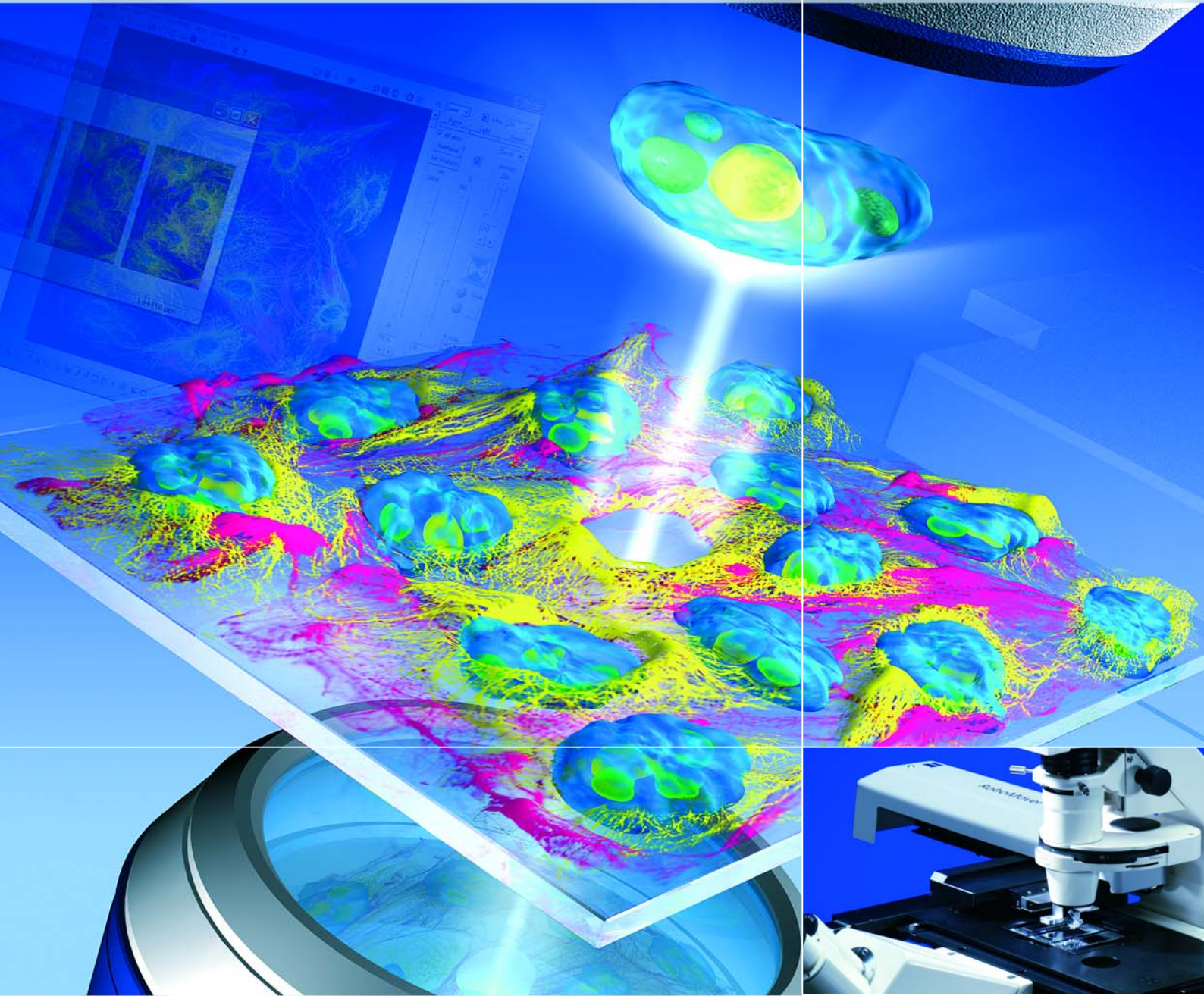


PALM MicroBeam Moving Worlds



**Non-contact Microdissection for
Pure DNA, RNA, Proteins and
Living Cells**



We make it visible.

Non-contact Sample Collection - A New Dimension in Life Sciences

The questions addressed by researchers in modern life sciences are becoming ever more complex. Understanding cellular mechanisms and intercellular communication are some of today's most important areas of study. To conduct reliable scientific analysis we need to study key molecules such as DNA, RNA and proteins – from very pure specimens. Free of adjacent tissue. Free of contact contaminants. A challenge for the tools that must be able to operate with precision at the micrometer level – and without coming in contact with the target cells.

With PALM MicroBeam, Carl Zeiss has met this challenge. From non-contact sampling using medical and biological materials for DNA or RNA recovery to protein analysis and the study of living cells, this system opens up entirely new perspectives in scientific research. Unique to this system is the patented Laser Microdissection and Pressure Catapulting (LMPC), a break-through technology that combines laser microdissection with laser-assisted transfer. This allows target cells to be excised and removed for analysis without any mechanical contact with the specimen. The result: pure, contaminant-free and hence clearly defined specimen material.

Laser Microdissection

Specimen Preparation and Selection

Sources (a selection)

- Histological specimens
- Living cells and cell cultures
- Plant material
- Chromosome spreads
- Forensic preparations

Preparation

- Cryofixation or FFPE material
- Living or fixed
- Stained or unstained
- Fluorescence staining

LMPC

Laser Microdissection & Pressure Catapulting

Precision

- Laser focus diameter < 1 µm
- Reproducible precision of stages < 1 µm
- Precise control of microscope and laser
- Perfect component compatibility

Automation

- Reliable and reproducible selection of target areas
- Choice of automated or manual microdissection
- Efficient specimen collection

Content

- Gentle, contact-free handling of specimens thanks to photonic technology
- Work directly on standard slides with no intermediate steps
- Contamination-free transport against gravity
- Reliable isolation and recultivation of living cells in a sterile environment
- Minimal operating costs when using standard consumables
- Automatable

From pathology to forensics, from genomic and proteomic analysis to stem cell research – PALM MicroBeam will open up incredible new possibilities in the laboratory. New discoveries in life sciences. Greater efficiency in daily practice. And the highest possible quality in your research results.

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Functional Downstream Analysis

DNA

PCR, mutation analysis, SNPs, genetic fingerprinting, LOH, FISH

RNA

RT-PCR, expression analysis, microarrays

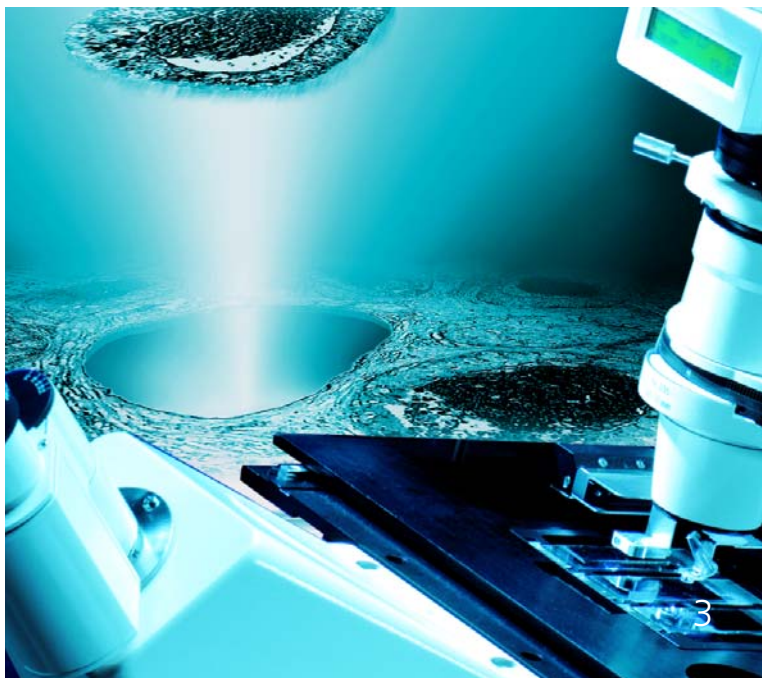
Proteins

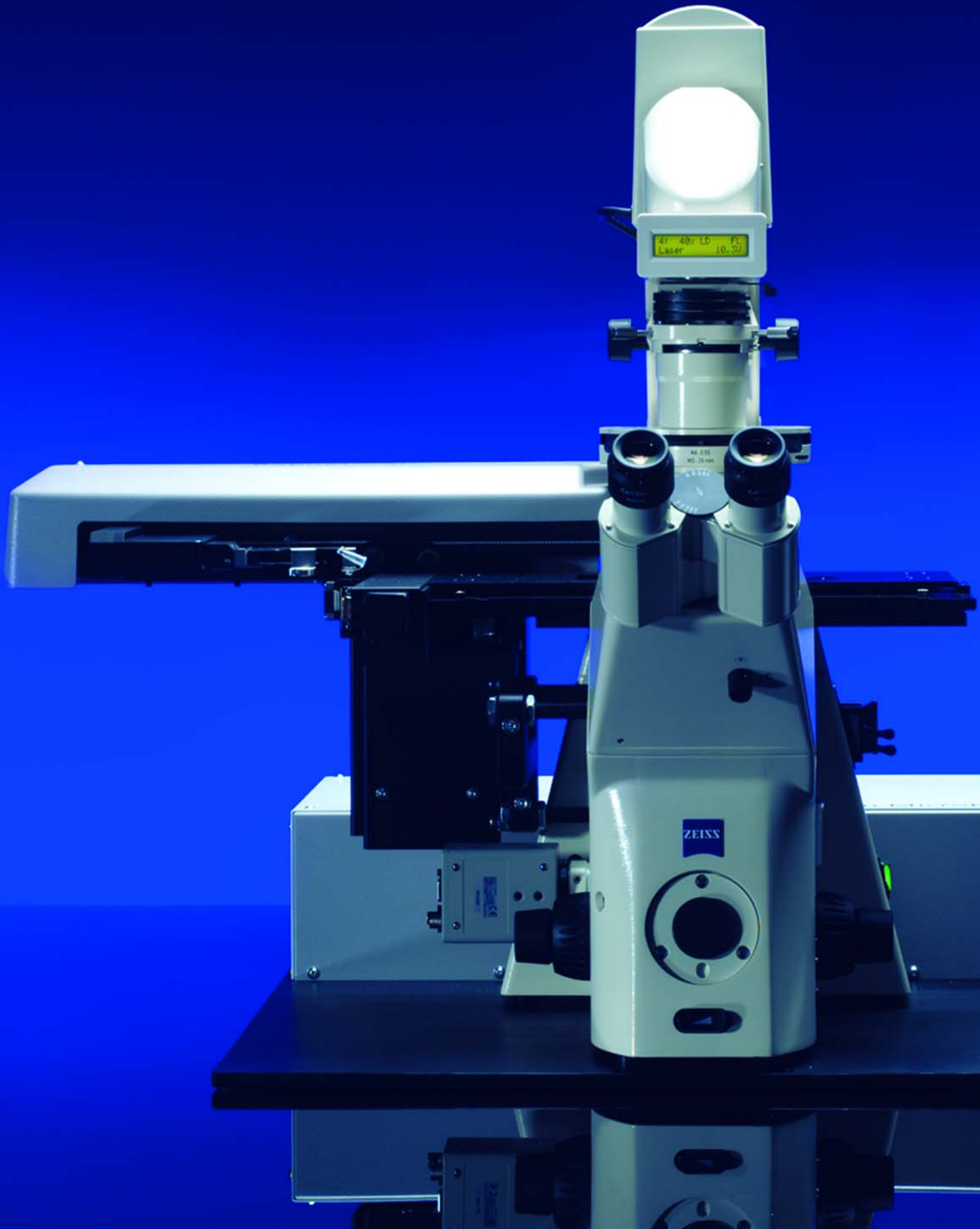
2-D PAGE, SELDI-TOF, MALDI-TOF, immunoblot, nLC/MS/MS

Living Cells

Regenerative medicine, stem cell research, cloning, tissue cultures, primary cultures

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No Contact - No Contamination: This is How LMPC Works

The secret of PALM MicroBeam's success is the LMPC technology developed by P.A.L.M. that made non-contact sampling possible. The key function is the laser catapult: after laser microdissection a defined laser pulse transports the selected specimen out of the object plane into a collection device. Minimal cause with maximum effect. And an invaluable innovation for scientific research.

The interaction of light and matter

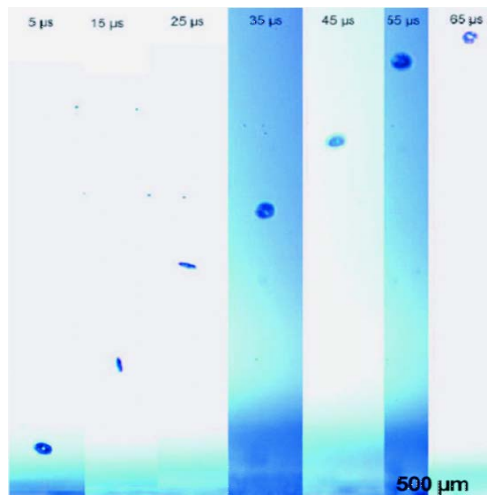
What gives LMPC its decisive edge is the ability to focus laser light through an objective with a high numerical aperture. Energy can be bundled to a focal point of considerably less than 1 μm . This allows manipulation down to the subcellular level without involving neighboring tissue. Even specimen removal is done by means of laser pulse: the

energy released will catapult the specimen against gravity and into a collection vessel. Completely contact-free. And free of contaminants as well.

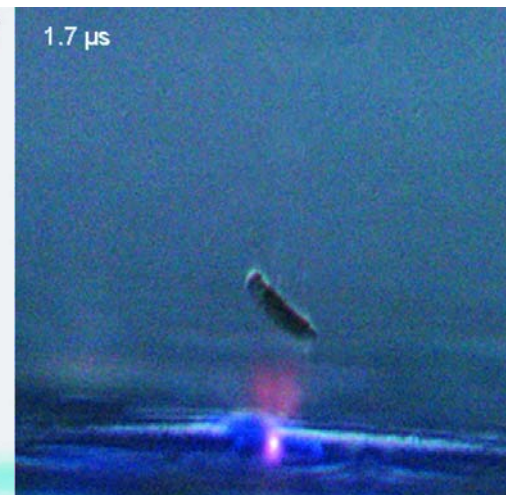
Fast, gentle specimen removal with LMPC

Not only precisely focused, but also extremely fast: with LMPC the laser pulse is directed at the specimen for only about 1 ns. The advantages: no heat can be transferred to the sample in this short period. And the best proof is the fact that living cells can be recultivated following LMPC. Even sensitive stem cells remain viable after LMPC.

Stroboscopic image series



Microdissected specimen following laser transport pulse



The left-hand figure shows images of microdissected specimens at various points during laser-pulse transport. The linear movement of the particle is clearly visible. The right-hand figure shows a detail from the image of a microdissected specimen 1.7 μs after the transport pulse: the particle is flying vertically towards the target.

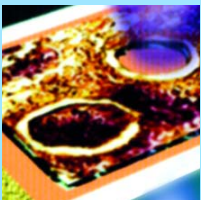
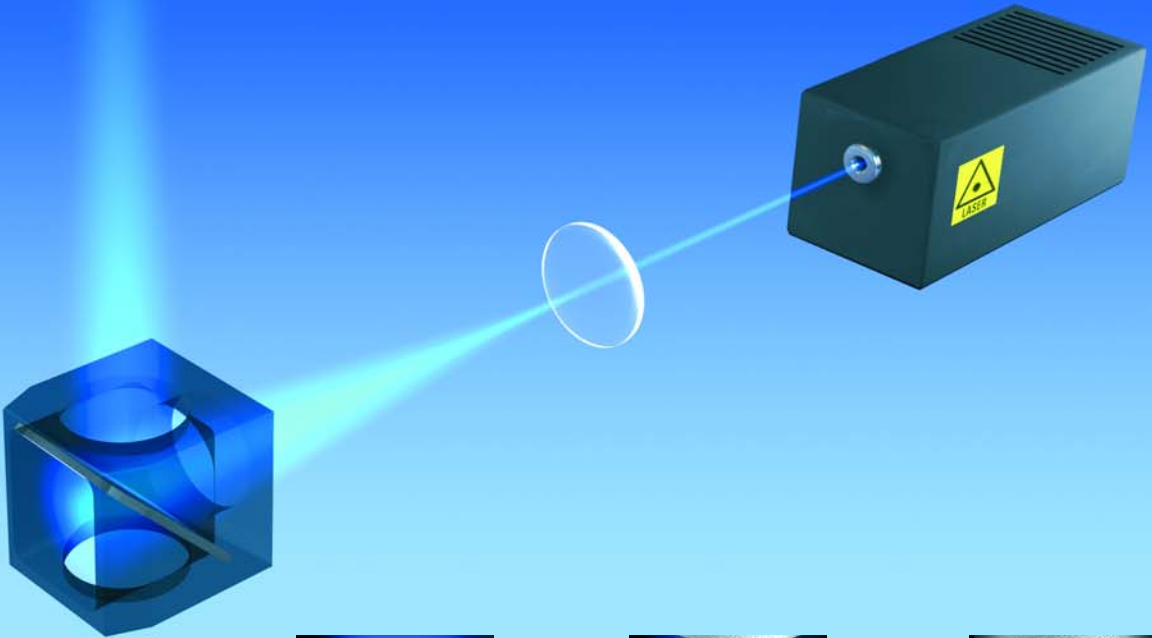
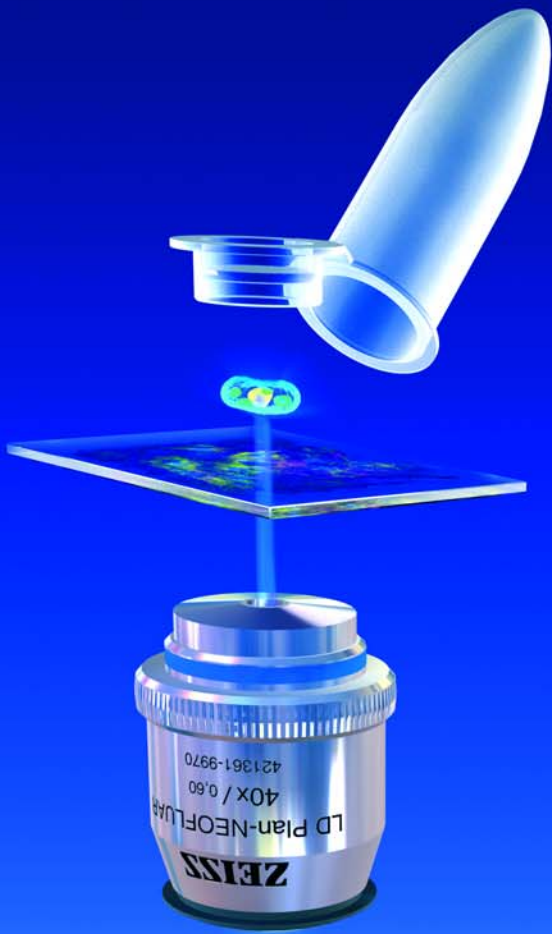
Images courtesy of Dr. A. Vogel

LMPC - a standard for research

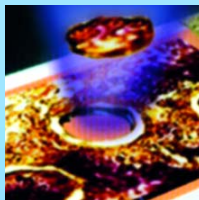
Dr. Alfred Vogel has been studying the effects of lasers on biological tissues successfully for a number of years. "PALM's LMPC technology is becoming more and more important in scientific research because it greatly simplifies a number of biotechnical techniques – indeed, it has made a number of them possible at all. For example, the demand for increased analytical precision requires precision in specimen preparation as well as their gentle transport into analytical containers. Then there is the problem of separating living cells from a heterogeneous ensemble. For both of these purposes LMPC is a technique that is fast, automatable, and contaminant-free."

Dr. Alfred Vogel,

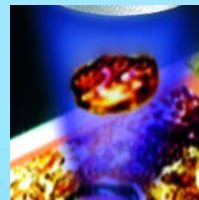
Institute for Biomedical Optics, University of Lübeck



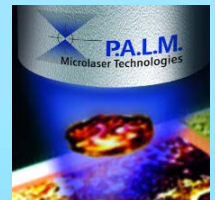
Source material is excised through microdissection



The transport pulse releases energy for transport



The microdissection is transferred vertically from the slide...



...and into the collection vessel

From Specimen to Application: Purified Material for Your Research

The problems studied in the life sciences are as varied as the answers sought by scientists. The tool they use in their research is always the same. It is the main element in this process, and it has to be as effective as it is flexible. PALM MicroBeam with its contact-free laser microdissection offers a key technology for producing pure specimens for analysis. Regardless of what source material is used. But the yield is always solid scientific results.

Workflow - from questions to answers

Laser microdissection and specimen preparation following contact-free removal can be seamlessly integrated into your work. The pathway from question to answer – the workflow – involves a number of steps:

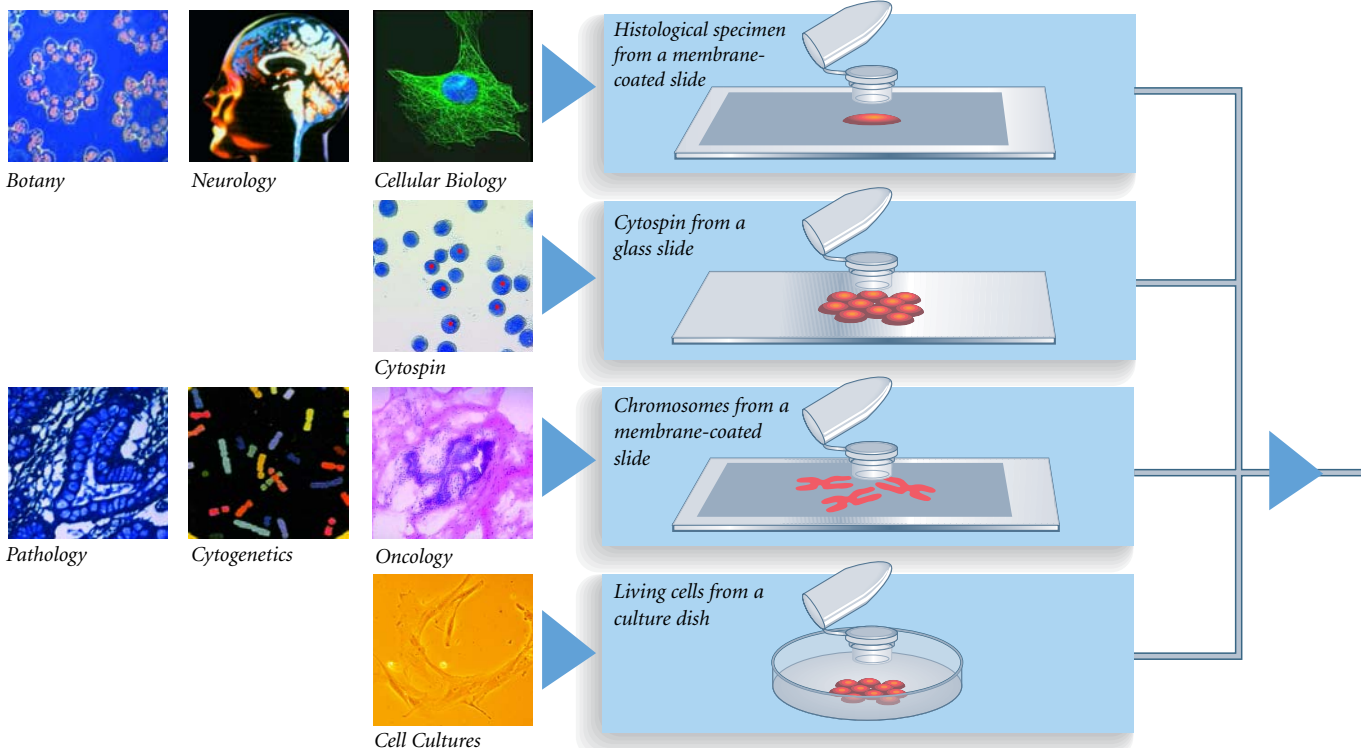
1. Handling of biomedical tissues
2. Sample selection and retrieval
3. Subsequent investigation

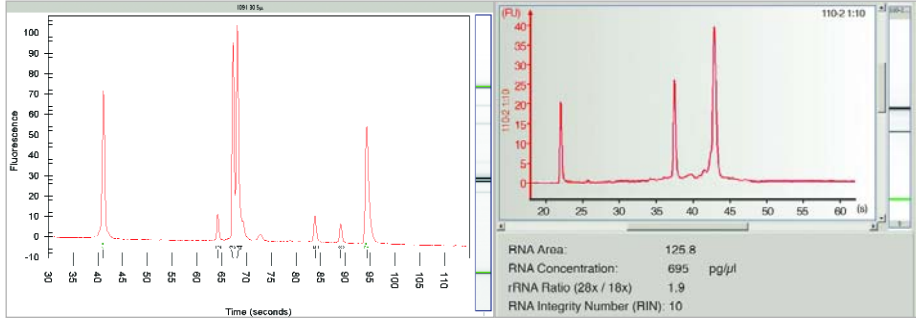
The link between source material and analytical specimen is PALM MicroBeam: with LMPC you can extract only those regions you want to investigate. You simply leave unwanted material behind.

Wide-ranging research activities require flexibility

PALM MicroBeam has proved itself in a large number of different areas. There are no limits, either in the choice of specimens, preparation or staining techniques.

- Histological specimens from membrane-coated slides
- FFPE and cryo, even directly from glass slides
- Archival material from glass slides
- Cytospins
- Chromosomes
- Living cells
- Fluorescence specimens





Selective tissue microdissection allows detection of smallest differences in DNA and a high quality RNA

This opens the door to use PALM MicroBeam in almost all areas of research.

Broad spectrum specimen removal

A wide range of source material means a wide range of analytical material as well. With PALM MicroBeam you can

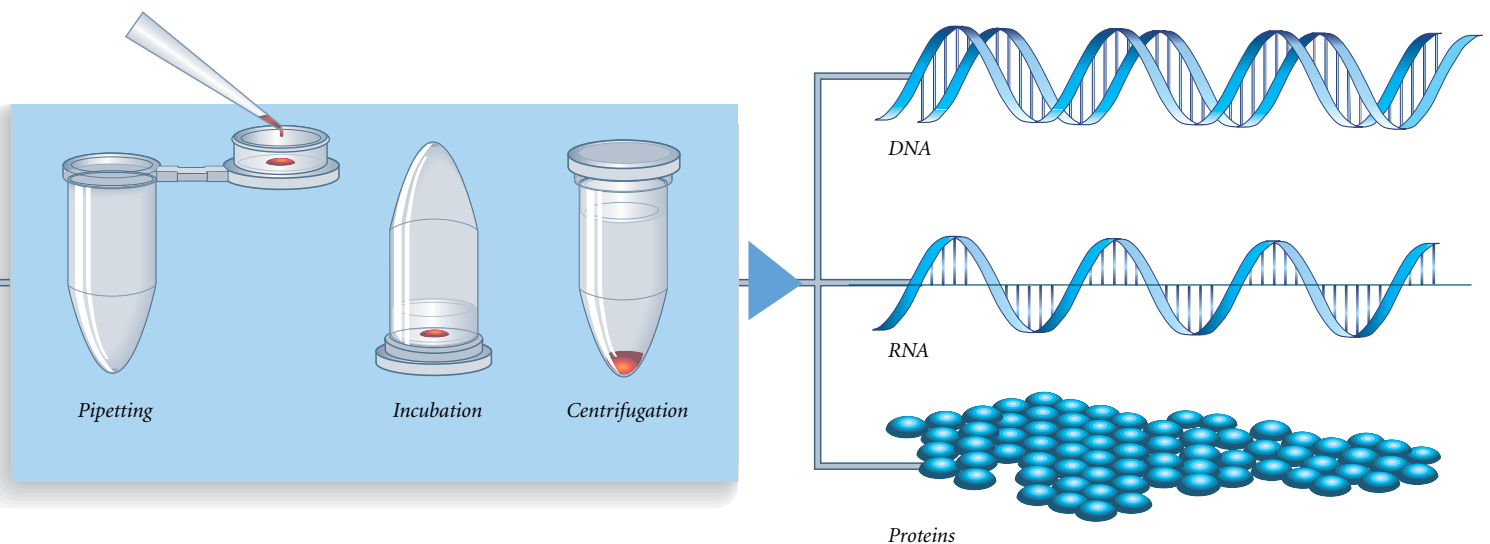
- retrieve whole tissue regions
- selectively target individual cells such as neurons in tissue
- selectively target fetal cells, sperm cells, or chromosomes
- identify and retrieve individual cells from cytopins and smears
- isolate living cells from fresh tissue and from cell cultures.

Unlimited subsequent analyses

- Analyze DNA, RNA and proteins
- Microarrays
- Recultivate living cells
- Select efficiently from heterogeneous cell cultures
- Micromanipulate living human, animal or plant cells

For applied research

The primary function of PALM MicroBeam – non-contact sampling using LMPC – is a springboard to successful research. Whether it is preparing cell regions for oncological studies, or separating individual cells for cytological research, or isolating individual particles or cells from evidential material for forensic purposes: PALM MicroBeam can be used in all of these disciplines. Only PALM MicroBeam can provide analytical material that is pure enough for applications like genetic fingerprinting.



Applications

Very Pure Specimens for Precise Results: DNA, RNA, Proteins and Living Cells with LMPC

Biological research at the molecular level is the focus of modern science and an important area in today's life sciences. Future research activity will revolve around the isolation of biomolecules from heterogeneous tissue or from individual cells. The instrument of choice: PALM MicroBeam from Carl Zeiss. So you can get results for even the most challenging of problems yourself – quick, safe, and reproducible.

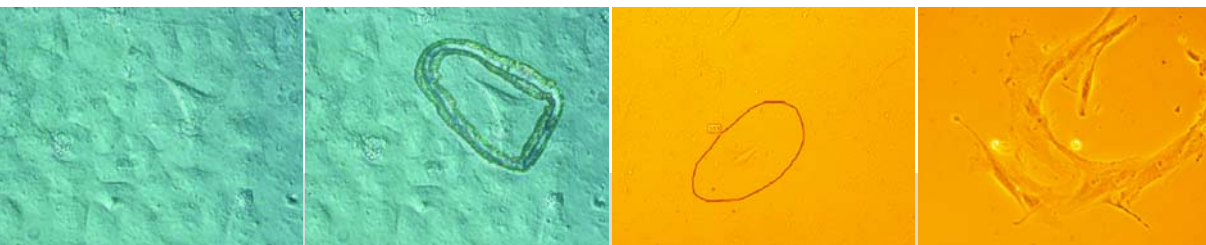
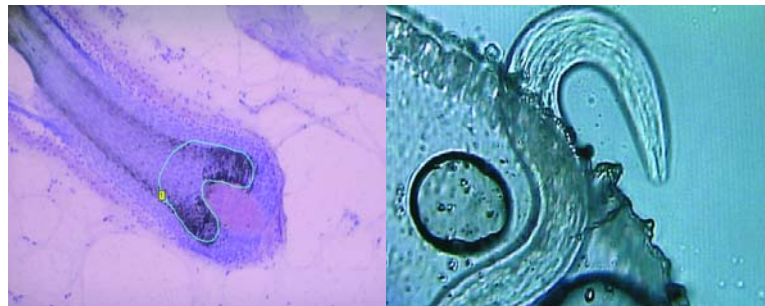
LMPC for purest DNA in genomic analysis

DNA research requires carefully selected source material. Particularly when studying individual cells, highest purity is a must. The same is true when selecting from a pool of individual cells: the cleaner the source material, the better the results. PCR, as a highly sensitive analytical tool, will amplify any material offered. Therefore, purest DNA is required to achieve reliable results. Only with LMPC from P.A.L.M. cancer cells, for example, can be clearly separated from the surrounding tissue to allow contamination-free analysis and reproducible results. And, unlike any other laser microdissection devices, LMPC

can also be used with normal glass slides. Thus, even old archival pathological or forensic specimens can be studied.

LMPC for highest yield of RNA

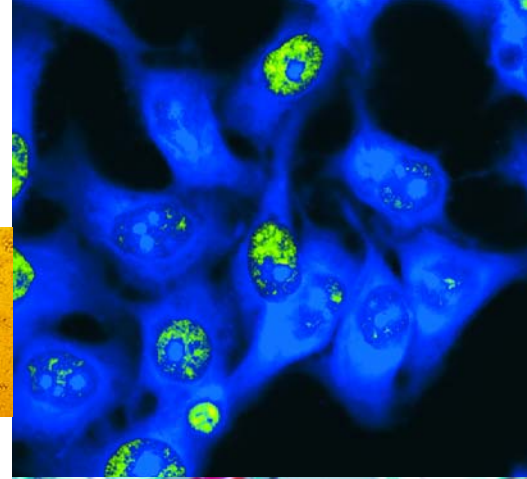
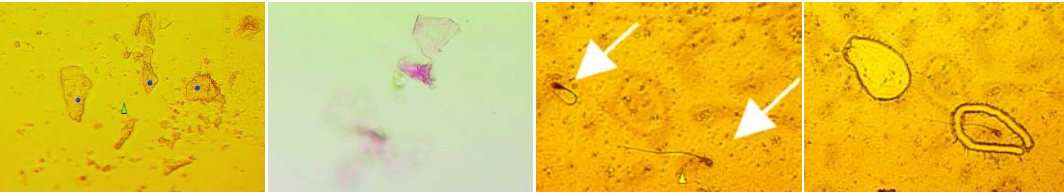
Exactly separated analytical material is also important for the study of gene expression patterns. A prerequisite for that is to dissect and collect material preserving RNA in highest integrity. The best proof for the unparalleled quality of the LMPC method: even from single cells reliable gene expression analysis is possible. For all applications, only precise collected cells or tissues can yield precise and reproducible results.



Living cells with PlasDIC

Even stem cells can be successfully recultivated following LMPC
Images courtesy of Dr. A. Buchstaller, LMU Munich, Germany

Working with a limited amount of specimen material: harvesting cell fragments from forensic adhesive tape or sperm cells from smears

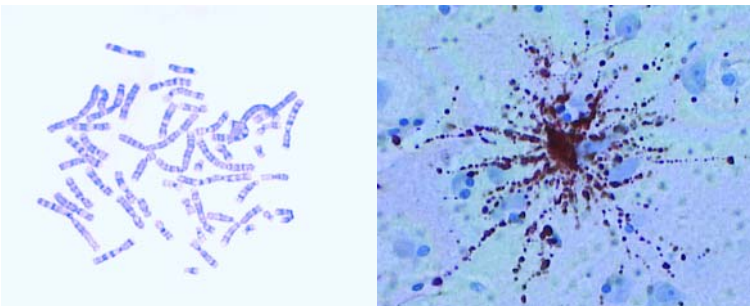
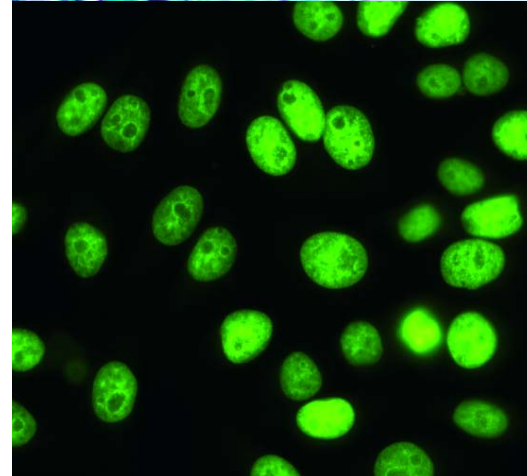
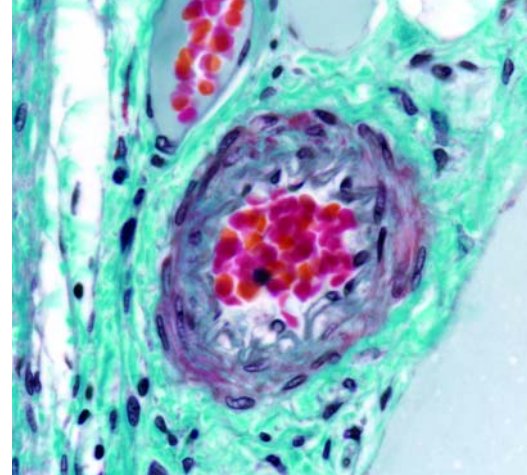


LMPC for pure proteins

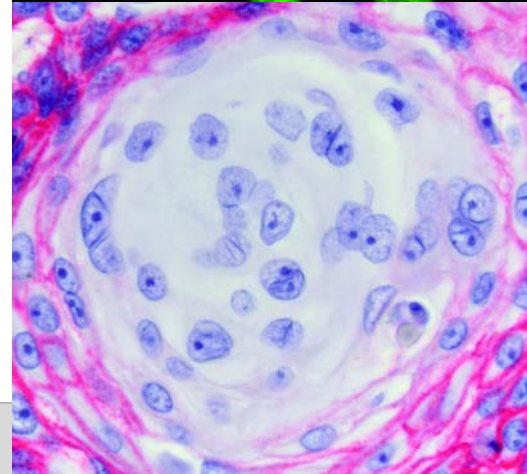
Even in protein research, the trend is toward careful separation of individual cells or cell fractions. Cellular and tissue expressions induced by a wide variety of factors can be determined when LMPC is used to harvest specimens at the protein level.

LMPC for living cells and fresh material

An innovative approach is to isolate a single living cell out of a heterogeneous cell culture using LMPC. This way transfected cells can be clonally expanded, or pure stem cell cultures can be achieved. Moreover tissue engineering as well as selective living cell ablation can be done fast, easily, and securely.



Unlimited variety of source materials:
hair follicles, *C. elegans*, chromosomes, astrocytes



Application Laboratory

Quality Support from the Outset: The PALM Application Laboratory

Specialized technology requires specialized know-how. The PALM team can offer years of experience in microdissection and other laboratory techniques to help you in your work. Carl Zeiss and P.A.L.M. provide a unique service with their Application Laboratory: whether you are looking for a system tailored to your specific applications, or simply need the help of an experienced scientist – our team is at your disposal. Together we can help you to solve your problems, either in our state of the art facilities or in your own laboratory.

At the customer's service

Your success and satisfaction are most important to us. Regardless of the problem facing you, we will help you to solve it. We are experienced in designing your experiments around microdissection. This can involve many tasks, including specimen preparation and subsequent steps such as RNA extraction or amplification. You can profit from our team members' many years of experience.

Proof-of-principle tests with your samples

Proof-of-principle tests in our application laboratory are part of the special service from P.A.L.M. – and one that you should take advantage of. You can find out for yourself how effective our system is, and at the same time you can profit from the PALM team's know-how. A distinct advantage if you are still looking for the right laser microdissection system to meet your individual needs. Or if you want to support your research grant with some initial results. Even if you are working in an area where microdissection is still a new technique, we can help you obtain initial results from your own specimens: RNA extraction, for example. And it goes without saying that images and results are yours to take with you.

RentalLab: by the day, by the week, by the month

You can save time, money and resources by carrying out your projects at our facilities – and, if necessary, with our help. We can provide you with advice and suggestions to help you find solutions. Whether you want to spend days, weeks or months with us, our expertise is at your disposal.

Highest quality results in the shortest possible time

“Our group is studying the molecular characteristics of prostate cancers. Our goal is to identify new diagnostic and prognostic markers and to evaluate new treatment targets. The heterogeneity in this tissue is well known. But in order to better understand the cancer-related mechanisms, it is essential to correlate molecular data with specific cell types. We microdissected our preparations in the PALM Application Laboratory and extracted high-quality DNA, RNA and proteins. With the lab's efficiency and our ability to focus and optimize every step with the LMPC, we were able to carry out around four months' worth of work in two weeks.”

*Dr. Thorsten Schlomm,
Department of Urology, UKE Hamburg, Germany*





Send your specimens to us

If you are short on time and personnel, you can simply send your specimens to us. We will perform the microdissection for you and, if desired, all necessary molecular-genetic analyses. Results and expert interpretation included.

Real-time with Remote Online

All you need here is a computer. We arrange a time for you to log on to P.A.L.M. so you can observe us working with the specimens you send us – live via Internet.

Investing in the future: training at P.A.L.M.

Take full advantage of all PALM MicroBeam functions. We offer training sessions so you can learn everything there is to know about the system. You will receive valuable tips for successful work with specimens before and after microdissection. And you'll find out about the latest trends, such as LMPC and recultivation of living cells.

For detailed information and a complete list of our services, go to www.palm-microlaser.com/labor or send any questions to: lab@palm-microlaser.com



Operation and Control Made Easy: Attention Paid to the Smallest Detail

Underlying the entire microdissection system is PALM RoboSoftware: you use it to operate both microscope and laser. PALM RoboSoftware makes it so easy and comfortable to run PALM MicroBeam: well laid out user interfaces, functionality right where you need and expect it, and standards for repeated microdissection and micromanipulation applications.

Central control: the main window

Everything under control in the main window: microscope on the right, laser on the left. Below are the drawing and laser functions and up above the list of elements as well as additional microscope functions such as fluorescence. Here you can also find PALM RoboMover and Navigator.

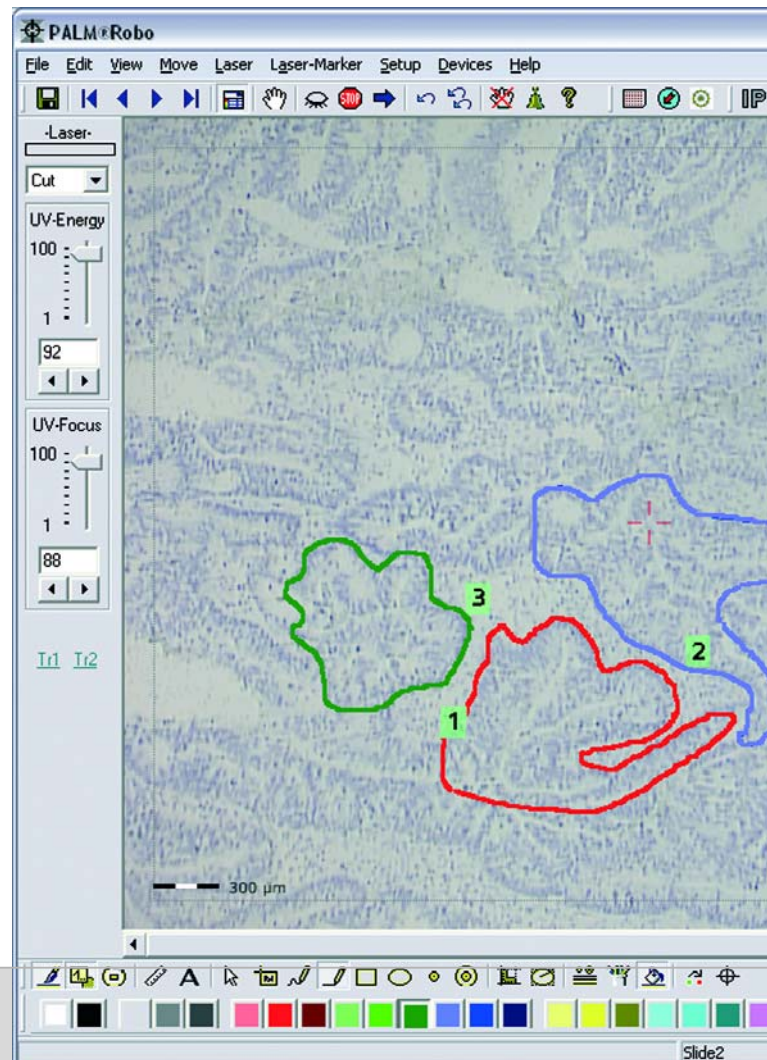
Keeping the specimen in view: Navigator

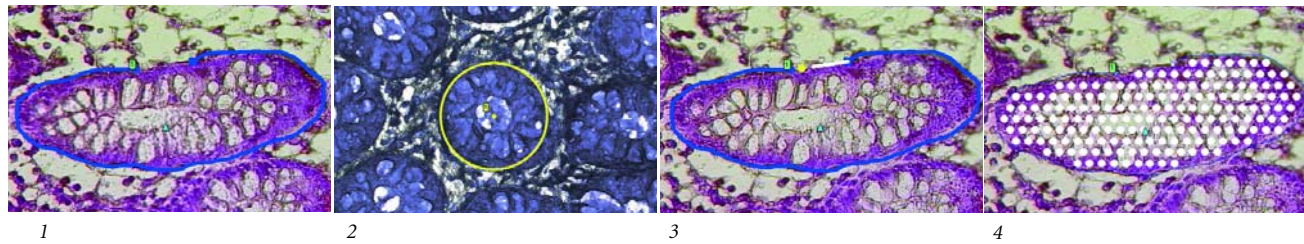
Navigator lets you view the specimen, entirely or in sections. The specimen is scanned and its image displayed in the Navigator window. With a click of the mouse you can position the microscope anywhere within the image and display this area on screen. Fast, clear, and precise.

Select and draw: the list of elements

The list of elements is the most important tool for actual laser microdissection. You use it to control the areas to be dissected, called elements. These elements can be outlined with different drawing tools such as freehand, rectangle, circle, or ellipse, and then marked with different colors. This allows you to

combine functions for intelligent microdissection as well as to export your data as Excel files.





1. Cut
2. AutoCircle
3. RoboLPC
4. AutoLPC

Cut, catapult, or both: the laser functions

Depending on the requirements, you will need different laser functions or combinations of functions. The choice is yours: cut only, a combination of cut and catapult, or special functions for working with membrane-coated or glass slides.

Automated capture: PALM RoboMover

PALM RoboMover allows you to automate your experiments as needed.

- Distribute specimens evenly into different microfuge caps or microtiter plate wells
- Set up concentration series, e.g. for determining detection limits
- Place an exact number of elements into each microfuge cap or microtiter plate well

Switching made easy

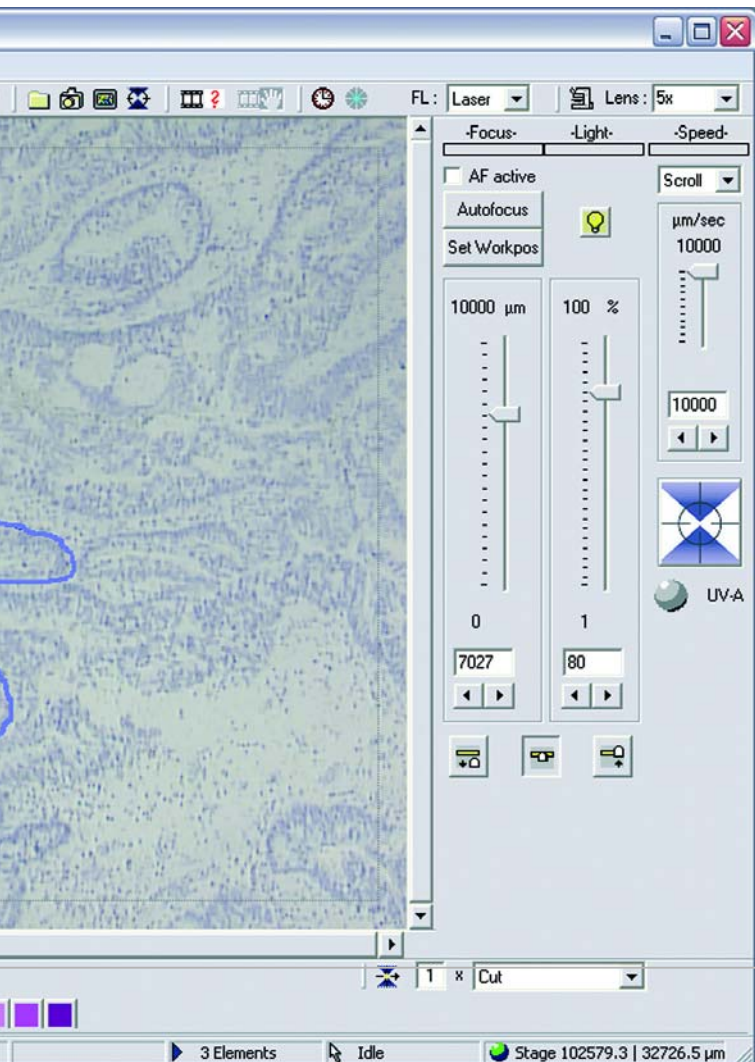
PALM RoboSoftware stores the coordinates of your elements in relation to the slide. This saves you the effort of setting reference points each time you switch or reuse your slides.

Checking the material with CapCheck

After microdissection is complete, the elements are located in caps or wells. During this phase you can use CapCheck to view the position of the catapulted material: morphologically intact with RoboLCP, or separated into flakes with AutoLPC.

Up-to-date user management for groups

If you work with user groups, our up-to-date user management system allows each member to find his or her own settings and data quickly.





Professional Documentation with the InformationCenter

Reproducible microdissection

In research, documentation of results is indispensable: specimen type, choice of elements, type of specimen retrieval, and image analysis, with or without commentary. Each step can be recalled and controlled. Meaning that all analytical results can be retraced with no gaps in the process.

Individual databases easily created

Adjust your database to suit the requirements of your experiments. Choose from any of the microdissection functions. Save your images in the well ordered structure you need for your work. Choose among different formats and generate reports. Each user in a work group individually for his or her personal needs. For you this means flexibility in documenting your work. And security in your experiments.

InformationCenter

List of Elements

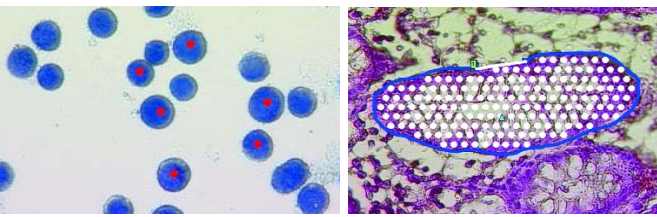
| Color | Type of Elements | Number of Elements | Areas (µm²) | Remarks |
|----------------------|------------------|--------------------|-------------|-------------|
| Red | Figure(s) | 3 | 982377 | 3 FreeHands |
| Green | Figure(s) | 1 | 382138 | 1 FreeHand |
| Blue | Figure(s) | 1 | 629542 | 1 FreeHand |
| Total: 5 1994057 µm² | | | | |

The InformationCenter interface displays a grid of 12 microdissection images. Below the grid, the 'Picture Information' panel provides technical details for the current image:

| Parameter | Value |
|----------------|-----------------|
| Microscope | Axiocvert 200 M |
| Objective | Fluar 5x/0.25 |
| Magnification | 5,000 |
| Condenser | Brightfield |
| Lamp level | 34 |
| Aperture | 0.320 |
| Reflector | 0 |
| Shutter (obj.) | Open |
| Filter | |
| Focus Position | 6342,250 |

The list of elements is an integral part of laser microdissection and non-contact sampling. All available elements are identified with their characteristics and are color coded to associate them with intended targets.

All pertinent data is collected in the InformationCenter: images, elements, surfaces, and methods. You save whatever your research requires, or use default settings, to ensure quality.

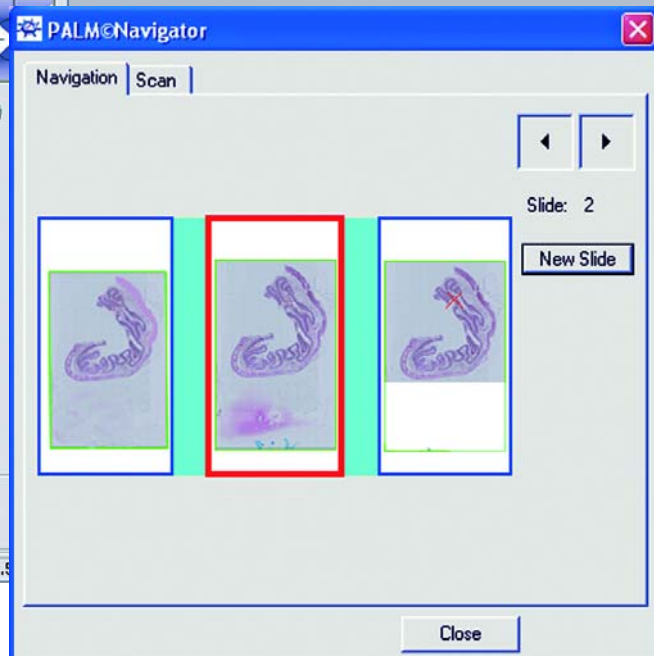


1
2
1. LPC
2. Close&Cut + AutoLPC

Precision work: PALM RoboSoftware moves the microscope stage and positions the specimen, precise to the micrometer. The speed of the procedure can be adjusted for the scroll function.

PALM RoboSoftware at a Glance

- Intuitive user interface
- List of elements
- Laser tools: Cut, LPC, RoboLPC, AutoLPC
- Graphic tools: Freehand, Circle / Ellipse and Dot
- Elements: copy, move and resize
- Serial sections
- LMPC with simultaneous fluorescence
- Up-to-date user management
- CapCheck
- Tabular export of element data
- Automation



Workflow Optimization: Greater Efficiency for Your Experiments

“Designed for practice” means ease of use and rapid, uncomplicated workflow. Loading and unloading are made fast and comfortable with automated loading positions. After choosing the objects, the selected areas are transported into the desired collection vessel via LMPC – with just a click of the mouse. An efficient way to run an experiment, and combined with Carl Zeiss microscopes, a highly reliable and flexible system, providing results at the very highest scientific levels.

Step by step - select, cut, transfer

Specimen removal is just as flexible: since the source material can be in a culture dish as well as on different slides, you can use the serial sections function for up to three slides at the same time. Only one slide will be stained and the elements marked on it; specimens will be extracted from the other

two. The advantage to you: maximum integrity of the analytical material.

Automatic and easy:

PALM RoboMover

With PALM MicroBeam you can choose from a variety of collection vessels for different types of experiments: individual caps or tubes, 8-cap strips, even microtiter plates in their own collectors. Specimen removal has been thought through to the smallest detail, regardless of whether different tissues are to be separated out or only one type is to be removed. And controlling your experiments is also done efficiently with PALM RoboMover. Distribution of the specimens or concentration series can be comfortably selected beforehand. Optimized visualization, no small matter with uncovered specimens, is guaranteed by the diffusor. Effortlessly and automatically.



Sterile work with LiveCell Collector in the culture dish



Rapid work with living cells in the culture dish with CapMover



Automated operation with PALM RoboMover: SingleTube Holder

Experiments



Living cells: white-glove treatment and high precision

Cell cultures differ in many respects from histological material. They are highly sensitive to their environment. They must be handled quickly and in sterile surroundings. With PALM MicroBeam you can take advantage of all the laser functions without having to remove the medium completely. The individual cells are in a medium-filled cap: a decisive factor with living cells. Their normal environment is maintained. Trypsinization is not necessary.

Where to go with the specimen?

PALM MicroBeam is equipped for experiments that use a wide range of collection vessels. The LiveCell Collector allows for sterile work, with the cap positioned manually over the culture dish. Removal is done in a closed dish with PALM MicroBeam; the remaining work is done under the sterile bench.

If, for example, a single cell is to be removed in an aseptic environment, then the CapMover will position a cap and holder in the culture dish semiautomatically. PALM RoboMover then harvests histological material automatically. This allows a wide variety of collection vessels to be used – from single caps or eight tubes up to 8-cap strips and whole microtiter plates.

*Automated operation and experiment control:
PALM RoboMover and microtiter plate*



*Automated operation at enhanced
throughput with 8-cap strips*



Systematic Precision: Perfect Coordination of All Components

Carl Zeiss offers a broad spectrum of components for PALM MicroBeam system. They all have one thing in common: together with the Axiovert 200 research microscope, they take full advantage of modern microdissection's potential. From LMPC under fluorescence illumination to experiments with living cells and automated workflow at higher throughput, the components are perfectly integrated and open up new dimensions for biomedical research.

Anything is possible: LMPC and fluorescence

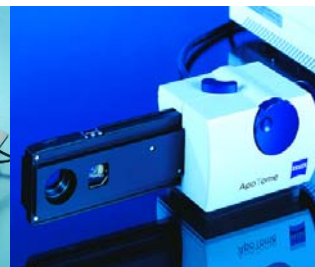
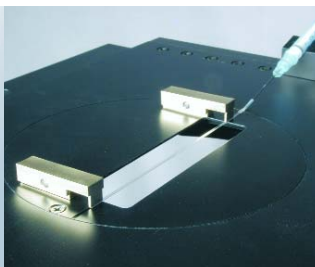
PALM MicroBeam opens the possibility of using fluorescence illumination in your applications, with or without using the laser functions at the same time (advanced or basic mode). In basic mode you can take fluorescence images with all available filters and then run LMPC. Or run them simultaneously – meaning LMPC under fluorescence illumination – with the advanced filter sets. Specially coated beam splitters reflect laser light and the necessary excitation wavelengths at the same time. With freeze mode you can keep the fluorescence image on screen and set the cut lines. The prepared material will no longer be irradiated, and the sensitive fluorescent stains won't fade. What this means for you is the broadest possible range of applications with maximum specimen safety.

For enhanced throughput: PALM RoboMover

Using PALM RoboMover, complex applications and experiments can be carried out quickly and efficiently. PALM RoboMover automatically collects and sorts different types of dissections from large amounts of specimen material at high speed. It is easy to operate: for each target position on a microtiter plate, for an 8-cap strip or for a single microfuge vial cap, you determine the type and number of cells to be catapulted into them. Then you start the desired laser function, manually or automatically depending on the application. This allows you to automate complex experiments. And with the CapCheck function you can visually examine the microdissections in the caps or wells right away.

Laser manipulation: the optical tweezers

The optical tweezers are an important module for non-contact cell manipulation. With them, single cells or objects can be captured in liquid and manipulated with PALM MicroBeam. They can then be pulse-transported into a cap for further use. The optical tweezers are available either as a separate tool or integrated into PALM CombiSystem. They come with one or two beams: one fixed, the other variable along the x, y and z axes in micrometer increments.



CapMover

Capillary holder

Stage II

ApoTome

High-performance objectives

Modular construction, with the flexibility required by research: PALM MicroBeam with the Axiovert 200 microscope platform and the high-performance AxioCam HR



**A research standard:
Axiovert 200**

Carl Zeiss research microscopes are world leaders in the fields of fluorescence microscopy and Live Cell Imaging. Axiovert 200 M inverted microscope is particularly suited for use with PALM MicroBeam.

- Fully motorized for high-end research
- Optimal fluorescence optics with high illumination homogeneity, perfect contrast and brilliant images, even at low levels of light intensity
- Great stability
- Ergonomically designed for comfortable work

**Unparalleled optical quality:
objectives from Carl Zeiss**

Developed to meet the needs of the most demanding applications and recognized in the scientific community for their brilliant optical quality: objectives from Carl Zeiss. Their transmission characteristics and their high numerical apertures make them perfect for laser microdissection.

Modules for PALM MicroBeam

| | Stage I | | | LiveCell Collector | Cap-Mover | Stage II | | | | RoboMover | | | Tweezers | Fluorescence | Image Processing | Incubator |
|--|--------------|------------|--------------------------------|--------------------|-----------|--------------|--------------------|--------------|------------------|----------------------|--------------|-------------------|----------|--------------|------------------|-----------|
| | Single Slide | Two Slides | Culture Dish, Capillary Holder | | | Three Slides | Micro-titer format | Culture Dish | Capillary Holder | 1 - 8 Caps and Tubes | 8-Cap-Strips | Microtiter format | | | | |
| Universal Application, Histological Sections | ● | ● | | | ● | ● | ● | | | ● | ● | ● | | ● | ● | |
| Living Cells, Culture Dish | | | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Serial Sections | | | | | ● | ● | | | | ● | ● | ● | | ● | ● | |
| Enhanced Throughput | | | | | | ● | ● | ● | | ● | ● | ● | | ● | ● | |
| Standardized Experiments | ● | ● | ● | | ● | ● | ● | ● | | ● | ● | ● | | ● | ● | ● |
| Standardized Turn Over Point | | | | | | ● | ● | | | ● | ● | ● | | | | |
| Sorting and Transporting | | | ● | ● | ● | | | ● | ● | | | | ● | | | ● |

Automatic Image Recognition: Image Analysis with AxioVision

Indispensable for successful research on sensitive samples: efficient image analysis for rapid, standardized and reproducible identification of target objects. AxioVision from Carl Zeiss can be integrated into PALM RoboSoftware. Designed for daily practice and easy to use – for rapid and dependable experimentation.

Direct access via Navigator

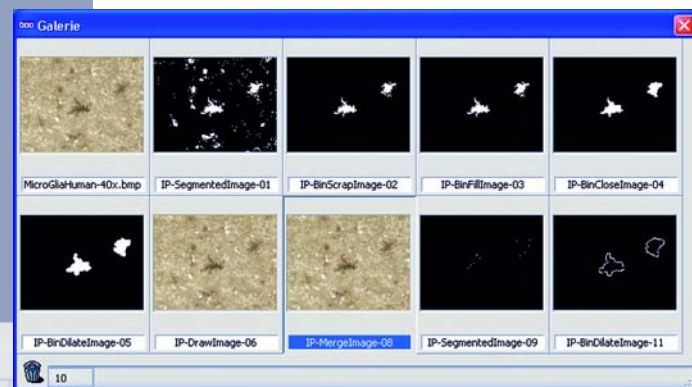
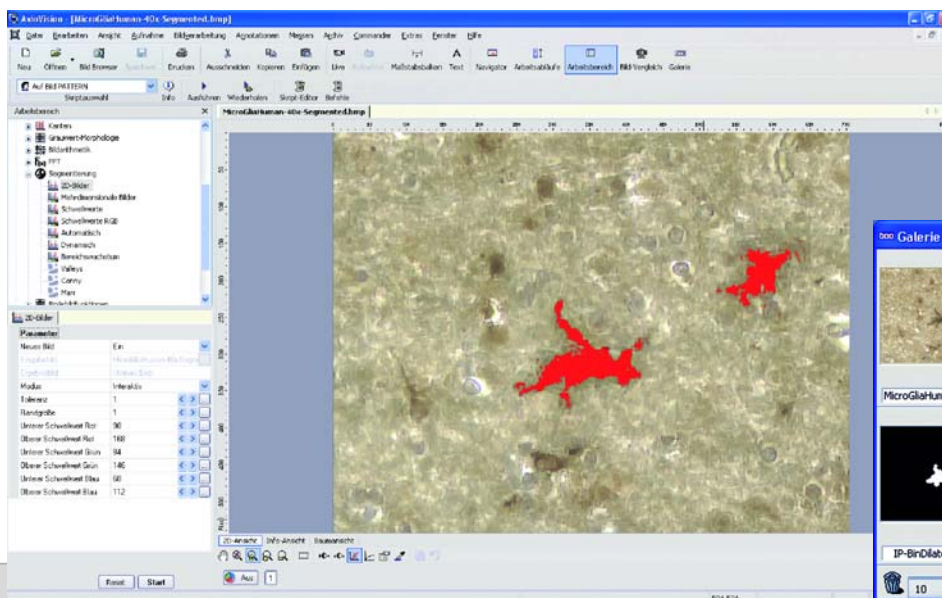
It doesn't get any faster: from Navigator you can switch to image analysis and back again. Then you analyze the target region and generate your list of elements – with no time lost and with complete precision. The image recognition is flexible. Either creating a script or using VBA (Visual Basic for Applications) interesting applications can be realized quickly.

Digital intelligence:

AxioVision 4.4 from Carl Zeiss

Microscope operation, imaging, evaluation, documentation – AxioVision 4.4 from Carl Zeiss combines all these functions in one platform. From the wizard to the scripting program to VBA programming, there are any number of great tools for automated image recognition to choose from.

- Automatic generation of LMPC element lists
- Very easy to use: script creation in Commander with image analysis functions
- Rapid, interactive segmentation
- VBA for programming LMPC applications
- Optimal integration in Carl Zeiss microscope systems



AxioVision

The AxioVision user interface allows images to be imported directly from PALM RoboSoftware for analysis. The image above shows a 2D segmentation of stained nerve cells.

AxioVision Gallery

PALM CapturePlate in its collector: combining non-contact sampling at high throughput with the microtiter plate



Functional Accessories: Materials from P.A.L.M.

With products from P.A.L.M., Carl Zeiss offers a seamless spectrum of consumables and accessories for your research. And always with an eye to providing optimal support for your individual application needs.

The latest technology: PALM CapturePlate

Like the microtiter plate, PALM CapturePlate has a series of capture positions. The microdissectates are transferred with a laser pulse into these wells, which can be filled with a biologically inert gel. The specimens are then centrifuged into a microtiter plate. Simple, fast, and secure. Using your own fill material adds value to your experiments: the material to be analyzed is fine tuned to your experiment from the very beginning.

For living cells

- LiveCell Collector: for live cell harvesting with LMPC inside a sterile culture vessel
- DuplexDish: culture dish with a double-membrane layer for subsequent selective isolation and recultivation of adherent growing cells
- Petriperm 50: sterile vessel for working with living cells

- MembraneRing: for microdissection and separation of living cells with subsequent recultivation (in combination with the Petriperm or DuplexDish)
- XP2 incubator: for working with living cells and time-lapse experiments in fully enclosed environments

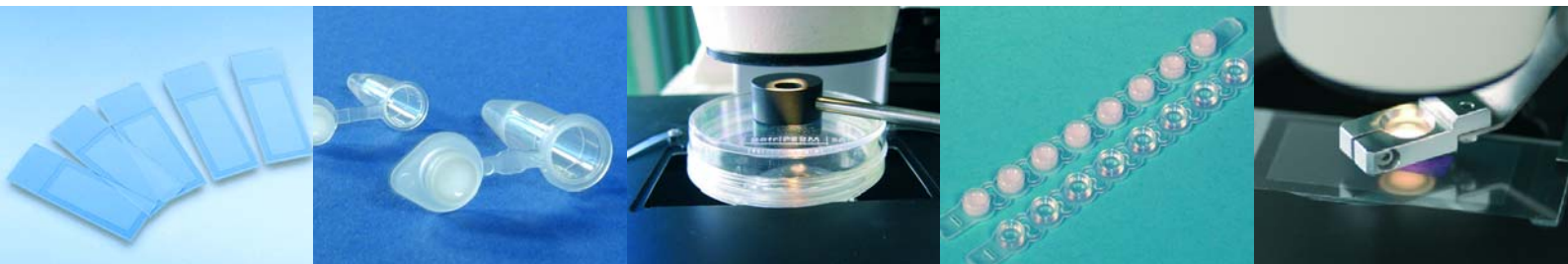
For all applications

There are standard consumables for almost every application. P.A.L.M. has also developed carefully designed accessories for specialized applications:

- Membrane slides: special glass slides with a thin membrane layer
- Adhesive Caps: for LMPC without moistening the caps with a capture liquid
- AdhesiveCaps opaque: for improved specimen visualization on the slides
- LMPC Microfuge tubes: for moving directly to the next step

For improved visualization

- Diffusor for optimal capture of morphological information from uncovered specimens
- LiquidCover glass for complete embedding of tissue specimens



Slides

Caps

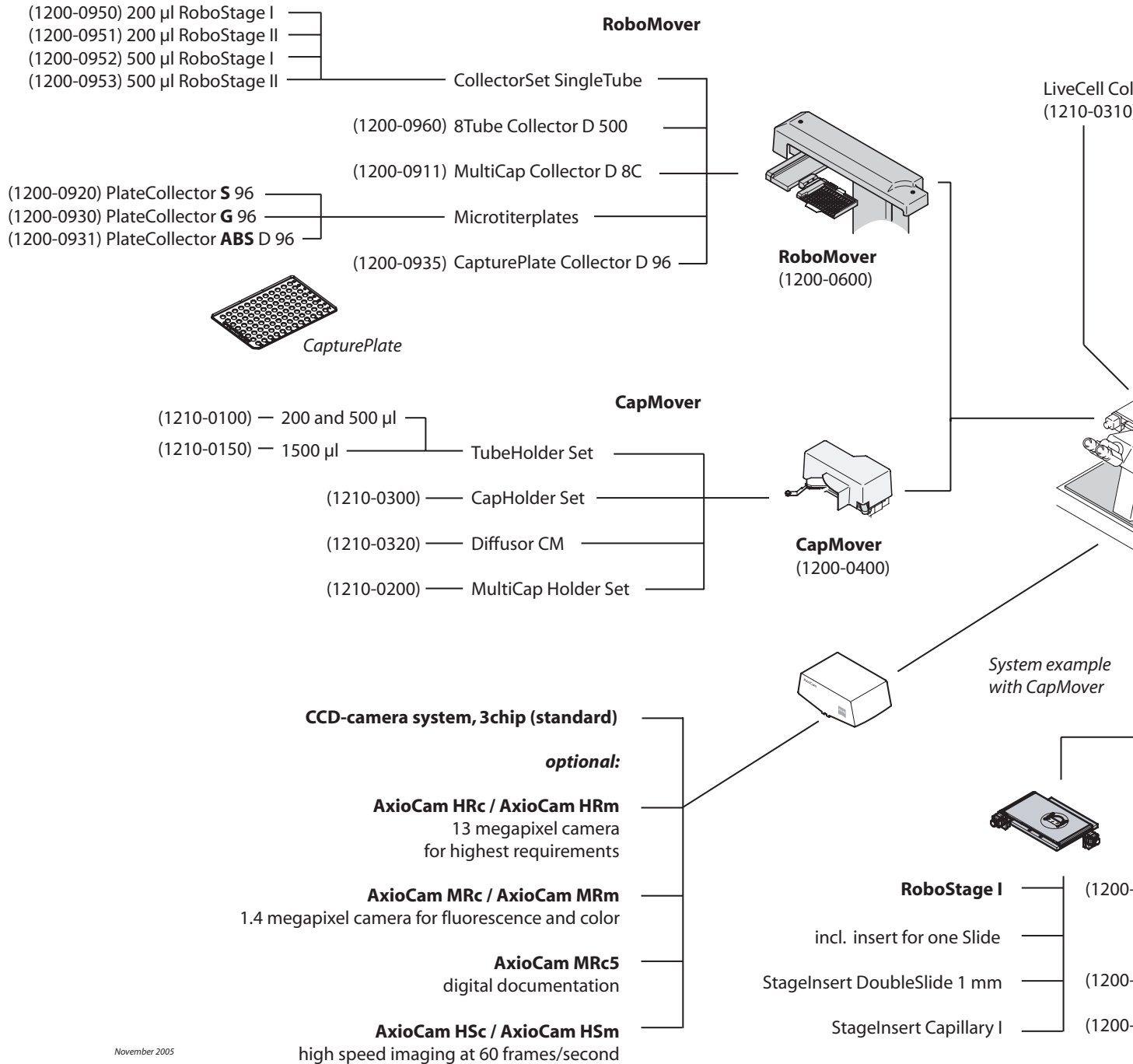
LiveCell Collector

Adhesive Strips

Diffusor

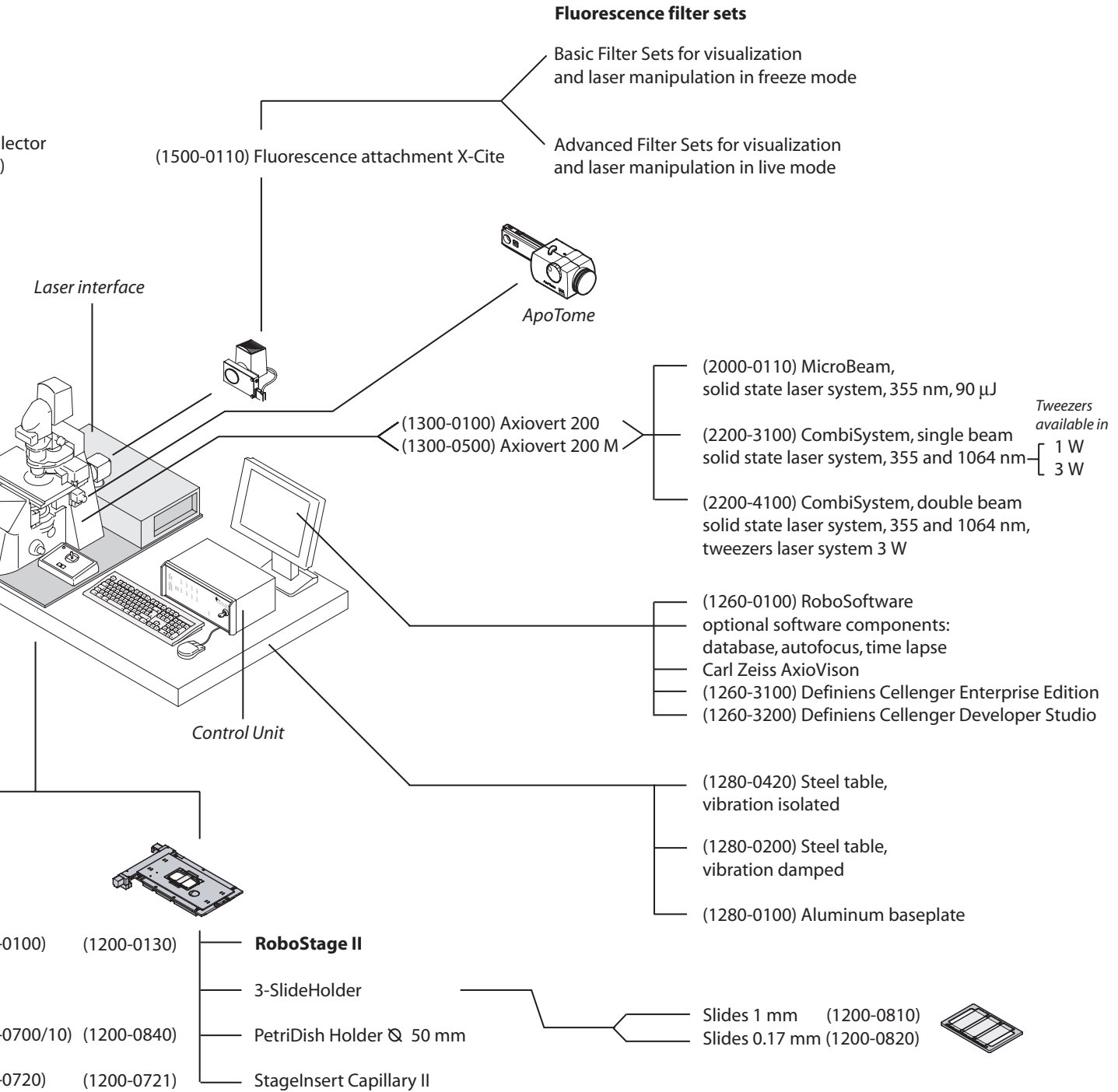
PALM MicroBeam - System Overview

Each set contains one holder for slides and one for culture dishes:



November 2005

PALM MicroBeam



One System - Many Advantages

- Flexible applications from archival material to living cells - for DNA, RNA and protein isolation
- Patented LMPC system for non-contact and contamination-free specimen capture
- From microdissection to integrated imaging workstations – future-oriented upgradeable technology with additional solutions from Carl Zeiss
- Optimal workflow with simple component integration: from individual experiments to automation
- Automated image analysis in transmitted light and fluorescence
- Standardized and time-tested consumables from P.A.L.M.
- Outstanding optics from Carl Zeiss and world-wide support
- PALM Application Laboratory: years of experience and specialized know-how



A Company of the Carl Zeiss Group

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US 5,689,109
US 5,998,129
US 6,930,764