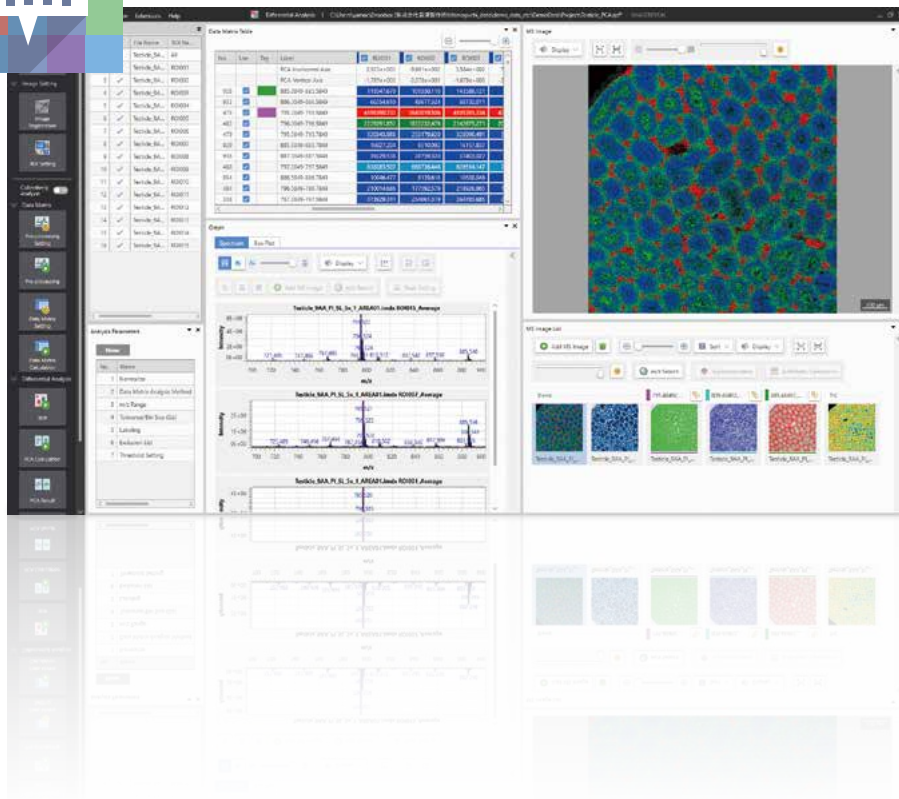


Mass Spectrometry Imaging Data Analysis Software

IMAGEREVEAL MS



Simplifying Routine Analysis

Are you worried about wasting time or valuable data?
Automatically uncover important information from
large amounts of data with IMAGEREVEAL MS.

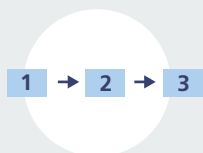


IMAGEREVEAL™ MS Workflow



The results can be checked after each analysis, so the parameters can be changed and the analysis re-run if the results are not as desired.

Key Features



Simple data processing in as few as 3 steps

"Collective Analysis" function consisting of differential analysis and image analysis. Optimal for daily routine work.



Multiple analysis modes

Choose an analysis method using up to 5 analysis modes. Data can be analyzed in multiple ways through a simple workflow.



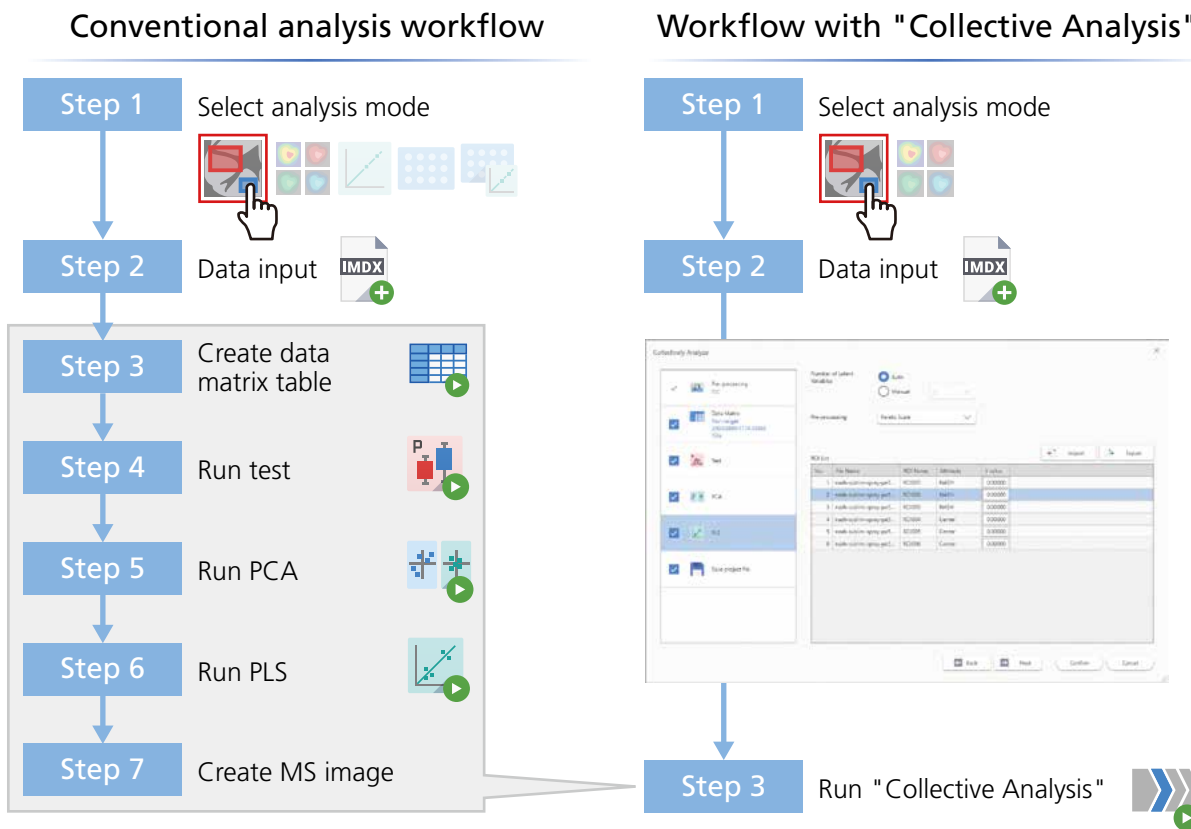
Analysis of data in general formats

~ Includes common data formats used in MS imaging ~

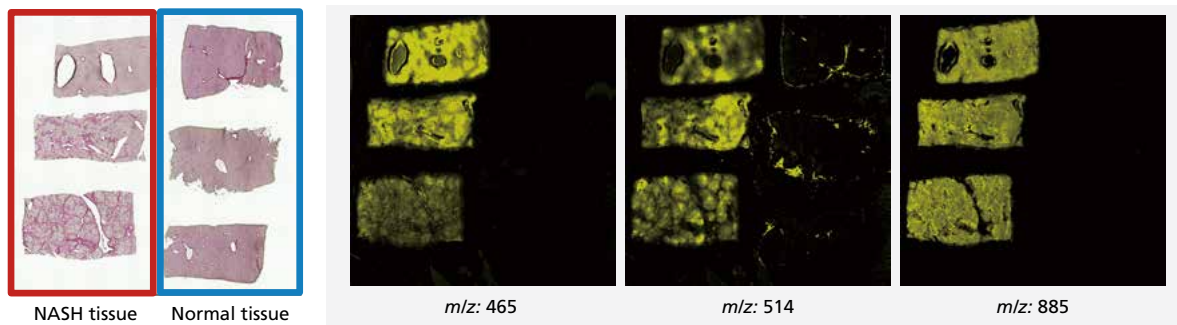
Using the included data conversion tool, "IMDX Converter", analysis can be carried out on data in the common MS imaging formats: imzML and Analyze7.5.

Processing in as few as 3 steps with the "Collective Analysis" mode

Automatically obtain MS images with distinctive characteristics using the "Collective Analysis" mode with pre-set parameters. This is a highly convenient feature when you need to process a lot of data in the same way. The user can create data matrix tables from differential analysis and/or image analysis, carry out statistical data analysis, and obtain MS images all in one step.



Examples using "Collective Analysis"



Sections to be analyzed

Automatically selected MS images

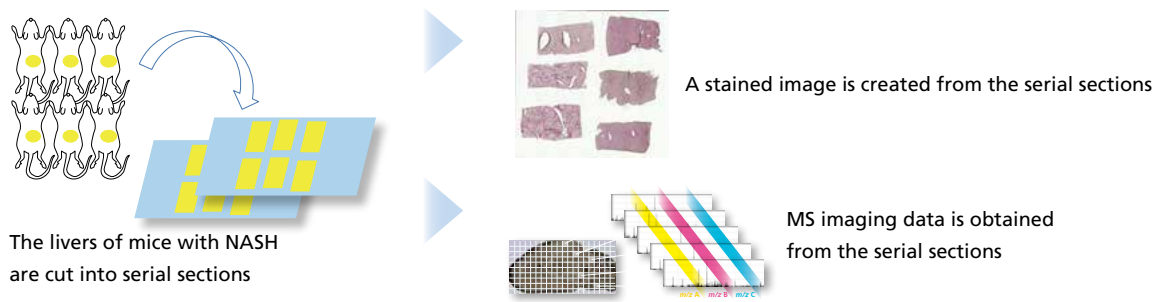
Using the "Collective Analysis" mode, MS images where the NASH tissue shows peculiarities with respect to normal tissue are automatically selected

Multiple analysis modes Introducing 3 examples of analysis modes

■ Analysis of mouse liver for NASH (Non-Alcoholic Steatohepatitis)

What is NASH?

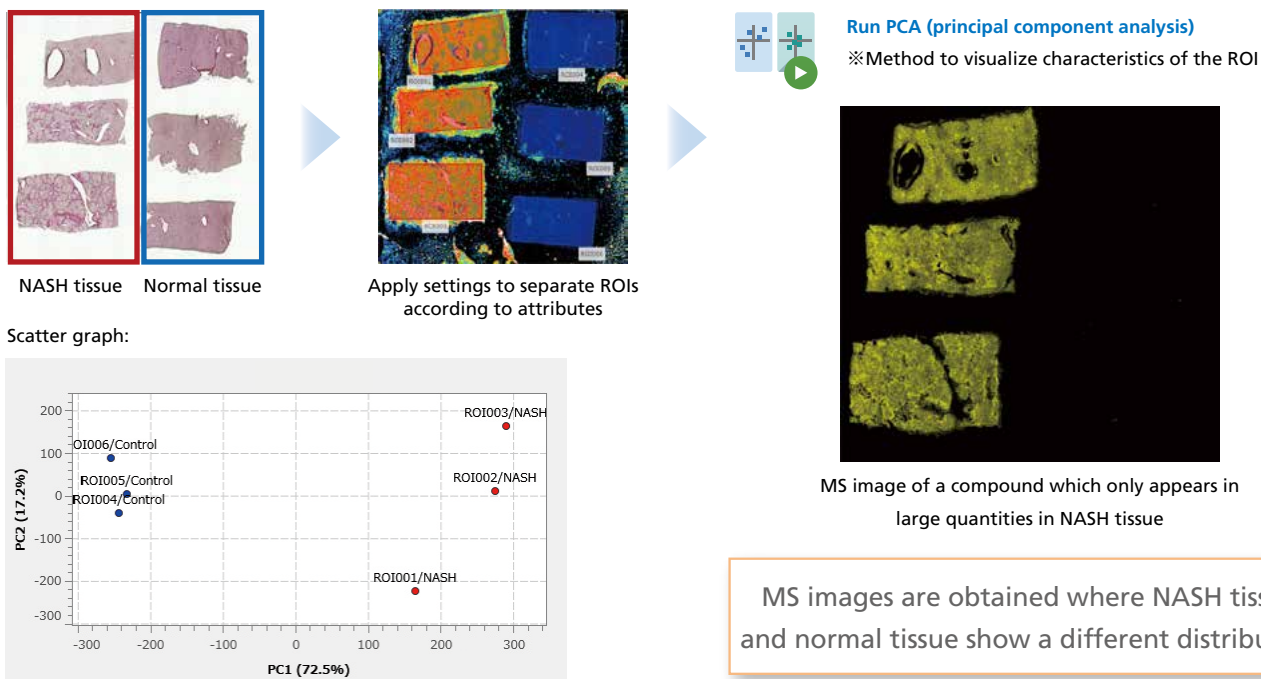
NASH (Non-Alcoholic Steatohepatitis) refers to a type of fatty liver disease that is not related to alcohol consumption.



1 Finding molecules unique to NASH tissue

Differential Analysis

Using statistical methods and comparing the average spectra of the ROIs, find molecules that are causing the differences between the ROIs.



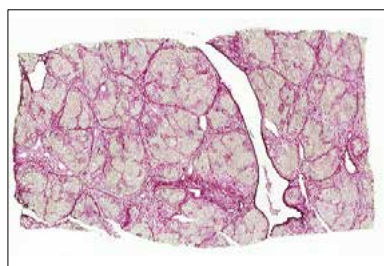
Further analysis can be carried out using the test functions, PLS (partial least squares) function, etc.



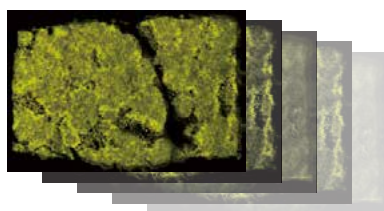
2 Finding molecules with similar distributions to the stained image

Image Analysis

Using statistical methods and comparing each m/z distribution, find molecules with distinctive distributions.



Stained image (Sirius Red stain)

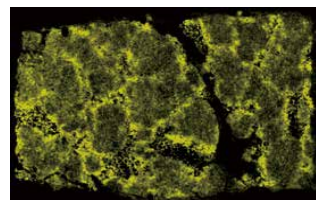


MS image data

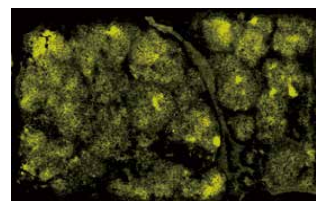


Run Similar Image Extraction

※ "Similar image extraction" is a method to search through MS image data and find MS images showing similar distributions to the stained image



MS image showing a compound abundant in a fibrotic area



MS image showing a compound abundant in a normal area

Further data analysis can be carried out using "Image Classification", "Segmentation", etc.

MS images resembling the stained image are obtained



3 Creating an MS image showing the concentration distribution of the target molecule

Quantitative Analysis

Using calibration curves, convert the intensity of the target molecule in the ROI into a concentration value.

【Preparing the unknown sample】



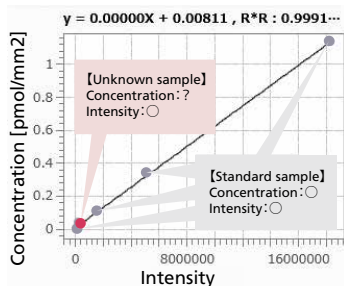
Liver section from a mouse that has been administered a drug

【Preparing the standard sample】

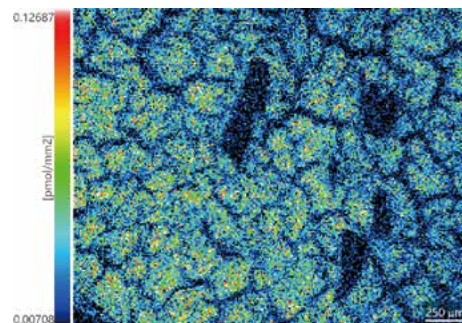


Dripping the same drug onto a liver section from a mouse that did not receive the drug

Sample provided by the Tottori University Chromosome Engineering Research Center



Create a calibration curve using liver sections with known concentrations of the drug

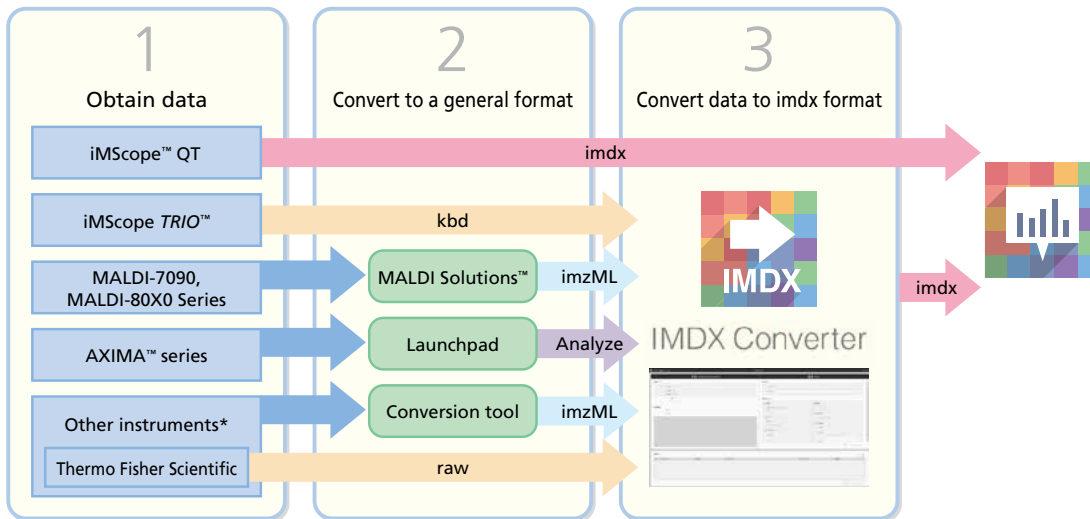


MS image with intensities converted into concentrations

An MS image is obtained showing the amount of the drug that has reached the liver

Processing of general data formats with IMDX Converter

Using the included data conversion tool, "IMDX Converter", it is possible to convert to the imdx format that can be read by IMAGEREVEAL MS.



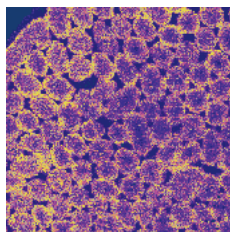
*The conversion of all data from other instruments is not guaranteed. Please refer to the product introduction website for the actual results of the data conversion.

Other features

Advanced optional license for image analysis

Functions can be added by purchasing this optional license.

Pseudo-colorization (UMAP)



A segmentation analysis is performed after pseudo-colorizing the data with UMAP as the pretreatment.*

* When using UMAP, parallel processing is performed on the CPU, so the results of segmentation analysis may differ depending on the PC environment.

Auto ROI Selector



This tool creates ROIs from an image.

Complicated regions and large numbers of regions can be effortlessly specified as ROIs.

Simultaneous processing of multiple MS image data files

It is possible to process multiple data files concurrently, and by inputting all the data at once, it is simple to compare the images. Data analysis can be carried out on up to a few hundred GB without splitting up the data.

Target analysis / Non-target analysis

Target analysis

Analysis of only target m/z values based on a list of lipids or metabolites, for example. It is also possible to create a custom list.

Non-target analysis

Analysis over all m/z within a specified MS range. Useful for checking which distinctive m/z values are contained within the range.

[For more details, click here](#)

License and feature comparison

| | | Basic license | Imaging license | Screening license | Full license | |
|--|---|----------------|-----------------------|-----------------------|----------------|--------------------------------------|
| | | Basic analysis | Quantitative analysis | Differential analysis | Image analysis | Screening/ Screening (quantitative)* |
| Statistical analysis | t-test/u-test/ANOVA/basic statistics | ○ | — | ○ | — | ○ |
| | PCA | — | — | ○ | — | ○ |
| | PLS | — | — | ○ | — | ○ |
| | Similar image extraction | — | — | — | ○ | — |
| | Image classification | — | — | — | ○ | — |
| | Segmentation | — | — | — | ○ | — |
| Spectral processing | Peak picking | ○ | — | ○ | ○ | ○ |
| | Normalization | ○ | ○ | ○ | ○ | ○ |
| | MS/MS spectrum normalization | ○ | ○ | ○ | ○ | ○ |
| | Mass correction | ○ | ○ | ○ | ○ | ○ |
| | Target analysis/ Non-target analysis | ○ | — | ○ | ○ | ○ |
| MS image | Filtering | ○ | ○ | ○ | ○ | ○ |
| | Interpolation | ○ | ○ | ○ | ○ | ○ |
| | Arithmetic operations | ○ | ○ | ○ | ○ | ○ |
| | Superimposition | ○ | ○ | ○ | ○ | ○ |
| Image settings | Alignment (Linear/Non-linear) | ○ | ○ | ○ | ○ | ○ |
| | ROI settings | ○ | ○ | ○ | ○ | ○ |
| Other | Simultaneous processing of multiple data sets | ○ | ○ | ○ | ○ | ○ |
| | Collective analysis | — | — | ○ | ○ | — |
| | Calibration curves | — | ○ | — | — | ○ |
| | Tagging | ○ | — | ○ | ○ | ○ |
| | Data conversion: imzML→imdx/Imdx→imzML | ○ | ○ | ○ | ○ | ○ |
| Advanced optional license for image analysis (sold separately) | Pseudo-colorization (UMAP) | — | — | — | ○ | — |
| | Auto ROI Selector | ○ | ○ | ○ | ○ | — |

It is possible to upgrade from the basic license to any of the other 3 licenses, or from an imaging license or a screening license to a full license.

*Screening/Screening (quantitative) is an analysis mode which automatically sets 1 ROI to 1 measurement point. It is convenient when measuring samples which differ at each measurement point. Differential analysis between measurement points can be carried out with "screening" and quantitative analysis between measurement points can be carried out with "screening (quantitative)".

A 30-day trial version of IMAGEREVEAL MS with all functions is available for download by clicking the button.

[Demonstration software download](#)

Operating environment

| | |
|---------|--|
| OS | Windows® 11 Professional 64 bit English/Japanese |
| CPU | Intel® Core™ i7 or higher, or Intel® Xeon® |
| Memory | 128 GB |
| Storage | The software uses both data files and temporary data storage. Storage equivalent to at least 5 times the size of the file being processed is required. |

For more details about recommended PC specifications, please contact your local sales engineer.

Compatible formats

It is possible to convert from iMScope data files in kbd format, from the general MS imaging formats imzML or Analyze7.5, and from Thermo Fisher Scientific's data files in RAW, to the imdx format that can be read by IMAGEREVEAL MS.

Caution: Certain pretreatment methods or creation of samples to obtain or process data with this software may require license permission from a third-party patent holder. (Installation of this software does not constitute such permission.) As regards the necessity of licensing from third-party patent holders, we recommend consultation with an expert or the holder of the patent rights.

This software was developed as a result of collaborative research with Kyushu University's Innovation Center for Medical Redox Navigation and Mitsubishi Tanabe Pharma Corporation.

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