Development of a Chip-Based Nanobore Column Platform with Universal Connectivity, Column Heating and Sheath Gas Capability

Helena Svobodova1, Peter Wang2, Amanda Berg,1 Gary Valaskovic1
1New Objective, Inc., Woburn, MA USA; 2New Objective, Shanghai, China

Introduction
Nanobore column chromatography has become a method of choice when analyzing small volumes of sample and analyzing high-throughput biological samples requiring temperature control of all chromatographic equipment within a continuous temperature control to improve chromatographic performance. Here we test a newly developed easy-to-use chip-based system enabled with different column lengths, column heating and universal connectivity. The combination of these features provides a high degree of flexibility, allowing researchers to choose a column that best matches the application, and the temperature capability which further expands the possible scope of PicoChip columns (higher than +5°C) and no different MS platforms take not included.1

Methods
Mass Spectrometry
- 1100 Series Top (Thermo)
- Full mass 300-1000 Da
- HPLC PicoChip column with preconfigured tip positioning (New Objective, Inc.)
- PicoChip columns heating is controlled by Change PicoChip Controller

Chromatography
- High-performance 5.5 µm (Alltech)
- Flow Rate: 100 nL/min
- Mobile Phase: A: 0.1% formic acid; B: acetonitrile
- 2 min. linear from 5% B to 25% B
- 2 min. column wash of 99% A
- 5 min. column re-equilibration at 5% B
- HPLC Al-Samplers (Lab Technologies)
- 4-port valve is operated using Agilent instruments (A., Inc.)
- Vial Loop

Temperature and Pressure Measurement
- Thermo HTMS autotemperature and humidity recorder (Thermoelectronic)
- Room temperature recorder was positioned on the nanospray source next to the analytical column and the room temperature was recorded every 60 minutes.

Sample
- BSA Digest (Waters MassPrep)
- Helix Call Digit

Results
- PicoChip® column has sheath gas capability providing columns with different inner diameters, bed lengths and a wide selection of stationary phase materials. The PicoChip® column has sheath gas capability which further expands the possible scope of PicoChip columns (higher than +5°C) and no different MS platforms take not included.1

- Utilized PicoChip column technology on different MS platforms
- Enable the use of PicoChip column technology on different MS platforms
- Use the sheath gas capability to run PicoChip columns at flow rates higher than 1 µL/min.

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Conclusions
- The use of PicoChip® column technology on different MS platforms
- Enable the use of PicoChip column technology on different MS platforms
- Use the sheath gas capability to run PicoChip columns at flow rates higher than 1 µL/min.

Future Work
- Evaluate the temperature stability of different types of gases
- Test the PicoChip® column technology on different MS platforms
- Use the sheath gas capability to run PicoChip columns at flow rates higher than 1 µL/min.

1Future Work
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