

BEST POSTER AWARD WINNER

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Poster #4

High Throughput Two Dimensional Liquid Electrophoresis Platform for Proteome Fractionation

The emerging field of top down proteomics has brought a renewed demand for high quality intact protein separations in the solution phase. This work covers details of our built in-house 2D liquid electrophoretic (2D-LE) platform that involves coupling a charge-based device to a mass-based apparatus. The charge based separation is a form of solution isoelectric focusing (sIEF) [1]. It is a simple, yet effective electrophoretic method to rapidly focus complex proteome samples into eight well resolved fractions according to isoelectric points. The mass based separation device being coupled is a form of preparative gel electrophoresis known as gel-eluted liquid fraction entrapment electrophoresis (GELFrEE) [2] which enables rapid partitioning of a proteome into 15-20 discrete mass range fractions over mass ranges up to 250 kDa. The 2D-LE platform involves coupling the sIEF apparatus to a multiplex eight channel GELFrEE device. A comprehensive separation using the 2D-LE platform was applied on a yeast proteome, resulting in 128 well resolved fractions in a little more than three hours. This work represents the first reported semi-preparative 2D-LE platform that has ever been multiplexed, thereby affording high-throughput comprehensive separations of complex proteome samples.

1. Tran and Doucette, Anal Chem. 2008
2. Tran and Doucette, JPR, 2008

POSTER AWARD WINNER

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Poster #11

Mapping the Influence of Demographic and Health Risk Factors on Cancer Incidence in the United States

Regional variation in cancer incidence in the United States is incompletely understood. In response, we created a hybrid graphical-statistical approach to discovering association between cancer incidence and 32 demographic measures. Dimensionality of the demographic data is reduced through principal components analysis, and two-dimensional cancer maps are created by overlaying the projected American states and the 32 projected demographic measures. Maps are refined by use of hierarchical clustering and stepwise linear regression to identify and illustrate those measures most predictive of incidence. Applied to cancer incidence at all anatomical sites, for males and females combined, 50.7 percent of data variance is explained. Measures of age, race, and state population growth had significant roles. In short, slowly growing states with an older, predominantly white population have higher incidence rates. Our use of age-adjusted incidence data makes the role of age unexpected. Agreement between predicted and actual incidence rates is good for New England states. Maine, however, is the exception. Its actual rate (526.1 per 100,000 per year for 2004) is the highest among the American states and substantially higher than its model-predicted rate (480.9). Cancer incidence in Maine appears to involve factors different than those for other states.