Liquid Extraction Surface Analysis Mass Spectrometry (LESA-MS): Examples of a New Surface Probing Technique for Clinical and Pre-Clinical Applications

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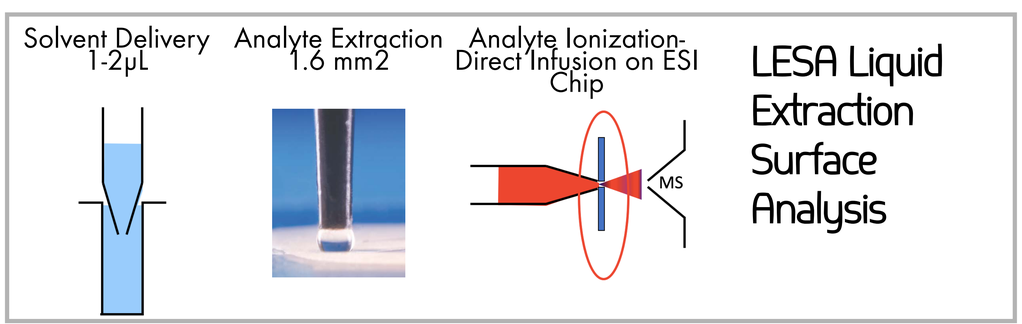
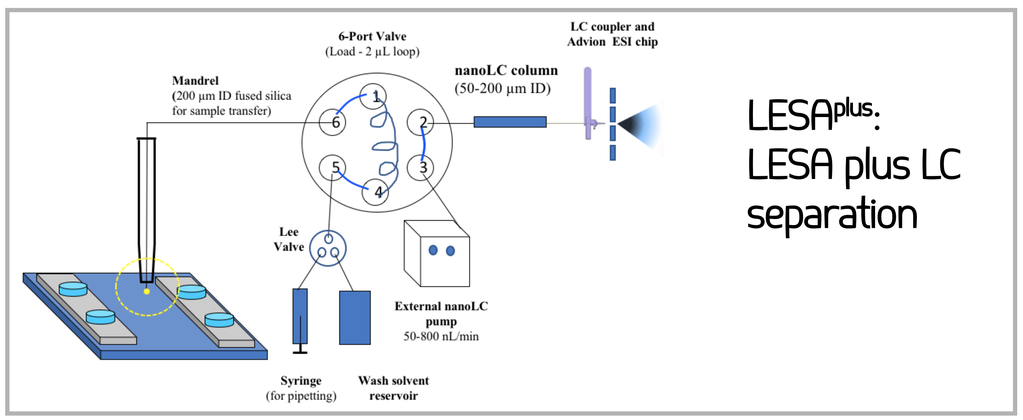
Advion

Introduction

Liquid Extraction Surface Analysis (LESA®) and its combination with liquid chromatography (LESA^{plus} ® LC) are two novel surface analysis tools that utilize localized liquid micro extraction coupled with mass spectrometry detection for spatially resolved information from biological surfaces such as tissues [Ref 1-3].

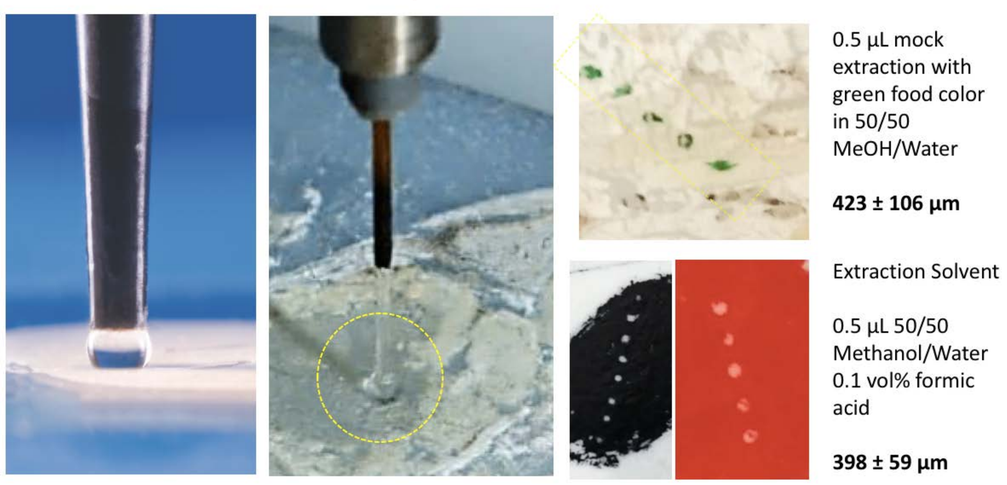
Methodology





Results

LESA and LESA^{plus} Spatial Resolution

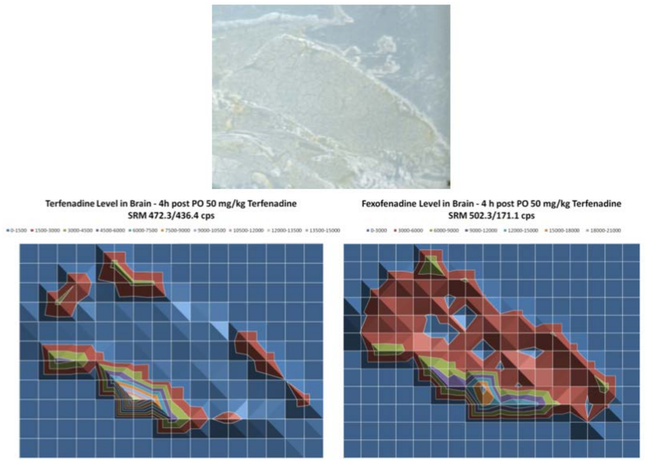


LESA spatial resolution of ca. 1000 µm on tissue target

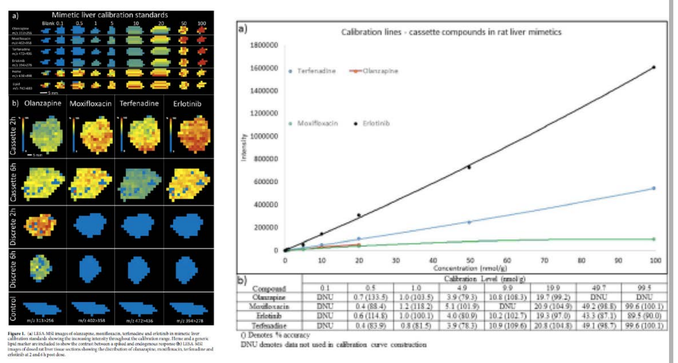
LESA^{PLUS} spatial resolution of ca. 400 µm on tissue target

Results

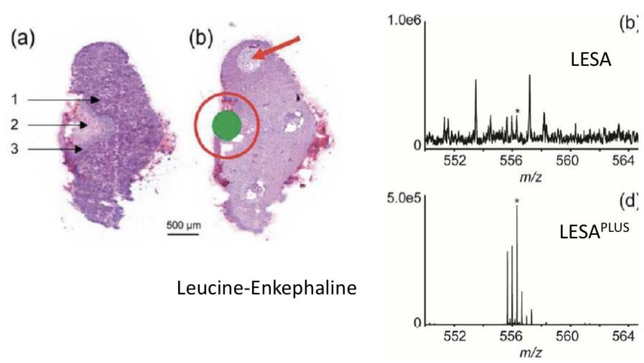
Example 1: Drug distribution after dosage - Blood brain barrier (BBB) crossing [Ref 4]



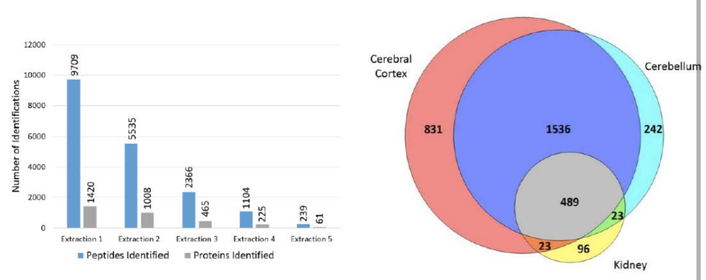
Example 2: Quantitative LESA-MS after cassette dosing [Ref 5]



Example 3: Neuropeptide detection in brain regions by LESA^{plus} [Ref 6]



Example 4: Bottom-up Proteomics from mouse tissue using LESA^{plus} [Ref. 7]



Summary

- LESA and LESA^{plus} liquid chromatography provide novel surface analysis tools for the spatial resolution of analytes from a wide variety of surfaces.
- Whole body or organ sections in particular can be probed for small molecules, lipids and proteins with a resolution of 400 - 1000µm.
- Commercial solution allows for automated processing of samples (Advion TriVersa NanoMate® LESA®).

References

[1] Kertesz and van Berkel Journal of Mass Spectrometry 2010 [2] Kertez and vanBerkel Analytical Chemistry 2010 [3] Almeida AB Sciex European Conference on MS/MS 2011 [4] Eikel et al. Rapid Communication in Mass Spectrometry 2011 [5] Swales at al. Science Report 2016 [6] Lamont et al. Analytical Chemistry 2017 [7] Ryan et al. Rapid Communication in Mass Spectrometry 2017

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