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Mass spectrometry imaging and localized omics studies

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Mass Spectrometry Imaging (MSI) is now a mature analytical technique since its appearance more than fifteen years ago. Its ability to localize a variety of biomolecules on biological section surfaces and its promises in the medical field was underlined from the beginning of the IMS development. However, many years after, it seems that MS imaging in its two main instrumental modes i.e. Matrix-Assisted Laser Desorption-Ionization (MALDI) and Secondary-Ion Mass Spectrometry (SIMS) are still in their early developments for the discovery of biomarkers of diseases. Some recent results have demonstrated that MSI techniques can be used to image low mass endogenous metabolites in addition to proteins in biological tissue sections. By its ability to locate on histologically well-defined areas of tissues previously intractable classes of molecules, MSI offers enormous clinical potential. The reasons for such a delay between the early expectations for the MSI development and the actual applications of the technique for localized proteomics and/or metabolomics is due to many factors, including sample handling, instrumentation or even bio-informatics limitations. Some improvements have led to promising results in localized proteomics and metabolomics and the main goal is now to combine the MS imaging data with biochemical, signalling and metabolic pathways together with histological features. All these various aspects will be discussed in the lecture, in order to highlight the present state and the future trends of MS imaging combined with omics studies.

Biography

Olivier Lapr v te has completed his PhD at the Paris-South University and joined the CNRS Institute of Natural Products Chemistry in 1989. He is now Full Professor of Toxicology, Director of the Research Unit CNRS 8638 of the University Paris Descartes, and Director of the Biological Toxicology Department of the Paris Hospitals. He has published 180 papers in reputed journals and is board member of international journals (*J. Mass Spectrom.*, *Eur. J. Mass Spectrom.*, *Anal. Bioanal. Chem.*). He is past-President of the French Mass Spectrometry Society as well as the French representative at the International Mass Spectrometry Foundation.

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