

First - Fast - Fluorescence

Leica MZ16 F and FA: The World's Most Advanced Fluorescence Stereomicroscopes

Ergonomic, TripleBeam[®] design, 16:1 zoom, 115× magnification, up to 840 lp/mm resolution, effective and time-saving analysis using the Leica System and Leica digital cameras and software

Leica
MICROSYSTEMS

How do genes work?

Light signals from inside the cell provide answers yet unknown

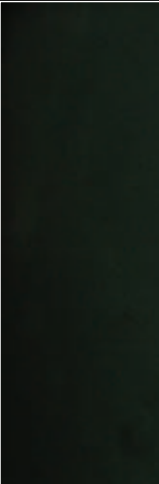
In today's basic research as well as in the biotechnology industry, model organisms are used that are similar to humans in many respects, but less complex. Mice, frogs, zebrafish, and fruit flies serve as representatives to investigate the developmental biology of humans and their illnesses in the form of a model. At the center of the interest are indicator areas such as heart/circulation, blood vessels, nerves, as well as bone and cartilage formation.

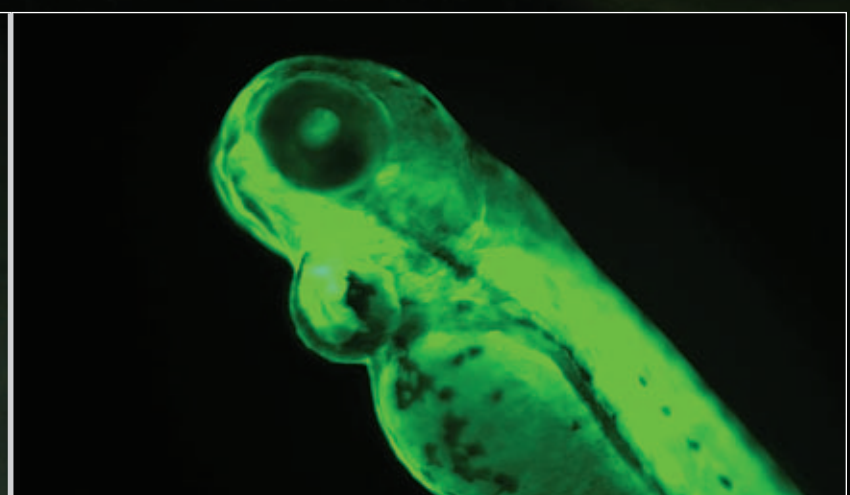
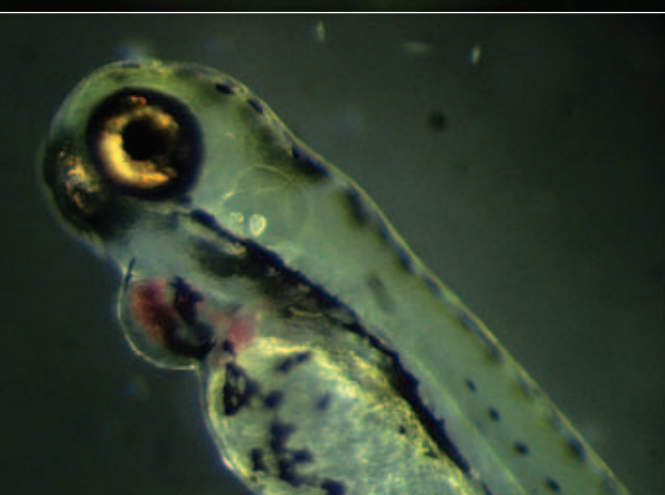
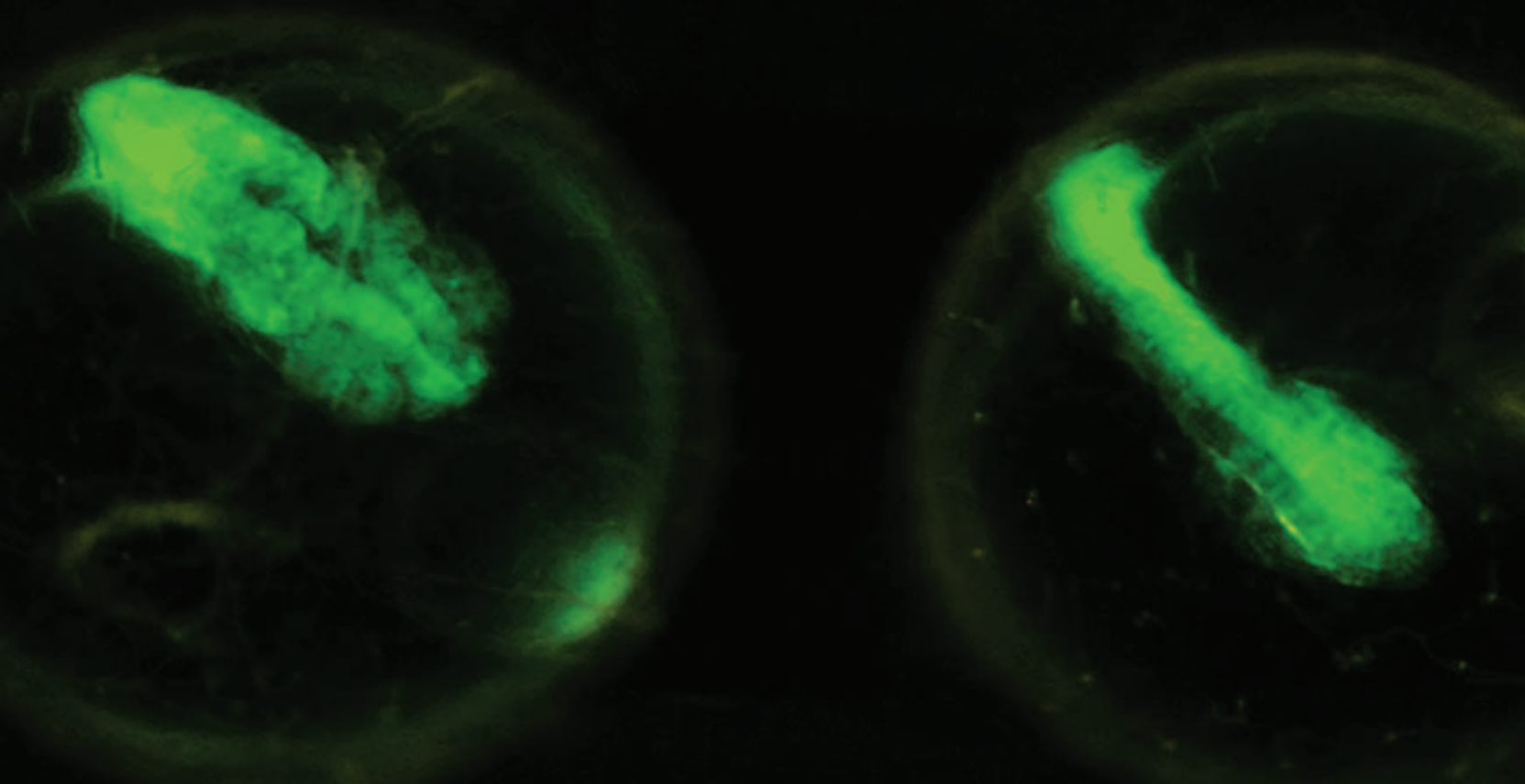
In research labs, millions of gene-treated model organisms are examined in different stages of their life cycle for mutated phenotypes. For this purpose, fluorescence microscopy has established itself as the most effective method for examining, identifying, sorting, screening and selecting. For all of these tasks, the new Leica MZ16 F and MZ16 FA from Leica Microsystems are the best fluorescence stereomicroscopes. Besides the largest zoom range and the highest resolution, the Leica MZ16 F and MZ16 FA are also the only fluorescence stereomicroscopes on the market with a fully apochromatically corrected optics system and patented TripleBeam® fluorescence technology. The customer benefit, user-friendliness and price-performance ratio are unbeatable.

With the Leica FluoCombi III™ accessories, the Leica MZ16 F is the ideal research instrument for all fluorescence-related tasks – from sorting and preparing to evaluating and screening of mutants.

Automatically faster

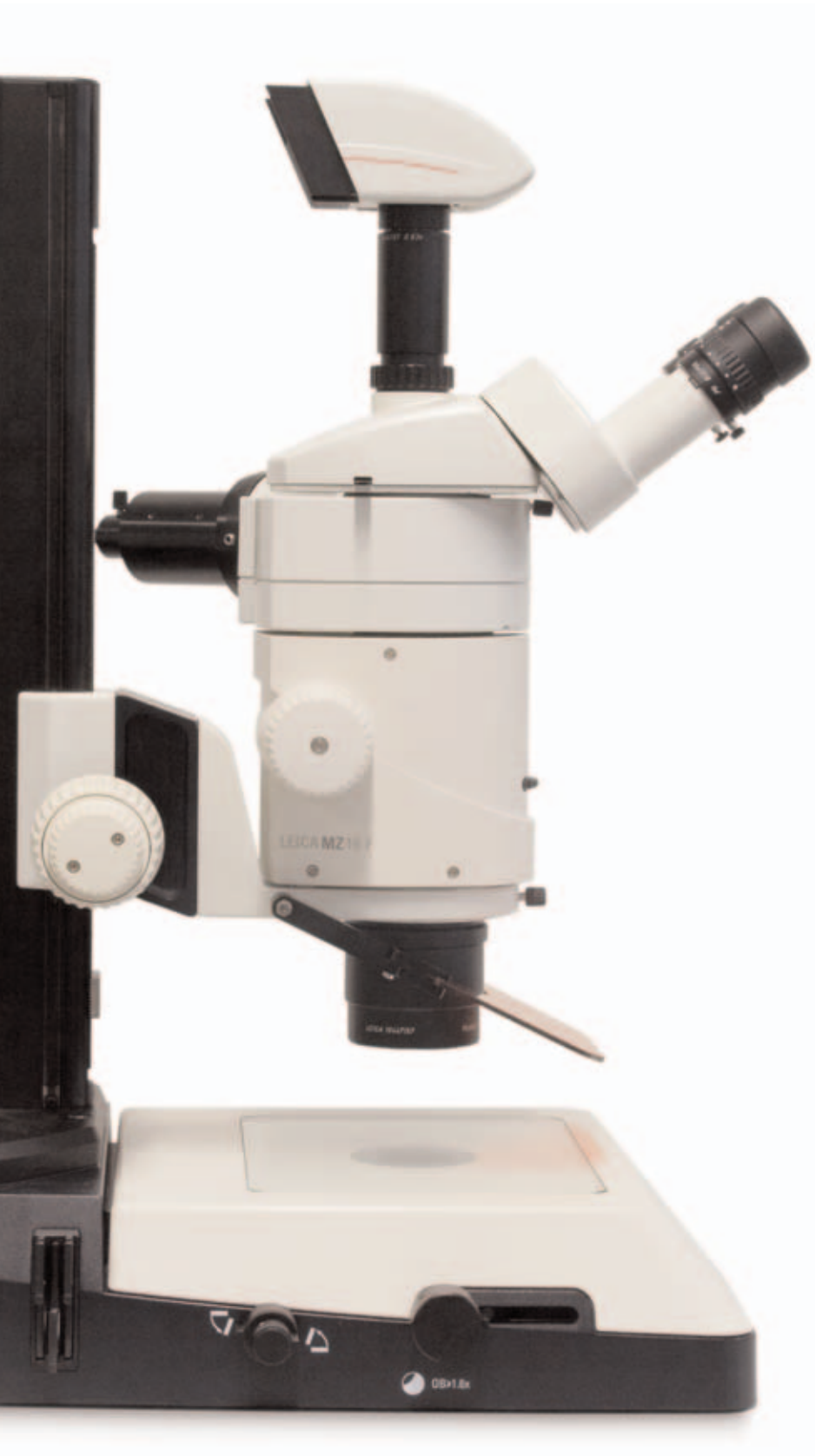
Long-term studies of living models are complex and extremely time-consuming. You can now reduce such an enormous time expenditure with the motorized and automated fluorescence stereomicroscope. Zoom, focus, filter changer, UV shutter and double iris diaphragm can all be manually controlled, ergonomically, in seconds. For repetitive working procedures, defined positions of zoom, focus, filter changer and double iris diaphragm can be saved and controlled, so that multi-fluorescence experiments, for example, can be reproduced very quickly and exactly. The Leica MZ16 FA automatically configures all settings at a single touch of a button, recognizes the filter type and controls the shutter for protection from UV light.





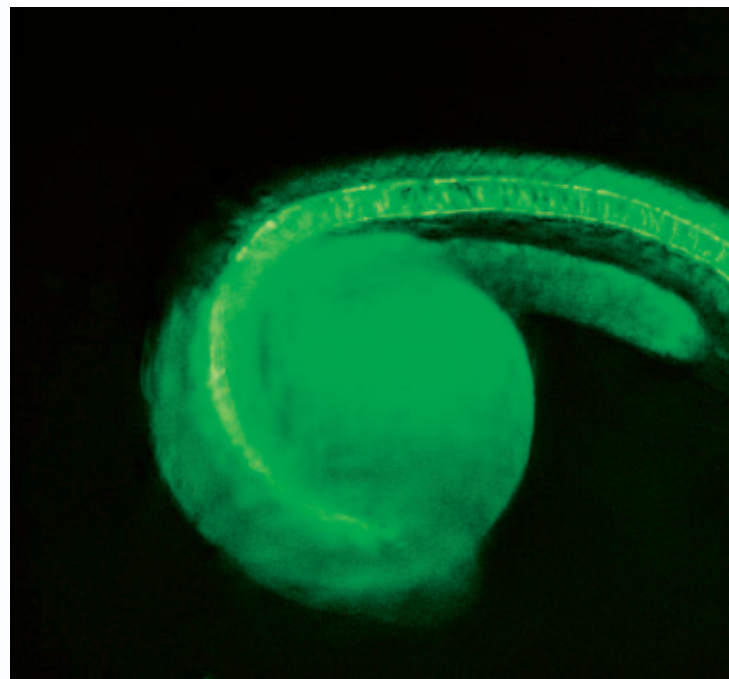
5 day old transgenic zebra fish larva. It expresses GFP (green fluorescent protein) controlled by a beta actin promoter that is active in all cells (right illustration). The same larva in transmitted light (left illustration). The black eyes, the ears with both otoliths and the labyrinth are perfectly visible. The heart (beating at the neck) is also perfectly visible and filled with red blood cells. Prof. Dr. Stephan C. F. Neuhauss, SNF Endowed Professor of Neuro Sciences at ETH Zurich and Institute for Brain Research at the University of Zurich.

"I am a molecular biologist and cancer researcher. We want to detect those genes that cause the major illnesses. In particular, we are interested in the genetic causes of the different forms of cancer, cases of cardiac arrest, diabetes mellitus and others. Accordingly, we hope to find completely new approaches for a new pharmaceutical development." André Rosenthal, cancer researcher, and his institute for molecular biotechnology in Jena are participating in the international Human Genome Project (HGP) with their research on chromosomes 7, 8, 11, 21 and X.



A zebrafish embryo (20 hours old) carrying a green fluorescent protein (GFP) gene under control of sonic hedgehog gene regulating sequences. GFP expression is detectable in the anterior floor plate and in the notochord.

Anterior to the left and dorsal up. Uwe Straehle, Forschungszentrum Karlsruhe, the Imaging Centre of IGBC and Cédric Vonesch EPFL Lausanne



You can be a live spectator when cells are working

In cell and molecular biology research, fluorescence microscopy is the method to make intercellular structures and their dynamics visible in vivo. If the cell features no autofluorescent cell components, various techniques, such as immunofluorescence or fluorochroming, are applied to render specifically selected components illuminating. An ideal fluorophor is the naturally fluorescent GFP gene which can be coupled to almost any chromosome as reporter gene or as marker. GFP fusions are procedures that are gentle on cells to trace gene activities in vivo. Upon excitation with light of a certain wavelength, the skeleton, core or any other desired cell component illuminates depending upon the marked protein. A safe evaluation of the markings that are often extremely fine and feature poor light requires the highest resolution and an extremely high intensity of the fluorescence signals.

100% apochromatic

Worldwide, optical systems from Leica Microsystems are synonymous with first-class image performance, brilliant image quality and high viewing comfort. In the Leica MZ16 F and MZ16 FA, the complete imaging system, including 16:1 zoom, objective and ErgoTube®, is apochromatically corrected using a high technological effort. Only a fully apochromatic optics system images fine structures clear in detail and without interfering colored edges. Contrast, richness in detail, resolution, image and color fidelity are optimum and expand the three-dimensional view of the inside of a cell. The planapochromatic top objectives support the high optical performance and light utilization.

Greatest zoom, highest resolution available

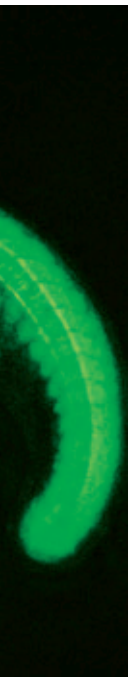
Leica MZ16 F and MZ16 FA are worldwide the fluorescence stereomicroscopes with the largest zoom range: In many cases, after sorting and processing the specimens, you no longer have to change to a light microscope to be able to precisely characterize details and reactions. This makes the work procedure significantly easier, and you save a lot of time: evaluate and manipulate the living specimens in their completeness first - three-dimensionally, with great depth of field, in large fields of view. Next, change to 115× magnification (with planapo 1× objective and 10× eyepieces) and analyze the finest fluorescence signals at a resolution of 420 pairs of lines/mm. The planapo objective 2× provides a 230× magnification, a resolution of 840 pairs of lines/mm, a visible structure width of 0.6 micron and a numeric aperture of 0.28.

Patented third beam path ensures intensive illumination

TripleBeam® is the patented third beam path in the Leica MZ16 F and Leica MZ16 FA. It is exclusively reserved for fluorescence illumination and guarantees maximum light utilization in each zoom setting and completely illuminated, uniform, reflex-free fields of view. This unique innovation from Leica Microsystems pays off with its intensely illuminated, detail-rich fluorescence images on jet-black backgrounds.

Image information in new dimensions

As the worldwide leading manufacturer of innovative precision instruments, Leica Microsystems has a clear goal in its sight: Making image information accessible with an imaging quality that goes beyond the ordinary. Since the typical model organisms are generally low in contrast, the structural portions are made visible only by using optics with special qualities. For this reason, the Leica MZ16 F and MZ16 FA are always equipped with planapochromatic objectives 1×, 2×, 1.6× or 0.63× and multiple-coated wide-field eyepieces 10×/21, 16×/14, 25×/9.5, 40×/6 for users wearing glasses. Soft clip-on eyecups protect glasses from scratches and prevent eye infections if several users work with the same instrument.



Leica MZ16 F

From stand to camera, the equipment of the Leica MZ16 F can be completely customized to match any required research, training and documentation task and ergonomically set up for any working situation. Particularly in this regard, the Leica MZ16 F is an investment that will pay off in the long run. Thanks to the modular design, the entire range of accessories of the Leica stereomicroscope series is available to you, such as ergonomic accessories, binocular and video/photo tubes, objectives, eyepieces, stands, illuminators, as well as video and digital cameras.

Taking humans as the standard

Users of the Leica MZ16 F benefit from the extraordinary range of observation tubes and ErgoModules®. Perfected for an ergonomic posture: The apochromatic ErgoTube® with continuously adjustable viewing angle from 10° to 50° and synchronous interpupillary distance adjustment from 55 to 75mm can be optimized with highest precision for any user. Persons of any size and stature can work with relaxed posture and head position – resulting in higher performance and productivity.

Interface for digital knowledge exchange

The new HD F and HD V video/photo tubes with sophisticated optics and design allow for a simple and quick trinocular setup of the camera (plug & play). The HD F features a fixed separation ratio of 50% in the binocular tube and 50% in the photo beam path. The observation and photo beam path of the HD V can be switched to three positions. This provides the perfect amount of illumination for any application. To go into more detail: Optionally 100% light for three-dimensional observation or 50% at all outputs or 100% light at the photo output and 100% light on the right visual beam path. A range of high-quality video objectives with different factorial magnifications and C-mount allow for selecting different image details.

Focusing without effort

Frequently repeated, subtle motor tasks like focussing place high demands on the musculoskeletal system. With the Leica motor focus system, any equipment can be moved up and down, weightless and precise – using manual control, a foot switch or a computer. For your experiments that use multifocus programs, you can save specific focal planes and access them quickly and accurately with just a push of a button.



Investment with a future

Constant warmth for living cells

Warmth is an important requirement for successful in vivo examinations of temperature-sensitive living cells. The Leica MATS (Microscope stage Automatic Thermocontrol System) Thermocontrol System with heatable stage made of optical glass ensures absolutely uniform temperatures over the entire stage surface, and reliably monitors and controls it. The temperature stability over a long span of time allows you to perform time-lapse experiments with precision, or to leave your work unattended for a while without worry.

High-performance TL RC™ transmitted-light stand for excellent contrast

When living cells have not been dyed, they are nearly transparent and impose the highest demands on the imaging performance of stereomicroscope and transmitted illumination. The high-performance TL RC™ transmitted-light base is the ideal supplement for the Leica MZ16 F to make these phase specimens visible with richness in contrast without artificial dyeing. The innovative Rottermann-Contrast™ is the new technology from Leica Microsystems for excellent display of transparent and semitransparent specimens in the positive, inverted and dynamic relief contrast. Illumination techniques in addition to the contrast method are also available. These include bright field transmitted light with a high or low degree of diffusion, oblique transmitted light and single-sided dark field (for detailed information about the new Leica stereomicroscope incident-light bases, refer to brochure M1-218-0).

Powerful solutions for fluorescence microscopy

The Leica EL6000 External Light Source is designed to provide precise control of fluorescence experiments and great ease of use.

- Long-life (+2000 h) metal halide lamp is a cost-effective and time-saving solution
- Homogenous fluorescence images are ensured since the lamp needs no alignment
- Easily attenuate the excitation light intensity via the integrated diaphragm
- The light source is placed away from the microscope so there is no heat transferred to the stand or stage



Leica MZ16 FA

Motorized, ergonomic, productive

Zoom, filter changer, UV shutter and double iris diaphragm can all be manually controlled ergonomically in seconds. You can comfortably and manually control all functions with fine, light finger motions, very quickly and exactly. At the touch of a button, zoom and focus drive up and down continually, or to individually saved positions; fine adjustments can be made with turn knobs. The filter changer rotates at the touch of a button, opens, closes the UV shutter and changes the aperture of the double iris diaphragm. You can save the settings using the hardware driver integrated into the Leica MZ16 FA and retrieve them at the touch of a button (see below).

Trials, time and costs minimized

Supposing you want to sort your object in the overview at low magnification first in bright-field transmitted light, and then observe it under fluorescence. Afterwards, you want to evaluate details at high magnification and with various fluorescence filters. Save the desired positions of zoom, focus, filter changer and double-iris diaphragm for each procedure, 5 altogether. Then a single press of a button at the beginning of an experiment suffices to set zoom, focus filter changer and double-iris diaphragm to the stored positions.

Motorized filter changer

The patented FLUOIII® filter changer holds four filter combinations (exciting and barrier filter on one filter holder) and is controlled by a hand switch. At the touch of a button, the desired filter holder drives exactly into position at high speed. During this process, a shutter automatically closes the illumination beam path to preserve sensitive specimens and protect users from UV radiation.

Automatic filter detection

A transponder is located on the fluorescence filters with the specific filter data. The Leica MZ16 FA system immediately recognizes when a fluorescence filter is in position and opens the UV shutter. If you want to interrupt work, you can close the UV shutter at the touch of a button. This protects sensitive specimens from being burned or bleached, without having to switch off the mercury burner lamp. Frequently switching the mercury lamp on and off decreases its life and causes delays, as the lamp can only be lit after it has cooled off. If the system recognizes a filter holder without transponder, the shutter remains closed. This filter holder has two empty openings for the observation beam paths, and is used if the user wants to switch to transmitted light or incident light observation without fluorescence, and in empty filter changer positions.



The world's best fluorescence stereomicroscope

Automatic measurement

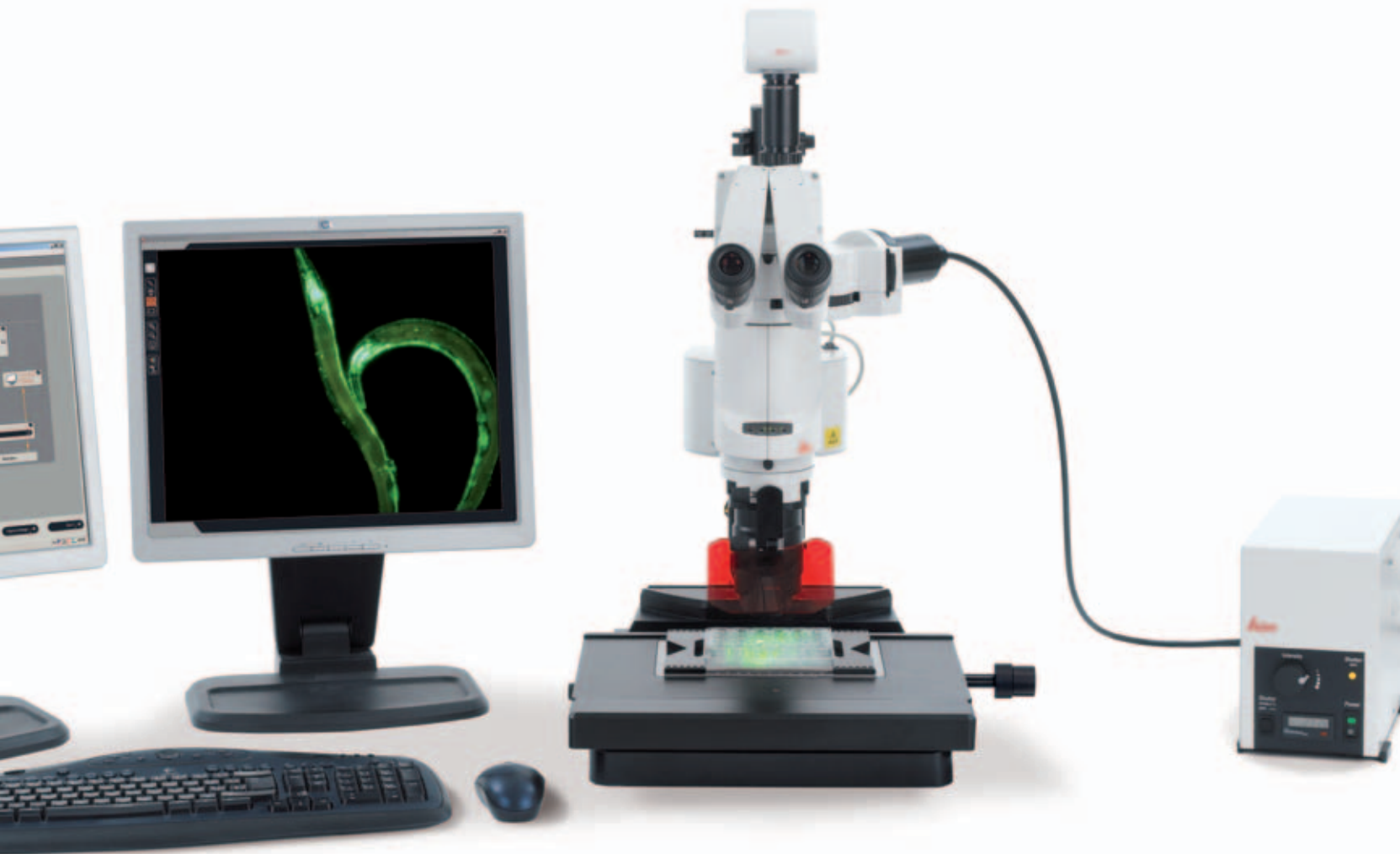
Adjust the magnification so that the desired line segment in the object corresponds to the reference distance in the eyepiece – the Leica MZ16 A immediately displays the measurement in mm, inches or thousandths of a millimeter. It is as easy as that.

Digital display

The Leica MZ16 FA is the first fluorescence stereomicroscope with a digital display. For every zoom change, you immediately see the current magnification, the field of vision diameter and the measurements with consideration of the factors for eyepiece and objective. Light-emitting diodes show the aperture setting of the motorized double iris diaphragm.

High-performance optics, camera and software – a perfect system

The frequently low light intensities for fluorescence imaging impose the highest demands on the digital camera and its control programs. Using the digital high-performance FireWire camera systems for scientific microphotography allows for creating perfect image data – even of weak fluorescent and living objects. Numerous easy-to-use image capturing and processing functions, as well as integration into common Windows-compatible programs (MS Office, Photoshop, etc.) allow for diverse applications using the convenient TWAIN interface.



Specialists for digital



New applications in biology, medicine and industry and the rapidly growing need for qualified knowledge require digital cameras with ever higher resolution that are faster and more convenient than ever, as well as comprehensive image processing software. The new Leica MZ16 F and MZ16 FA fluorescence stereomicroscopes fulfill the highest requirements for advanced analyses, scientific publications, international exchange of information, and presentations at universities, colleges and conventions.

From the stereomicroscope to the digital camera including application software, Leica Microsystems offers you customized, future-oriented complete solutions for professional image acquisition, archiving, analysis, processing, presentation or printout. Our program features a series of professional high-end cameras for PC and Mac as well as image management and analysis software developed specifically for your fluorescence applications.

Digital FireWire color camera system Leica DFC340 FX

The Leica DFC340 FX is a highly sensitive, monochrome camera that is particularly suitable for routine fluorescence photography. The active-cooled CCD sensor provides a maximum resolution of 2 megapixels and features exceptionally fast live preview images.

Leica DFC350 FX and DFC300 FX FireWire digital camera systems

The DFC350 FX (monochrome) and DFC300 FX (color camera) were developed specifically for image capture procedures under low light intensities. The highly sensitive 2/3" progressive scan interline sensor allows fast-bleaching fluorescence specimens and sensitive living cells to be displayed or stored quickly. Resolution: 1.4 Mpixel.

Digital 12 megapixel high-performance FireWire camera system Leica DFC500

The Leica DFC500 is the professional camera of the superlative for analyses, measurements and processing of high-quality image data. The Leica DFC500 allows for unlimited use for all contrasting, bright light and dark light procedures and particularly for extremely low-light specimens and weak fluorescence. Resolution: 1.4 to 12 megapixels.





image processing

Leica Application Suite, the new, powerful software concept

LAS is the new Leica interface that provides the operating environment for motorized stereomicroscopes, digital cameras, motorized focusing drives and external light sources (CLS 150XD, CLS150 LS, KL 2005LCD, EL6000) from Leica. LAS optimizes the capture, analysis and editing of digital images in the biosciences, clinical and industrial sector.

Thanks to its modular concept, the functionality of LAS ranges from simple, interactive image measurements to automatic measurements of a multitude of features based on several parameters. Thanks to its user interface – which has been awarded a design prize – the LAS is particularly easy to learn and use.

The suite is supplied with all motorized components and includes such core functions as the control system of the stereomicroscope and a Leica DFC camera as well as image display and basic image editing. Add-on modules such as image superimposition, multifocus and measuring must be licensed separately.

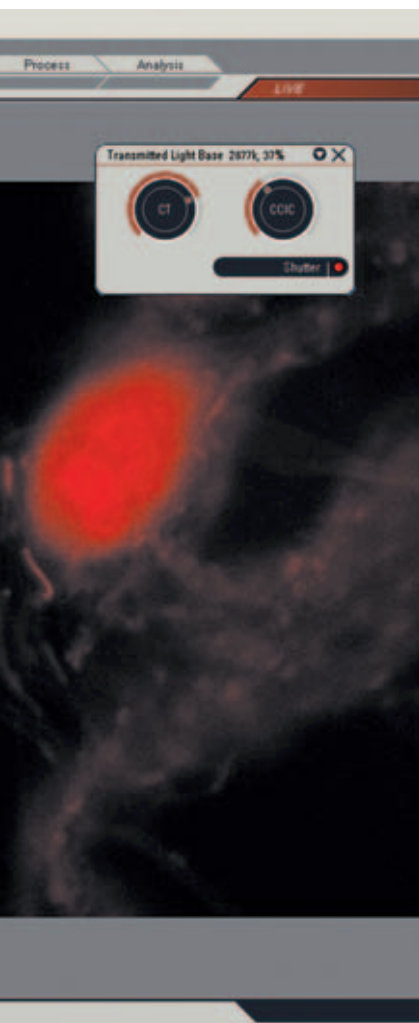
Leica AF6000 – A Complete Application Suite

Developed in consultation with leading laboratories, the Leica AF6000 offers true flexibility of configuration and high ergonomics. Highly integrated control of the Leica microscope range is included in the core application. Optimal Leica digital camera systems have been selected for monochrome imaging with the Leica DFC350 FX for dedicated acquisition at high speed and low light levels. The Leica AF6000 meets the requirements across all fluorescence applications, from multi channel imaging, to time lapse and z-stacking. A wealth of features are included as standard for image documentation, quantification, enhancement and analysis.

Leica IM1000 Image Manager

Leica IM1000 is a modular software package for image acquisition, processing, measurement and output as well as for exchange and storage of data. The clearly arranged, user-configurable archive structure allows the entire work flow of a lab to be mapped in the system.

Leica IM1000 offers a wide range of application modules, such as measuring, multifocus, image correlation, time lapse, image superimposition, presentation, and much more. Thanks to its modular concept, the Leica IM1000 can be tailored to tasks and budgets.



Leica Microsystems – the brand for outstanding products

Leica Microsystems' mission is to be the world's first-choice provider of innovative solutions to our customers' needs for vision, measurement and analysis of microstructures.

Leica, the leading brand for microscopes and scientific instruments, developed from five brand names, all with a long tradition: Wild, Leitz, Reichert, Jung and Cambridge Instruments. Yet Leica symbolizes innovation as well as tradition.

Leica Microsystems – an international company with a strong network of customer services

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and representatives of Leica Microsystems
in more than 100 countries.

In accordance with the ISO 9001 certificate, Leica Microsystems (Switzerland) Ltd, Business Unit Stereo & Macroscopic Systems has at its disposal a management system that meets the requirements of the international standard for quality management. In addition, production meets the requirements of the international standard ISO 14001 for environmental management.

The companies of the Leica Microsystems Group operate internationally in three business segments, where we rank with the market leaders.

• Microscopy Systems

Our expertise in microscopy is the basis for all our solutions for visualization, measurement and analysis of microstructures in life sciences and industry. With confocal laser technology and image analysis systems, we provide three-dimensional viewing facilities and offer new solutions for cytogenetics, pathology and materials sciences.

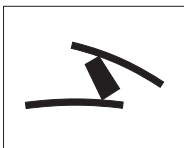
• Specimen Preparation

We provide comprehensive systems and services for clinical histo- and cytopathology applications, biomedical research and industrial quality assurance. Our product range includes instruments, systems and consumables for tissue infiltration and embedding, microtomes and cryostats as well as automated stainers and coverslippers.

• Medical Equipment

Innovative technologies in our surgical microscopes offer new therapeutic approaches in microsurgery.

Winner 2005



Innovationspreis
der deutschen Wirtschaft
The World's First Innovation Award

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