

Sensitive Top-down Analysis using Spray-capillary-based CE-MS approaches

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Quantitative analysis of intact proteoforms in mass-limited, complex samples remains challenging due to the low ion intensity in MS detection and peak overlap caused by insufficient separation. While targeted top-down proteomics methods such as parallel reaction monitoring (PRM) have been developed for LC-MS, they typically require microgram-level sample input, limiting their utility for scarce samples. To overcome this, we recently developed an ultrasensitive spray-capillary-based method that enables ultralow-volume sampling and online CE-MS quantitation of intact proteoforms from picogram-level complex samples such as single cell analysis. To further enhance throughput, we recently introduced a multisegmented injection strategy using this spray-capillary platform. By integrating multisegmented spray-capillary CE-MS with PRM, we achieved highly sensitive and targeted quantitation of intact proteoforms at the attomole level with high throughput (e.g., analyzing 7+ samples in less than one hour). This platform demonstrated high selectivity and specificity, enabling high-throughput characterization and quantification.

User consent

yes

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