

# Imaging Mass Spectrometry

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Imaging mass spectrometry combines the chemical specificity and parallel detection of mass spectrometry with microscopic imaging capabilities. The ability to simultaneously obtain images from all analytes detected, from atomic to macromolecular ions, allows the analyst to probe the chemical organization of a sample and to correlate this with physical features. The sensitivity of the ionization step, sample preparation, the spatial resolution, and the speed of the technique are all important parameters that affect the type of information obtained. Recently, significant progress has been made in each of these steps for both secondary ion mass spectrometry (SIMS) and matrix-assisted laser desorption/ionization (MALDI) imaging of biological samples. Examples demonstrating localization of proteins in tumors, a reduction of lamellar phospholipids in the region binding two single celled organisms, and sub-cellular distributions of several biomolecules have all contributed to an increasing upsurge in interest in imaging mass spectrometry. Here we review many of the instrumental developments and methodological approaches responsible for this increased interest, compare and contrast the information provided by SIMS and MALDI imaging, and discuss future possibilities.

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