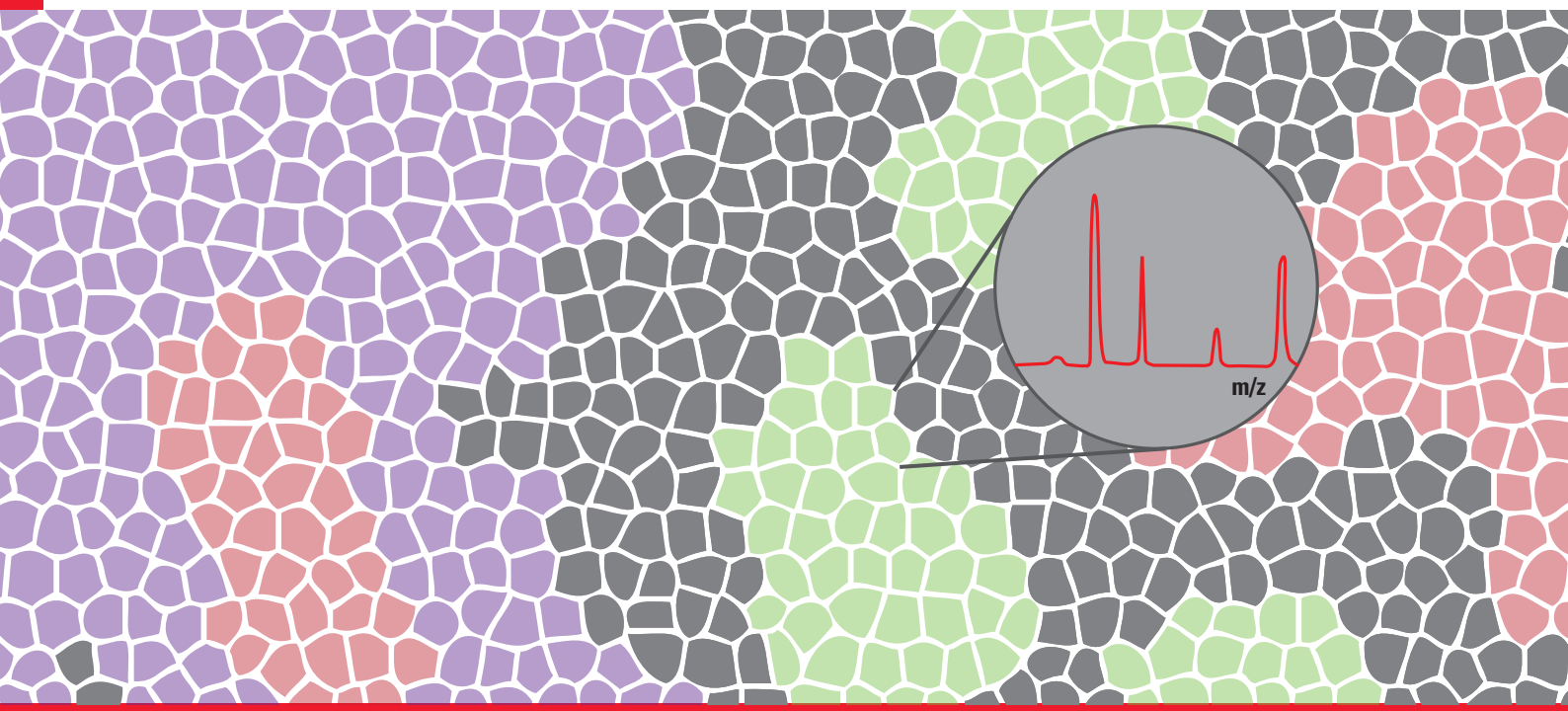
From Eye to Insight

Leica
MICROSYSTEMS



Cancer Research: Fast and reproducible biomarker discovery

Discover biomarkers with speed

Biomarkers can be used as indicators of certain diseases, such as cancer. The tumor microenvironment moved into the spotlight in this concern. It is in close interaction with the tumor itself. Nevertheless, there are distinct molecular differences between tumor and non-tumor regions, as well as in the tumor itself. They can only be deciphered by isolating specific, minute sections of these regions

Laser Microdissection uses a Laser to cut microscopic specimens on a cellular level. After cutting, the Leica LMD systems use gravity to collect the dissectate into vessels just below the specimen. That is why Leica LMD Systems allow for collection directly into your downstream analysis containers, such as PCT microtubes for fast tissue homogenization, protein extraction, and digestion by Pressure Cycling Technology (PCT, PressureBioSciences Inc.). PCT can process a sample for mass spectrometry analysis within four hours.

The combined techniques allow for separation of the tumor microenvironment with high precision and speed. Downstream molecular analysis of the different regions will be meaningful, since they can be analyzed separately and not as a mixture.

Typical fields of research

- Biomarker Discovery
- Cancer Research
- Personalized Medicine
- Translational Research
- Proteomics
- Metabolomics

References

- Hunt AL et al., Cancer Res 2019;79 doi. org/10.1158/1538-7445.AM2019-4709
- Guo T et al., Nat Med. 2015; 21:407-13
- Shao S et al., Proteomics 2015; 15: 1-11

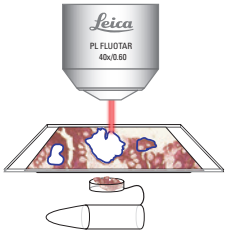
Fast and pure Sample Preparation for Biomarker Discovery

Sample preparation
Sectioning and preparation of sections on special LMD slides.

Fixation and staining
Fixation and staining of tissue for microscopy and LMD application. Can be automated with a stainer.

High Precision

LMD utilizes a laser which can be focused in the field of view of a microscopic specimen. The laser can dissect the ROI and the dissectate falls into a collection container beneath with gravity. Afterwards, the dissectate can be investigated for its gene expression, proteins etc.



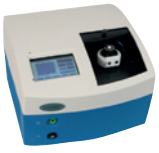
Collect pure material via gravity: LMD by Leica Microsystems

Microscopy and ROI definition
Visualize your sample and mark your regions of interest (ROI) – manually or automated. Or import your ROIs from another device.

Laser microdissection
Dissect the ROIs by gravity into standard consumables, such as PCR tubes. Or collect them directly into your downstream analysis vessel, e.g. PCT µTubes.

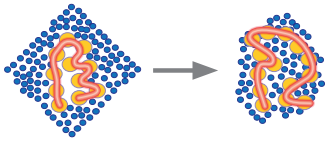
High Speed and Reproducibility

Pressure Cycling Technology from Pressure BioSciences Inc. allows for rapid and reproducible preparation of peptides in under 4 hours. Saving several hours, and providing hands off sample preparation for minute tissue samples with direct sample transfer from Leica LMD systems to PCT microtubes.



PBI Pressure BioSciences Inc.

Homogenization and Extraction – 30mins @ 45,000psi
Lys-C Digestion – 1 Hour @ 45,000psi
Trypsin Digestion – 1 Hour @ 20,000psi

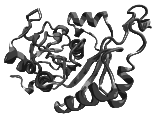


Tightly folded protein with a hydrophobic core. Folded protein interior not accessible to water or enzymes.

Hydrated "open" protein under pressure. Unfolded protein interior now accessible to water and enzyme.

Protein Preparation
Homogenization, extraction and digestion of minute samples with Pressure Cycling Technology (PCT) for high speed and reproducibility.

Analysis
Analyze your samples by mass spectrometry methods and identify your biomarkers.



DEMO AND DETAILS

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