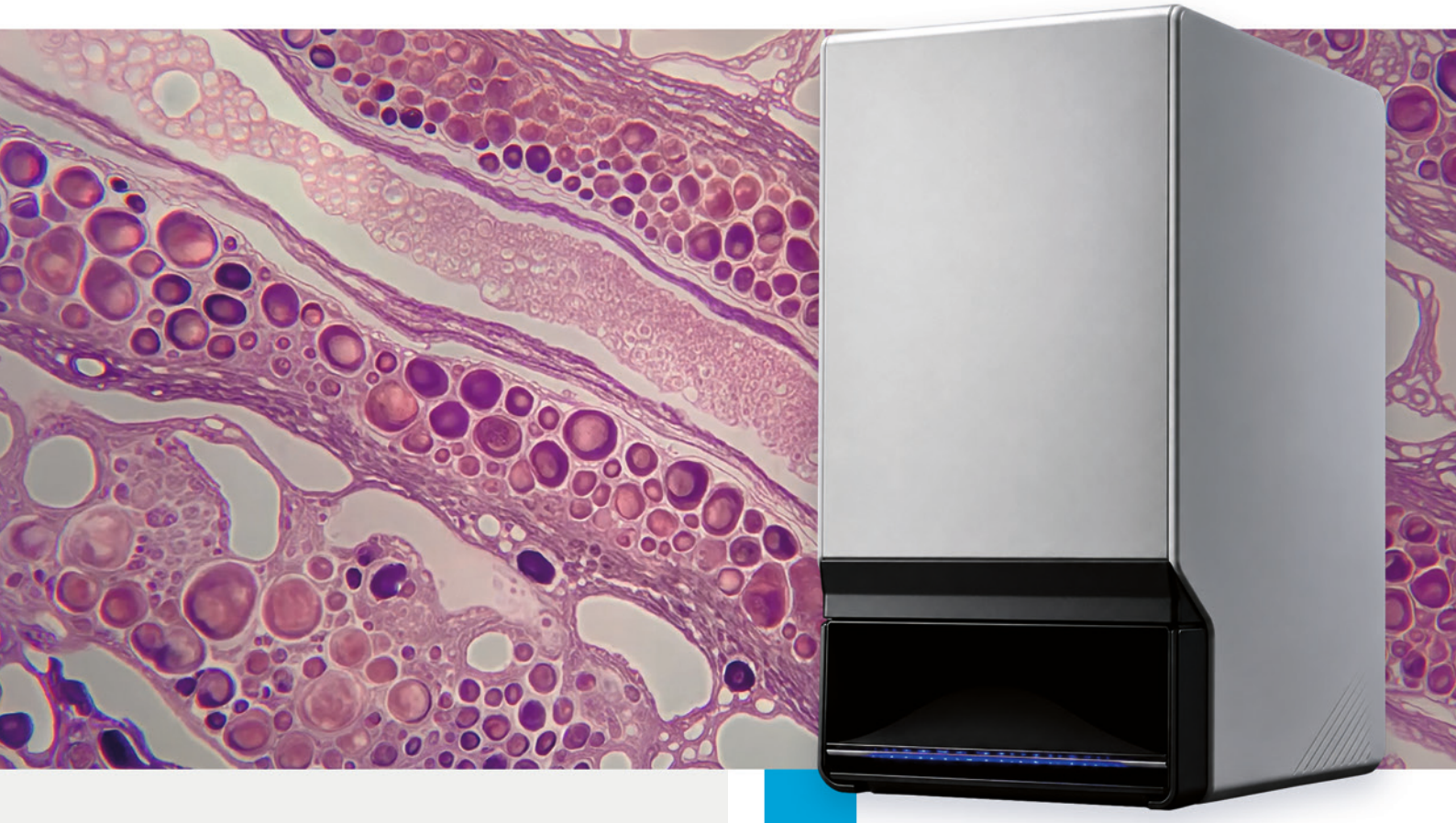
Microscopes



The challenge

Microscopy systems must meet increasingly complex requirements in modern life science research and education. Enabling high-quality 3D cell imaging is critical for assessing cell-to-cell interactions in advanced biological studies.

At the same time, systems must support a wide range of working distances to adapt to different microscope configurations. Compact system designs are essential to ensure compatibility with diverse academic and laboratory environments.

> *For example: in pathology and diagnostic microscopy as well as in high-content scanning microscopy, scanning multiple focal planes to analyze cell layers requires rapid z-stacking.*

Optotune's solution

Optotune's tunable lenses can be integrated into stereo and scientific microscopes, supporting various configurations and working distances. In scientific microscopes, they enable rapid focusing across multiple focal planes without mechanical movement, eliminating vibrations that reduce image quality. With focusing times below 10 milliseconds, liquid lenses support high-quality time-lapse imaging. Their compact design allows flexible integration into different parts of the microscope while minimizing space requirements.

In academic microscopes, liquid lenses in the eyepieces provide fast and comfortable vision correction for multiple users.

Advantages

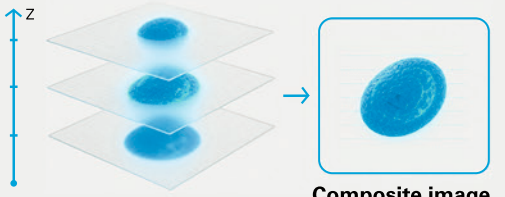
- **Fast focus adjustment:** ~10 ms
- **Large focus range:** 50-300 times DOF
- **High resolution / repeatability:** 1-7% / 10-50% of DOF
- **Form factor:** from 10.6 mm to 40 mm outer diameter

Optotune Switzerland AG info@optotune.com www.optotune.com +41 58 856 3000

Time-lapse live-cell systems

Fast, vibration-free 3D cell imaging

Live-cell imaging is essential for organoid imaging, drug discovery and personalized therapies including infertility. It requires z-stacking for 3D cell imaging. Vibration caused by motorized stages impacts the image quality. Liquid lenses remove this hurdle thanks to non-moving parts. The fast response time ~10 ms reduces the cytotoxicity of the illumination light and enables fast high-content screening.



Z-stack (focus planes)

Composite image
all z-planes combined

Cytology, pathology and diagnostics microscopy

Digital pathology requires fast autofocus and the acquisition of several slices. The fast response of liquid lenses enables high-throughput slide scanning, while their compact form factor and high reliability make them an ideal focusing solution for routine pathology diagnostics.

Customer success story

A handheld microscope manufacturer struggled to achieve the autofocus performance it needed due to hysteresis and image quality limitations of conventional liquid lens technology. By adopting Optotune's EL-3-10, it achieved the speed, precision, and optical performance required for its premium microscope portfolio.

3x

Throughput increase
settling time < 10 ms per plane for z-stacking

Reduced phototoxicity
short illumination time thanks to faster image acquisition

Scan for more info:

info@optotune.com www.optotune.com +41 58 856 3000