

## Individual Abstract Info

**Session:** Biomarkers and Mass Spectrometry

**Code:** TP24

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### Disease Fingerprinting by MALDI Orthogonal-TOF MS

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#### Introduction:

MALDI mass spectrometry has become an important tool for proteomics researchers. MALDI Orthogonal-TOF mass spectrometry [1-2] provides superior biomarker discovery performance characteristics over traditional axial MALDI systems. Pulsing ions orthogonally into the time-of-flight detection region separates ionization conditions in the sampling chamber from detection. The influence of ionization conditions on mass accuracy is eliminated. The excellent mass accuracy and sensitivity and high resolution achievable over a wider mass range assures high information content in the MALDI spectra. This translates into ease-of-use and higher confidence in the resulting data. The application of a comprehensive suite of in silico machine learning technologies and advanced informatics tools to MALDI Orthogonal-TOF data enables the generation of biomarker fingerprints for diagnostic and drug discovery applications.

#### Methods:

Carrier-protein sample preparation protocols were developed using a novel membrane adsorber: affinity capture of albumin and ion-exchange to capture a broad range of serum carrier proteins. Selective enrichment of the peptide fraction was achieved by targeted elution. MALDI analyses were performed on a commercially available MALDI Orthogonal-TOF mass spectrometer with collisional cooling. A comprehensive suite of advanced informatics tools including a learning mode in which biomarker models are determined (also called a training or discovery mode); and an application mode in which the learned models are applied to classify unknown data samples (a classification mode) will be described. The steps necessary to convert MALDI data into a disease fingerprint will also be presented including: Outlier Rejection, Feature Discovery, and Model Building.

#### Abstract:

Highly reproducible peptide disease fingerprints were detected from serum using both the albumin-based and ion-exchange based approaches. MALDI spectra were used to generate disease fingerprints for Alzheimer's disease and ovarian cancer samples. Use of these fingerprints for the classification of unknown samples will be presented. [1] Chernushevich IV, Ens W, Standing KG, Analytical Chemistry, 1999, 71, 452A. [2] Loboda AV, Ackloo S, Chernushevich IV. Rapid Communications in Mass Spectrometry. Volume 17, Issue 22, Pages 2508 – 2516. A high-performance matrix-assisted laser desorption/ionization orthogonal time-of-flight mass spectrometer with collisional cooling.

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