

Pathology Partners

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Leading-edge Laser Microdissection Technology

by Stephanie Bohnert, *Product Manager – Life Science Division, Leica Microsystems, Inc.*

A brief history of laser microdissection technology

The tools for microdissection have evolved. Early on, researchers used simple needles and ultrasonic piezo stepper motor microdissectors controlled by micromanipulators. A microscope was used to view the cells while manually manipulating a needle or other device. It wasn't until the application of laser technology that true isolation and capture of single cells was viable on a repeatable basis.

Today, the technique of sending a laser through a compound microscope's high magnification objective makes it possible to selectively and reliably separate cells from surrounding tissue. The use of computers and lasers allows the user to simply "draw" an outline around the region of interest on the monitor. With a simple click of the mouse, the microscope automatically cuts and captures the desired cells. The precision, repeatability, and ease of use of this method have allowed LMD to be used as a mainstream technique in pathology laboratories.

Leica Microsystems began developing its LMD technology in 2000. The first system launched to the marketplace, the upright Leica AS LMD system, was supplied with a gas laser, which enabled the dissection of thinner tissues. In 2005, Leica Microsystems introduced the Leica LMD6000, a system equipped with a powerful diode-pumped, solid-state laser. And now, in 2009, the latest generation products, the Leica LMD6500 and Leica LMD7000, are available.

Description of Instrumentation

The new Leica LMD6500 and LMD7000 utilize an upright microscope with a precision steering prism to guide a focused UV laser beam. Using specialized software, microscopic regions of interest on specimens are marked and excised by a laser. Once the laser cuts the desired region free from surrounding tissue, the region of interest gently drops by gravity into a dish or other collection vessel, which may contain lyses buffer. The dissectate can then be processed for downstream analysis. The buffer preserves the DNA, RNA, or proteins for future subsequent analysis.

Among Leica Microsystems' unique advantages are:

- **Non-contact methodology** – eliminates contamination
- **Speed** – the prism-guided laser directs the laser at higher speeds than the typical stage moving approach; speed is particularly important when isolating large regions or large numbers of cells
- **Precision** – the prism-guided laser can achieve greater precision than stage moving systems



Laser microdissection technology allows pathologists to obtain selective, relevant results, quickly.

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Novocastra™ Antibodies: New IHC Tools

by Dr. Mark Rees, *Marketing Manager, Novocastra™, Leica Microsystems, Inc., Biosystems Division*

To gain further insight into the development of Novocastra™ antibodies, two scientists, **Dr. Michael Pinkney**, Molecular Biology Manager, and **Dr Nigel Piggott**, Principal Development Scientist, both of Leica Microsystems' Biosystems Division, explain what it takes for a company to deliver superior IHC assays. [Click here to read more.](#)

Leica Microsystems is pleased to offer a **2 for 1 discount offer** on Bond RTU Antibodies. **Hurry!** This offer is only valid on Bond RTU orders placed between **July 1, 2009** and **September 30, 2009**. Call 800-248-0123 and reference code **RTU2F1**, or mail in the attached, card and we will contact you to prepare a quotation.

- The Bond RTU 2 for 1 Offer is not valid with any other discount program.
- This offer excludes Novocastra Abs and Bond ISH probes.
- Contact your local Leica Microsystems sales representative, exclusive dealer representative, or call 1-800-248-0123 for more information.
- Leica Microsystems employees and agents are not eligible to participate.



News You Can Use



Attention Canadian Customers

In order to better serve the North American market, Leica Microsystems has consolidated all of its North American customer service and order processing for all business areas in Bannockburn, Illinois. The integration began on February 27, 2009. The North American customer service representatives have been available to assist you since March 2, 2009. Leica Microsystems will continue to provide you with innovative products and you will continue to experience the same high-quality customer service and application/technical support that you currently receive.

Specialized Customer Service Representatives for our Canadian customers are available to assist you between 7:30am and 6:00pm CST:

Jamie Tinault (English) 800-248-0123 (press 5)

jamie.tinault@leica-microsystems.com

Mary Sweeney (English) 800-248-0123 (press 5)

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Ginette McIlroy (French) 888-895-3422

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If you have any questions or concerns, please contact Leica Microsystems' customer service representative Jamie Tinault at 800-248-0123 (press 5). We appreciate your continued interest in Leica Microsystems and look forward to supplying you with high-quality product solutions and customer service into the future.



Leica Microsystems Acquires Surgipath Medical Industries, Inc.

On December 2008, Leica Microsystems acquired Surgipath Medical Industries, Inc. Based in Richmond, Illinois, Surgipath is a well-established provider of consumables and medical device accessories for clinical histology and research laboratories. Surgipath's range of products includes processing reagents, storage and specimen transport devices, cytology accessories and safety products.

What does this mean to customers?

The newly expanded range of high-quality Surgipath consumable products combined with Leica Microsystems wide histology product range offers customers a new level of convenience, efficiency and value. Now, when our new high-quality consumables are matched with our proven, high-quality histology instruments, a higher level of quality results can be achieved in the laboratory. The expanded product range includes processing reagents, storage and specimen transport devices, cytology accessories, and products for more safety. These products complement and expand Leica Microsystems' broad histology product range used in laboratories around the world.

We invite you to take advantage of **The Leica Microsystems Free Sample Consumable Offer!** Contact your local Leica Microsystems sales representative to order a free consumables sample of your choice. This offer is good through December 31, 2009.

- **Tissue Processing Consumables** includes Parablocks, paraffin, cassettes, reagents, Waxsol. Embedding Consumables includes paraffin and base molds, dissection instruments, and L'Absorbs
- **Microtomy Consumables** includes disposable blades, slides, lubricants, Sta-On, and D.I.'s
- **Multistainer/Autostainer Consumables** includes SelecTech stains, reagents, slides, special stains, and controls
- **Coverslipping/Transfer Station Consumables** includes ACS Cover Glass, Acrytol, Micromount, xylene, slide folders/boxes, and L'Absorbs



The Biosystems Division of Leica Microsystems 2009 Symposia Series

by Mary Cheles, *Director of Technical Support, Leica Microsystems, Inc., Biosystems Division*

The Biosystems Division of Leica Microsystems began its 2009 Symposia Series, "Advances in Histology and Immunohistochemistry Techniques," on May 13, 2009 at the Hyatt Regency Jersey City, New Jersey. Attendees learned about exciting industry advances that are shaping the histology laboratory, earned free CEU credits, and saw demonstrations of state-of-the-art laboratory solutions for workflow challenges.

Guest Speakers and topics included:

- Richard W. Cartun, Ph.D., Director, Histology & Immunopathology, Hartford Hospital, "Immunohistochemistry Update"
- Robert B. Patterson, MD, MPH, Director, Anatomic, Clinical and Dermatopathology, Butler Health System, "Cervical Cancer Screening in a World with HPV Vaccines"
- Peter B. Illei, MD., Assistant Professor of Pathology, Director of Immunopathology Laboratory, Johns Hopkins Medical Institutions, "Immunohistochemical Analysis of Carbonic Anhydrase-IX (CA-IX), Napsin-A and Hypoxia-inducible Protein-2 (HIG2) Expression in Renal Cortical Tumors"
- Alton D. Floyd, Ph.D., Consultant, "Quantitative Assessment of Microscopic Images"
- Mark Rees, Ph.D., Marketing Manager, Novocastra™, Leica Microsystems, "A Review of the Clinical Utility of New Novocastra Antibodies"



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The agenda included the afternoon breakout sessions: Pathology Practice Insights and a Green/Lean Histology Workshop. Leica Microsystems' Seminar Series always includes a complimentary lunch and the chance to network with colleagues. If you are interested in hearing about future seminars in your area, simply email broadpectrumhistology@leica-microsystems.com to be added to the mailing list.



Leica Microsystems presented Automated Histology Systems at the 14th Annual Executive War College in New Orleans April 27 – 30, 2009.

For the first time, Leica Microsystems was invited to join the group of speakers at the Executive War College, which is the world's largest gathering of laboratory and pathology professionals. This year's conference focused on Workflow Optimization and Automation in Histology, Digital Imaging and Digital Pathology Systems, Laboratory and Pathology Mergers, and Acquisitions and Solutions to Tough Economic Times.

To find out more, click <http://www.executivewarcollege.com/index>.



Laser Microdissection (cont.)



This method of selecting and analyzing individual cells and cell clusters is very useful for pathology diagnoses and many more applications. With both the Leica LMD6500 and LMD7000, pathologists can quickly, selectively, and routinely dissect and analyze regions of interest down to single cells to obtain relevant, reproducible, and specific results.

The gravity method

Prior to observation, tissue is mounted to a transparent foil-membrane microscope slide, specimen facing down, on the microscope stage. The finely focused laser cuts through the membrane, which frees the region to drop. The foil-membrane's strong absorption of UV laser light protects the tissue from UV damage as well, and allows cutting through the tissue network (ablation). The foil is much like a plastic collection vessel, e.g., PCR tube, and is inert with respect to the specimen.

Leica Microsystems' cell collection method of gravity is straightforward and very gentle for the delicate cells. Since this contact- and contamination-free gravity method does not require any further measures, it also saves time and cost. Dissectates of any specimen shape or size can be transferred from the system into laboratory vessels, and nearly unlimited specimen amounts can be pooled.

Precision laser beam movement

Speed and precision are prerequisites to obtain homogeneous material for downstream analysis and reliable results. The laser beam movement of the Leica LMD7000 and LMD6500 is controlled by high precision optics, while the microscope stage and the sample are stationary. This approach allows precise cutting at high magnifications, and fast cutting speeds at low magnifications. This technique ensures rapid capture, minimizing degradation of the specimen. Documentation is easy and convenient because the image remains fixed and only the laser moves.

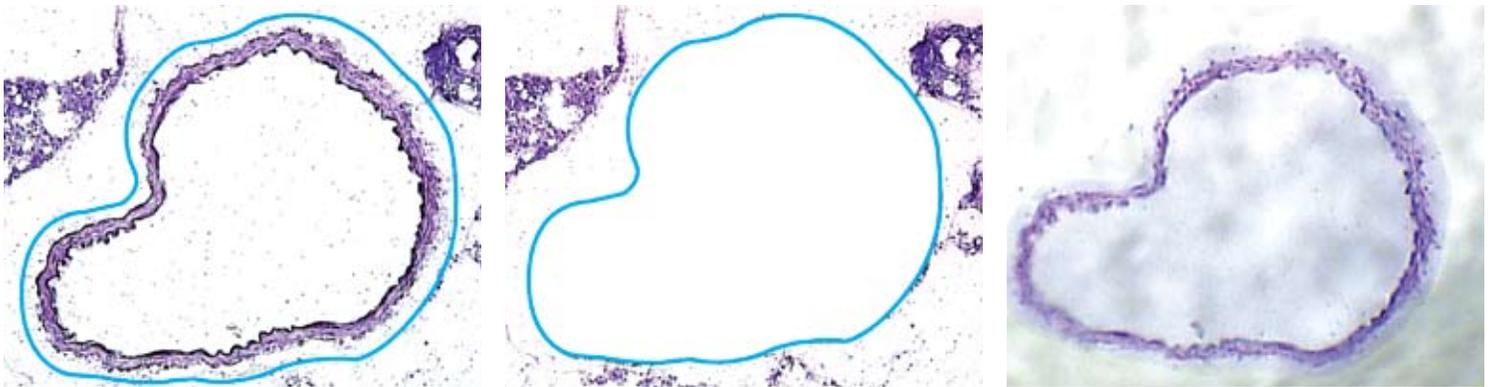
Laser Microdissection (cont.)

The direct, real-time laser-cutting feature is unique, and the user can perform live, immediate dissections. This function is especially beneficial for specimens that are difficult to cut and for real-time tissue ablation.

System integration

Leica Microsystems has developed dedicated microdissection objectives with high UV transmission and outstanding imaging performance – the Leica SmartCut series. Higher UV transmission is synonymous with more laser power on the tissue. The unique 150x dry objective enables the dissection of even the smallest areas without having to use oil. The Leica LMD's intuitive and powerful software allows the user to obtain the desired results with a minimum learning curve, which allows a pathologist to focus on medicine instead of on the microscope.

Laser microdissecting techniques have evolved into very sophisticated technology and so have Leica Microsystems' solutions. A core value of Leica Microsystems, continuous improvement, drives our development teams to design better tools for you. If you have not seen a Leica Microsystems LMD solution lately, please call 800-248-0123 for a free in-house demonstration.



Frozen section (10 µm) of a mouse aorta (whole vessel) stained with cresyl violet on a POL frame slide.



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Imprint

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