

MALDI imaging mass spectrometry for direct tissue analysis: a new frontier for molecular histology.

Prof. Dr. Axel Walch, Institute of Pathology, Helmholtz Zentrum München, Deutsches Forschungszentrum für Gesundheit und Umwelt (GmbH), Ingolstädter Landstrasse 1, 85764 Neuherberg, Germany.
axel.walch@helmholtz-muenchen.de

Abstract

Matrix-assisted laser desorption/ionization (MALDI) imaging mass spectrometry (IMS) is a powerful tool for investigating the distribution of proteins and small molecules within biological systems through the in situ analysis of tissue sections. MALDI-IMS can determine the distribution of hundreds of unknown compounds in a single measurement and enables the acquisition of cellular expression profiles while maintaining the cellular and molecular integrity. In recent years, a great many advances in the practice of imaging mass spectrometry have taken place, making the technique more sensitive, robust, and ultimately useful. In this overview, we focus on the current state of the art of MALDI-IMS, describe basic technological developments for MALDI-IMS of animal and human tissues, and discuss some recent applications in basic research and in clinical settings.