

Flexible, Modular Laser Capture Microdissection

# Applied Biosystems® Arcturus<sup>XT</sup>™ Laser Capture Microdissection System



The Applied Biosystems® Arcturus<sup>XTM</sup> Laser Capture Microdissection System from Life Technologies is a unique microdissection instrument that combines laser capture microdissection (LCM) and ultraviolet (UV) laser cutting into one platform. The open, modular design enables unparalleled research flexibility and versatility.

The system removes the guesswork from the microdissection process by allowing researchers to maintain custody of the sample throughout the experiment, helping to ensure that only the desired material has been collected.

- Laser capture microdissection and UV laser cutting in a single system
- Open, modular platform to suit your research
- Simple, intuitive operation
- Superior image quality
- Sample custody maintained at all times

## The Power of Two Lasers in One System

The Arcturus<sup>X7™</sup> offers you the powerful combination of laser capture and laser cutting for your microdissection. The solid-state IR laser, exclusive to Life Technologies microdissection, delivers a gentle capture technique that preserves biomolecular integrity, and is ideal for single cells and small numbers of cells. The solid-state UV laser permits unprecedented speed and precision, and is well-suited for microdissecting dense tissue structures and for capturing large numbers of cells. Together, the two lasers offer you the power to:

- Easily collect individual cells and large regions in the same sample
- Confidently microdissect adjacent cells in a single sample
- Rapidly microdissect challenging samples

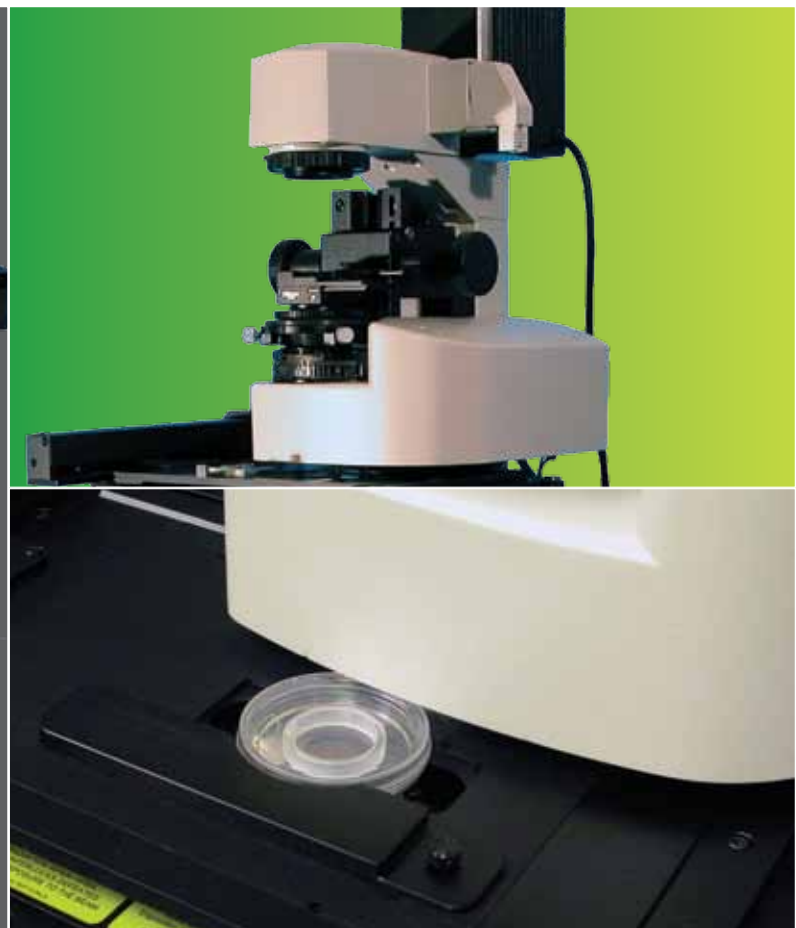


## Unprecedented Research Flexibility

Modular configuration designed to suit your changing research needs.

The Applied Biosystems® Arcturus<sup>XTM</sup> Laser Capture Microdissection System allows you to choose from a variety of modules to fit with your research requirements, wherever your research takes you. The system utilizes a Nikon Eclipse® Ti-E inverted research microscope with top-of-the-line options. Each instrument has IR-enabled LCM, an interactive pen-display monitor, and a trackball-actuated stage for easy and ergonomic navigation. The system may be configured with LED bright-field illumination or high-intensity halogen illumination, which enables phase contrast and differential interference contrast (DIC) microscopy applications.

The Applied Biosystems® Arcturus<sup>XTM</sup> Laser Capture Microdissection System may be purchased with or without UV laser cutting and attenuable fluorescence. A wide range of objectives are available, including 2x–100x dry and 100x oil (see back page for complete list). For ultimate image quality and analysis, a high-resolution megapixel camera may be added. Also, a second flat screen monitor may be included for maximum workstation efficiency.



### Expansion Options

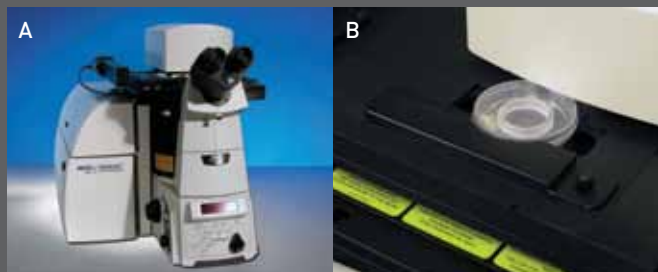
The Applied Biosystems® Arcturus<sup>XTM</sup> Laser Capture Microdissection System has an open platform that can be upgraded and expanded to meet changing research requirements. The available microscope port allows users to modify the system for alternate applications, such as adding a second camera for high-resolution imaging. The open system design also makes possible the easy exchange of stage inserts to accommodate alternate sample formats such as larger slides, which are ideal for neurobiology studies. Petri dishes enable you to perform live cell experiments (Figure 1).

### Ultimate Flexibility in Sample Source and Preparation

The unique combination of IR laser capture and UV laser cutting permits the use of any slide type and any sample preparation (Figure 2). Choose from glass membrane or framed membrane slides for contact or non-contact microdissection. Unlike other systems, the Arcturus<sup>XTM</sup> LCM System permits efficient use of low-cost plain glass slides. Any of the following specimen preparations may be used:

- Thin or thick sections
- Frozen or formalin-fixed tissues
- Chromogenic stained, fluorescently stained, or unstained sections
- Hydrated or dehydrated specimens
- Fine-needle aspirates
- Forensic smears
- Live plant whole-mount preparations
- Live cell cultures

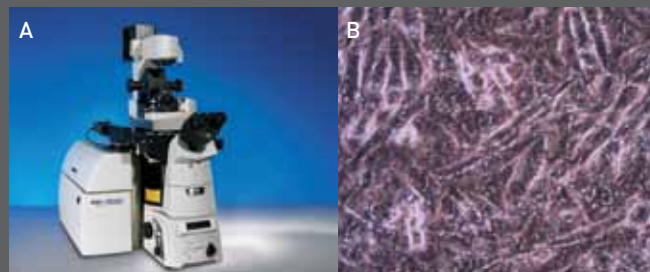
Figure 1. System Flexibility.



Binoculars facilitate traditional microscope functionality during or in between microdissection experiments.

A modular stage insert provides opportunity for alternate sample formats such as large-format slides or petri dishes.

Figure 2. Contrast Imaging.



Phase contrast illumination with optional DIC eliminates the need to stain the specimen and is ideal for live cell applications.

HEK cells observed with phase contrast illumination using a 40x objective.

Figure 3. Superior Optics for Subcellular Microdissection.



Colon tissue, H&E stain, visualized using a 40x objective.

Forensic sample, sperm, visualized with DIC using a 60x objective and 1.5x magnification.

Human chromosome metaphase spread. Giemsa stain, visualized using a 100x air objective.

# Operation Made Easy

The simple, intuitive user interface places the focus on research. From sample loading to extraction of biomolecules, the streamlined workflow maximizes experimental efficiency (Figure 4).

## Simple Software Automates Your Workflow

The Arcturus<sup>XTM</sup> System Software included with your instrument simplifies your laser capture microdissection workflow. With the simple click of a mouse you can control all system operations, including: stage translation, slide and objective selection, focus and light intensity, laser parameters, cap transfers (including QC confirmation), and camera settings.

## Never Lose Track of Your Sample

Automatic electronic documentation may be employed to record each step of the process—before and after microdissection. Static images and live video can be taken at any point during the process, providing a record of the entire experiment. View the CapSure<sup>®</sup> LCM Cap at the QC station for positive identification of captured material, and utilize Capture Groups to display and track all individual and group area measurements.

## Automate Image Analysis

The AutoScanXT Image Analysis Software Module automatically identifies cells and regions based on user-defined criteria, which greatly reduces the overall time required to perform a microdissection experiment. This optional module can be used to analyze an individual image, tiled images, the area under a CapSure<sup>®</sup> LCM cap, or the entire slide area. AutoScanXT Software performs optimally on high-contrast samples and may be used with colorimetric, fluorescent, and IHC-stained specimens. Once the regions have been automatically identified, the user proceeds directly to standard microdissection using the Arcturus<sup>XTM</sup> instrument.

## Streamlined User Interface Simplifies Your Workflow





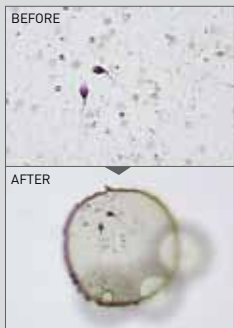
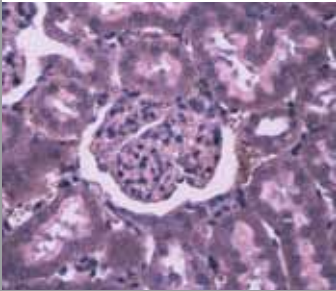
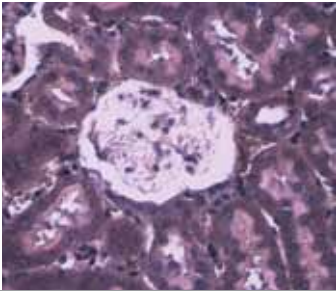

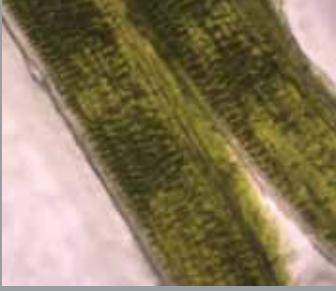
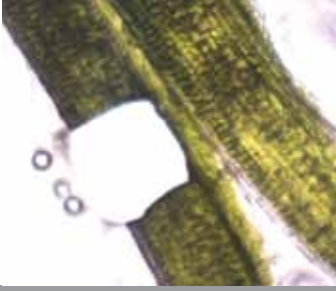

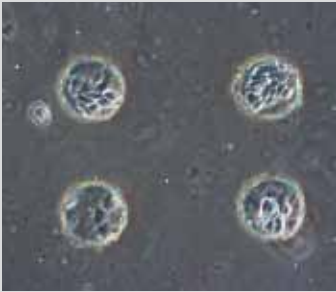
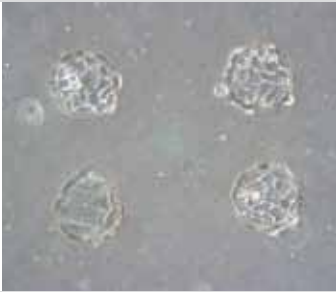
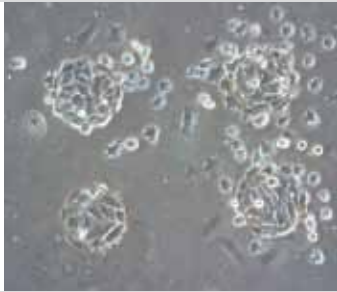
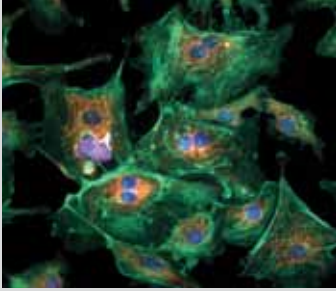
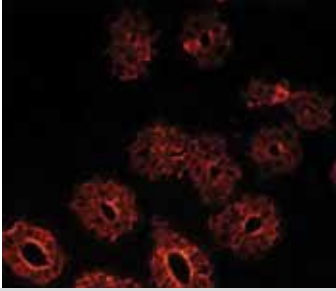
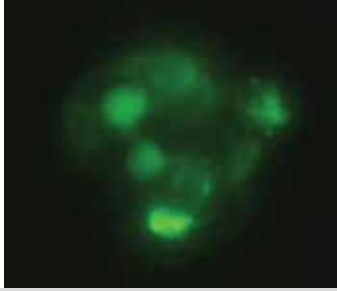
Step 1: Setup	Step 2: Inspect	Step 3: Select	Step 4: Microdissect	Step 5: QC
Load materials onto stage and input important study information.	Identify cells of interest using the fully automated microscope tools, including autofocus and digital zoom.	Use simple drawing tools to designate cells for microdissection by drawing freehand or using defined-area circles.	Save time and increase productivity with easy-to-use tools for laser cutting and laser capture.	Inspect the microdissected material on the CapSure <sup>®</sup> cap for positive identification of captured material and assurance of proceeding downstream with the exact cells of interest.
				

Figure 4. Simple Operation. Go from sample loading to extraction of biomolecules in just five steps.

# Rapidly Isolate Pure Cell Populations for Microgenomic Analysis

	Before Microdissection	After Microdissection	Captured Cells
<p>Rat kidney FFPE section, Paradise® Reagent stain, microdissected using IR-LCM only.</p>			
<p><i>Poa pratensis</i> (Kentucky bluegrass) live whole-mount preparation, microdissected using IR-LCM and UV laser cutting.</p>			

<p>Chinese hamster ovary (CHO) cells grown in the Arcturus<sup>XTM</sup> Live Cell Growth Chamber, then isolated under sterile conditions using the Arcturus<sup>XTM</sup> Microdissection Petri Dish. The isolated cells were allowed to outgrow and were visualized under differential interference contrast (DIC) at 0 hours (left), 24 hours (center), and 48 hours (right) post-microdissection.</p>			
<p>(Left) Triple-labeled bovine pulmonary artery endothelial (BPAE) cells. Mitochondria = red, F-actin = green, and nuclei = blue. Visualized simultaneously using a triple bandpass dichroic filter. (Center) Human breast carcinoma, anti-cytokeratin/Cy3 dye. (Right) HEK cells transfected with a GFP construct. Protein expresses in the cytosol. Image taken at 40x.</p>			

# Applied Biosystems® Arcturus<sup>XTM</sup> Laser Capture Microdissection (LCM) Instrument Specifications

Feature	Detail	Standard	Optional*
Microscope	Nikon Eclipse Ti-E microscope base	X	
	Standard microscope operation outside of LCM operating software	X	
	Binoculars, CFI 10X eyepieces		X
Lasers	Infrared (IR) Capture Laser: Solid-state, near-IR (810 nm)	X	
	UV Cutting Laser: Solid-state, passive Q-switched, diode-pumped (355 nm)		X
Illumination	High-intensity LED illumination system	X	
	Nikon Diascopic Illumination Tower for contrast imaging (100 W halogen lamp)		X
Objectives	2x, 10x, and 40x Nikon CFI60 objectives	X	
	4x, 20x, 60x, 100x dry and 100x oil Nikon CFI60 objectives		X
Intermediate Magnification	1.5x optical magnification	X	
	2–3x digital zoom	X	
Stage	Motorized, trackball-actuated in X and Y axes with 1 µm precision	X	
	Stage insert for three 75 mm x 25 mm slides	X	
	Stage insert for large-format slides; Two positions, adjustable to 75 mm x 25 mm, 75 mm x 38 mm, 75 mm x 50 mm		X
	Stage insert for petri dish: 50 mm x 7 mm		X
Contrast Methods	Bright-field	X	
	Phase contrast (PhL, Ph1, Ph2)		X
	Differential interference contrast (DIC), Senarmont method (rotating polarizer)		X
Microdissection Camera	1024 x 768 1/3" color CCD with electronic shutter to 1/10000 s and on-chip integration to 30 seconds	X	
High-Resolution Imaging Camera	2560 x 1920; 5 million real pixels, progressive scan interline color CCD		X



Feature	Detail	Standard	Optional*	
Epifluorescence	2,000-hour broad-spectrum metal halide lamp; user-replaceable with no alignment required. Six-position fluorescence filter turret with three filter cubes (R, G, B) and three available positions for application-specific filter cubes.		X	
	<b>Fluorescence Filters</b>			
	<b>Color</b>	<b>Excitation</b>	<b>Emission</b>	
	Red	590–650 nm	663–738 nm	X (w/FL option)
	Green	510–560 nm	>590 nm	X (w/FL option)
	Blue	450–490 nm	>515 nm	X (w/FL option)
	UV	325–375 nm	>420 nm	X
	Triple Dichroic: <i>DAPI</i> <i>FITC</i> <i>TRITC</i>	385–400 nm 475–493 nm 545–565 nm	450–465 nm 503–533 nm 582–622 nm	X
Software	Applied Biosystems® Arcturus <sup>XTM</sup> Operating Software with pen display interactive monitor	X		
	AutoScanXT Image Analysis Software		X	
Motorization	Stage	X		
	Focus	X		
	Objective nosepiece	X		
	Fluorescence filter turret		X	
	Phase contrast/DIC condenser		X	
	DIC analyzer		X	
Dimensions	30" (D) x 22" (W) x 29" (H)	X		
Power	100–240 VAC, 50–60 Hz; 600 W	X		
Altitude	For use up to 6,600 ft (2,000 m)	X		
Operating Temp/Humidity	18–30°C/<60% relative humidity (non-condensing)	X		
Work Surface Required	36" x 72" (92 cm x 183 cm), 33" (80 cm) vertical clearance	X		
Computer	2.8 GHz Pentium 4 (min), 2 GB RAM (min), 80 GB hard drive (min), DVD+/- RW drive, Windows XP Pro, 1280 x 1024 dpi resolution monitor, and interactive pen display monitor	X		

\*All options are field upgradeable for installation at a later date.

# The Complete Solution for Microgenomics

Applied Biosystems® Arcturus® products offer you everything you need for microgenomics. From tissue-staining kits and laser capture microdissection instrumentation to kits for extraction, amplification, and labeling, Life Technologies has what you need for your microgenomics project.

## Superior Applications and Technical Support

Life Technologies employs a dedicated team of highly qualified and expertly trained application scientists and technical support specialists to assist researchers in any molecular or cellular biology research area.

## Peer-Reviewed Publications by Independent Researchers

Life Technologies maintains a citation database containing hundreds of scientific publications with applications enabled by Applied Biosystems® Arcturus® LCM products. This database is on our website at [www.appliedbiosystems.com/arcturus](http://www.appliedbiosystems.com/arcturus) and contains applications and relevant articles in proteomics, gene expression profiling, mutation analysis, and many other research areas.



HistoGene® kits for frozen tissue and immunofluorescence staining.



Applied Biosystems® ArcturusXT™ microdissection instrument for capturing pure cell populations.



PicoPure® kits for DNA and RNA extraction and isolation.



RiboAmp® PLUS kits for RNA linear amplification from frozen samples.



Paradise® PLUS reagents for staining, RNA isolation and amplification, and whole transcript reverse transcription from formalin-fixed, paraffin-embedded samples.



Turbo Labeling™ kits for non-enzymatic labeling of unmodified amplified RNA (aRNA) for microarray gene expression profiling.



## ORDERING INFORMATION

Description	Part Number
<b>Applied Biosystems® Arcturus® Laser Capture Microdissection Systems</b>	
Arcturus <sup>XTM</sup> Microdissection Instrument (LCM only)	ArcturusXT
Arcturus <sup>XTM</sup> LED Illumination Tower	0310-5537
Arcturus <sup>XTM</sup> Phase Contrast Illumination Tower	0310-5535 (manual); 0310-5761 (motorized)
Arcturus <sup>XTM</sup> Epi-Fluorescence	Manual: 0310-5504 or 0200-6229 Motorized: 0310-5749 or 0310-5750
Arcturus <sup>XTM</sup> UV Laser Cutting	0310-5538
Arcturus <sup>XTM</sup> Differential Interference Contrast (DIC) Base (includes 10X and 40X objective DIC sliders)	14423-00
Arcturus <sup>XTM</sup> DIC Analyzer Cube	9000-1055
Arcturus <sup>XTM</sup> 4X Objective	14676-00
Arcturus <sup>XTM</sup> 20X Objective	14658-00
Arcturus <sup>XTM</sup> 60X Objective	14659-00
Arcturus <sup>XTM</sup> 100X Air Objective	14662-00
Arcturus <sup>XTM</sup> 100X Oil Objective	14661-00
Arcturus <sup>XTM</sup> DIC 20X Slider	6550-0118
Arcturus <sup>XTM</sup> DIC 60X Slider	14668-00
Arcturus <sup>XTM</sup> UV Filter Cube	9000-1034
Arcturus <sup>XTM</sup> Triple Dichroic Filter Cube	6530-0056
Arcturus <sup>XTM</sup> High-Resolution 5-Megapixel Camera	14379-00
Arcturus <sup>XTM</sup> 17" LCD Flatscreen Monitor	10904-00
Arcturus <sup>XTM</sup> Binoculars	0200-6228
Arcturus <sup>XTM</sup> Large Format Slide Stage insert	0310-5408
Arcturus <sup>XTM</sup> Petri Dish Stage Insert	0310-5631
AutoScanXT LCM Image Analysis Software	9050-0005

Description	Size	Part Number
<b>CapSure® LCM Caps and Accessories</b>		
CapSure® Macro LCM Caps	48 caps	LCM0211
CapSure® Macro LCM Caps, Bulk Pack	240 caps (5 x LCM0211)	LCM0212
CapSure® HS LCM Caps Starter Pack with Alignment Tray and Incubation Block	24 caps	LCM0213
CapSure® HS LCM Caps	32 caps	LCM0214
CapSure® HS LCM Caps, Bulk Pack	160 caps (5 x LCM0214)	LCM0215
PEN Membrane Frame Slides	50 slides	LCM0521
PEN Membrane Glass Slides	50 slides	LCM0522
PEN Membrane Frame Slides for Live Cell Microdissection	5 slides	LCM0530
PEN Membrane Frame Slides for Live Cell Microdissection, Bulk Pack	25 slides	LCM0531
Arcturus <sup>XTM</sup> Live Cell Growth Chambers	6 chambers (sterile)	5000300
Arcturus <sup>XTM</sup> Microdissection Petri Dishes	6 petri dishes (sterile)	5000301
<b>Applied Biosystems® Arcturus® Microgenomics Reagents</b>		
HistoGene® LCM Frozen Section Staining Kit	72 slides	KIT0401
HistoGene® LCM Immunofluorescence Staining Kit	32 slides	KIT0420
PicoPure® DNA Extraction Kit	30 extractions (Macro Cap) 150 extractions (HS Cap)	KIT0103
PicoPure® RNA Isolation Kit	40 isolations	KIT0204
RiboAmp® PLUS RNA Amplification Kit	(12) 1-round or (6) 2-round applications	KIT0521
RiboAmp® PLUS HS RNA Amplification Kit (High Sensitivity)	(6) 2-round applications	KIT0525
Paradise® PLUS Reagent System	12 samples	KIT0312
Paradise® PLUS Whole-Transcript RT Reagent System	12 samples	KIT0315
Turbo Labeling™ Kit Biotin	12 samples	KIT0608
Turbo Labeling™ Kit Cy3	12 samples	KIT0609
Turbo Labeling™ Kit Cy5	12 samples	KIT0610

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