



Leica LMD6000

Experience a New Level of Speed!

The fastest laser microdissection ever!

Leica
MICROSYSTEMS

Intelligence
Speed
Precision
Integration

Experience a New Level of Speed!

Laser microdissection has become an indispensable technology for sample preparation. In all areas of research, it is the basic prerequisite to obtain well-defined starting material for downstream experiments. Therefore, meaningful analyses in the fields of genomics, microarrays, biochips, and proteomics can only be attained with the help of such high-precision technology. Sample preparation is done directly from the tissue section using a UV laser. The development of both the method and the instruments has made enormous progress during the past five years. Now as before, the driving force in this market is the Leica microdissection system.

High-speed microdissection –

The fastest way from tissue section to reaction buffer

Time is usually the most critical factor in specimen preparation. Extremely short handling times combined with maximum collection rates result in an unsurpassed speed of cell selection. The isolated material then falls directly into the lysis buffer and thus is protected from degradation.

Intelligent sample preparation – Just a mouse click away

Thanks to the automated cell recognition and laser cutting, sample isolation requires just a few mouse clicks. You can store all the experiment's parameters and reuse them again and again. This makes microdissection fun – even for thousands of cells.

High precision systems – When every μm counts

The new laser ensures outstanding cutting quality at all objective magnifications. The scanning stage enables the repositioning of the selected cells with micrometer accuracy. This, along with our patented optical laser control system, renders the collection of even the smallest specimens possible – with maximum precision and at high speeds.

Integrated solution for everybody's needs

Laser microdissection is a technology that can be used in many fields of life science research. Due to its modular concept, the system is very flexible: we offer you a variety of standard configurations. Thus you can profit from the versatility of the system and choose a solution that is perfectly tailored to your requirements.





Leica Design by Christophe Apothéloz

The Optimum Leica LMD6000 Configuration For Your Application

In recent years, laser microdissection has become established as a new method for cell selection in life science research. To meet the requirements of many different application areas, we have put together four standard configurations. This way, you can quickly and easily find the best microdissection system for your application.

Typically Leica LMD6000

The heart of the new LMD system is the fully automated upright research microscope Leica DM6000 B* with motorized transmitted light and fluorescence axes. It is equipped with motor focus and motorized revolving nosepiece and supports the customers' processes with automated functionalities like illumination manager, contrast manager, FIM, IFW and a lot more.

Our new laser generation is a diode laser that provides a much higher beam quality and longer lifetime. The shorter pulse duration in combination with the optimal optical transmission at 355 nm enables fast and highly precise cutting. In addition it provides more energy especially for harder materials or thicker sections.

The live images for the system are provided by the Hitachi analog 3 CCD camera. The new generation of this series offers an automated, digital color shading correction, which minimizes virtual color gradients within the images. In addition the customer benefits from the perfect color accuracy and its extremely fast live images. The camera realizes integration times up to 8 seconds, which can be important for fluorescence images with low intensities.

* Please refer to the Leica DM6000 B brochure for detailed information.



Standard Configurations

			LMD6000 Patho	LMD6000 Living Cell	LMD6000 Proteome	LMD6000 Multi-User
Stand	Focus					
	Objective turret					
Transmitted light	Condenser					
	Transmitted-light methods	BF				
		PH				
DIC						
Fluorescence Stage	Fluorescence axis					
"Basic package" software includes:	Control software for the microscope					
	Full laser control					
	Autofocus					
	Automated collection devices and positioning of the PCR tubes					
	Full automated inspection modus					
	Saving the user profiles					
	Overview BF images					
	Multi-cutting over the entire slide					
	Database interface (database Leica IM1000 is an option)					
	"Advanced package" software includes:	Three-slide holder control				
Serial section cutting						
Overview fluorescent images						
Cutting over all slides at all magnifications						
Extended driver for collection devices						
Optional Software	Integrated database Leica IM1000					
	Live Cell Cutting module (LCC)					
	Automated Vision Control module (AVC)					
Research fields	Cancer research					
	Forensic					
	Gene expression profiling					
	Laser ablation					
	Living cell research					
	Neuroscience					
	Pathology					
	Plant research					
	Proteomics					
	Multi-User facilities					

- motorized
- scanning stage
- manual
- available
- recommended

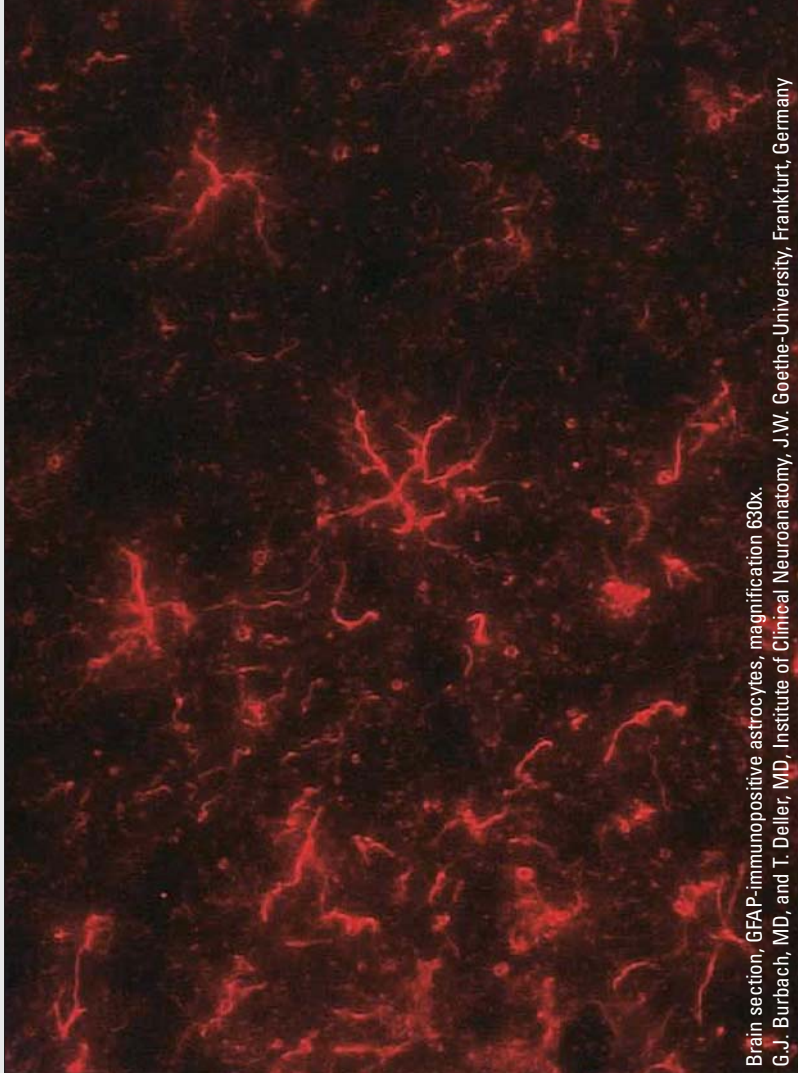
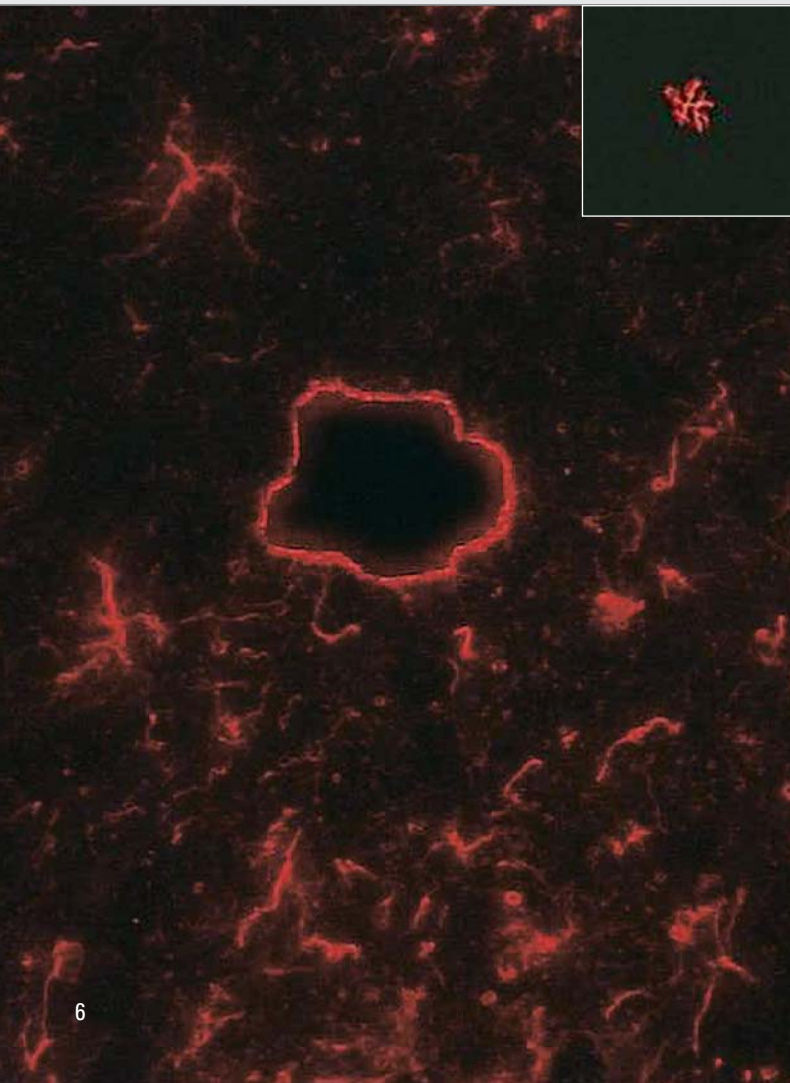


Leica LMD6000 Living Cell

Your ideal system for live-cell cutting and laser ablation

- Living cell research
- Neurobiology

Living organisms can be perfectly inspected with the Leica LMD6000 Living Cell. The intelligent illumination and contrast managers guarantee brilliant images in record time. The ability to inspect with fluorescence is also becoming increasingly important in laser microdissection. Simultaneously viewing and sectioning specimens is a standard feature here. In addition the fully automated fluorescence axis minimalizes bleaching effects, accelerates your processes and offers the opportunity of exactly reproducible experiment conditions.



Brain section, GFAP-immunopositive astrocytes, magnification 630x.
G.J. Burbach, MD, and T. Deller, MD, Institute of Clinical Neuroanatomy, J.W. Goethe-University, Frankfurt, Germany

- Laser ablation

The adjustment of the laser focus in Z-plane plays an important role in experiments such as laser ablation. The distance of the laser beam to the specimen can be adjusted in order to guarantee the damage of defined segments of the cell.

Sample Preparation – Just a Mouse Click Away

Let's start with the basis

The foundation of the new laser microdissection system is the high-end Leica DM6000 B digital research microscope. The new microscope system automates complex workflows in the simplest possible way: one touch of a button is enough to switch to an entirely different contrast method – truly a state-of-the-art research system with high potential. Operating the entire system is intuitive and relieves the user of the need to make routine adjustments. The automated, visual control of the collected dissectates is just as simple as the automated selection of cells using the fully automated and fully integrated cell recognition system. The system works quickly and reliably. This results also in drastically increased productivity.

Brilliant fluorescence and sophisticated DIC contrasting

When developing our new laser microdissection system, we placed great emphasis on image quality. Microdissection requires uncompromising image quality. The new Leica LMD6000 is convincing proof of this. See for yourself the spectacular resolution of the automated fluorescence, the differential interference contrast (DIC) and the phase contrast. The quality of the fluorescence is dramatically enhanced by the new light source Leica EL6000. The newly developed BGR filter cube for blue-green-red light emission enables simultaneous cutting under fluorescence inspection. In addition, Leica's fast autofocus is just one of the many advantages that make working with the Leica microdissection system easy and efficient. Details in living cells or tissues are impressively rendered by the Leica LMD6000.



“Modern laboratories require efficient time management. A forward-thinking system is thus indispensable for innovative research.”

Dr. Christian May

Product Manager “Laser Microdissection”
Leica Microsystems CMS GmbH, Wetzlar, Germany

Dr. Christian May set a high value on the following benefits:

- Fast and reliable inspection of all types of cells through fully automated contrasting methods
- Improved quality of images by the automated fluorescence axis
- Sectioning of thicker or harder samples as well as reliable ablation with the new laser module

Leica LMD6000 Multi-User

The system for high speed, precision and flexibility

- Multi-User facilities

The Leica LMD6000 Multi-User is the most extended configuration. Nothing will be impossible in respect to multiple applications. In addition all system parameters can be stored for later retrieval. Reprogramming of experiment conditions is therefore obsolete after changing to a different application or specimen. This is an important advantage when many users with different demands work on the same system.

Three slide holder allows simultaneous work on up to three slides, enabling work in stained/unstained mode. In this way, specimen selection can be done on the stained tissue and the pattern copied to another unstained slide.



- Gene expression profiling
- Neurobiology

The powerful diode laser is guided along the sectioning line in the specimen with maximum accuracy by newly developed optics. This allows large cell areas or hundreds of individual cells to be gained from the tissue section in a minimum of time and directly into the reaction buffer. You can work with up to three slides in parallel and collect the specimen into four microcentrifuge tubes or an 8-well strip. This increases the sample throughput and shortens your working time at the system.

The handling of the collection devices is convenient due to the automatically movable tray.

The photo shows the device for four microcentrifuge tubes. However, the tray easily takes customized devices as well as the regular collection devices.



The Faster Way From Tissue Section to Reaction

Experience a new level of speed

Sample preparation is a critical step of every experiment. That's why it's so important to quickly and reliably gain the starting material for downstream analysis. To obtain nucleic acids or proteins as intact as possible, the time between tissue preparation and the cell lysis should be kept to a minimum. In this respect, the Leica microdissection system sets new standards. Extremely short handling times, combined with maximum collection rates thanks to a powerful diode laser, result in unsurpassed speed and precision in the isolation of the cells of interest.

Fast detection with intuitive software

The partner of the efficient laser, in respect of speed, is the intuitive software. Once the specimen to be microdissected is identified on the tissue section, you can define the size, shape and number of cells or areas you need for the downstream analysis. The software module AVC* (auto vision control) will automatically recognize the specimens, followed by the automatic laser cutting to the previously defined caps of microcentrifuge tubes. This will relieve the user of the tedious task of marking the cells by hand and, in conjunction with quick sectioning techniques, results in unsurpassed collection rates.

* Available as an option for Leica LMD6000 Multi-User and LMD6000 Proteome (refer to page 5).

Speed



“Single-cell gene expression analysis techniques including the Leica Microdissection system are crucial for our research.”

Prof. Dr. Birgit Liss

Department of Normal and Pathological Physiology
Institute of Molecular Neurobiology
Philipps University Marburg, Germany

Prof. Dr. Liss will profit in her work from the new Leica LMD6000 system:

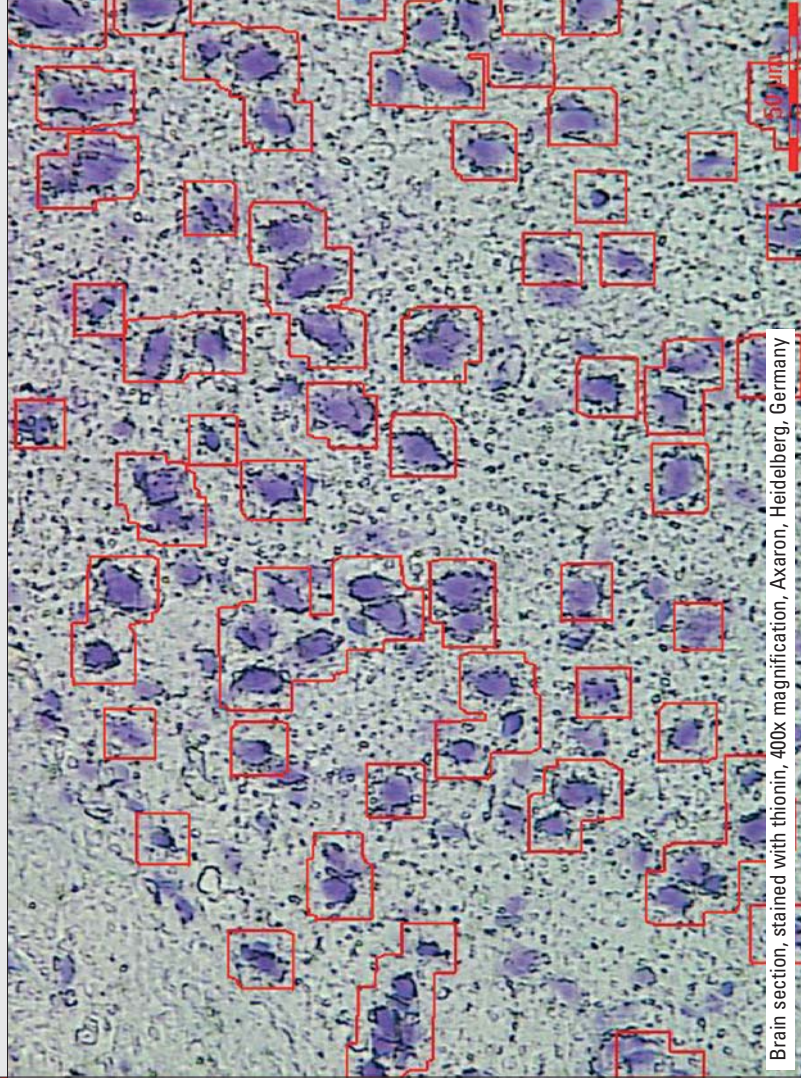
- Fast, efficient and contamination-free cutting of cells saves time of entire experiments
- Three slide holder increases sample throughput
- “Serial section cutting” feature ensures high quality RNA from untreated tissue sections

Leica LMD6000 Proteome

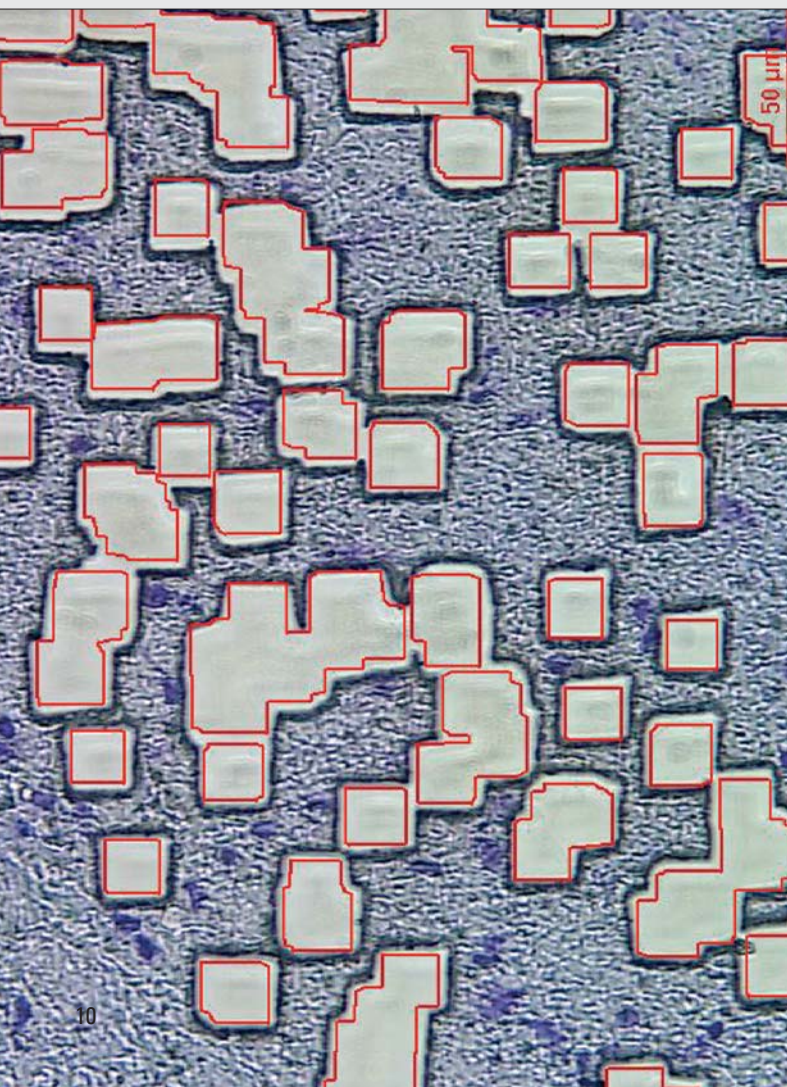
Your system for high precision cutting and high collection rates

- Proteomics
- Gene expression profiling

Automated systems with a straightforward design are an especially invaluable aid in the field of high-end research. Time-consuming routine tasks are entirely taken over by the system. The high-precision stage and laser control allows accurate automatic cell recognition. Subsequent collection of hundreds of individual cells in an extremely short time are just a few mouse clicks away. Specimens directly drop by gravity into a buffer for direct downstream application.



Brain section, stained with thionin, 400x magnification, Axaron, Heidelberg, Germany



- Cancer Research

Disease research highly depends on the amount and quality of material to be investigated. If large areas of tissue need to be collected, e.g. for investigation of gene expression pattern, microdissection with the 6.3x SmartCut objective is the perfect solution.

Additionally the image of the whole tissue section can be archived by generating an overview image with the 1.25x objective – a potentially important point when working with pathological tissue to get an image backup on investigated tissue.

When Every μm Counts

SmartCut objectives – Experience a new level of precision

With the new optics and precision laser control, you can dissect even the tiniest of specimens with maximum precision and high speed. This is possible because the laser guidance system works optically and is independent of the stage movement. The Leica SmartCut objectives significantly increase efficiency of laser microdissection. The high UV transmission together with the outstanding imaging performance of the UV laser yield the best possible results. The SmartCut series includes objectives in a range from 6.3x to 150x for all conceivable applications, even including the selection of individual metaphase chromosomes.

100% repositioning – wherever you want

Accurate and reliable repositioning of the cells to be collected is the key to higher throughput in such application areas as proteomics or biochip analysis. With a new scanning stage design, we attain an accuracy of at least two μm without the loss of speed associated with common precision stages. Even more, the repositioning is applicable together with the AVC software module*. The pattern of the automatically selected cells can be transferred to another slide in the holder. In this way, you can cut out the specimens from the adjacent slide without running additional cell recognition software.

* Available as an option for Leica LMD6000 Multi-User and LMD6000 Proteome (refer to page 5).

Precision



“Precise specimen preparation is the basis for reliable research findings. Leica Microdissection is the key to your success.”

Dr. Izabela Noll

Application Manager “Laser Microdissection”
Leica Microsystems CMS GmbH, Wetzlar, Germany

Dr. Izabela Noll knows the limitations researchers meet when working on proteomics and attaches with the Leica LMD6000 importance to:

- Leica AVC software module automates the procedure of specimen definition and recognition
- Leica SmartCut objectives 40x and 63x are optimal for microdissection of individual cells
- “Serial section cutting” feature enables protein isolation from the intact, unstained tissue



Leica LMD6000 Patho

**Your entry-level system for laser microdissection
in routine laboratory work**

- Pathology
- Forensic
- Plant Research

This configuration represents the standard system for microdissection including all functions of the Leica LMD6000. The standard brightfield contrasting method offers the optimal solution for investigation on specimens stained with the classical stains or by immunohistochemistry. Especially researchers who do not require high throughput or large amounts of specimens will be satisfied with the system, which makes the classical – non-automated – microdissection much easier. The integration of the powerful laser into a laser microdissection system with state-of-the-art optics means that even thicker or harder tissue can be sectioned easily and with precision.



Bouin's fixed paraffin embedded Mouse testis, stained with Hematoxylin and Eosin magnification 400x
P. Sawhney, PhD, College of Pharmacy, The University of Texas, Austin, Texas, USA



The versatility of this configuration is unbeatable. The variety of objectives, holders and collection devices always gives you the optimal system solution for your application. Additionally a powerful database* is integrated, allowing you to easily follow your experiment by archiving the images of the tissue sections before and after microdissection. If necessary, the sample throughput can be increased by multi-cutting over the entire slide.

*Available as an option (refer to page 5).

Integrated Solution For Everybody's Needs

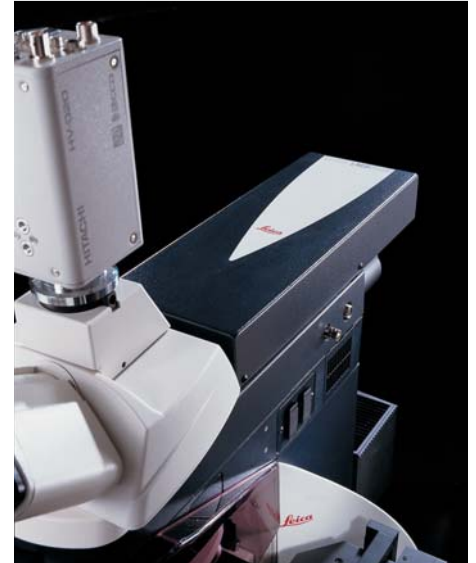
A system solution can only be as good as the sum of its components

All components of our laser microdissection system interact efficiently with each other. This requires a logical integration of the complete system functionality. Due to the modular concept of the Leica microscopes, our Leica LMD6000 offers high versatility. Next to the essential basis of our digital high-end research microscope coupled with the laser, all other options are available and can be used in any combination. In this way, the configuration you choose suits your needs.

Flexible technology for the highest levels of research

Choose between various components to compile a system ideally tailored to your applications: we offer either a motorized or high-precision scanning stage. SmartCut objectives with the required magnifications and an additional 1.25x objective to generate overview images of your tissue sections are standard accessories. In addition to the manual condenser for brightfield, we offer a fully automated variant – enabling contrasting inspection modes. Optimal for fully automated fluorescence is the new external light source Leica EL6000. To complete the fully-integrated solution, you can select between a basic and an advanced software package. In addition optional software modules like the living cell cutting LCC-module or the auto vision control AVC-module and the database Leica IM1000 are available.

Integration



Compactness meets Elegance: The fully-integrated solution is tailored to multiple applications. The intelligent Leica Microdissection system expands your opportunities: full potential for various research areas, concentrated in our all-in-one system solution.

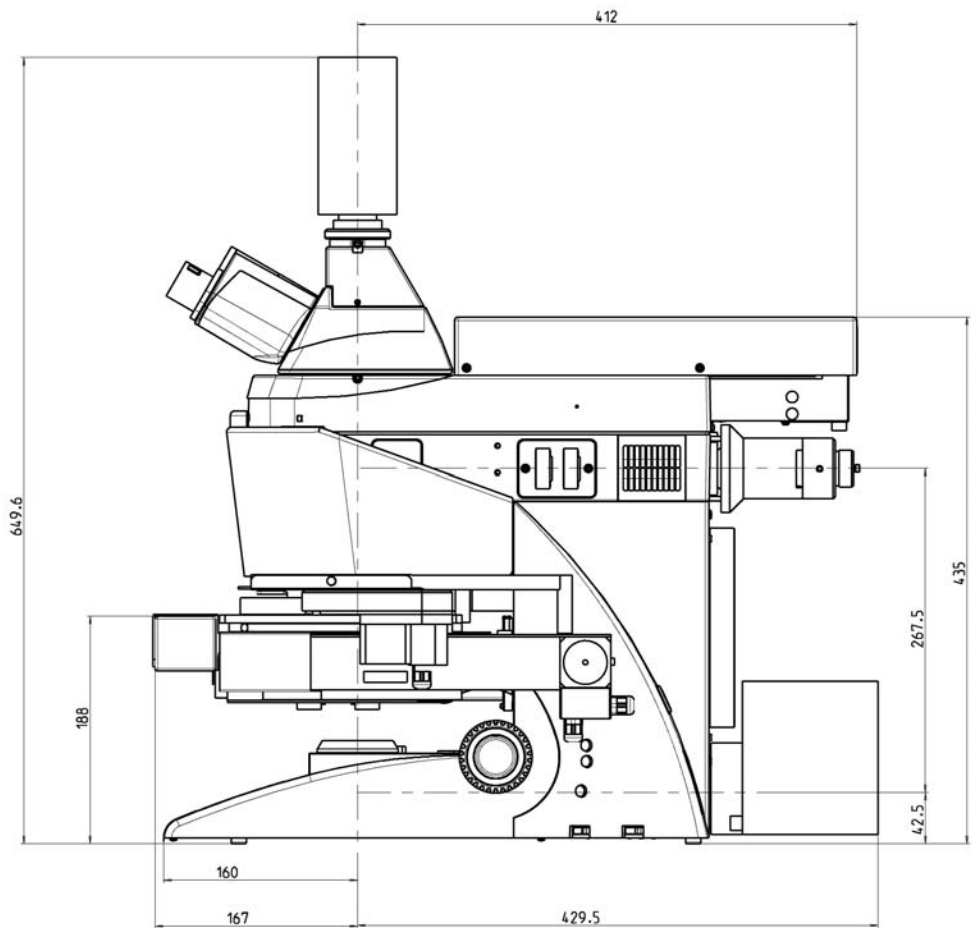
Even the basic Leica LMD6000 system fulfills all the requirements for efficient laser microdissection:

- The system is equipped with all necessary features for routine LMD enabling tissue inspection and manual selection of regions of interest for cutting such as tumors or spermatozoa
- Powerful diode laser allows cutting of all standard tissue sections as well as cutting of harder tissues (e.g. plants) or thicker tissues
- Non-contact LMD is a prerequisite for contamination-free collection of material for subsequent molecular analyses

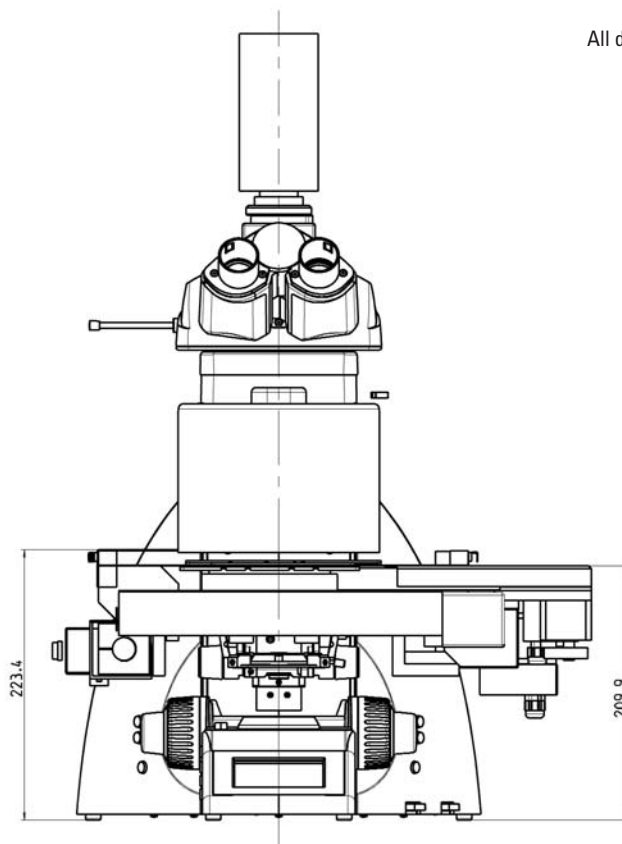
Technical Data

		Leica LMD6000 Patho	Leica LMD6000 Living Cell	Leica LMD6000 Proteome
Stand	Power supply	In CTR6000 electronics box	In CTR6000 electronics box	In CTR6500 electronics box
	Display	Leica Screen (7.3 x 7.3 cm) with information and control panels	Leica Screen (7.3 x 7.3 cm) with information and control panels	Leica Screen (7.3 x 7.3 cm) with information and control panels
	Interfaces	1 x RS 232	1 x RS 232	1 x RS 232
Operation	Focus	motorized	motorized	motorized
	Objective turret	motorized including dry and immersion mode 7x M25 thread	motorized including dry and immersion mode 7x M25 thread	motorized including dry and immersion mode 7x M25 thread
	Stage	Motorized stage	Motorized stage	Scanning stage
	Control elements	6 freely programmable function buttons SmartMove – Control elements for z (focus) movement – Control elements for x,y (stage) movement – 4 freely programmable function buttons	6 freely programmable function buttons SmartMove – Control elements for z (focus) movement – Control elements for x,y (stage) movement – 4 freely programmable function buttons	6 freely programmable function buttons SmartMove – Control elements for z (focus) movement – Control elements for x,y (stage) movement – 4 freely programmable function buttons
Transmitted-light axis	Illumination	12V 100W halogen lamp	12V 100W halogen lamp	12V 100W halogen lamp
	Automation	– Automatic illumination manager (brightness adjustment) – Automatic contrast manager (field and aperture diaphragm adjustment) – Constant Color Intensity Control (CCIC)	– Automatic illumination manager (brightness adjustment) – Automatic contrast manager (field and aperture diaphragm adjustment) – Constant Color Intensity Control (CCIC)	– Automatic illumination manager (brightness adjustment) – Automatic contrast manager (field and aperture diaphragm adjustment) – Constant Color Intensity Control (CCIC)
	Contrast techniques	BF	BF PH DIC POL	BF PH
Condensers	Automation	BF condenser	Motorized condenser turret 7-position Motorized polarizer	Motorized condenser turret 7-position
Fluorescence axis	Mot. filter turret	–	5-position	–
	Illumination	–	Leica EL6000	–
	Automation	–	– Automatic illumination manager (FIM) (brightness adjustment) – Automatic contrast manager (field diaphragm adjustment) – Circular and rectangular field diaphragms for eyepiece or camera viewing	–
	Filter system	–	LMD BGR filter cube for simultaneous viewing and cutting	–
Laser		Solid state laser, wavelength 355 nm	Solid state laser, wavelength 355 nm	Solid state laser, wavelength 355 nm

Leica LMD6000 Multi-User	
In CTR6500 electronics box	
Leica Screen (7.3 x 7.3 cm) with information and control panels	
1 x RS 232	
motorized	
motorized including dry and immersion mode 7x M25 thread	
Scanning stage	
6 freely programmable function buttons	
SmartMove – Control elements for z (focus) movement – Control elements for x,y (stage) movement – 4 freely programmable function buttons	
12V 100W halogen lamp	
– Automatic illumination manager (brightness adjustment) – Automatic contrast manager (field and aperture diaphragm adjustment) – Constant Color Intensity Control (CCIC)	
BF PH DIC POL	
Motorized condenser 7-position Motorized polarizer	
5-position	
Leica EL6000	
– Automatic illumination manager (FIM) (brightness adjustment) – Automatic contrast manager (field diaphragm adjustment) – Circular and rectangular field diaphragms for eyepiece or camera viewing	
LMD BGR filter cube for simultaneous viewing and cutting	
Solid state laser, wavelength 355 nm	



All dimensions are in mm



Leica Microsystems – the brand for outstanding products

Leica Microsystems' mission is to be the world's first-choice provider of innovative solutions to our customers' needs for vision, measurement, lithography and analysis of microstructures.

Leica, the leading brand for microscopes and scientific instruments, developed from five brand names, all with a long tradition: Wild, Leitz, Reichert, Jung and Cambridge Instruments. Yet Leica symbolizes innovation as well as tradition.

Leica Microsystems – an international company with a strong network of customer services

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and representatives of Leica Microsystems
in more than 100 countries.

The companies of the Leica Microsystems Group operate internationally in four business segments, where we rank with the market leaders.

● Microscopy Systems

Our expertise in microscopy is the basis for all our solutions for visualization, measurement and analysis of microstructures in life sciences and industry. With confocal laser technology and image analysis systems, we provide three-dimensional viewing facilities and offer new solutions for cytogenetics, pathology and materials sciences.

● Specimen Preparation


We provide comprehensive systems and services for clinical histo- and cytopathology applications, biomedical research and industrial quality assurance. Our product range includes instruments, systems and consumables for tissue infiltration and embedding, microtomes and cryostats as well as automated stainers and coverslippers.

● Medical Equipment

Innovative technologies in our surgical microscopes offer new therapeutic approaches in microsurgery.

● Semiconductor Equipment

Our automated, leading-edge measurement and inspection systems and our E-beam lithography systems make us the first choice supplier for semiconductor manufacturers all over the world.

 www.leica-microsystems.com/Microscopes


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