
Preface

The concept of mass spectrometry imaging (MSI) encompasses a range of powerful analytical techniques, all with the capability to explore the molecular signatures and chemical biology of numerous biological samples. MSI not only provides a molecular snapshot of the tissue sample being analyzed but also allows preservation of the spatial distribution of a target species of interest.

From lipids and metabolites to proteomic macromolecules, MSI can track molecular profiles which can be subsequently aligned to correlate specific anatomical features of the tissue under study. Moreover, it enables the mapping of ion profiles, which could lead to the prediction of functional partners that link biochemical pathways and whole disease networks.

There has been a meteoric advancement over the last 20 years in MSI technology and methodologies, and subsequently this unique process has been adopted as a worldwide complementary research tool featuring in numerous research projects. This protocol series aims to address the various techniques, novel applications of MSI, and its role as a discovery tool in the field of proteomics, lipidomics, and metabolomics. The authors demonstrate through their areas of expertise how MSI can be applied to many areas of research including clinical pathology, translational medicine, toxicology, biomarker and response studies along with the potential integration of MSI into forensic workflows.

In addition to the traditional protocol format of this book, other authors discuss novel image processing, future models of disease, and ethical issues in an MSI context. Furthermore, the potential amalgamation of the research scientist and clinician is discussed, bringing innovative bench technologies into the clinical setting.

Collaborative research, networking, and scientific partnerships are crucial in the progression of exciting techniques such as MSI, and this book is a testimonial to the union of likeminded “mass spec” scientists. The authors who have kindly contributed to this protocol series on MSI comprise past and present colleagues and fellow MSI enthusiasts, with many of whom I have enjoyed enlightening scientific discussion whether it be at a conference or simply over a coffee.

Mass spectrometry has enabled me to add the “edge” to my biomedical themed research interests and forge many friendships and collaborations, thus allowing me to connect with scientists throughout Europe, America, and Australia which for me began in my current place of work, the Centre for Mass Spectrometry Imaging Mass Spectrometry Imaging, directed by Professor Malcolm R. Clench within the Biomolecular Sciences Research Centre, Sheffield Hallam University, lead by Professor Nicola Woodroffe

Ultimately the authors herein work directly or in collaboration with mass spectrometry and aim to push the boundaries of biological molecular mapping from atoms to supramolecular complexes.

Sheffield, South Yorkshire, UK

Laura M. Cole

Imaging Mass Spectrometry

Methods and Protocols

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