

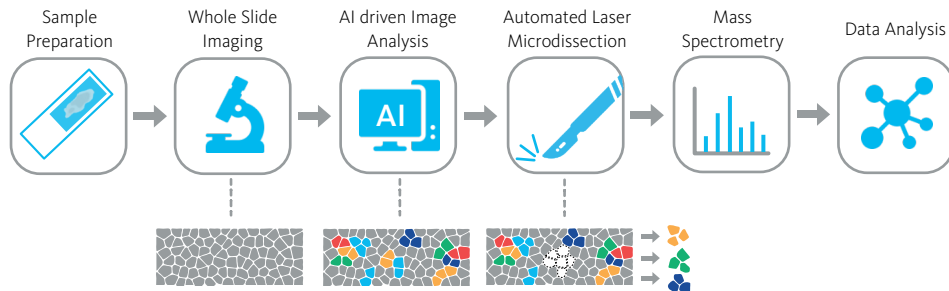


From Cell to Insight

Automated Single Cell Isolation
for Proteome Analysis

Automated Workflow for Single Cell Isolation

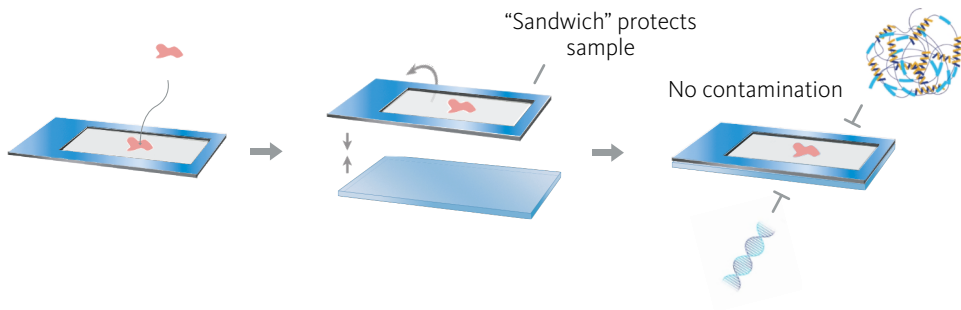
Isolate and decode molecular signatures of individual cells in their native environment. Starting with prepared tissue on membrane slides, AI-driven single-cell segmentation and automated laser microdissection (LMD) (via **CellCut** or for high-throughput **CellCut HT**). Combined with ultra-high sensitivity mass spectrometry, this approach enables deep, spatially resolved molecular insights at the single-cell level.



Cut It All — Completely Contamination-Free

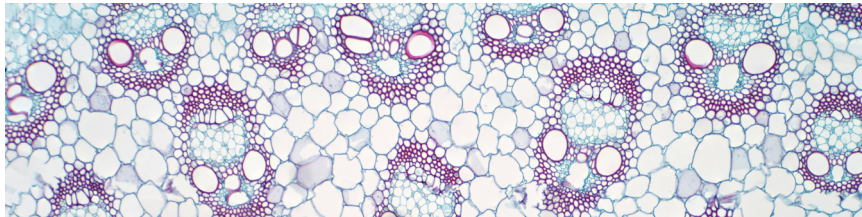
You can dissect a wide variety of samples, including fresh frozen tissue, FFPE material, plant tissue, living cells, smears, cytopins, and even thick tissues such as bones.

The tissue is sectioned onto an inert membrane slide with negligible autofluorescence. For LMD the membrane slide is flipped and placed in a sandwich-like setup onto a glass slide. This method protects the tissue from contamination throughout the entire process.



Whole Slide Imaging and Beyond

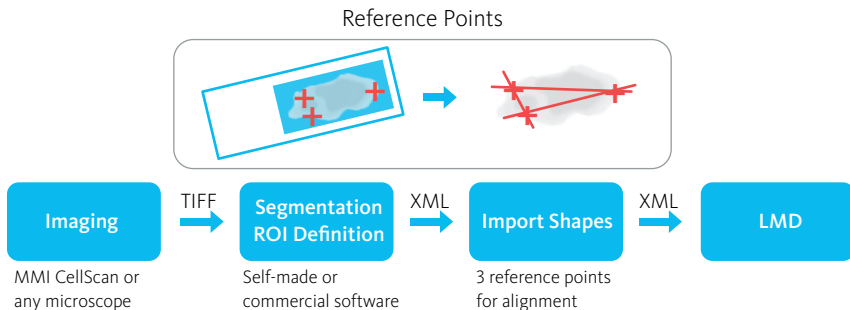
Whole slide imaging with subsequent single-cell isolation can be performed using almost any standard whole slide scanner. However, the MMI **CellScan** offers a uniquely versatile and high-performance solution. CellScan supports all major imaging modes and fast 5D scanning (time-lapse, Z-stacks, XY, multi-color fluorescence). Integrated with CellCut, it fits seamlessly into LMD workflows. Full remote access enables image acquisition and AI-driven cell segmentation from anywhere.



Monocot plant vascular tissue – 20x objective, captured using the MMI CellScan

AI-Driven Image Analysis Meets LMD

Cell shapes of interest can be defined using established AI-based imaging analysis software, such as StrataQuest, BIAS and the **MMI CellDetector** and then imported and aligned into the LMD software. All common data formats, including XML, JSON and TIFF are supported. For accurate alignment, 3 reference points are selected from recognisable features of the sample on the whole slide image. After importing the shapes, these reference points are identified on the live image of the LMD system for precise alignment of the cell shapes.



Automated Laser Microdissection – CellCut

Automated single-cell isolation using laser microdissection is available with the MMI CellCut or the high-throughput CellCut HT. Both systems use a gentle UV laser to ensure nearly 100% collection efficiency while preserving sample integrity. CellCut isolates hundreds of cells into reaction tubes, while CellCut HT enables higher throughput by isolating cells directly into 96-well plates.



CellCut – isolation of single cells into reaction tubes



CellCut HT – high throughput isolation into 96-well plates

High Throughput Isolation – CellCut HT

CellCut HT enables automated high-throughput isolation of single cells. It ensures the precise positioning of 96-well plates onto the microdissection stage, streamlining the workflow for downstream single-cell analysis.

LMD System

Gentle high throughput
laser microdissection

Software

Intuitive interface for precise
and efficient workflows

Robot

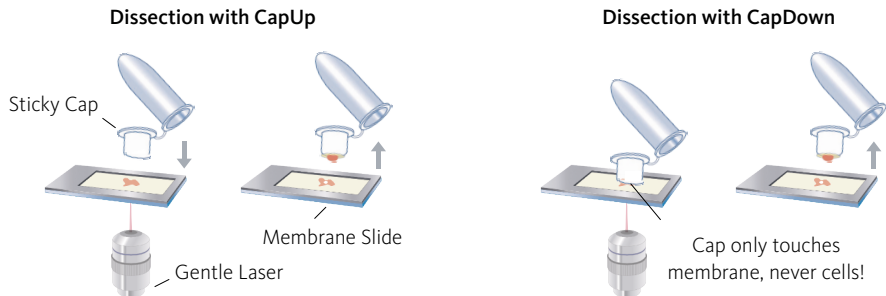
For precise positioning
of 96-well plates



CellCut HT: High throughput platform for high-precision single-cell isolation

Unique Collection Principle: CellCut

Efficient and contamination-free sample isolation is essential for reliable downstream analysis. The CellCut system uses CapLift technology to transfer samples via a sticky cap into an isolation cap. During the collection process, the sample never comes into direct contact with the sticky cap; instead, the cap solely touches the membrane of the Membrane Slide.



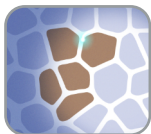
CapUp - During dissection, the StickyCap stays at the top and is guided downward after cutting to isolate the sample with the StickyCap. CapDown - The StickyCap is in contact with the membrane during cutting, ensuring the sample stays intact and preventing loss – especially crucial when isolating small regions such as single cells or organelles.

Unique Collection Principle: CellCut HT

In the CellCut HT, a puncher gently stretches a sticky silicone layer within a 96-well plate, allowing for the smooth transfer of dissected cells from membrane slides. The sample itself never comes into direct contact with the puncher—only the membrane of the slide is touched.



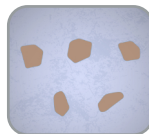
Tissue samples are mounted on Membrane Slides, placed under a 96-well plate with an elastic silicone membrane.



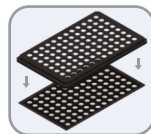
Gentle UV laser precisely cuts single cells.



A puncher stretches the silicone membrane to isolate the cells into the well.



Visual inspection confirms successful cell isolation. No overlapping between cells.

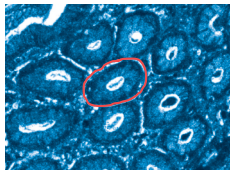


Silicone 96-well plate is transferred onto a standard 96-well plate. Ready for downstream analysis.

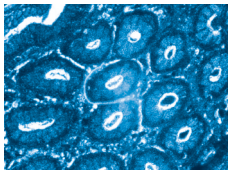
Gentle To Cells

Maintaining sample integrity is key to accurate analysis. MMI CellCut ensures maximum preservation using specialised laser technology that delivers a cutting edge as fine as $0.3\text{ }\mu\text{m}$. This ultra-precise, gentle approach protects surrounding tissue and preserves valuable biological information, including RNA, DNA, and proteins. With such precision, even cellular organelles can be isolated. Additionally, the system allows for complete visual inspection of your sample, during and after isolation, ensuring full control and confidence at every step.

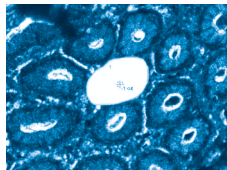
Before cutting



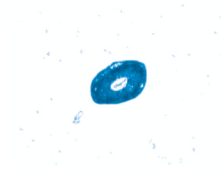
During cutting



After cutting



Inspection



Isolation of cross-sectioned crypts of intestinal glands - 20x magnification

Real Insights from Experts

Gain first-hand perspectives from leading researchers who trust the precision and reliability of the MMI Laser Microdissection System in their daily work. Scan the QR codes to access the interviews.



Björn Krenz

Head of Department, Plant Viruses, Leibniz Institute DSMZ, Braunschweig, Germany



Watch the interview



Mark Kühnel

Group leader at UKA RWTH Aachen, Institute for Pathology, Aachen, Germany



Watch the interview



Molecular Machines & Industries



*“Revolutionizing single cell isolation with
gentle precision to preserve every cell’s
unique value”*

Instruments

Consumables

Service

EMEA + Asia

Molecular Machines & Industries GmbH
Breslauer Strasse 2
85386 Eching, Germany

Phone: +49 (0)89 319 048 40
E-Mail: info@molecular-machines.com

Americas

Molecular Machines & Industries Inc.
PO Box 348
MI 48840, Haslett, USA

Phone: +1 331 716 2447
Mobile: +1 508 494 3833
E-Mail: sales_us@molecular-machines.com

China

Phone: +86 139 101 77616
Email: chen@molecular-machines.com