

Localomics: Combining Mass Spectrometry Imaging & Microproteomics

Liam A. McDonnell

1. Fondazione Pisana per la Scienza ONLUS, Pisa, Italy.



Liam McDonnell obtained an M_{CHEM} in Chemistry from the University of Oxford, UK, and a PhD in Chemistry from the University of Warwick, UK. Following a post-doctoral researcher position at the FOM institute for Atomic and Molecular Physics in Amsterdam, he started his own research group at Leiden University Medical Center, where he is Associate Professor. He is director of Proteomics at the Fondazione Pisana per la Scienza, and Vice-President of the Mass Spectrometry Imaging Society.

Abstract:

Mass spectrometry imaging (MSI) is able to simultaneously record the distributions of hundreds of molecules directly from tissue. These spatially-resolved molecular information can be combined with multivariate/clustering analysis to reveal regions of tissue with distinct molecular signatures, a process that has been termed MSI-based molecular histology and has been used to reveal tumor subpopulations, metabolically distinct cell layers, and tumor interface zones.

Rapid direct tissue analysis is essential for MSI in order to maintain spatial localization and acceptable measurement times. The absence of an explicit analyte separation/purification step means MSI lacks the depth of coverage of LC-MS/MS. Here, we demonstrate how MSI can be combined with high sensitivity microproteomics, even of the same tissue section.