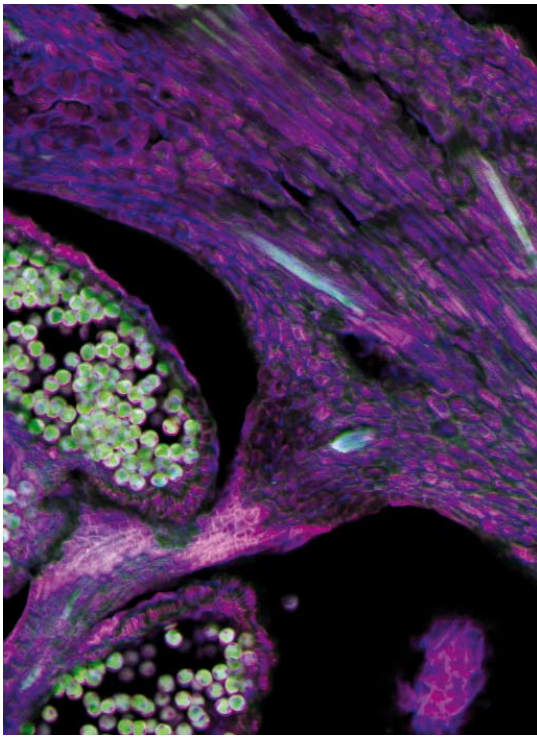
Simplifying Complex Microscopy

Increased Usability without Compromise

As microscopy systems become more advanced, they also often increase in complexity. As a result, the everyday researcher can become progressively more removed from the imaging process itself. Among such techniques are fluorescence wide field as well as confocal microscopy – both of which play a pivotal role in medical and biological research. In order to increase the usability of these systems and to bring microscopy back into the lab, Olympus has introduced its all-in-one microscopes for easy operation without compromising on image quality. With all necessary components contained within a "box", these microscopes are compact and movable as well as being suitable for use by researchers of all experience levels.



Ease of use

The Olympus all-in-one microscope range enables microscopy to occur at the point of discovery. With user-focused, one-touch functionality, these systems are suitable for beginners and experienced users alike. With simple operation, excellent ergonomics and intuitive software, well-defined images can be captured in just a few simple steps. Once the microscope is switched on, the user simply needs to open the cover, load the specimen and close the cover again. All further operation is performed via the interactive PC software. User-friendly navigation functions allow even a first time user to capture complex images with ease.

User-friendly software

Easy-to-follow instructions are clearly displayed on-screen, for effortless capture of high-quality images. The all-in-one microscopes have the ability to automate the complete set-up procedure in accordance with the fluorescence dye used to obtain the best possible image. This process is initiated via a single click of the mouse, and all settings can be manually fine-tuned, as required. A map of the specimen is generated automatically, which the user can scan to identify any point(s) of interest. Image capture subsequently occurs in a quick and easy manner, at the simple click of the mouse. Once the image has been obtained, the software facilitates various editing and analysis operations.

Image variation

As researchers often need to capture more than one image type, a variety can be produced with these systems, including: fluorescence, phase contrast, confocal and brightfield. The 'box' microscopes are also capable of capturing images in various modes, such as time-lapse, z-stack and stitching. Furthermore, fluorescent channels can be overlaid directly in live mode for high-resolution, real-time observations.

FSX100

The FSX100 enables users to obtain high-quality fluorescence images with ease. As a widely adopted technique, fluorescence illumination and observation is based on the ability of certain molecules to be labeled with specific fluorophores which absorb one wavelength of light and emit a longer wavelength. Fluorescence microscopes must therefore have the ability to accurately provide the excitatory light and image the emitted fluorescence signals. However, as fluorescence excitation light is very bright and potentially damaging to fluorescent molecules, this microscope automatically shutters it during periods of inactivity to minimize unnecessary exposure. Great image quality is produced as the entire system uses UIS2 optics. High NA objectives, suited for fluorescence imaging, are used to improve the sensitivity for low-light level specimens.

Once the region of interest is displayed on-screen, the user can make any addi-

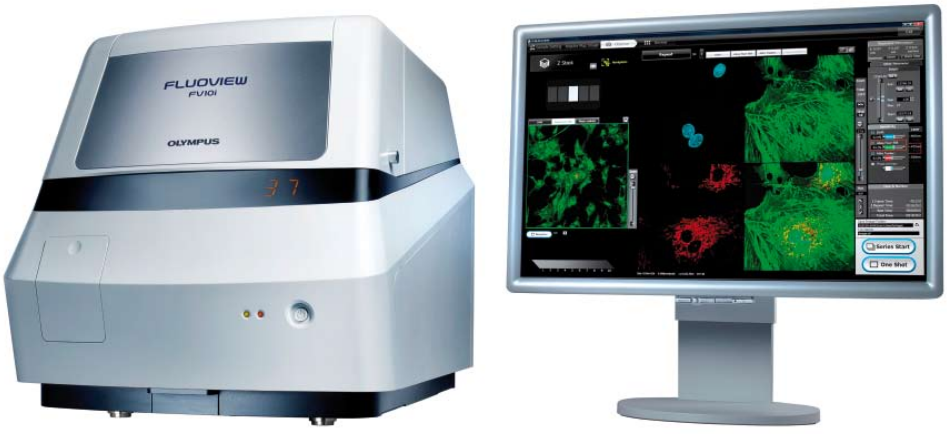
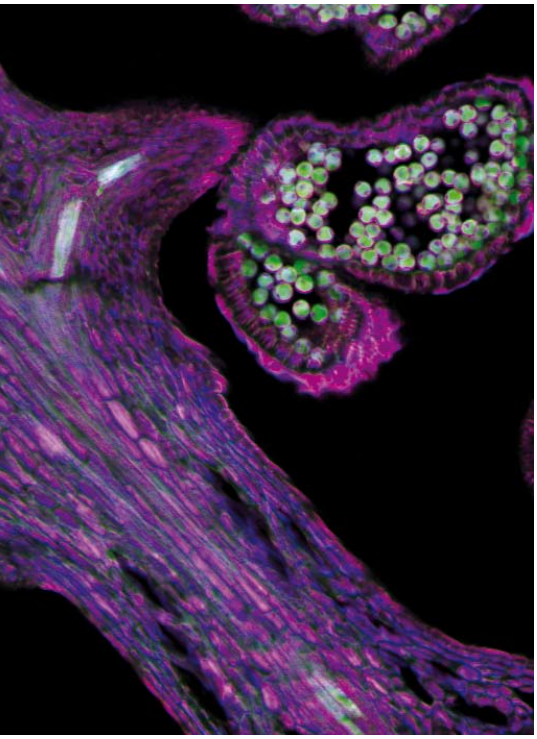


Fig. 1: Olympus FV10i: Confocal microscopy for users of all experience levels

tional adjustments to the auto-focus and magnification, as well as to compensate for cover glass thickness. The microscope can correct this difference and optimize image quality via a motorized correction ring on the objective. Functionality is increased with the ability to directly overlay images on the live image with just one click, enabling real-time comparisons. To further facilitate the high-quality image capture, users are able to easily remove blur and add emphasis to the edges of samples using the real-time noise reduction function and black-balance correction. What is more, its light-tight design eliminates the requirement for a darkened room, enabling imaging to occur in daylight at the lab bench.



With the ability to save and recall specific user settings and an innovative library management system, it is easy for all users to get to grips with.

FluoView FV10i

The FluoView FV10i is the world's first self-contained confocal laser scanning microscope (cLSM), making it an effective and user-friendly research tool. With the ability to control the motorized stage, removing any background fluorescence from the focal plane and collect serial optical sections from thick specimens, cLSM enables high-quality image capture for a number of applications within cell biology.

Designed with the ability to be installed anywhere and used by anyone, the complete automation effectively removes time consuming processes from the imaging procedure. With integrated optical and mechanical modules, it can capture images from 10x to 600x magnification using the 10x and 60x objectives in combination with the optical zoom. Furthermore, built-in vibration isolators enable installation directly on the lab bench. The laser scanning microscope is fully-equipped with four diode laser units and a unique two-channel detection unit, which automatically sets optimal conditions in accordance with the fluorescence channel used.

Overview images are automatically acquired via a click on the 'acquire map image' icon. From this 'map' image, the user can select areas of interest to scan and zoom in on. The image display can be switched for each fluorescence channel, and the system can overlay these with one another. With five different types of observation mode to choose from, sophisticated confocal images are easily obtained including, z-stack time-lapse, multi-area time-lapse and highly advanced multi-area z-stack time-lapse images. The control screen enables fine-tuning of the automatic configuration so that researchers can remain in control of all experimental conditions.

The light-tight system provides an ideal environment for a darkroom, and is available in a water-based model with integrated incubator for live cell time-lapse imaging, and in an oil-based model for extremely high resolution imaging of fixed samples. As such, the water immersion model is able to maintain cell samples at 37 °C, allowing users to perform time-lapse imaging over a number of days without the timely set-up of an external incubator. By removing the requirement for both an incubator and a darkroom, functionality and usability are both improved.

Conclusion

The all-in-one microscope range from Olympus enables any researcher within the laboratory to realize the extensive benefits of fluorescence and confocal microscopy. Complex microscopy is made accessible to a broader audience while maintaining excellent imaging results.

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Fig. 2: The FSX100 all-in-one fluorescence microscope for one-click imaging

Fig. 3: All-in-one: Olympus presents a completely new concept in microscopy.