SCIENCE FOR THE BENEFIT OF HUMANITY

Manjula Donepudi, Ph.D.
Assistant Director
Technology Transfer
(212) 327-7091
mdonepudi@rockefeller.edu

Multi-Quadrupole Ion Trap (MultiQ-IT) for Mass Spectrometers

RU 1065

Technology Summary

Mass spectrometry (MS) has become an indispensable tool for analysis of "precious" biological samples. Despite recent success in increasing the sensitivity and resolution of MS analysis, the majority of current mass spectrometers operate as "sequential-in-time" instruments, which select, manipulate and analyze a limited number of ions during a single analysis cycle. Because of this sequential mode of operation, these instruments exhibit very substantial sample scanning losses associated with this low duty cycle analysis.

Drs. Brian Chait and Andrew Krutchinsky at The Rockefeller University have developed the MultiQ-IT – a novel, high-capacity ion trap designed to explore the concept of performing mass spectrometry in a parallel manner. The device can be used as a splitter of the incoming stream of ions into a large number of concurrent ion beams, each containing ions with specific m/z values. The ion intensities in each beam can be analyzed in real time and in parallel either directly with arrays of detectors or with additional mass spectrometers specifically tuned to detect ions within given m/z ranges. Such simultaneous parallel analysis can reduce or totally eliminate the "scanning losses" characteristic of conventional "sequential-in-time" mass spectrometry analyses. This approach promises to yield gains analogous to those seen in massively parallel computing and state-of-the-art DNA sequencing.

Area of Application: Mass spectrometry instrumentation.

Stage of Development: Prototype developed and tested.

Lead Inventor: Dr. Brian Chait

Patent Information: US Pat. 8,637,817; US Pat. 8,866,076; US App. 14/493,776 pending.

Reference: Krutchinsky A.N. et al, **A novel high-capacity ion trap-quadropole tandem mass spectrometer;** *Int. J. Mass Spectrom. 268:93-105 (2007).*