy alone, the standard of care for lymph-node positive patients remains adjuvant chemotherapy. Hence the lymph node status is emphasized as a crucial component in treatment decision-making.

The unfolding of the 'omics' era allowed for the use of large-scale data to assist in the prediction of several important clinical features of cancer, such as the risk for recurrence, tumor aggressiveness and response to therapy, and several commercial assays were developed as a result, all of them based on gene expression profiling. These include OncotypeDX, Prosigna and MammaPrint, which determine risk of recurrence of luminal breast cancer. While some of these tests are widely used in the clinic, they still suffer from highly inaccurate risk estimates. Proteomics makes a natural complement to the genomic and transcriptomic studies, but in contrast to these, as proteins convey the actual functional properties of cells these much better reflect the cancer phenotype. Mass spectrometry (MS)-based proteomic analyses have undergone a revolution in the past decade, owing to improvements in instrumentation, sample preparation and quantification methods. Current state of the art MS-based proteomics provides accurate, quantitative and wide measures of protein abundance.

TECHNOLOGY

We developed a protein-based signature that determines the metastatic state of luminal breast cancer based on the proteomic profile of the primary tumor. This signature aims to relieve the need for multiple lymph nodes biopsies, which increase inflammation and potential complications. This 15-protein signature was extracted from genome-scale quantitative proteomics research using supervised classification algorithms. It shows high specificity and sensitivity with an AUC of a ROC curve of 0.93. This is the first proteomic signature that allows such a classification.

ADVANTAGES

- Determine the aggressiveness of the tumor already by the initial biopsy
- Obliterating the need for intrusive surgical disruption of the lymph nodes
- Prevent unnecessary systemic treatment.

PATENTS

Patent Pending

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