

Microspray and microflow liquid chromatography, the way forward for LC-MS bioanalysis: Focus on large molecule bioanalysis

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Abstract

It is well known that the efficiency of ionization improves as the liquid flow rate to the source decreases for electrospray ionization. The improved ionization efficiency leads to better MS signal. Microflow liquid chromatography (MFLC) has also been shown to be advantageous for over 40 years. Conventional LC-MS flow rates are in the range of 250-600 $\mu\text{L}/\text{min}$ with column internal diameters of 2.1 mm. Microspray (AKA "high flow nanospray") is technique that typically consists of flow rates of 5-100 $\mu\text{L}/\text{min}$ with column diameters from 0.25-1.0 mm. Microspray and MFLC combined, is a great means to achieve the benefits of improved MS signal from nanospray and optimal analysis times shown by conventional LC-MS flow rates. Reduced solvent usage, more instrument up time (due to "effective sample advantage) and more injections per sample if needed are other advantages of MFLC-MS/MS. Improved HPLC pumps and optimal ESI source design provide additional benefits for LC-MS bioanalysis. Here we report on the use of MFLC-MS/MS for the analysis of large molecules (ADC's, peptides, biomarkers, etc.) from biological fluids.