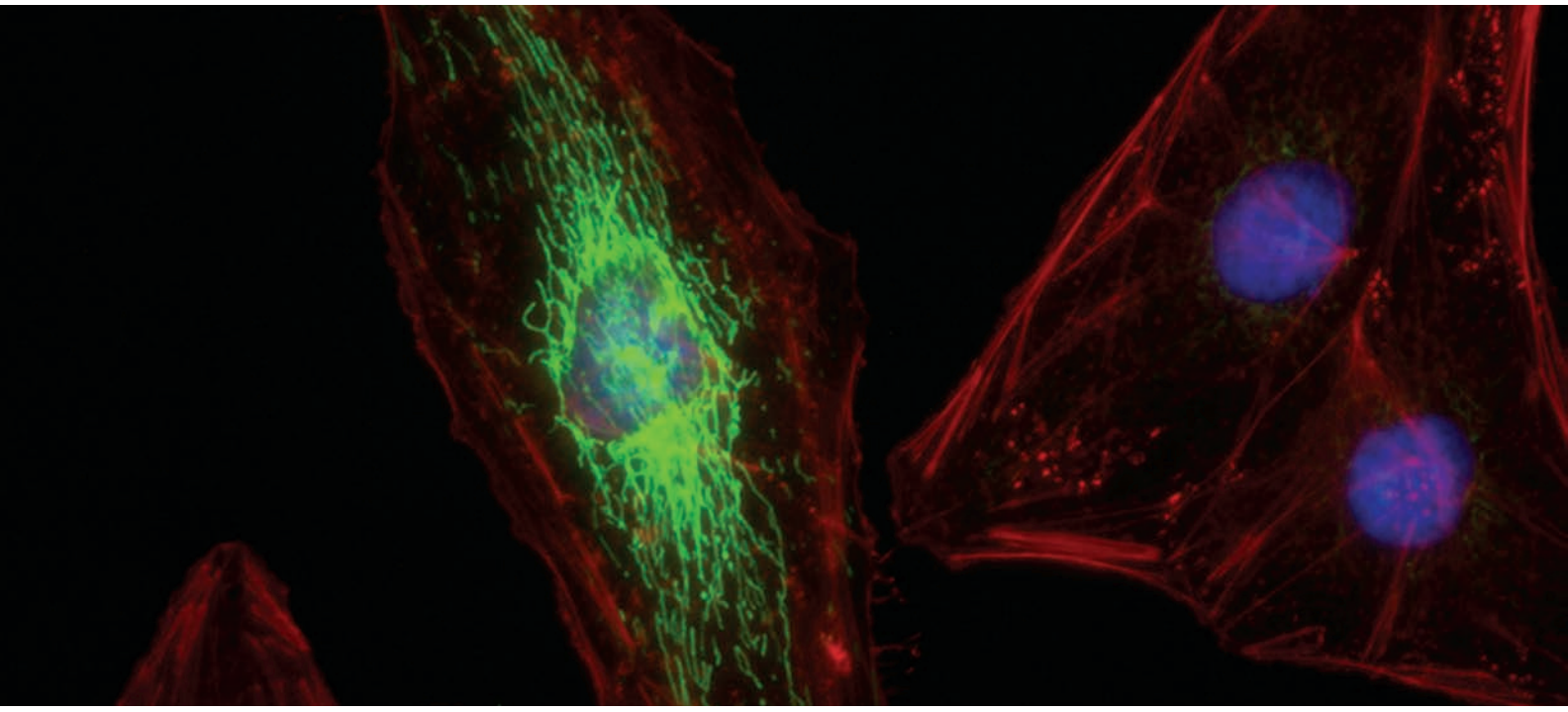

Automated imaging. Simplified.

The EVOS® FL Auto Imaging System.

The EVOS® FL Auto Imaging System is designed to eliminate the complexities of high-end microscopy while maintaining the highest levels of performance. This fully automated multichannel fluorescence imaging system was developed for advanced automated imaging applications such as time-lapse imaging, multiwell plate scanning, image stitching and tiling, and cell counting. You can quickly image a sample to check its condition or experimental progress, or use the EVOS® FL Auto Imaging System equipped with the optional onstage incubator to acquire high-resolution time-lapse movies of experiments spanning many hours. The EVOS® FL Auto Imaging System is controlled through a 22-inch high-resolution touch screen monitor or a mouse. Novice users are able to navigate the intuitive touch screen controls to perform sophisticated imaging, and experienced users will appreciate the superb quality of the images produced (Figure 1). With automated stage movement, filter and objective changes, focus, and exposure, the EVOS® FL Auto Imaging System takes the mystery out of microscopy and lets you concentrate on your research.

Figure 1 (above). Three-color imaging of HeLa cells with the EVOS® FL Auto Imaging System. HeLa cells were transduced with CellLight® Mitochondria-GFP (Cat. No. C10600). Following an overnight incubation, cells were fixed and permeabilized with the Image-iT® Fixation/Permeabilization Kit (Cat. No. R37602), stained with ActinRed™ 555 ReadyProbes® Reagent (Cat. No. R37112) and NucBlue® Fixed Cell ReadyProbes® Reagent (Cat. No. R37606), and imaged on the EVOS® FL Auto Imaging System using a 40x objective.

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See how simple automated imaging can be

Automated multichannel fluorescence microscopy has been out of reach for many researchers, in part because of the high cost of the instruments capable of performing sophisticated imaging functions, and in part because of the steep learning curve associated with using those complex instruments to full advantage. Now the surprisingly affordable EVOS® FL Auto Imaging System (Figure 2) makes high-level imaging applications—such as time-lapse acquisition, multiwell plate scanning, image stitching and tiling, and cell counting—accessible to even novice users via a clear and easy-to-use touch screen interface.

Figure 2. EVOS® FL Auto Imaging System with EVOS® Onstage Incubator.

Images that are crisp and complete

Sharp focus should be easy to achieve, but in practice, focusing a high-end microscope can be frustrating. The EVOS® FL Auto Imaging System simplifies focusing with several modes of autofocus available to optimize speed and accuracy in a variety of situations. In addition, the Z-Stack Flat Focus feature collects a series of images in the z-axis, extracts the brightest pixel from each image layer or stack, and then returns a single, focused image (Figures 1, 3, and 4).

The EVOS® FL Auto Imaging System also makes it easy to scan a large area of a sample and acquire multiple images to build a tiled and stitched image (Figure 5). The scan can be automated either of two ways. If you know which part of the culture vessel or slide you want to scan, you can size an "area of interest rectangle" over the scan region on a virtual vessel diagram. Alternatively, you can use a live image to find and mark the opposite corners of the area you want scanned. Either way, you point to what you want and the EVOS® FL Auto Imaging System does the rest. →

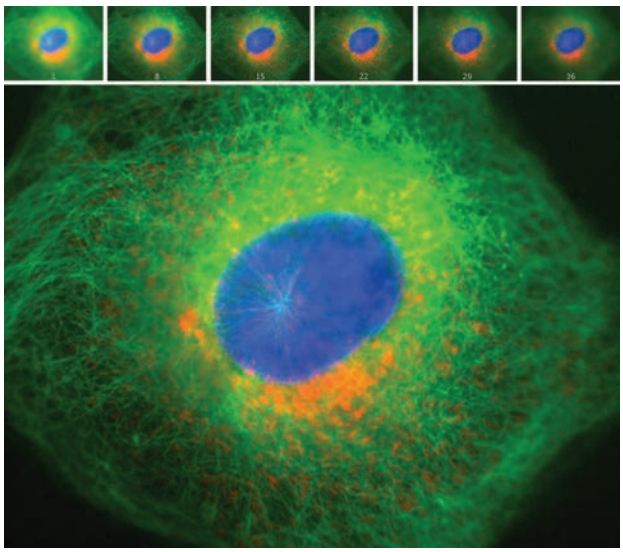

Figure 3. Three-color imaging of HeLa cells with the EVOS® FL Auto Imaging System demonstrating the Z-Stack Flat Focus feature. HeLa cells were transduced with CellLight® Tubulin-GFP (Cat. No. C10613) and CellLight® Mitochondria-RFP (Cat. No. C10601). Following an overnight incubation, cells were stained with NucBlue® Live ReadyProbes® Reagent (Cat. No. R37605) and imaged on the EVOS® FL Auto Imaging System using a 100x oil objective. A series of images from the Z-stack are shown above the final, focused image.

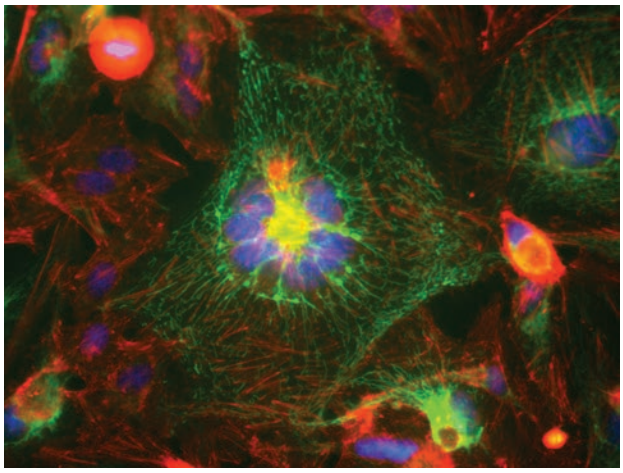

Figure 4. Three-color imaging of HeLa cells with the EVOS® FL Auto Imaging System. HeLa cells were transduced with CellLight® Mitochondria-GFP (Cat. No. C10600). Following an overnight incubation, cells were fixed and permeabilized with the Image-iT® Fixation/Permeabilization Kit (Cat. No. R37602), stained with ActinRed™ 555 ReadyProbes® Reagent (Cat. No. R37112) and NucBlue® Fixed Cell ReadyProbes® Reagent (Cat. No. R37606), and imaged on the EVOS® FL Auto Imaging System using a 40x objective.

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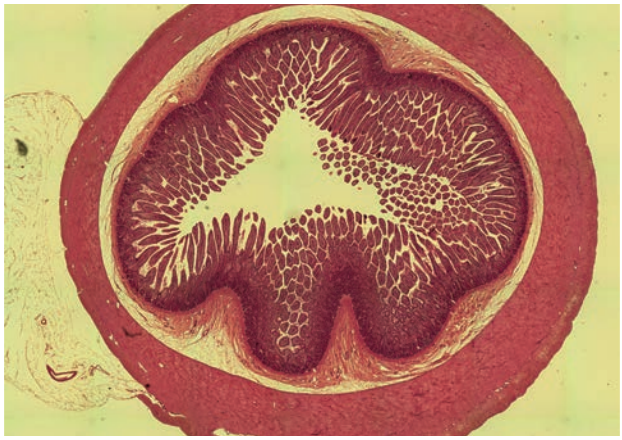

Figure 5. Scanned and stitched image of a rat ileum. A tissue section of a rat ileum was stained with hematoxylin and eosin and scanned with the EVOS® FL Auto Imaging System using a 10x objective. Multiple images were then tiled and stitched together using the EVOS® FL Auto software.

You also have the option to create a "scan routine", a series of steps to acquire a tiled and stitched image. For repeat experiments, scan routines can be saved, recalled, and even edited. An integrated Scan Review tool allows zooming in and out and panning of the composite image. Once assembled, the entire scan or specific regions can be exported.

Time-lapse imaging, cell counting, and more

Creating and running time-lapse movies (Figure 6) is a snap with the built-in Time Lapse Wizard tool. It walks you through the steps of creating a time-lapse routine to acquire individual images at intervals you define, over a time period you specify. Those images can then be automatically stitched together into a video or exported to your favorite video-creation software.

Other image editing and analysis tools that are integral to the EVOS® FL Auto Imaging System's user interface include an automatic counting function, a manual counting tool that lets you mark with a label and count up to 96 different kinds of objects per session, measurement and annotation tools, and an image and video review environment.

Scanning stage compatible with nearly any vessel

The EVOS® FL Auto Imaging System has an automated scanning stage that can be adjusted with sub-micron resolution over an X-Y travel range of 115 mm by 78 mm. Samples in almost any vessel can be imaged using one of the interchangeable vessel holders available. The vessel holders allow a perfect fit of your microscope slide, cell culture flask or dish, or multiwell plate to the stage of the EVOS® FL Auto Imaging System for increased precision in sample alignment. With their secure fit to a variety of slides, flasks, and dishes, these interchangeable vessel holders make imaging a range of samples convenient and easy.

Control the environment with the EVOS® Onstage Incubator

The optional EVOS® Onstage Incubator enables the incubation of cells on the automated X-Y stage, allowing the capture of images from a live sample over long periods of time and the creation of time-lapse movies. The EVOS® Onstage Incubator consists of a stagetop environment chamber (placed on the automated X-Y stage of the imaging system) and a separate control box that supplies power and gases to the chamber. It is fully integrated with the imaging system and is controlled by the same software and user interface that controls the EVOS® FL Auto Imaging System, giving you full control of temperature, humidity, and CO_2 and O_2 levels in the chamber from the touch screen monitor. Interchangeable vessel holders compatible with the EVOS® Onstage Incubator are available for multiwell plates, 35 mm or 60 mm Petri dishes (either one or two plates of each size), and one or two T-25 culture flasks.

The gas mixture in the stagetop environment can be controlled to suit the needs of your sample and experiment. The control box has push-to-connect (PTC) inputs for three gases (air or air-CO_2 premix, CO_2 only, and N_2 only) supplied by the corresponding gas tanks. The N_2 port gives you the option of creating a hypoxic environment. For the air-CO_2 premix port, you can choose 5% premixed CO_2 or manually enter the percentage of the CO_2 and O_2 to reflect the specifics of your setup. There is also a built-in oxygen sensor that can be calibrated in minutes to ensure that the atmosphere in the stagetop chamber is replenished with the appropriate gases in the correct proportions.

Long-life LED light cubes and filters

All of the EVOS® fluorescence imaging systems use proprietary LED light cubes, which combine bright LED illumination with excitation and emission filters into single components that are user-changeable and automatically recognized by the system. The EVOS® FL Auto Imaging System can accommodate up to four LED light cubes simultaneously to provide fully automated multichannel fluorescence imaging.

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An important advantage of LED bulbs compared to the mercury arc lamps used in many conventional cell imaging systems is their consistency of illumination intensity over time. Mercury arc lamps can decrease in intensity by 50% in the first 100 hours of operation. Consequently, images acquired in different sessions using mercury arc lamp illumination cannot be quantitatively compared without performing complicated and time-consuming calibrations. The LED bulbs in EVOS® systems are designed to shine with reliable consistency over time, permitting you to confidently compare quantitative results from images acquired on different days.

The LED bulbs in the EVOS® LED light cubes are rated for more than 50,000 hours (8 hr/day for ~17 years), compared to 300 hours for a typical mercury bulb and 1,500 hours for a metal halide bulb. That can mean big savings in upkeep costs for your instrument over time. Another cost-saving feature of the EVOS® LED light cubes is their integration of high-performance, hard-coated optical filters. Hard-coated filter sets are more expensive initially but are not subject to the degradation over time that occurs with soft-coating technology. Hard-coated filters also have sharper cutoffs and significantly higher transmission efficiencies that typically result in more than 25% additional light transmission than conventional soft-coated filters. The hard-coated EVOS® filters will help give you brighter fluorescence, higher transmission efficiencies, better signal-to-noise ratios, and the ability to detect faint fluorescent signals, and they will last longer to save you money over the life of the instrument.

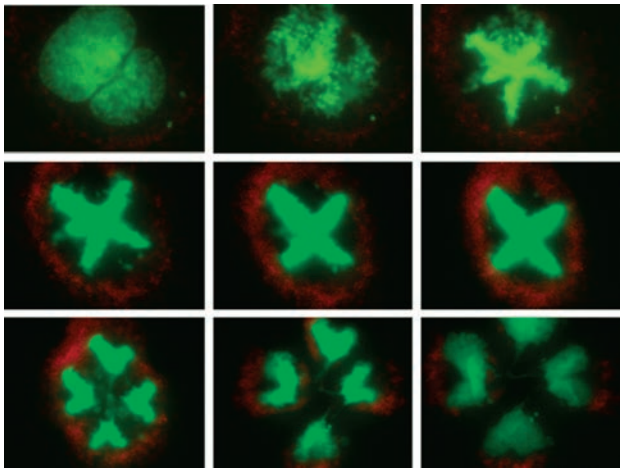

Figure 6. Time-lapse series of HeLa cells undergoing cell division. HeLa cells were transduced with CellLight® Histone 2B-GFP (Cat. No. C10594) and CellLight® Mitochondria-RFP (Cat. No. C10601). Following an overnight incubation, cells were imaged every 30 min for 16 hr on the EVOS® FL Auto Imaging System using a 20x objective and the EVOS® Onstage Incubator.

High-performance objective lenses

A high-quality objective lens is one of the most critical components of any cell imaging system, and to get the best results it needs to be matched to the type of imaging being done as well as to the type of sample and the vessel on which the sample is being imaged. More than 20 high-performance EVOS® objective lenses are available to attach to the EVOS® FL Auto Imaging System's 5-position automated objective turret. You can choose from plan achromat, plan fluorite, or plan apochromat lens construction, with individual lenses in a range of magnifications and optimized for phase-contrast imaging, oil immersion, or long or short working distances. Long working distance lenses are optimized for use through vessels with a nominal wall thickness of 0.9–1.5 mm (e.g., slides, flasks, and microtiter dishes), whereas short working distance lenses are "coverslip corrected" and optimized for use through #1.5 coverslips (approximately 0.17 mm thick). They have a higher magnification-to–numerical aperture (NA) ratio and provide higher resolution compared to long working distance lenses.

Integral color and monochrome cameras

Bright-field and fluorescence imaging place very different demands on imaging systems, so the EVOS® FL Auto Imaging System is equipped with two different, software-switchable cameras. The high-sensitivity CMOS color camera is well suited to bright-field and phase-contrast imaging, whereas the high-sensitivity interline CCD monochrome (grayscale) camera can be used for fluorescence or bright-field and phase-contrast imaging. The built-in software allows the display of grayscale images in user-defined pseudocolor when using the monochrome camera in fluorescence channels. However, although pseudocolors help differentiate the channels used in multichannel overlays, grayscale images usually show more detail.

Automated imaging is within your reach

Experience how simple automated imaging can be by requesting an in-lab demonstration of the EVOS® FL Auto Imaging System from one of our trained representatives. For more information, visit **lifetechnologies.com/evosflautobp69**. ■

Product	Quantity	Cat. No.
EVOS® FL Auto Imaging System	1 system	AMAFD1000
EVOS® Onstage Incubator	1 instrument	AMC1000

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