PL01

Imaging mass spectrometry in drug development and environmental toxicology

Charles Pineau [1,2]

[1] *Inserm UMR_S1085, IRSET, Univ Rennes, 35000 Rennes, France*

[2] *Protim Core Facility, BIOSIT - UAR 3480 CNRS - US18 Inserm, Univ Rennes, 35000 Rennes, France*

💻: charles.pineau@inserm.fr

Among the numerous applications of mass spectrometry, MALDI imaging mass spectrometry (IMS) is a truly blooming field in biological research. IMS is widely recognized as a valuable tool for identifying a variety of compounds including metabolites, lipids and proteins from tissue sections, as it also provides spatial and quantitative information about the analytes *in situ*. Hence, IMS has naturally emerged as a robust and versatile technique for drug development pharmacokinetics and toxicological studies. It is particularly powerful for distribution studies as it offers several advantages over conventionally used LC-MS and whole-body autoradiography (QWBA). Indeed, IMS does not require radioactive labeling and can be used for the simultaneous monitoring of a drug and its metabolites directly in tissue sections, thereby preserving the crucially needed spatial information.

Despite the increasing improvements of IMS, the low detection sensitivity of some compounds remains an important challenge to overcome. We will discuss our developments ranging from on-tissue chemical derivatization (OTCD) that consists in modifying the chemical structure of analytes in order to improve their ionization yields to the use and benefits of three-dimensional IMS. Examples will be given on the use of the technology for the development of pharmaceutical drugs and for understanding the mechanisms that underlie the toxicity of environmental pollutants.