IMPROVING DRUG EFFICACY EVALUATION WITH MASS SPECTROMETRY IMAGING

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Developing a drug requires to demonstrate its efficacy in preclinical and clinical studies but also to characterize its pharmacokinetic properties. Among them, absorption, distribution, metabolism and elimination benefit from the more and more widespread use of MALDI Mass Spectrometry Imaging in the pharmaceutical industry.

If Quantitative Whole-Body Autoradiography is still a gold standard to support the design of radiolabelled clinical studies, its lack of molecular specificity limits the understanding of the distribution of the drug and its metabolites. On the contrary, the use of high resolution mass spectrometers such as FT-ICR MS allows a quantitative characterization of the metabolic profile of the drug at the tissue level in order to further understand its behaviour in the organism.

As Mass Spectrometry Imaging does not require the long and costly synthesis of a radiolabelled drug, this label-free technique offers a unique opportunity to gain information about the drug and metabolite distribution in the earliest stages of research, making distribution a new tool for target validation or drug selection.

Quantitative MSI allows pharmaceutical researchers to understand quickly drug pharmacokinetics at the tissue level and not only at the blood level, but also contributes to the mechanistic characterization of the drug by imaging at the same time the distribution of potential endogenous biomarkers supporting target engagement and PK/PD studies.

There is no restriction in term of sample and QMSI can be applied in almost all therapeutic fields. Oncology, neurology or dermatology are among the most promising areas where MSI has demonstrated its game changing place.

In this seminar, we propose to illustrate the potential of MALDI-FT-ICR MSI associated to dedicated Multimaging software solution to understand target engagement, efficacy, toxicity or drug formulation selection.