Laser microdissection in proteomics

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Presently, the application of state-of-the-art technologies from proteomics and functional genomics to the study of cancer is rapidly shifting to the analysis of clinically relevant samples such as biopsy specimens. Studies to identify markers of disease or protein changes that are informative for disease progression must address the problem of tissue heterogeneity that represents one of the most important hurdles we face today for implementing the new technologies. Laser microdissection is now well established as a tool facilitating the enrichment of cells of interest from tissue sections overcoming the problem of tissue heterogeneity.

For any laser microdissection methods, the number of cells required to obtain a 2D protein profile suitable for protein detection and mass spectrometry identification is in the order of 50,000 cells or more, a fact that hindered the use of this technology on a routine basis. Even if a smaller number of cells would be required thanks to more sensitive protein detection procedures one would still need to address the problem of cellular heterogeneity, as immunohistochemistry with a single antibody marker can often detect heterogeneity even in ducts that are composed of a small number of cells. Here we discussed several aspects of laser microdissecton technique (P.A.L.M. Microlaser Technology) as applied to the gel-based proteomic analysis of breast cancer.