

New Technologies and Novel Applications

A few topics from novel instrumentation to automated sample processing and method development strategies in LC/MS/MS analysis will be combined in this session.

1) A novel hybrid mass spectrometer for biomarker discovery, metabolite identification, pharmaceutical development and research will be introduced. Coupling atmospheric pressure ionization with Ion-Trap (IT) and Time-of-Flight (TOF) technologies, IT-TOF mass spectrometer delivers high mass accuracy and high mass resolution (10,000 at 1000 m/z) independent of MS mode. Powerful software enables scientists to work with greater confidence in a diverse range of research fields such as impurities identification, biomarker discovery, and metabolite structural verification. Application examples, such as ligand identification in drug discovery; characterization of natural products; and analysis of hormone metabolite, will also be discussed.

2) A novel approach to high-throughput bioanalysis based on online SPE-LC/MS/MS has been proposed. Biological samples such as plasma and urine are loaded to the online SPE system, and matrix is thoroughly removed by online washing so that there is no effect of ionization suppression/enhancement from the matrix, and this allows drugs content as well as chemical structure in biological matrix to be determined in a precise and accurate manner. A high throughput capability to analyze over 200 compounds per day has been achieved.

3) LC-SRM-MS/MS is the standard methodology in bioanalysis. When a drug compound contains two basic functional groups, a mixture of two isobaric $[M+H]^+$ ions may be produced which differ only in the site of the proton attachment. The relative abundance of the two precursor ions as well as the apparent MS/MS fragmentation pattern depends on the experimental conditions. The implication in the LC-MS/MS based bioanalysis will be discussed.

4) Shimadzu's brand-new UHPLC, Nexera, was designed to accommodate the entire spectrum of analytical needs from micro LC to UFLC and UHPLC with the high pressure rating of 130 MPa (up to 3 mL/min). Nexera has the fastest 10-seconds injection cycle time and the carryover specification is less than 0.0015 % before rinsing, which is an improvement by a factor of 3 compared to the widely accepted Prominence series HPLC. This was achieved via reducing the contact surface by 60 % and reengineering the design and materials of key system components. In addition, newly equipped multi-solvent rinsing capability assures virtually no carryover even with the stickiest of compounds. Selected data from real world samples obtained by early adaptors will be discussed.

Workshop Leaders:

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