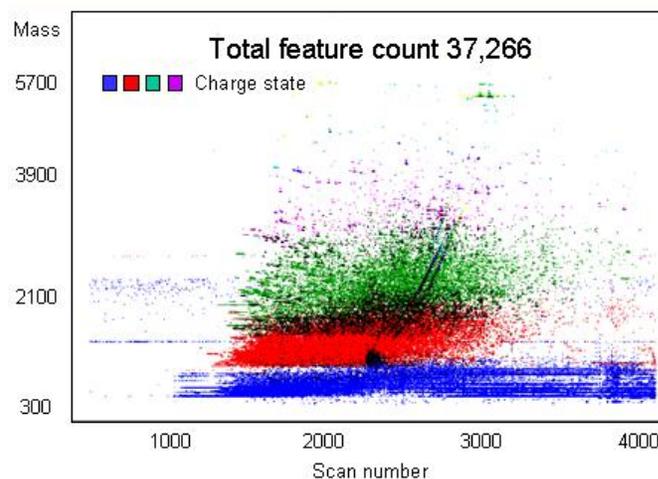


## Newly Found Proteins May Indicate if Breast Cancer Cells will Resist Treatment

*Expertise, instruments at EMSL critical in international study*

At the Department of Energy's EMSL, researchers from Erasmus Medical Center Rotterdam and EMSL studied cancerous cells and identified 55 proteins that vary in abundance between patients responsive to the breast cancer treatment tamoxifen and those that are not. The cells were microdissected from larger tumors. This exacting process, done by scientists at the Rotterdam center, results in pure samples of cancerous cells. The samples, constituting only about 3000 cells, were then packed by experts at EMSL into small inner-diameter capillaries and processed through EMSL's liquid chromatography/Fourier transform mass spectrometer. The data were analyzed using the accurate mass and tag approach. Using this process, the team identified 2000 proteins from each sample procured by laser microdissection. Of these proteins, 55 were different in abundance between those that responded to tamoxifen and those that did not, indicating that a biomarker for resistance to this drug might exist.



*EMSL users determined the relative abundance of thousands of peptides, which led to the identification of 55 proteins that were different in abundance between the patients that responded to the drug and those that did not.*

**Scientific impact:** This study shows the effectiveness of using the accurate mass and tag approach with relatively small clinical samples. With this approach, 2000 proteins were identified that differed between tumors extracted from patients resistant to tamoxifen and those that were not. Previous studies that employed a small number of cells (<10,000 cells) typically identified 20 times fewer proteins. This work is part of EMSL's ongoing efforts to predict biological functions from molecular and chemical data.

**Societal impact:** The drug tamoxifen is used to treat breast cancer; however only about 50 in 100 people taking tamoxifen respond. Of those that respond, the majority eventually develop a resistance to the drug. This study provides data that could aid in isolating a protein or set of proteins that would predict if a patient will respond to the drug or if a different treatment is needed.

For more information, contact EMSL Communications Manager Mary Ann Showalter (509-371-6017).

**References:** Umar AN, H Kang, AM Timmermans, MP Look, ME Meijer-van Gelder, MA den Bakker, N Jaitly, JW Martens, TM Luider, JA Foekens, and L Pasa-Tolic. 2009. "Identification of a putative protein profile associating with tamoxifen therapy-resistance in breast cancer." *Molecular & Cellular Proteomics. MCP*. doi:10.1074/mcp.M800493-MCP200

**Acknowledgments:** This research was funded by the National Institutes of Health's National Center for Research Resources, Dutch Cancer Society, and the National Genomics Initiative/Netherlands Organization for Scientific Research.