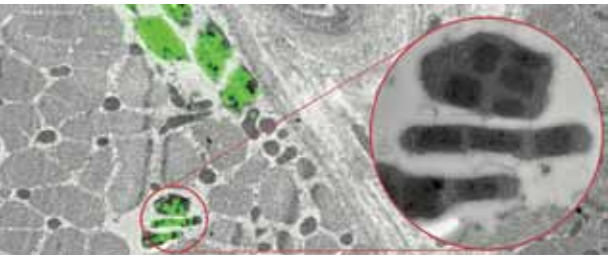
Product Flyer



Introducing the world's first commercially available integrated light and transmission electron microscope

Tecnai™ with iCorr™: a fast, accurate and automated solution for correlative light and electron microscopy.

Key Benefits

- Expedite correlated results; fully integrated platform removes the need to change instruments
- Eliminate sample handling; use the same instrument to conduct both LM (fluorescence) and EM imaging easily
- Locate precise regions of interest quickly and easily using the proven iCorr fluorescence solution and reveal ultra-structural details with powerful TEM resolution
- Correlate all regions of interest automatically to display both LM and EM data with precise context in minutes

Modern microscopy in the life sciences covers a large field of applications, with resolution requirements ranging from the nanoscale to the mesoscale. As biological processes are highly dynamic and complex, many events occur only in a sub-population of cells or scattered over tissues. In these instances, several imaging methods can be combined to create a more complete understanding of such systems.

Shedding Light on CLEM

Correlative microscopy methods use several microscopy techniques to observe the same sample, and **Correlative Light and Electron Microscopy (CLEM)** is by far the most widely applied and proven multimodal imaging method. Moreover, users can study dynamic events and the precise localization of fluorescently tagged proteins in cells and tissues using light microscopy while Electron Microscopy (EM) can resolve fine, ultra-structural details at the nanometer scale and provide such context to labeled structures. The great advantage of CLEM is that it combines high-level and ultra-structure details.

Taking CLEM a Step Further with FEI's iCorr technology

FEI's Tecnai with iCorr is the first **integrated light and electron microscope** that combines a fluorescence light microscope and electron microscope into a single, harmonized instrument, thereby enabling a faster more accurate approach to correlative microscopy. iCorr is precisely designed to automate and accelerate CLEM experiments, resulting in light microscopy image stitches that cover a large sample area. Moreover, it automates image overlays that reveal ultra-structural detail at defined positions of interest.

Existing Tecnai Platforms

FEI's new iCorr solution is easily added to existing Tecnai platforms as a simple upgrade. Current owners have the option to convert their systems to an integrated CLEM solution.

Multi-Modal Imaging

Tecnai with iCorr consists of a fully integrated, LED-based widefield fluorescence microscope (FM) controlled by powerful correlative software. This module is located at the standard sample position on the Tecnai transmission electron microscope (TEM) column. Imaging in FM and TEM modes is done sequentially, without exchanging the sample manually between modes. Using the common EM specimen stage and holder, the sample is tilted to 90˚ to record LM images in reflection and fluorescence modes, and then tilted to 0˚ for normal TEM imaging. Switching between these imaging modes is seamless and fast with the iCorr™ software.

Acquiring FM Images

After inserting the sample into the Tecnai TEM and tilting it 90˚ toward the iCorr light module, users can access the reflection mode to identify the sample's location on the EM grid. With iCorr software, image acquisition and stitching of a large part of the sample on the EM-grid in fluorescence mode are done within minutes. Since most samples are not flat, a typical LM image would be only partially in focus; thus, the software automatically collects a stack of LM images at different focus points and calculates a complete in-focus image (Figure 1) resulting in clear and accurate data.

Overlaying EM Images

The fluorescence signal in an image identifies the positions where labeled molecules or structures of interest are located. These positions of interest can be noted and stored at the click of a mouse using the iCorr software. Then, using a shared coordinate system, these positions of interest are automatically located and imaged in TEM mode to gather ultra-structural detail with a single mouse click. These TEM images are automatically superimposed on the LM grid overview (Figure 2A) with precise accuracy, delivering fast, high quality correlated results.

Obtaining High-Resolution EM Images

The items captured by fluorescence signal that are chosen as areas of interest undergo a detailed investigation using the high resolution imaging in EM mode (Figure 2B). Finally, these sub-cellular details bring about full context and reveal critical information that leads to better research discoveries and more precise answers.

Acknowledgment

We thank Matthia Karreman and Elly van Donselaar (Utrecht University) for collaborating and providing samples for this work.

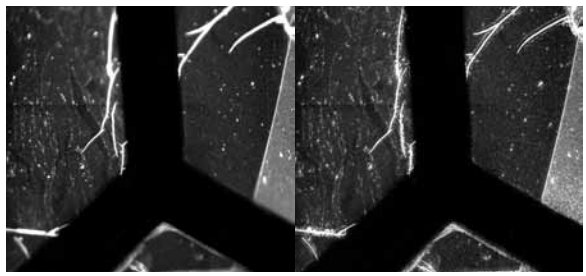


Figure 1: (left) Single fluorescence image of a section on an EM grid, which displays variations of focus. (right) Reconstructed focal stack, showing one complete in-focus image.

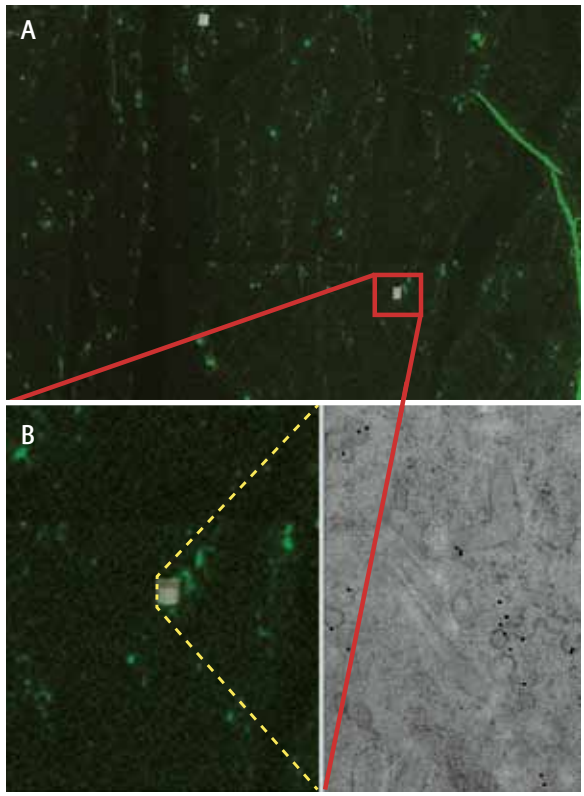


Figure 2: Three images of the same CLEM experiment on the Tecnai with iCorr. **A)** By zooming in and out, the fluorescence overview of the sample is easily visible. **B**) Shows a correlated high resolution electron microscopy image which reveals ultra-structural information of one of the areas of interest.

World Headquarters
Phone: +1.503.726.7500

FEI Europe
Phone: +31.40.23.56000

FEI Japan
Phone: +81.3.3740.0970

FEI Asia
Phone: +65.6272.0050

FEI Australia
Phone: +61.7.3512.9100

FL0011 07-2012

TÜV Certification for design, manufacture, installation and support of focused ion- and electron-beam microscopes for the Electronics, Life Sciences, Research and Natural Resources markets.