

[FULL SPECTRUM MOLECULAR IMAGING]

SYNAPT™ XS
High Definition Mass Spectrometry™

Full Spectrum Molecular Imaging

COMPREHENSIVE VISUALIZATION
OF MOLECULAR DISTRIBUTIONS



Waters
THE SCIENCE OF WHAT'S POSSIBLE.™

The spatial distribution of molecules, determined by MS imaging, can provide a wealth of information regarding biological, physiological, and chemical features and processes.

Waters Full Spectrum Molecular Imaging represents a combination of advanced Mass Spectrometry (MS) imaging technologies, designed to deliver high quality, comprehensive, spatially resolved molecular information across a variety of application areas and with the minimum of time and effort.

Confidence is assured through the coupling of high performance ion mobility separation with high resolution MS, while a choice of complementary ionization techniques provides flexibility and delivers multi-layered, information-rich data from a single sample.

This provides a more complete and comprehensive picture of the sample, through mapping the distributions of a variety of molecule types including small molecules, drugs and metabolites, lipids, and peptides.

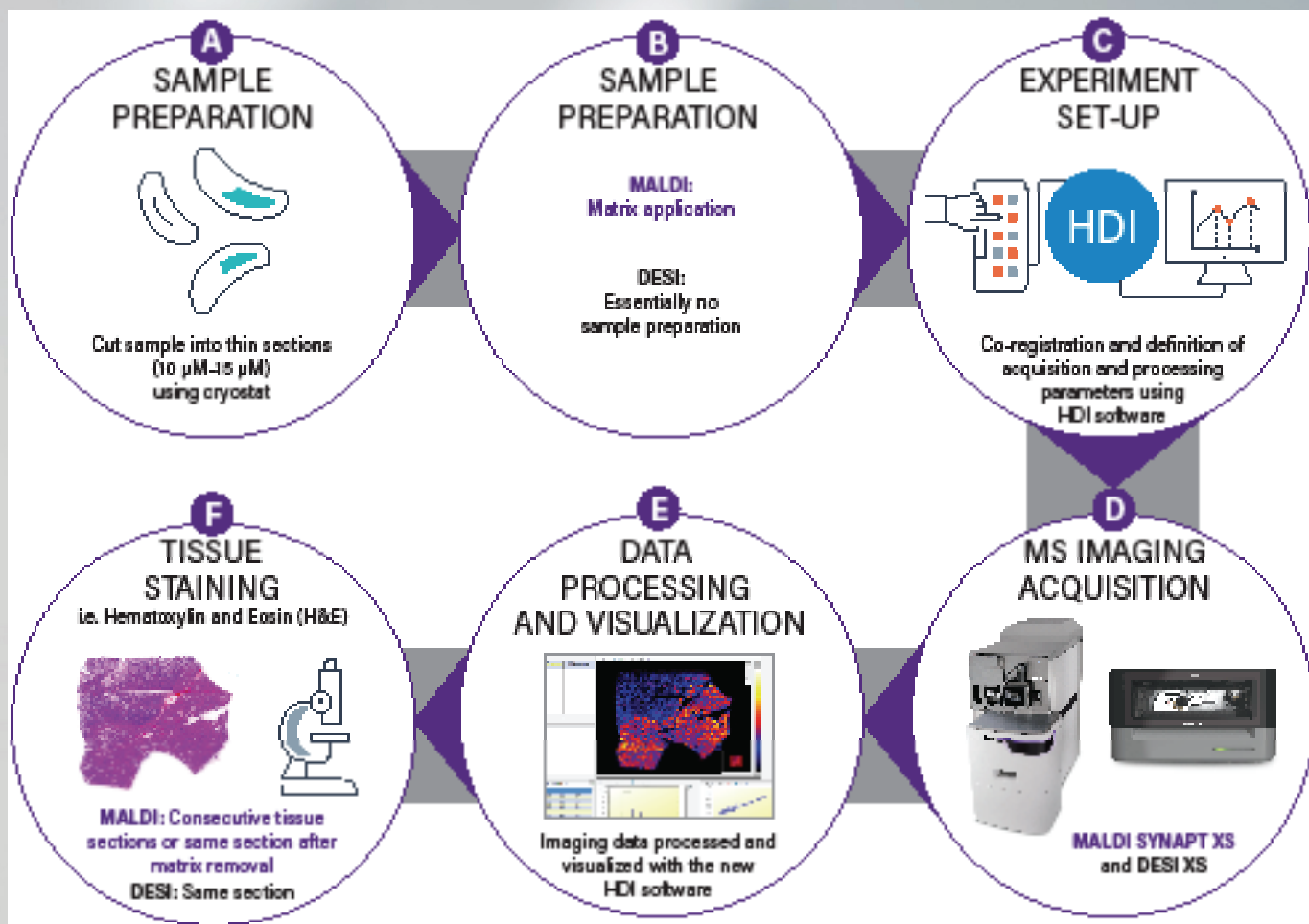
An intuitive, fully integrated workflow translates complex samples into meaningful answers faster and easier than ever before, while single-vendor system-level support guarantees compatibility, maximizes productivity, and brings peace of mind for the future.



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DESI/MALDI Combination Workflow

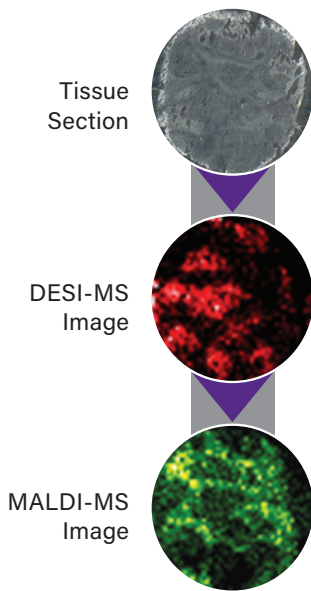
The spatial distribution of molecular species in a sample can provide a wealth of information about biological, chemical, and physiological processes. Mass spectrometry imaging with DESI* and MALDI* produces label-free, multiplexed, and objective measurement of molecular targets from complex surfaces. Combine that with Ion Mobility and SONAR and you have a unique toolbox for the investigation of molecular distributions.



Multiple Imaging Experiments with the Same Sample

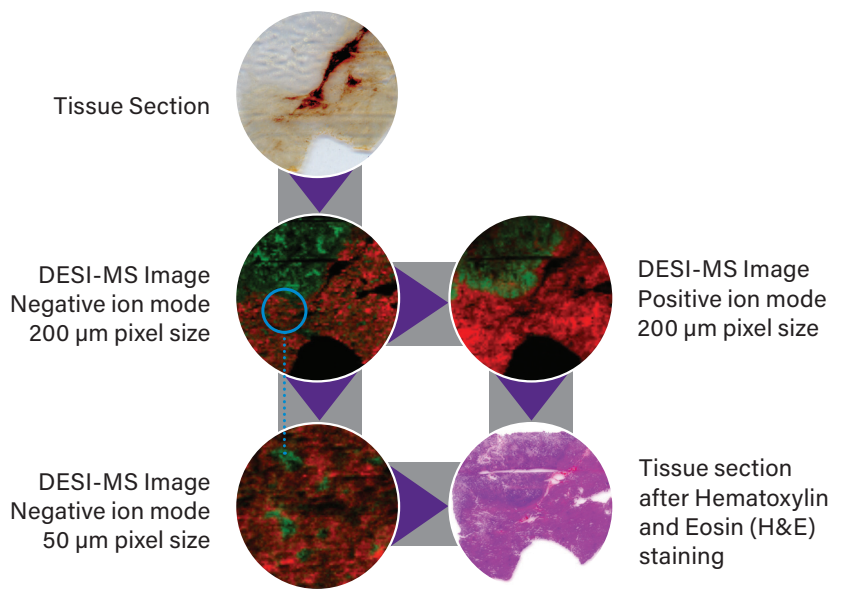
Many applications demand the maximum amount of information from the minimum of sample. The non-destructive nature of DESI means that a single tissue section can be analyzed multiple times, for example at different spatial resolutions or using different polarities, without significant degradation of signal or modification of chemical signature. Following multiple DESI analyses, the same tissue section can then be used for either histological staining (see DESI – Staining Workflow) or analysis by MALDI MS imaging (see DESI – MALDI workflow).

DESI - MALDI WORKFLOW¹



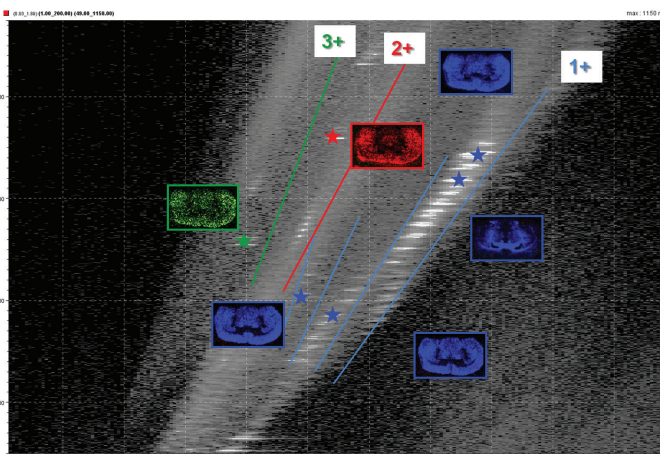
Repeat analysis of the same tissue sample using DESI imaging followed by MALDI imaging, highlighting the flexibility of DESI to fit into existing workflows, and the complementary nature of the two imaging techniques.

DESI - STAINING WORKFLOW¹



Repeat analysis of the same sample using DESI imaging under different analytical conditions followed by histology staining, highlighting the ability to obtain maximum information from the minimum amount of sample.

COMBINE MS IMAGING WITH THE POWER OF ION MOBILITY²



Ion mobility allows the gas phase separation of ions by compound class and charge in an MS imaging experiment.

Unlike UPLC-MS, MS imaging does not involve any form of separation prior to ionization. The resulting data are often highly complex due to the level of detail observed and the potential for background interferences.

SYNAPT HDMS enables the powerful combination of MALDI and DESI imaging with ion mobility-mass spectrometry. This allows the gas phase separation of ions by compound class and charge in an MS imaging experiment, providing a level of selectivity that would not be possible with mass resolution alone.

The result of this is cleaner imaging data, allowing the more precise visualization of molecular distributions in the presence of background.

BRINGING TOGETHER POWERFUL TECHNOLOGIES IN A
Single System Solution



MALDI* IMAGING

- Excellent spatial resolution
- Wide variety of applications
- Well established MS imaging approach



DESI‡ IMAGING

- Minimal sample preparation
- Excels at lipid and small molecule imaging
- Enables multiple imaging experiments on the same sample

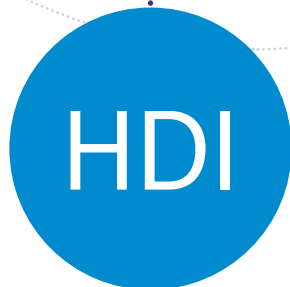


SYNAPT XS HDMS[†]

- Enhanced selectivity with a unique combination of ion mobility separation and SONAR
- Proven robustness and reliability
- Superior performance for low molecular weight compounds
- Highly efficient fragmentation by low energy collision induced dissociation (CID)
- Performance unaffected by variations in sample surface topography

FULL SPECTRUM MOLECULAR IMAGING

- Discover, identify and measure a broad range of molecular targets with one system
- Obtain more comprehensive, detailed information than from any individual imaging technique
- Extract the maximum amount of information from minimal sample
- Definitively and objectively interpret molecular distribution information
- Flexibility to adapt to changing priorities and future needs
- Single vendor for total system support



HDI IMAGING SOFTWARE

- Intuitive, integrated software suite covering the full MS imaging workflow
- Makes effective use of both mass spectral and ion mobility data
- Optical image overlay merge molecular and morphological information

* MALDI: Matrix Assisted Laser Desorption Ionization.

‡ DESI: Desorption Electrospray Ionization.

† DESI is also supported on Xevo™ G2-XS QToF and SELECT SERIES™ Cyclic™ IMS.

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2. Mouse brain sample provided by Prof. Ron M.A Heeren and Karolina Skraskova, Maastricht University.

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