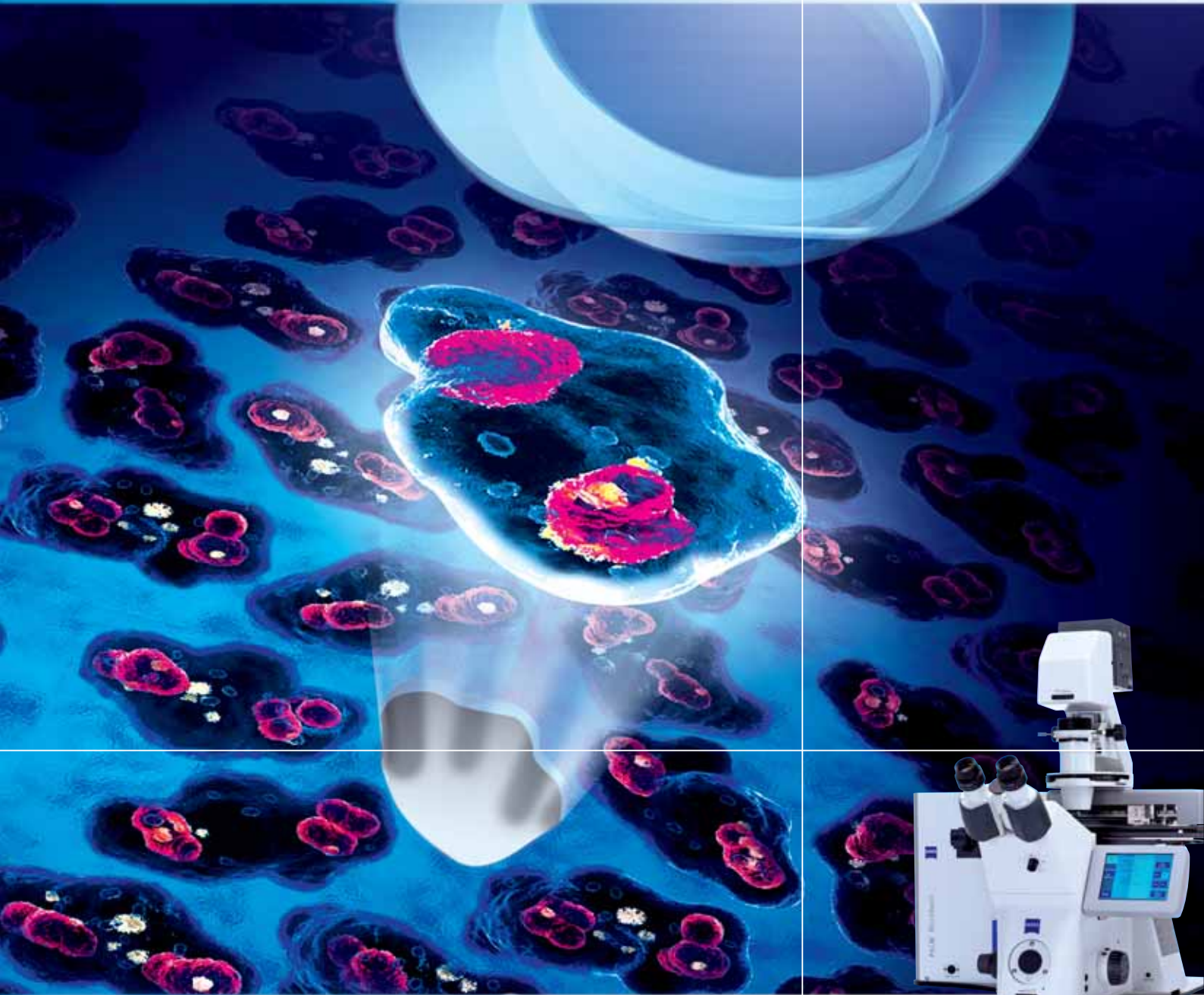


PALM MicroBeam

Building Bridges



**From Microdissection System to
Research Platform - The New Standard
in Modern Life Science Research**



We make it visible.

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From Fluorescence Imaging to High-Purity Specimen – The New Flexibility in Life Sciences

The number one name for advanced microdissection: PALM MicroBeam from Carl Zeiss. With its non-contact sampling capabilities, this system has opened up entirely new perspectives in science and research. Unique to this system is the use of Laser Microdissection and Pressure Catapulting (LMPC) technology. This break-through approach combines laser microdissection with laser-assisted transfer, which is now standard in modern Life Science research. LMPC enables the investigation of key molecules such as DNA, RNA, proteins and living cells – at unsurpassed levels of purity. With the introduction of a new, fully integrated PALM MicroBeam system platform, Carl Zeiss enhances an already remarkable achievement with a large number of powerful components, including:

- Axio Observer, the inverted research microscope with its newly designed fluorescence beam path for absolutely superb imaging
- AxioVision system software and additional functionalities, featuring Extended Focus and Multichannel Fluorescence
- AxioCam MRc and MRm for brightfield and fluorescence high-resolution Digital Imaging
- a wide range of automated procedures that always yield reproducible results

From pathology to forensics, from genomic and proteomic analysis to stem cell research – the new PALM MicroBeam yields highly precise, contaminant-free, and hence clearly defined specimen material. It also offers the greatest possible flexibility by providing

Laser Microdissec

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
- For fluorescence and transmitted-light

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

"The heterogeneity observed in differentiating embryonic stem cells stands in the way of obtaining valid In-vitro models for drug discovery. Elimination of undesired cell types by genetic modification is complicated and extremely time-consuming. The innovative PALM MicroBeam technology enabled us to isolate relevant stem cell cultures quickly, precisely and effectively. As a result, pharmacological evaluations could be realized within a very short time frame."



Dr. Gabriela Cezar, University of Wisconsin-Madison, USA

a fully integrated system solution – from microdissection system to research platform – that is always ready for laboratory use.

- PALM MicroBeam is a truly agile system providing a tangible return on investment
- Perfectly suited for the workflow of even the most complex experiments
- Particularly gentle handling of fluorescence specimens and living cells
- Gentle, contact-free handling of specimens thanks to photonic technology
- Works directly on standard slides with no intermediate steps
- Reliable isolation and recultivation of living cells in a sterile environment

tion

Subsequent 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

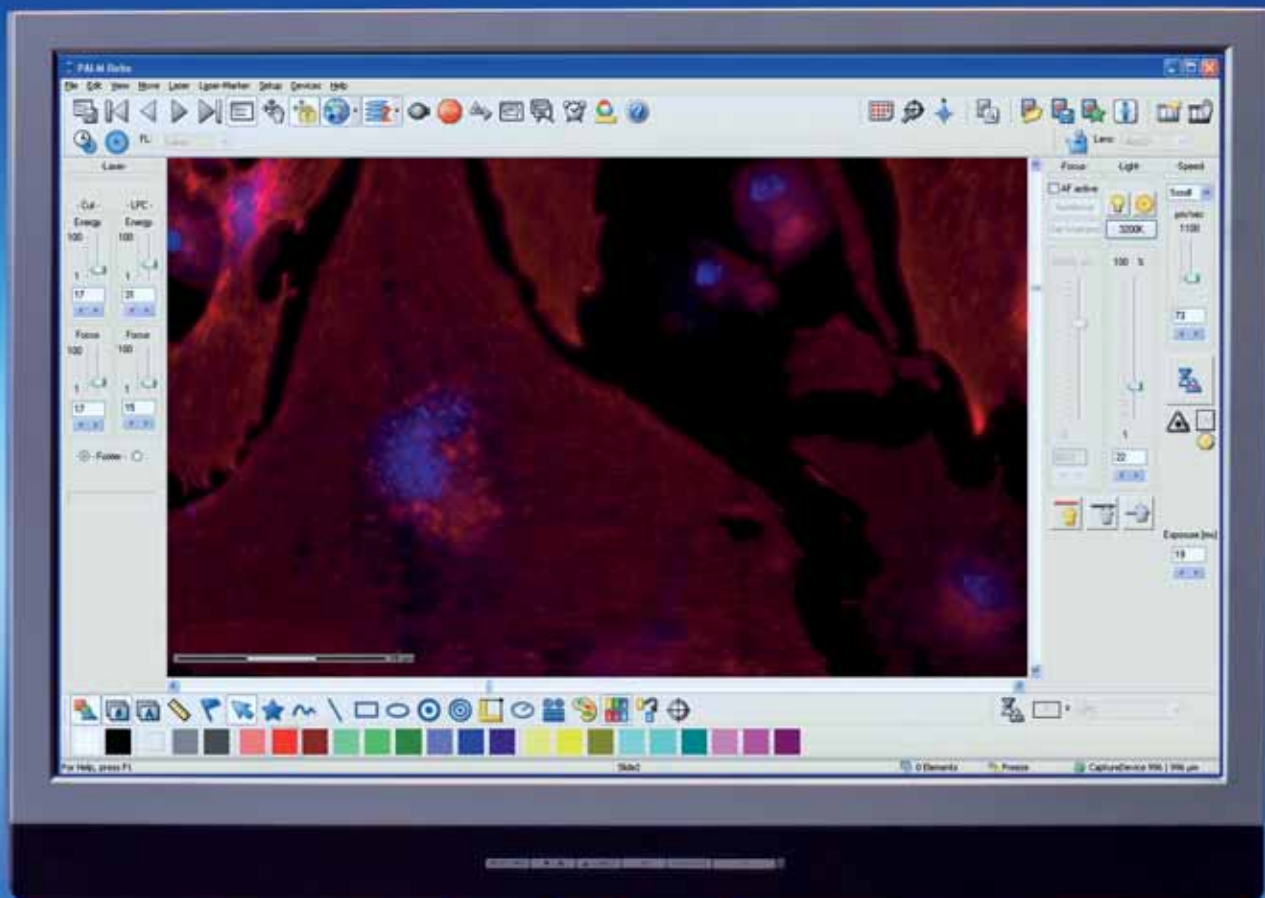
Living Cells

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





PALM MicroBeam



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 core 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.

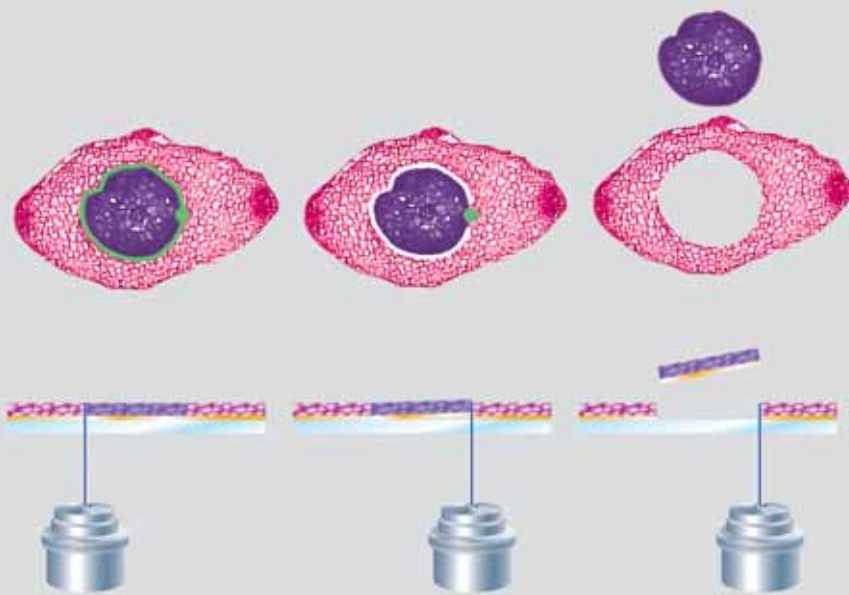
The interaction of light and matter

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 and gentle specimen removal with LMPC

Precise and fast focusing: with LMPC the laser pulse is directed at the specimen for only about 1 ns. In this short time frame, no heat can be transferred to the sample, a tremendous advantage. The best evidence for this is the fact that living cells can be recultivated following LMPC. Even sensitive stem cells remain vital and maintain their genetic structure after LMPC.

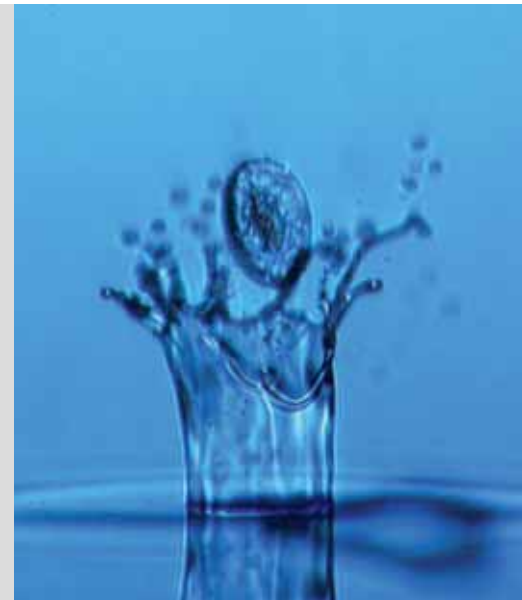


The three steps involved in contact-free laser microdissection:

Left: The laser cuts the microdissectate free from the surrounding tissue.

Center: With the LPC pulse on the cut line, non-contact transport into the collection vessel is initiated.

Right: The microdissectate is lifted off from the substrate and flies into the cap.



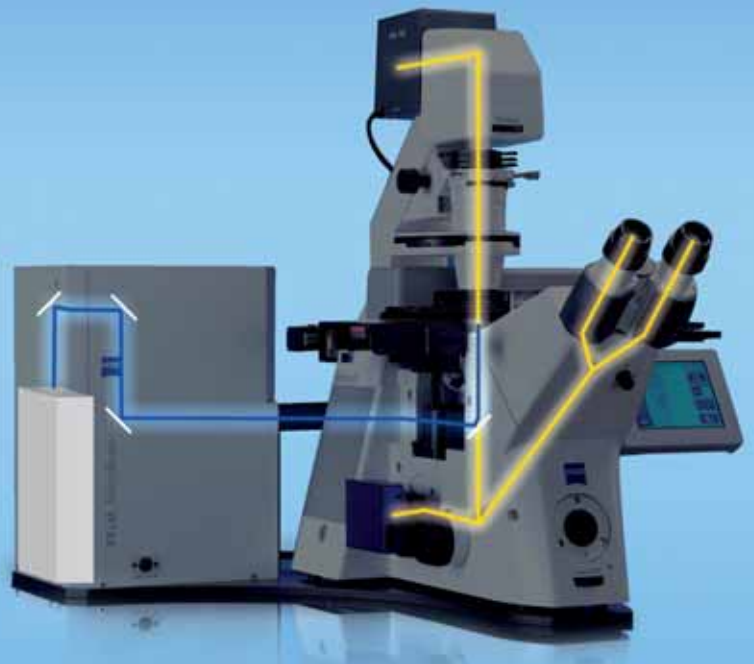
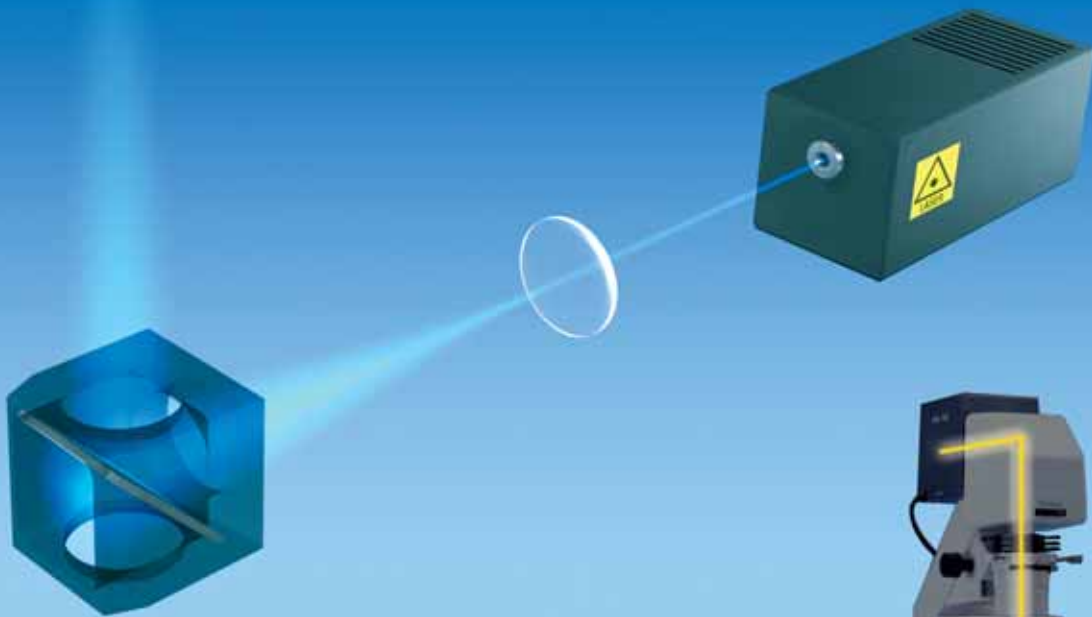
The transport pulse is lifting a laser microdissected membrane out of a liquid.

Image courtesy of Prof. A. Vogel, Lübeck, Germany

LMPC - a standard for research

Professor Alfred Vogel has been studying the effects of lasers on biological tissues successfully for a number of years. "LMPC technology from Carl Zeiss is becoming increasingly important in scientific research because it greatly simplifies a range of biotechnical techniques – indeed, it has made many of them possible at all."

Professor Dr. Alfred Vogel,
Institute for Biomedical Optics, University of Lübeck, Germany



Above: Diagram of the laser beam path. The laser is focused onto the object and transports it into the collection vessel.

Right: Beam path of the microscope. The laser beam path is shown in blue, the illumination beam path in yellow.

From Fluorescence Signal to Specimen and Application: High-Purity Material for Your Research

The various areas of investigation pursued in Life Sciences demand a technology that is both effective and flexible. That is a tool that can transform lines of scientific investigation into useful applications by providing pure specimens. The procedures to be performed are always similar: first you need to recognize, then select, and you are ready for isolation using LMPC. The new PALM MicroBeam ensures an uninterrupted workflow and is designed for universal use. Regardless of the source material you use, precise detection, laser microdissection and laser transport lead to homogeneous analytical material – providing you with efficient procedures and solid scientific results.

The new fluorescence workflow: superb signals for outstanding results

The true strength of PALM MicroBeam is its ability to detect even the weakest fluorescence signals

upstream of laser microdissection, which is a great benefit for microdissection:

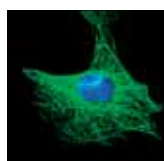
- using fluorescence, tissue components can be identified according to features not visible in brightfield
- fluorescence allows the monitoring of the synthesis of specific compounds in individual cells
- fluorescence permits the visualization of the cell interior (expression, pathways) and the cell surface (receptors, ligands)
- Multichannel Fluorescence allows the imaging of specimens stained with a combination of different fluorescent dyes
- fluorescence in combination with AxioCam MRm yields an outstanding signal-to-noise ratio, enabling even the weakest signals to stand out from the background noise



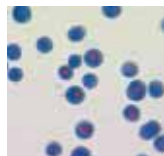
Plant Research



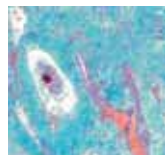
Neurology



Cell Biology



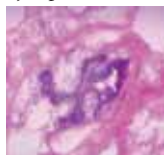
Cytospin



Pathology



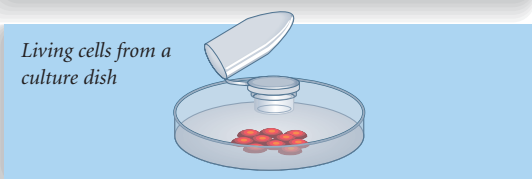
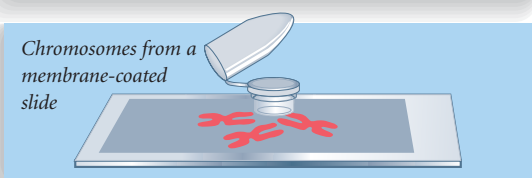
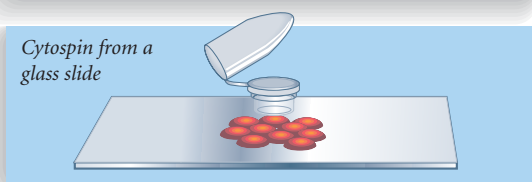
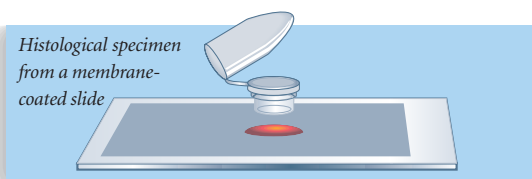
Cytogenetics

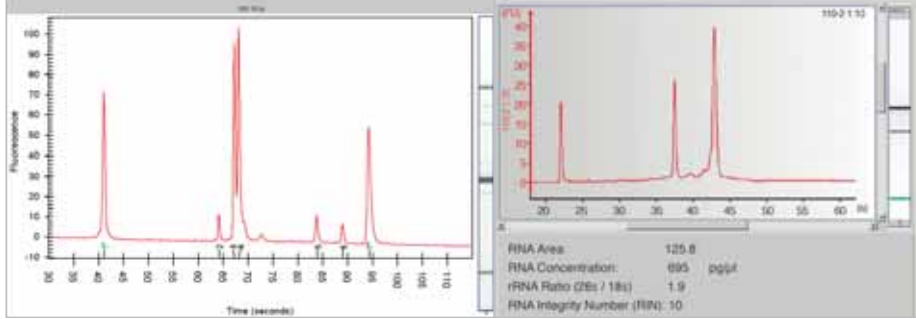


Oncology



Cell Cultures





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

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. Preparation of biological 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.

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.

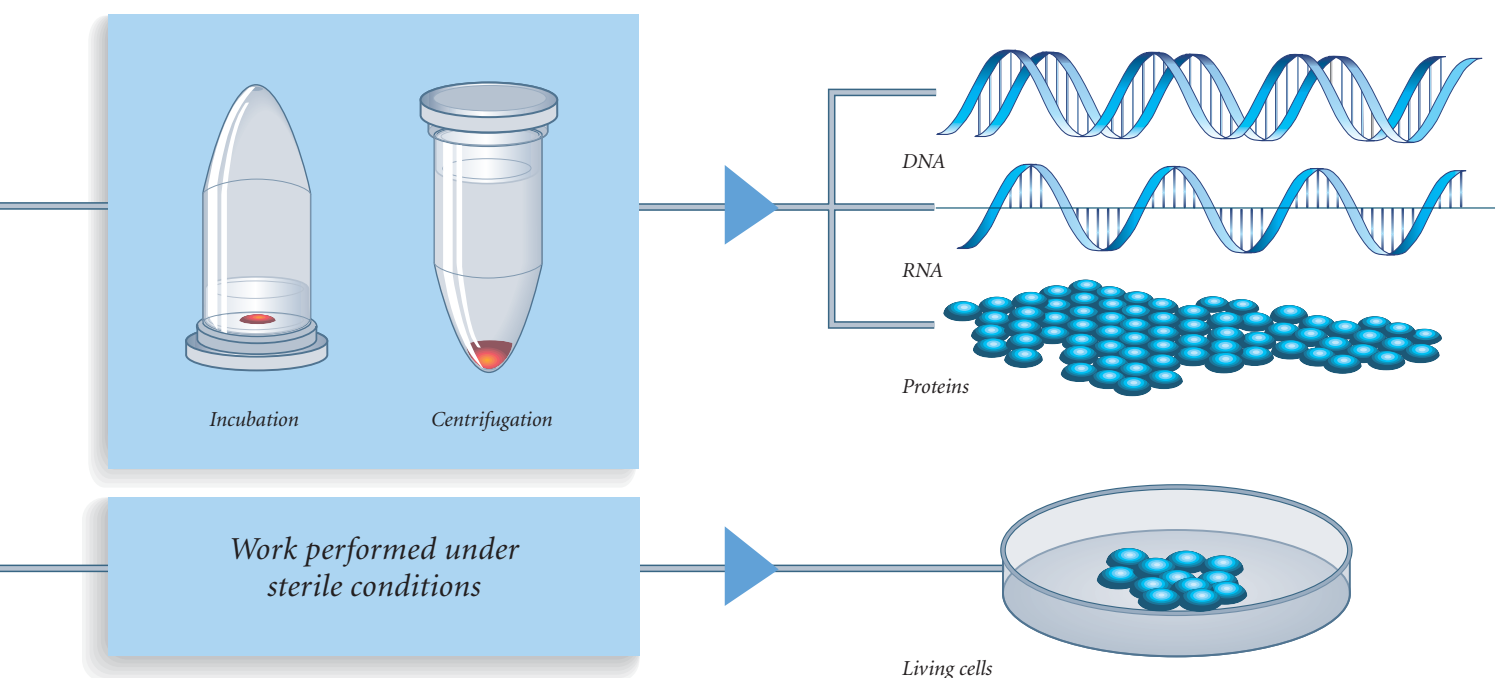
Broad spectrum specimen removal

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

- selectively harvest tissue regions or individual cells
- selectively isolate fetal cells, sperm cells, down to chromosomes
- selectively isolate individual particles directly from a forensic adhesive tape
- select and isolate individual cells from Cytospin preparations and smears
- isolate living cells from fresh tissue and 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



High-Purity Specimens: DNA, RNA, Proteins and Living Cells

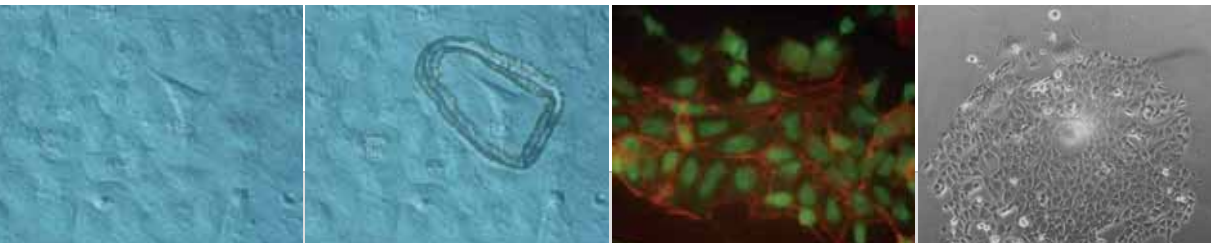
Biological research at the molecular level is the focus of modern science and an important area in today's Life Sciences. Future research activity will revolve around the isolation of biomolecules from heterogeneous tissue or from individual cells. The instrument of choice: PALM MicroBeam from Carl Zeiss.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

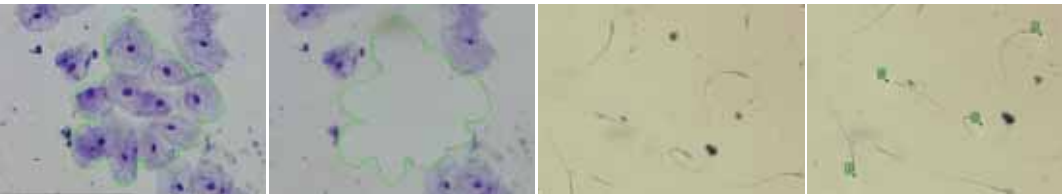


Living cells with PlasDIC

Even stem cells can be successfully recultivated following LMPC with their genetic character maintained.

Image courtesy of Dr. A. Buchstaller, LMU Munich, Germany

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

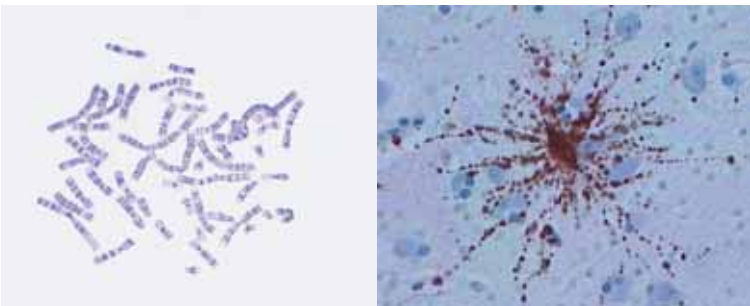
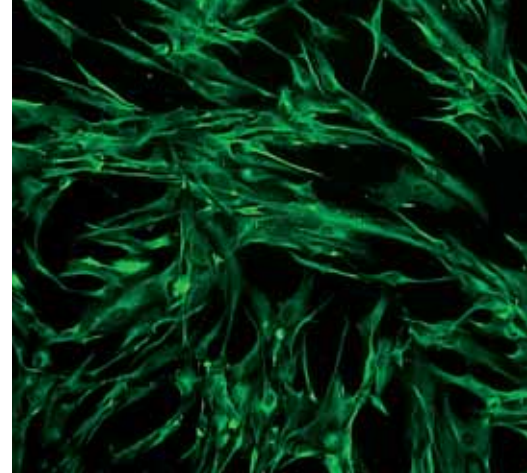


LMPC for pure proteins

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

“The functionality of the PALM system allows us to directly investigate the complex biological processes that take place in heterogeneous brain tissue. By using automatic recognition and dissection of various different cell types, processes can be investigated at the molecular level for each individual cell type. Thanks to our collaboration with the Application Laboratory, specific technical and scientific requirements for our experiments could be met with ease.”



Dr. Jon Cooper, King's College, London, UK

Application Laboratory

Quality Support from the Outset: The PALM Application Laboratory

Specialist technology requires specialist know-how. The PALM team offers years of experience in microdissection and other laboratory techniques to help you in your work. Carl Zeiss with its PALM Application Laboratory provides a unique service: if you are looking for a suitable system for your applications or need an experienced scientist on your side, we are always available to assist you. Together we can 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. 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

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.

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. Our expertise is at your disposal.

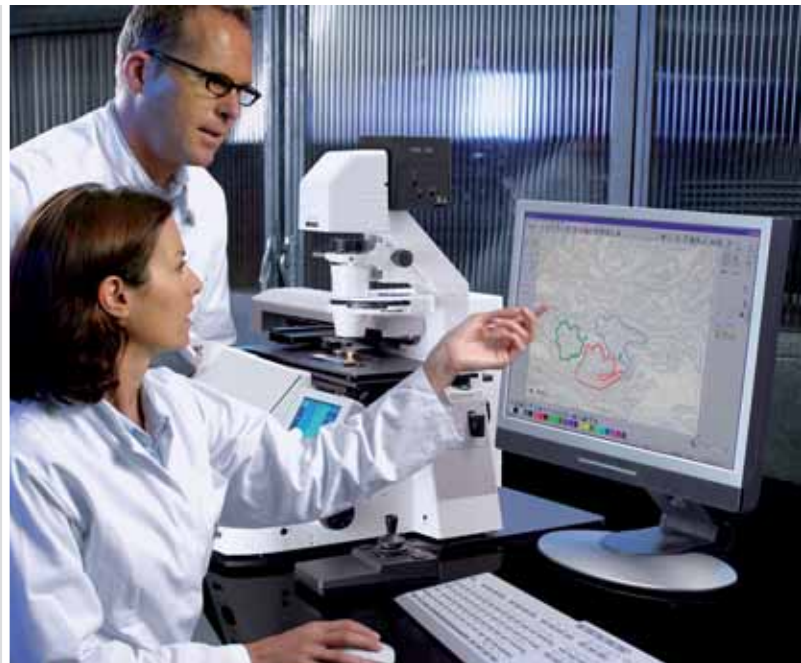


Highest quality results in the shortest possible time

"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.

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.

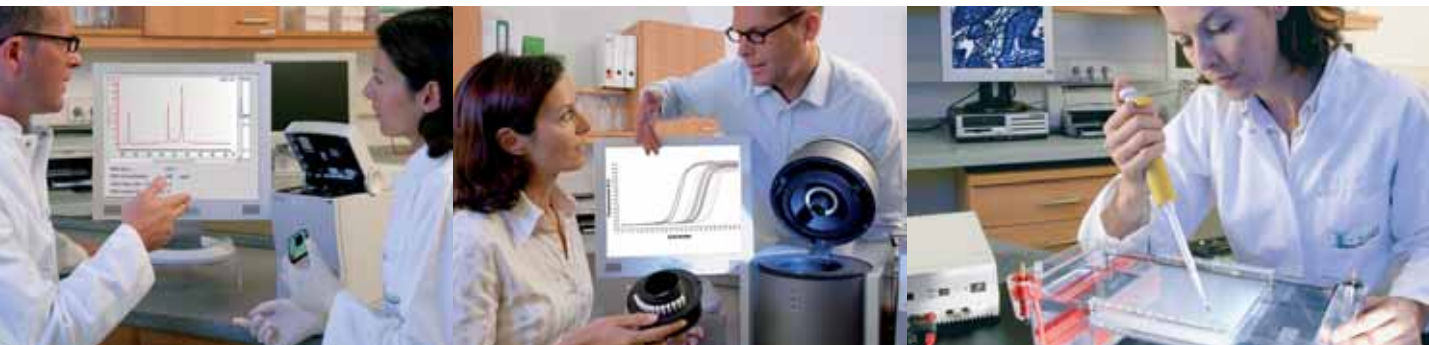
Take full advantage of all PALM MicroBeam functions. We offer training sessions so you can learn everything there is to know about the system. You will receive valuable tips for successful work with specimens before and after microdissection. And you'll find out about the latest trends, such as LMPC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

For detailed information and a complete list of our services, go to:

www.zeiss.de/palm-labs

or send any questions to:

palm-labs@zeiss.de



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

The new PALM RoboSoftware provides the basis for you to operate and control PALM MicroBeam with unparalleled ease and comfort. It offers a well laid-out user interface and functionality right where you need and expect it – with standards for frequently repeated microdissection and micromanipulation applications. And the successful integration of the Axio Observer system platform with AxioVision makes microscope and experiment control significantly easier.

Central control: the main window

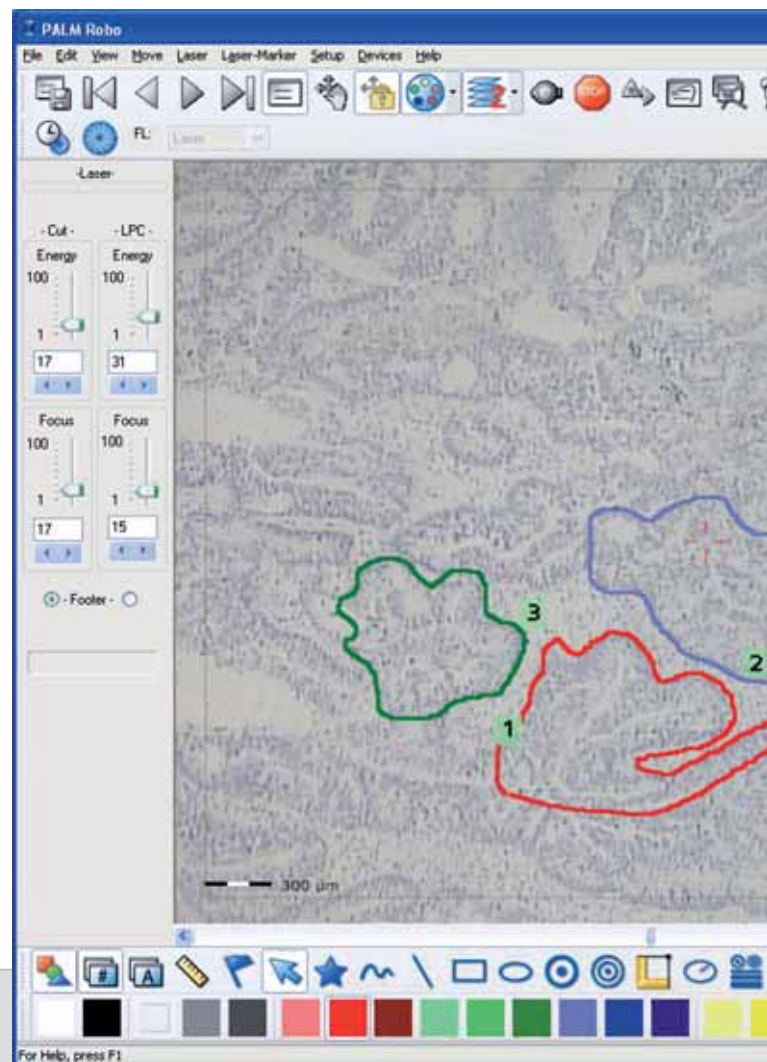
Everything under control in the main window: microscope on the right, laser on the left. Below are the drawing and laser functions and up above the list of elements as well as additional microscope functions such as fluorescence. Here you can also find PALM RoboMover and Navigator.

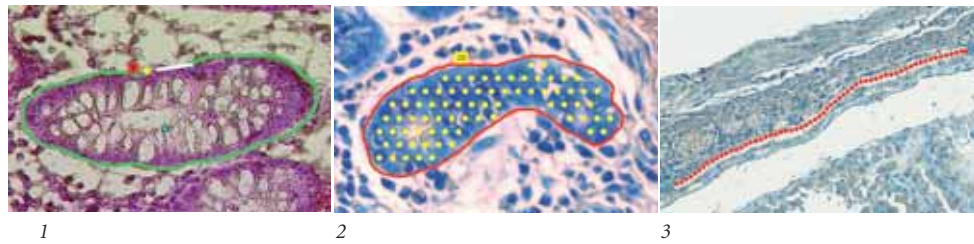
Keeping the specimen in view: Navigator

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

Greater recognition capability: the fluorescence function

Satisfactory results with good image recognition: the newly developed combination of fluorescence and experiment control enables highly precise image recognition. Through Multichannel Fluorescence, details are identified that can only be made visible by superimposing several different fluorescence images. The system allows different exposure times and channels to be set easily and to be displayed in the Navigator window.





1. RoboLPC
2. AutoLPC
3. LineAutoLPC

Cut, catapult, or both: the laser functions

Cut only, a combination of cut and isolate, or special functions for processing membrane-coated or glass slides.

One-of-a-kind: PALM RoboMover

PALM RoboMover allows you to automate your experiments as needed.

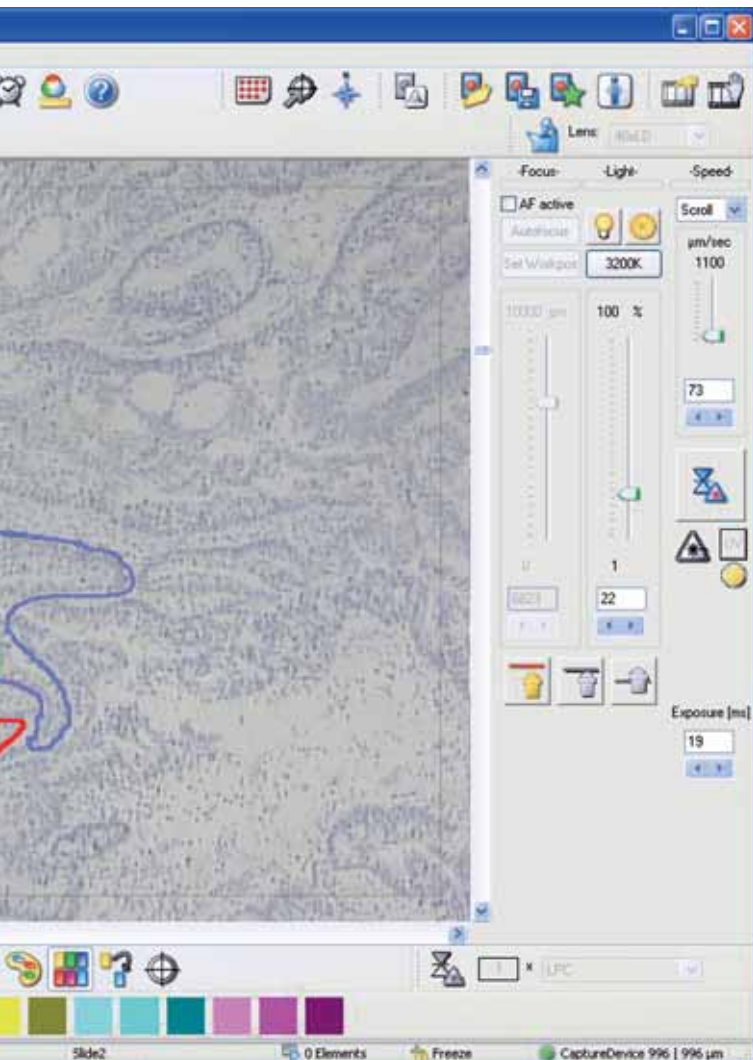
- Distribute specimens evenly into different caps of microfuge tubes or microtiter plate wells
- Define concentration series
- Match the colour coding of the various tissue groups and collection vessels

Visibly more information: camera technology

Carl Zeiss cameras from the AxioCam MR line are your first choice if you are seeking high resolution (monochrome or colour). And, in a snap, your microdissection system turns into an Imaging System.

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 RoboLPC, or separated into flakes with AutoLPC.





Professional Documentation: 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

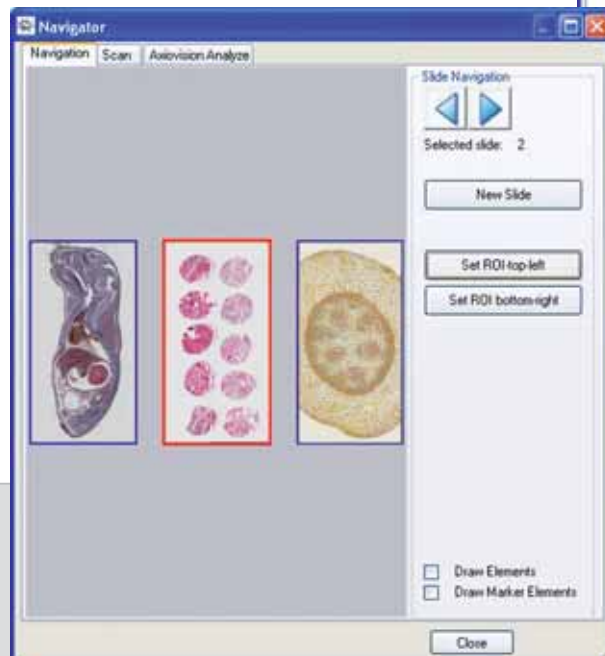
Adjust your database to suit the requirements of your experiments. Choose from any of the microdissection functions. Save your images in the well ordered structure you need for your work. Choose among different formats and generate reports. Each user in a work group individually for his or her personal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

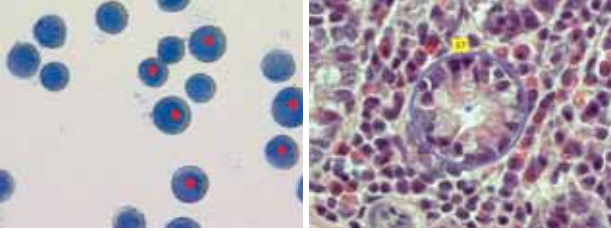
InformationCenter

All pertinent data are collected in the InformationCenter: images, elements, surfaces and methods. You save whatever your research requires, either individually or automatically, to ensure quality.



PALM Navigator





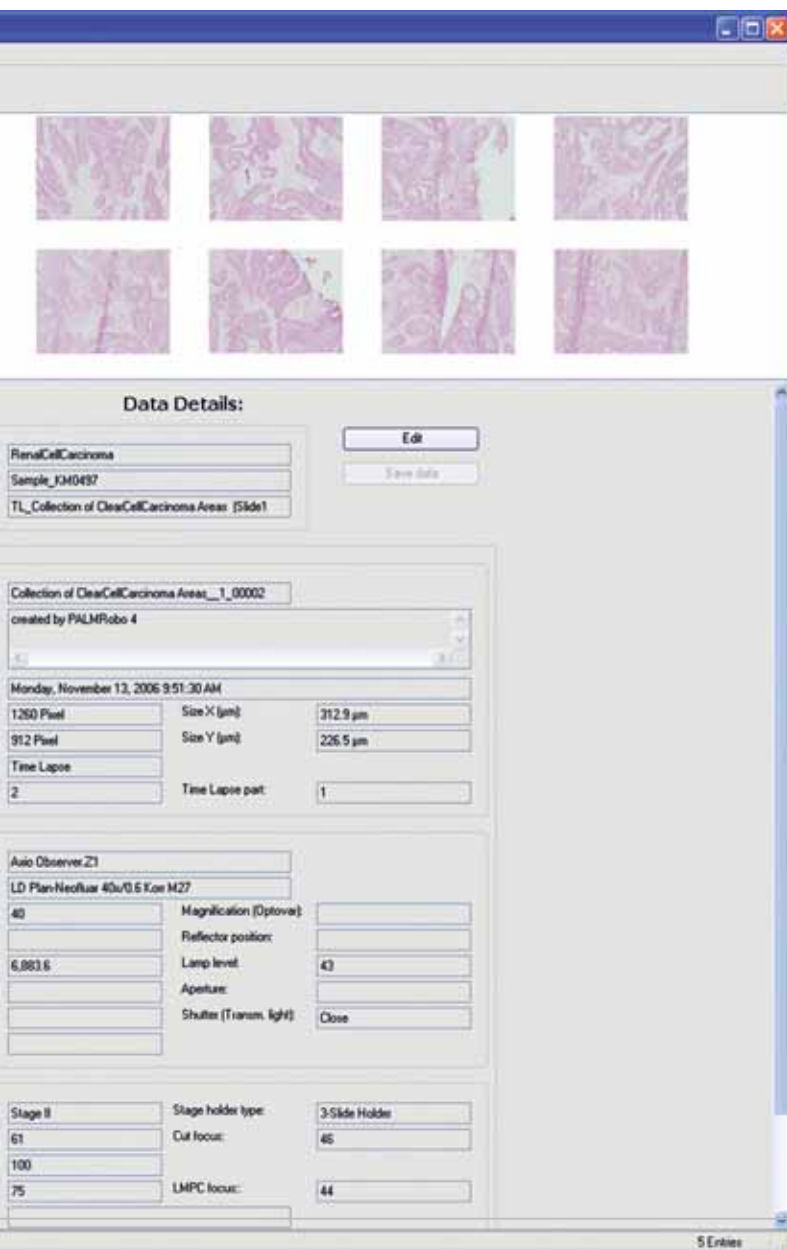
1

2

1. LPC
2. AutoCircle

PALM RoboSoftware at a Glance

- Newly designed intuitive user interface
- List of elements and database
- Laser tools: Cut, RoboLPC, AutoLPC and LineAutoLPC
- Graphic tools: Freehand, Circle / Ellipse and Dot
- Imaging: Multichannel Fluorescence and Extended Focus
- Serial sections and navigation across several slides
- LMPC under fluorescence visualisation
- Up-to-date user management
- Digital camera technology
- Full integration of AxioVision



Digital Intelligence: Features for Superb Imaging

Differentiated fluorescence applications are also gaining in importance in the field of laser microdissection. As an integrated high-end system, PALM MicroBeam from Carl Zeiss is perfectly designed to capture via fluorescence even the smallest tissue samples in difficult environments. It features high-performance optics, the Axio Observer research platform, digital camera technology and the AxioVision software. Multichannel Fluorescence and Extended Focus ensure that even the weakest fluorescence signals can be visualized. The result: more than the sum of individual images and positive synergy of individual information.



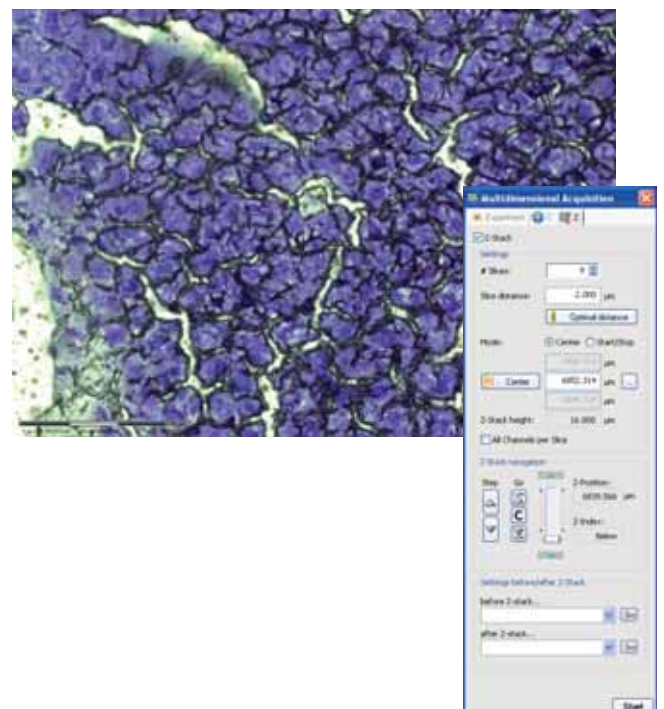
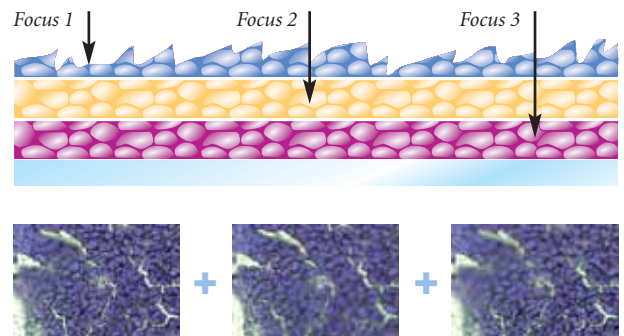
Fluorescence on all channels: you make the choice

With the new PALM MicroBeam, you can choose among several fluorescence variants. Basic-Fluorescence is suitable for all applications. Advanced-Fluorescence enables you to manipulate with the laser under fluorescence illumination. With Multichannel Fluorescence there are several applications available to you: composite images with direct setting of the exposure time for different fluorescence dyes. The image data are generated by the black-and-white camera AxioCam MRm and then computationally processed in PALM MicroBeam. The result: an image with more information.

Extended Focus:

get the whole picture

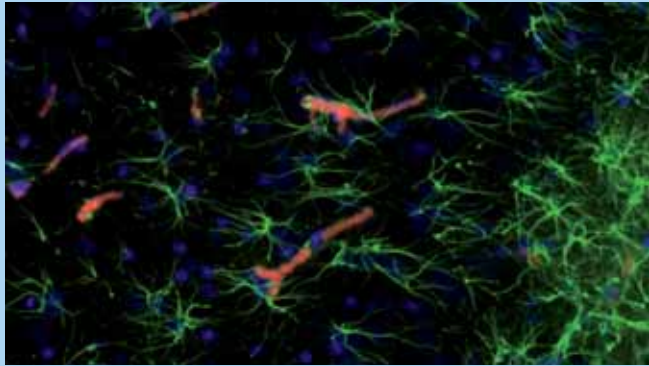
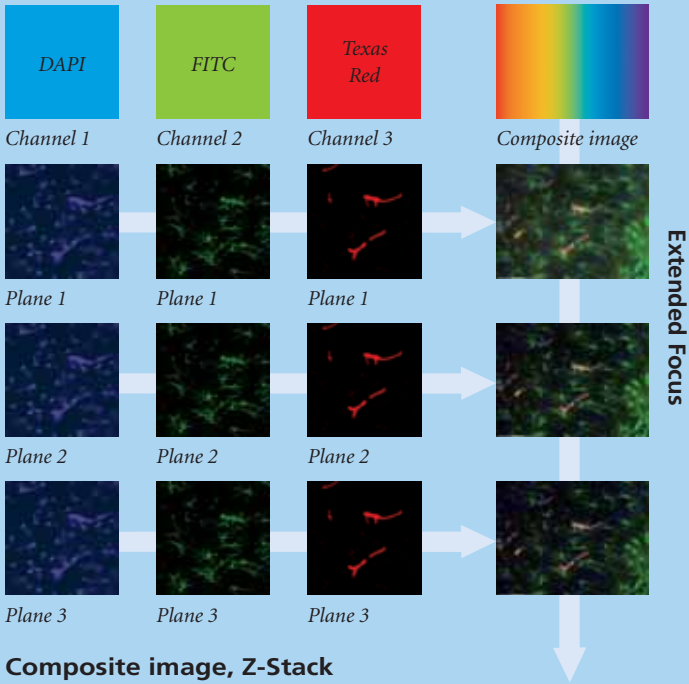
Exposures of thicker microdissected specimens, in particular, are usually blurred at the specimen edges because the specimens are never entirely flat. If the entire substrate relief is of interest, the Extended Focus feature can generate an image that encompasses the entire topography. The specimen appears needle-sharp across the entire image and sheds light on all details for use in the subsequent image analysis and microdissection.



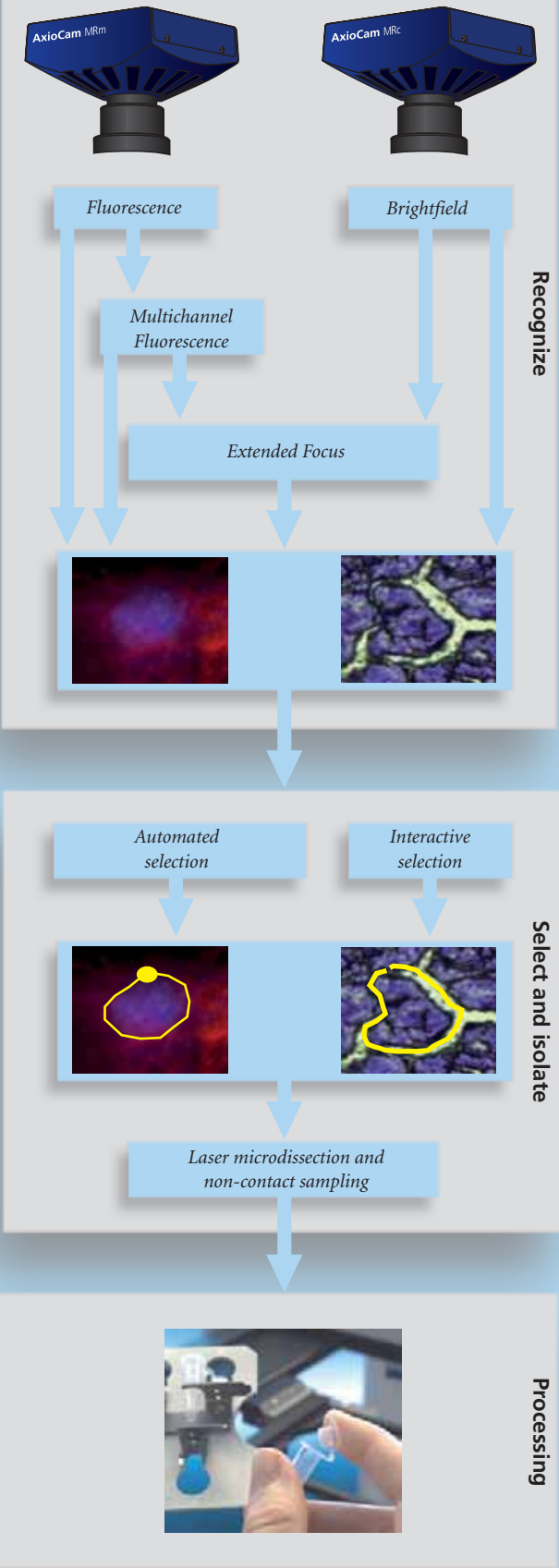
Combining Multichannel Fluorescence with Extended Focus: break down the barriers to the invisible

To establish precisely the relationship between individual cells and tissue, fluorescence is used simultaneously on multiple channels. During fluorescence recognition, focus limitation on only one plane is deactivated. The result: images with outstanding contrast for detailed investigations and microdissection results of unmatched precision. An additional advantage is that you can work offline in Freeze Mode. All modules are accessed from within the Navigator and the highly sensitive specimen only needs to be scanned once. Minimum bleaching, maximum protection.

Multichannel Fluorescence



Software Workflow





Functional Accessories: Materials from Carl Zeiss

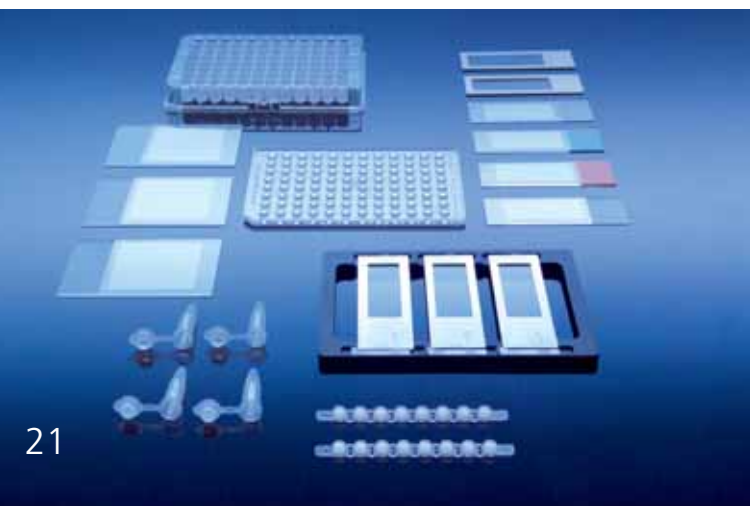
For PALM MicroBeam, Carl Zeiss offers a seamless spectrum of consumables and accessories for your research, which are tailored exactly to your requirements. Accessories specifically developed for work under sterile conditions or for collecting large numbers of microdissectates provide optimal support for your application needs and ensure that your research runs smoothly. Of course, you can also use traditional molecular biology consumables for your PALM MicroBeam routine applications.

Working with fixed material

Microdissection from Carl Zeiss not only offers precise separation and non-contact sampling of the tissue of interest but also, when using the consumables, its preparation.

- MembraneSlides, colour-coded according to membrane type: PEN for all-round, PET for fluorescence and POL for micromanipulation
- New: double-sized microscope slides, particularly for large substrates such as those used in neurosciences
- Adhesive materials for dry collection of analysis material, such as Caps, 8-CapStrips or 96-well microtiter plates

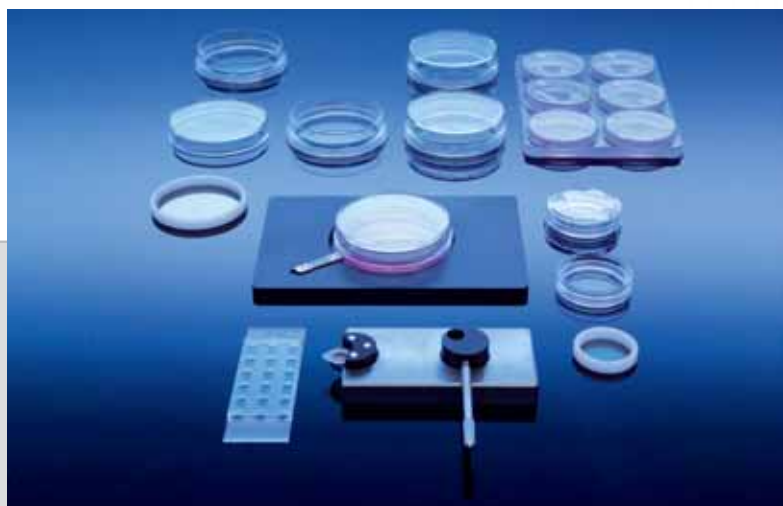
Fixed tissue



Carl Zeiss: living cells

For work on living cells, Axio Observer provides the basis for microdissection from Carl Zeiss. Here, culture dishes can be used for microdissection and for imaging, from 50 mm and 35 mm down to the microslide. When working with a normal culture dish, the MembraneRing can be used. It transforms a Petriperm culture dish into an accessory for microdissection. The DishHolder 6/35 can accommodate several culture dishes at the same time: the Stage II microtiter format makes this possible. The DuplexDish is the ideal format when recultivating from one culture dish: sterile recultivation in a closed culture dish with the LiveCell Collector is a unique procedure. The cap remains in the closed dish and is moved by a magnet. Ideas from Carl Zeiss.

Living cells



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: the source material can be in a culture dish as well as on different slides. You can use the serial sections function to process up to three slides in parallel. During this procedure, staining will occur and elements will be

marked only on one slide. Specimens will be extracted from the other two slides. 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-CapStrips, 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.



*Automated operation and experiment control:
PALM RoboMover*

*Rapid work with living cells in the
culture dish with CapMover*

Experiments



Living cells: white-glove treatment and high precision

Only adherent cells reveal themselves by their distinct morphology. They can be isolated (also individually) with PALM MicroBeam for subsequent analysis or recultivation. Without trypsination. Cell cultures differ in many respects from histological material. They are highly sensitive to their environment and must be handled quickly in sterile surroundings. With PALM MicroBeam you can take advantage of all the laser functions without having to remove the medium completely. After LMPC the individual cells find themselves again in a medium-filled cap. Their normal environment is maintained – a critical requirement for living cells:

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 performed under the sterile bench. If, for example, a single cell is to be removed in an aseptic environment, PALM CapMover will position a cap and holder in the culture dish. Harvesting of histological material with PALM RoboMover is fully automated. This allows a wide variety of collection vessels to be used – from single caps to eight tubes, 8-CapStrips and whole microtiter plates.



For easy collection using only a single tube: SingleTube Collector

Up to eight microtiter tubes: EightTube Collector

Automated operation at enhanced throughput with 8-CapStrips

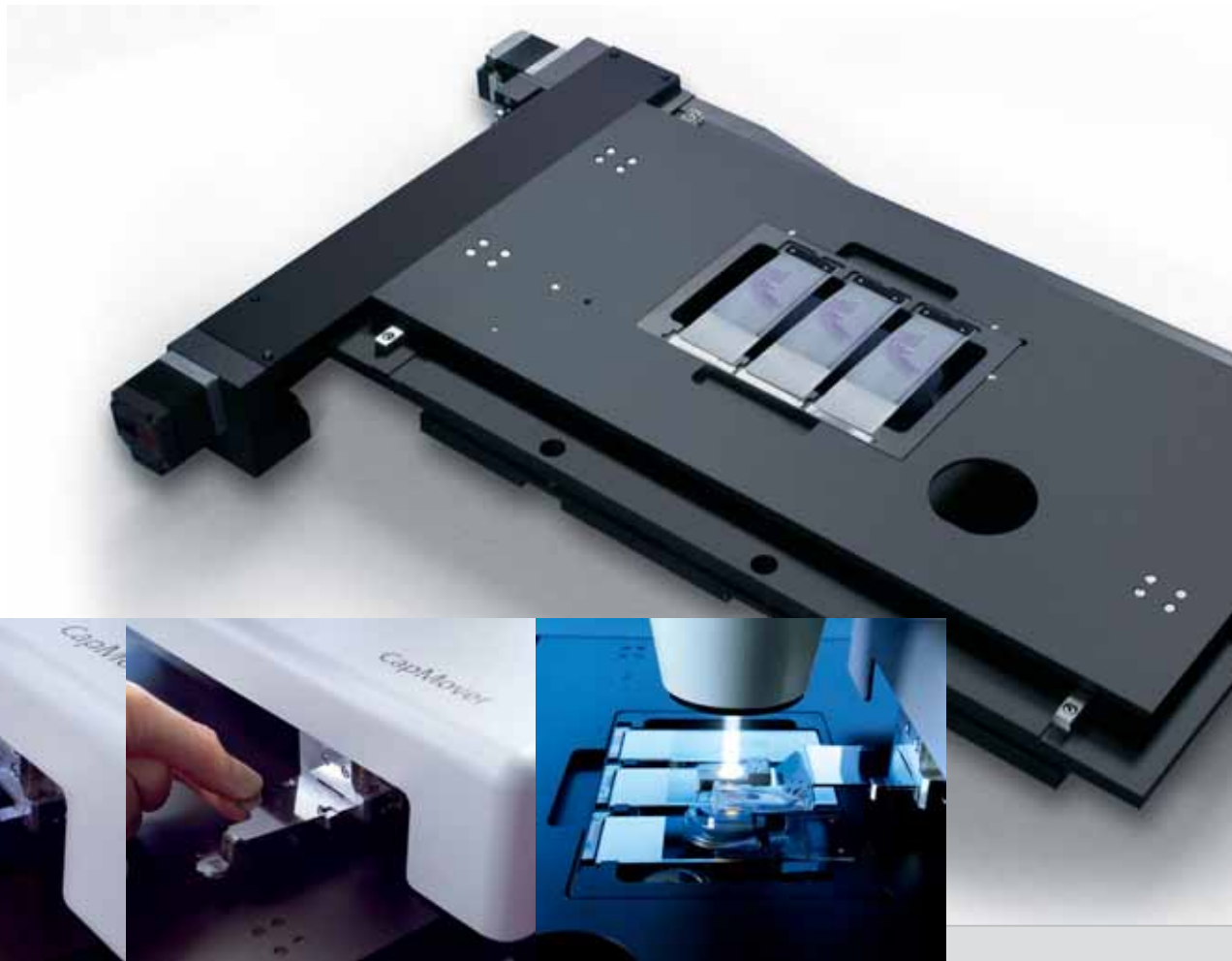
PALM Components

Prepared for all eventualities: PALM Stage II

Speed, flexibility, precision: this is what PALM Stage II stands for. The fast drive mechanism allows for rapid scanning and speedy navigation across the substrate. No matter what type of substrate you are dealing with. The microtiter plate format permits the use of inserts that can accommodate up to three slides or either a 50 mm or a 35 mm culture dish. If no insert is in the stage, imaging workstation analysis is performed directly on a microtiter plate or a six-well plate.

Smooth and gentle: the new PALM CapMover

Here again robot technology is used: the cap is advanced in a linear fashion. PALM CapMover lowers the cap into the culture dish and collects the cells as gently as possible. The cells can be transferred directly from the cap into another culture dish. Minimum effort for maximum efficiency.



*For histological specimens:
Diffusor and tube*

*Living cells from a culture dish:
a single cap*

*Homogeneous illumination beam travelling
through the diffusor: visualization almost as good
as with cover-slipped specimens*



System Landscape from Carl Zeiss: A Research Station Grows with Your Needs

Integrated into PALM MicroBeam, the system components from Carl Zeiss open up entirely new perspectives for science and research and provide an unmatched degree of flexibility. From the Axio Observer research platform with its unparalleled fluorescence capabilities to the high-resolution AxioCam product line, the functions and modules of the AxioVision software platform, ApoTome and PlasDIC. They all perfectly complement the new PALM MicroBeam, setting new standards for flexibility, performance and quality in Life Sciences.

Digital Intelligence:

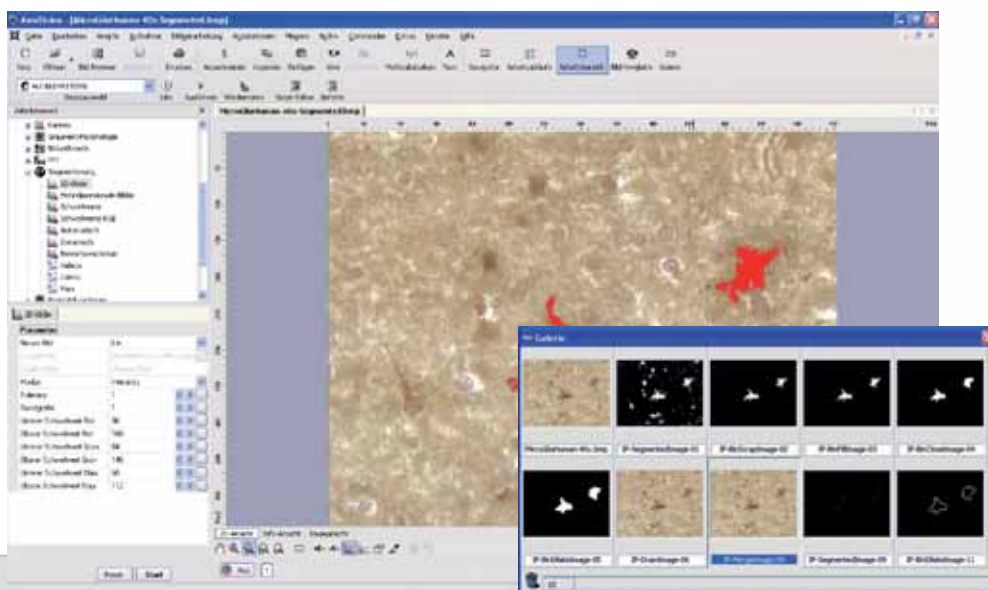
AxioVision from Carl Zeiss

Microscope control, measuring, evaluation and documentation – AxioVision 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.

- Very easy to use: script creation in Recorder
- Functionality from binary image processing to Boolean operations and measurement of image properties
- Fast, interactive segmentation
- VBA for programming applications: control over the microscope and the LMPC
- Optimal integration into all Carl Zeiss systems

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.



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



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.

The new standard in research: Axio Observer

Developed to provide the most sophisticated microscopic techniques for observation, manipulation and analysis in Life Science research: the inverted Axio Observer research microscope from Carl Zeiss. The new apochromatic fluorescence beam path features extremely high detection performance in brightfield, particularly in Fluorescence Imaging – especially useful for microdissection. The new reflector revolver enables the use of up to five filters in addition to the brightfield laser. The combination with Multichannel Fluorescence opens up a new dimension in microdissection. Precise recognition – precise sampling.



Reflector revolver



AxioCam MRm

Zeiss Components

Factor image quality:

optical sections with ApoTome

More information and thus more useful results even from thick sections: the visible results of the ApoTome slider in microdissection. Visible resolution along the z-axis is increased by a factor of 2 compared to conventional fluorescence microscopy. With this technical innovation, optical sections can be obtained and 3D images of the section provided. For thick sections in particular, this technique also achieves maximum resolution and contrast in the xy-view. The result: microdissection performed with a precision never achieved before.

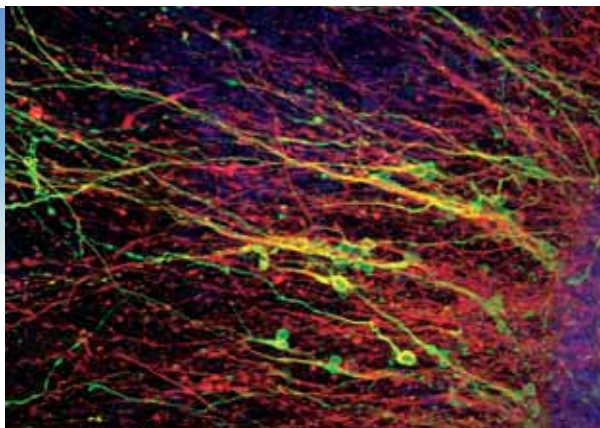
The PlasDIC principle in laser microdissection

PlasDIC, a Differential Interference Contrast method involving the illumination of the object with natural light, can be used in combination with PALM MicroBeam. The arriving light is linearly

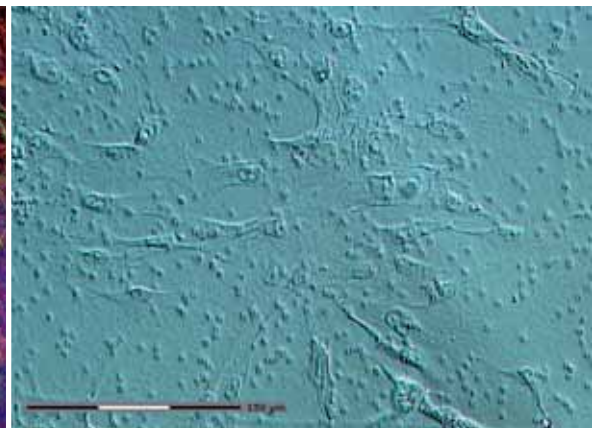
polarized just before the DIC prism. The downstream analyzer is only transparent for light that oscillates in one plane and can thus interfere. The contrast is continuously adjustable and can be adapted according to the object's specific requirements. Section information can now be accessed that was not visible before with the conventional Nomarski DIC technique. When combined, ApoTome and PlasDIC allow contrast-rich imaging of living cells, laser manipulation of cells, and contact-free transport for recultivation in standard plastic culture dishes using sterile materials and techniques, as high-end research requirements dictate.



ApoTome



Sprouting axons of a dorsal root ganglion explant, triple fluorescence



Living cells with PlasDIC from Carl Zeiss: maximum contrast for selecting the appropriate cells for recultivation and manipulation

The New PALM MicroBeam

- Compact design
- Efficient experiments
- Non-contact sample collection
- Optimised for live cell handling
- High-performance fluorescence
- Digital camera technology
- Integrated microdissection and imaging workstation



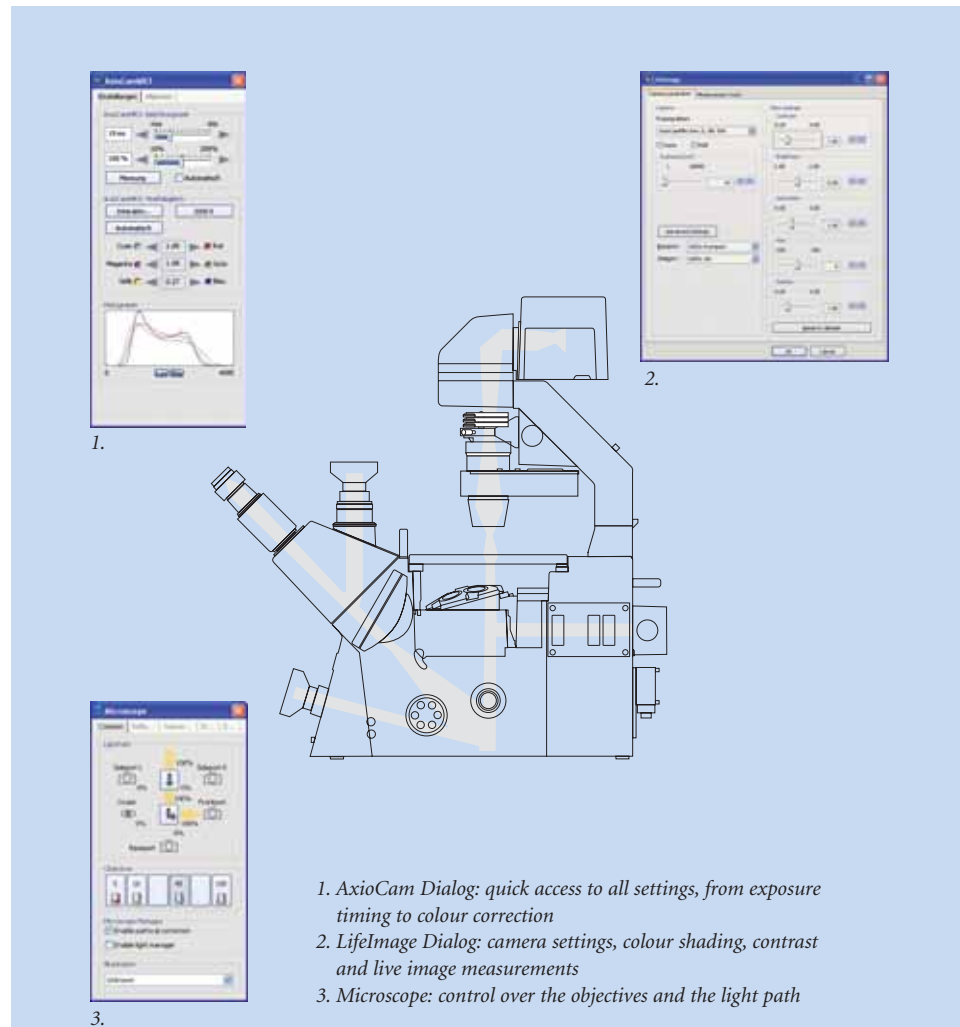
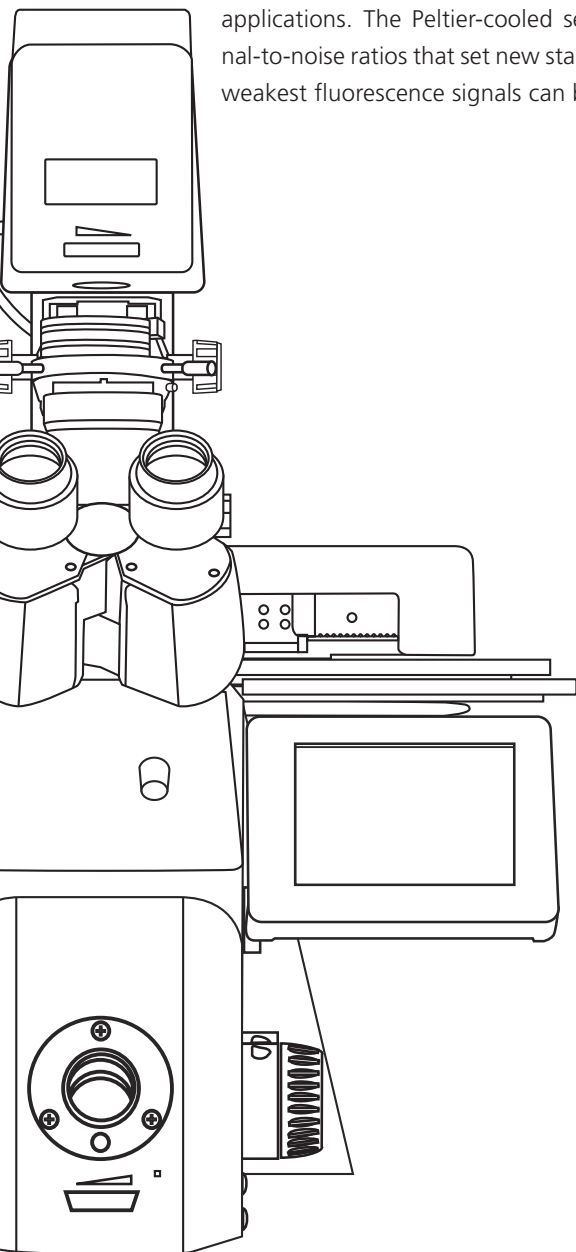
Camera Technology

Highly sensitive: AxioCam MR

Outstanding sensitivity, high dynamic range and maximum resolution and image quality – these features predestine the Carl Zeiss cameras from the AxioCam MR product line for use in microdissection. With 1.4 megapixels, their resolution is unsurpassed within this segment. The monochrome model is tailored to your fluorescence imaging applications. The Peltier-cooled sensor yields signal-to-noise ratios that set new standards: even the weakest fluorescence signals can be visualized.

Highlights of the AxioCam MR product line

- Highly sensitive 2/3" CCD sensor
- Dynamic range 1 : 2200
- 3 x 12 bit colour depth
- Rapid live image
- AxioCam MRm: extended range of sensitivity for fluorescence to near-infrared
- AxioCam MRm: no colour filter mask – higher resolution
- AxioCam MRm: Peltier stage sensor-cooling, low noise level, high signal-to-noise ratio



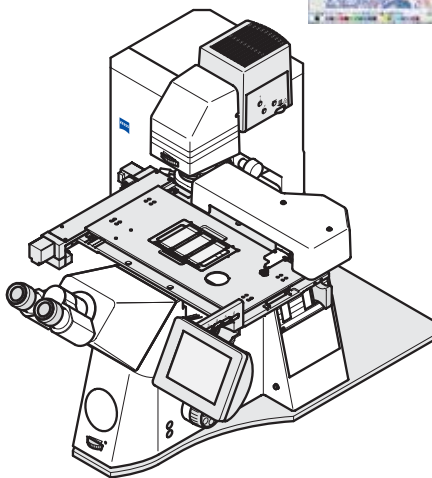
1. AxioCam Dialog: quick access to all settings, from exposure timing to colour correction
2. LifelImage Dialog: camera settings, colour shading, contrast and live image measurements
3. Microscope: control over the objectives and the light path

From Routine to High End

PALM MicroBeam from Carl Zeiss can be configured to meet the unique requirements of your applications – from the base model for open access applications to the high-end model for challenging research endeavours.

PALM Stage II

Inserts in microtiter plate format, from slide to culture dish



Base model's standard equipment

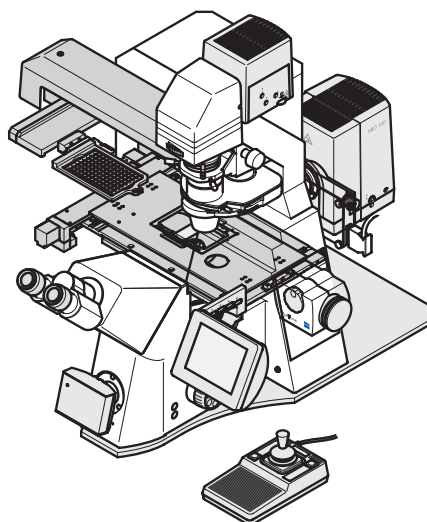
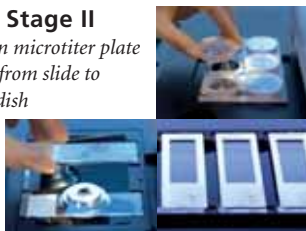
PALM RoboMover

Increased throughput, from single cap to 96-well CapturePlate



PALM Stage II

Inserts in microtiter plate format, from slide to culture dish



High-end model's standard equipment

Joystick

Quick positioning



Software provided

PALM RoboSoftware for the control of microdissection, laser function and contact-free transport

User interface and InformationCenter



Navigator

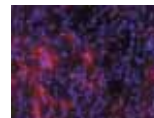


PALM CapMover

Easy handling of standard applications and living cells

Fluorescence equipment

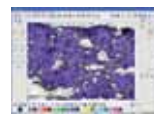
Basic- or Advanced-Fluorescence with fast filter wheel and HBO or X-Cite



Software provided

1. PALM RoboSoftware for microdissection, laser function and contact-free transport. Additionally with Multichannel Fluorescence and Extended Focus

2. AxioVision for automated object recognition



User interface and InformationCenter

ApoTome

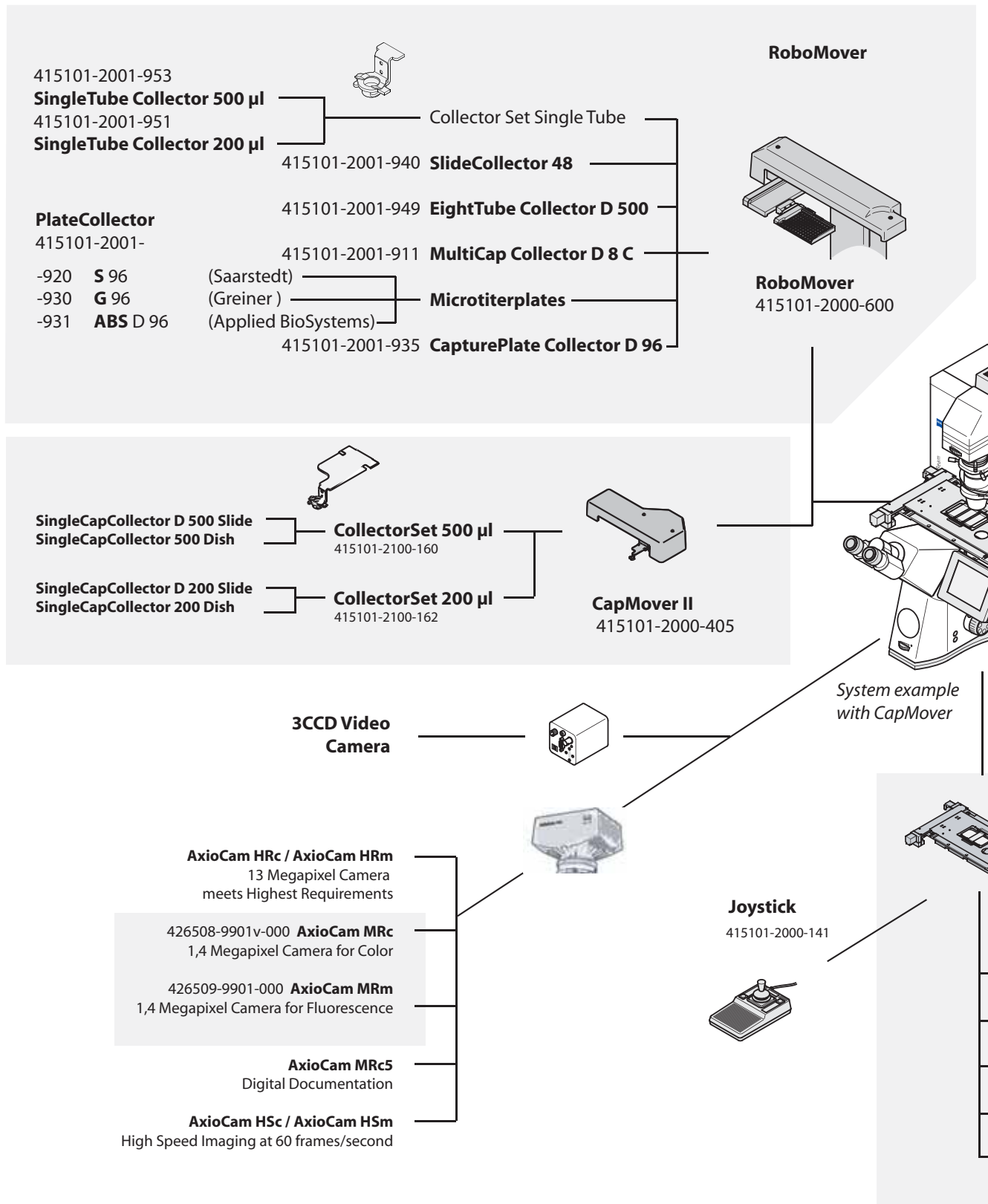
Creation of optical sections for thick sections



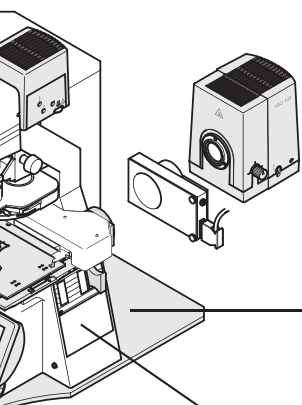
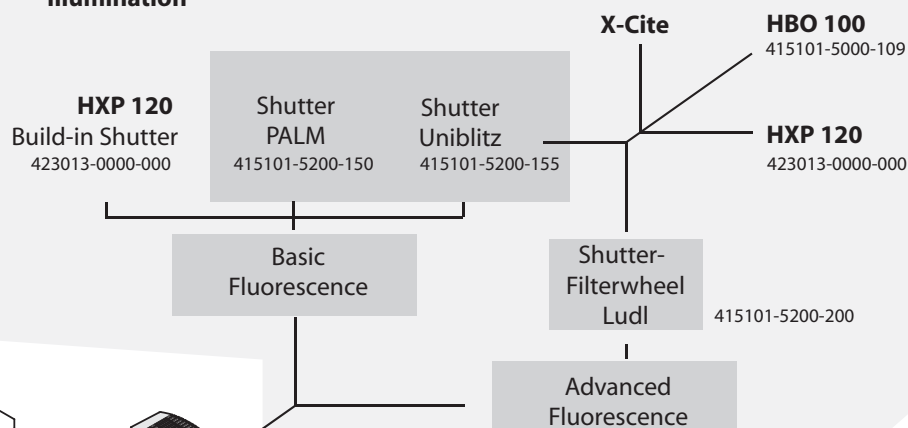
Applications and Recommended Equipment

		Applications	Pathology, Histology	Forensics, Rare Events	Living Cell applications	Plant Research	Increased throughput	Standardized dissection transfer	Sorting and transporting	Immobilize cells and manipulate	Fluorescence experiments	Extended Focus	Time lapse, Lesion research	Work performed under sterile conditions	Imaging workstation	Incubator
Stage II	1-3 slides	•	•	•		•	•	•	•	•	•	•	•		•	•
	Culture dish 35 mm				•	•			•	•	•	•	•		•	•
	Culture dish 50 mm	•			•				•	•	•	•	•	•	•	•
	DishHolder 6/35				•	•			•	•	•	•	•	•	•	•
	Capillary insert								•					•		
CapMover	Tube: 500 µl/200 µl	•	•	•		•										•
	Single cap: 500 µl/200 µl				•						•					
RoboMover	Single Tube	•		•	•				•							
	1-8 Tubes	•	•			•										
	8-CapStrips			•			•	•								
	Microtiter plates						•	•								
	CapturePlate		•				•	•								
	SlideCollector 48D			•				•								
LiveCell Collector	Cap				•	•			•	•				•		•
	Tweezers				•				•	•	•	•	•	•	•	•
Fluorescence			•	•	•	•	•		•	•	•	•	•	•	•	•
AxioVision	Base	•	•	•	•	•	•				•			•	•	
	Commander for scripting		•	•			•	•			•	•			•	
	Multichannel Fluorescence			•	•						•	•			•	
	Extended Focus			•	•	•			•	•		•	•	•	•	
Joystick		•	•	•		•			•	•	•		•	•		
AxioCam	MRC		•	•		•	•		•	•		•	•		•	
	MRm			•	•						•	•	•		•	
ApoTome											•				•	
PlasDIC					•				•	•				•	•	•
Consumables	Single Tube	•	•	•	•	•								•		
	AdhesiveCaps	•	•	•		•										
	MembraneSlides	•	•	•							•	•	•		•	
	FrameSlides		•	•		•									•	
	DuplexDish				•	•			•	•		•	•	•	•	•
	MembraneRing				•	•			•	•		•	•	•	•	•
	8-CapStrips			•			•	•			•					
	CapturePlate						•	•								
	Ibidi-µSlides		•		•		•	•	•	•	•	•	•	•	•	•
	Advantix AmpliGrid			•												

PALM MicroBeam - System Overview



Fluorescence Illumination



Axio Observer A1
415101-3000-551

Axio Observer D1
415101-3000-552

Axio Observer Z1
415101-3000-553

(2000-0110) MicroBeam,
solid state laser system, 355nm, 100 μ J

(2200-3100) CombiSystem, single beam
solid state laser system, 355 and 1064 nm

(2200-3100) CombiSystem, double beam
solid state laser system, 355 and 1064 nm,
tweezers laser system 3 W

*Tweezers
available in*

1 W
3 W



ApoTome
with Safety Kit
415101-2605-105

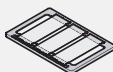
RoboStage II

415101-2000-130

Three Slide Holder

Slides 1 mm 415101-2000-810

Slides 0,17 mm 415101-2000-820



StageInsert Capillary II

415101-2000-721

DishHolder \varnothing 50 mm CC

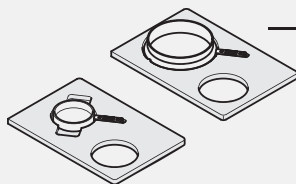
415101-2000-841

DishHolder \varnothing 35 mm CC

415101-2000-835

DishHolder 6 / \varnothing 35 mm

415101-2000-836



LiveCell Collector

415101-2100-310

2007-01-29

One System – Many Advantages

- Flexible applications from archival material to living cells – for DNA, RNA and protein isolation
- Patented LMPC system for non-contact, contamination-free and gentle specimen capture
- From microdissection to integrated imaging workstations – expandable technology with additional solutions from Carl Zeiss
- Expandable to include high-resolution digital cameras for fluorescence and brightfield, Multichannel Fluorescence and Extended Focus
- Optimal workflow with seamless component integration: from individual experiments to full automation
- Outstanding optics from Carl Zeiss and world-wide support
- PALM Application Laboratory: years of experience and specialized know-how

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