

Advertisement feature



The upgradeable EXi Aqua from QImaging addresses the imaging requirements of a busy laboratory.

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Up Close and Personal Microscopy under the lens

For centuries, microscopes have allowed researchers to see what they couldn't see before. Now, techniques such as live-cell imaging, fluorescence imaging and super-resolution microscopy are demanding more powerful microscope platforms and cameras. Here are the advances in microscopy that are bringing the field into a whole new light.

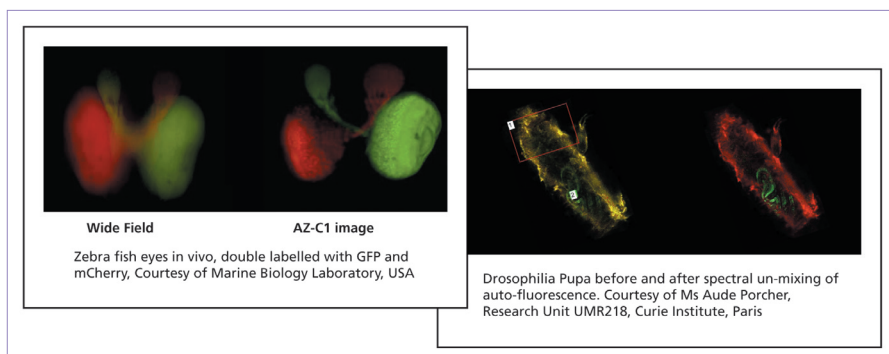
Nikon's AZ-C1 microscope provides an imaging platform for developmental biology, cell biology, stem cell and tissue research by combining the AZ100 Multizoom and C1 confocal microscopes. Designed for macro imaging, it captures fields of view larger than 1 cm while permitting deeper confocal imaging. With a single lens, observations ranging from macro imaging of a whole organism to micro imaging of a single cell can be achieved. Up to three separate objective lenses can be attached, offering a large optical zoom range for high magnifications using stepwise or continuous zoom mode. The addition of a motorized stage further expands imaging possibilities by allowing image capture in multiple fields of view. The AZ-C1 also includes many other features such as an ergonomic tilting eyepiece tube, up to seven laser lines, fiber-coupled optics, a modular system, a telecentric zoom system and an epi-illumination light path separated from the imaging path.

The McCrone Group provides the **Olympus SZX10 stereo-microscope** with coaxial illumination module and **PAXcam digital camera** as a combined set for microanalysis and identification. The SZX10 helps users analyze their samples more efficiently and precisely with a 600-line-pairs-per-mm resolution and a zoom ratio of 10:1. The coaxial illumination module enhances contrast, increasing visual detail. The PAXcam digital camera, equipped with Microsoft-compatible measurement software, precisely captures and analyzes images with grain sizing, particle counting and image stitching. Users are able to fully document their experiments and place them easily into their existing software systems. The package is available only at McCrone Microscopes

and Accessories, a division of the McCrone Group. Users receive high-level customer service packages including assembly, user training and ongoing support.

Carl Zeiss MicroImaging expands its optical sectioning techniques with a new product line that allows researchers to perform light microscopy far below the diffraction barrier. Two super-resolution methods, SR-IM and PALM, are available on a single platform, integrating the **AxioObserver** microscope with laser wide-field illumination and sensitive EMCCD detection. Operating in SR-SIM (super-resolution structured illumination microscopy) mode, the system uses raw images imprinted with a finely structured illumination pattern to compute super-resolution images with up to twice the resolution of confocal microscopes. SR-SIM works with all fluorophores. PALM (photoactivated localization microscopy) uses many detection and localization cycles of single fluorophores under total internal reflection (TIRF) conditions to obtain imaging resolutions down to 20 nm. "The two techniques integrated into our state-of-the-art microscope systems add a new dimension to fluorescence microscopy, thus enabling new approaches and experiments in all disciplines of biomedical research," stated Dr. Ulrich Simon, President and CEO of Carl Zeiss MicroImaging GmbH. "We are confident that these techniques will continue to allow the users of Zeiss microscopes to achieve pioneering results in science."

Used in combination with microscopy platforms, CCD (charge-coupled device) cameras capture and record image data. The **EXi Aqua™ Bio-Imaging Microscopy Camera** from **QImaging** was designed to address the multiple imaging requirements



Images taken with Nikon's AZ-C1 microscope.

of a busy laboratory—from quantitative color and immuno-fluorescence imaging to the capture of dim fluorescent protein data. An entry-level microscopy camera, the EXi Aqua can be upgraded to provide more capabilities as the lab grows. Besides being cost effective and easy to use, the 20 MHz, 14-bit EXi Aqua can act as both a sensitive monochrome camera and, when utilized with the optional RGB filter module, a high-resolution color camera. The EXi Aqua is also available with a convenient Bayer mask color CCD option. Flexible binning enhances the camera's sensitivity and speed, and exposure times range from 10 microseconds to 18 minutes. The camera is cooled and stabilized at 0° C. "The EXi Aqua is an excellent entry-level microscopy imaging device with the added bonus of upgradeability to achieve lower noise and 50% higher frame-rate in the future, should a researcher require the additional performance," says Rachit Mohindra, Associate Product Manager. "The camera can adapt with its user's needs."

Accessories

In support of its leading **FluoView FV1000MPE** multiphoton microscope platform, **Olympus** has introduced three new accessories. Researchers who are considering installing a two-photon instrument or desire greater flexibility will benefit from the Laser Sharing System because it alleviates the need for a second laser by optically redirecting light from the first laser. Similarly, the Dual-Port SIM (Simultaneous) Scanner offers increased flexibility to microscopists performing protocols that involve photobleaching using both visible and infrared light. The Dual-Port SIM Scanner does not require the user to change optics or rehook fibers,

thus eliminating alignment issues and saving time. Combined with the Multi-Point SIM scanner software, scientists can take advantage of a dedicated neuroscience application that enables the scanner, laser and data set to be controlled by the user. According to Dennis Donley, Manager for laser scanning confocal microscopes at Olympus, these new developments will enable "scientists using the FluoView FV1000MPE multiphoton system to have even more flexibility and imaging power to address their research."

Reagents

Isolating recombinant proteins with His-tag purification systems is arduous and tends to produce results with poor specificity and visibility under the electron microscope. To overcome these obstacles, **Nanoprobes, Inc.** has developed a simple reagent capable of labeling almost any His-tagged recombinant protein for imaging with electron microscopy. Using a small nickel compound, the His-tag binds to a versatile gold particle, called **Nanogold®**, which remains tightly bound to the target protein with minimal disruption to the system. Since the Nanogold® label is large, stable and electron dense, it is ideal for direct imaging using electron microscopy and will benefit scientists who seek a reliable, convenient way to visualize how proteins behave in cells. According to James Hainfeld, Ph.D., President of Nanoprobes Inc., "His-tagging has been a monumental breakthrough in isolating recombinant proteins. Since the labeling process for imaging has been arduous and limiting, we've created a simple reagent that labels almost any His-tagged recombinant protein for imaging—even under the electron microscope—in just one step."

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- Rachit Mohindra
Associate Product Manager

Companies mentioned in this Product Focus:

Carl Zeiss International - www.zeiss.com

McCrone Group - www.mccronemicroscopes.com

Nanoprobes, Inc. - www.nanoprobes.com

Nikon Inc. - www.nikonusa.com

Olympus America Inc. - www.olympusamerica.com

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