Protein ID and Biomarker Analysis by Mass Spectrometry: Challenges and Solutions for Quantification and Differential Analysis

Mass spectrometry, as enabled by modern ionization methods such as MALDI and ESI, has dramatically transformed the science of protein identification and quantification. There is a rapidly growing demand for the quantitative analysis of proteins and peptides by LC-MS/MS in the bio-analytical and clinical laboratories. This short course will help attendees deeply appreciate specific challenges associated with successful outcomes in LC-MS based protein analysis. An in-depth view of the practical aspects involved in protein/peptide analysis by LC-MS/MS will be covered and will include case studies from the literature and from the instructor's personal experiences.

The use of nanospray enabled LC-MS has developed from a qualitative tool for (global) proteomics to a quantitative method suitable for activities such as peptide/protein biomarker validation. Key to success has been the combination of highly specific sample preparation methods, high sensitivity nanospray ionization, and high performance tandem mass spectrometry. Critical parameters involved in robust sample preparation, nanobore LC and nanospray, sensitive & selective MS detection along and their analytical benefits will be emphasized. The transition of the qualitative nLC-MS/MS technology to methods suitable for absolute quantification will be discussed. New tools for cloud based data sharing and the underlying principles for biomarker identification and validation by differential mass spectrometry will be presented. Real world examples will be presented. The course will also feature an additional hands-on "connections workshop" to hone your expertise is making high quality LC-MS fluid connections.

The target audience includes analysts that have been engaged in qualitative proteomics wishing to transition to quantitative methods, analysts that have specialized in small molecule quantification, and those involved in the development of methods for clinical outcomes.

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