ImageXpress Micro XLS
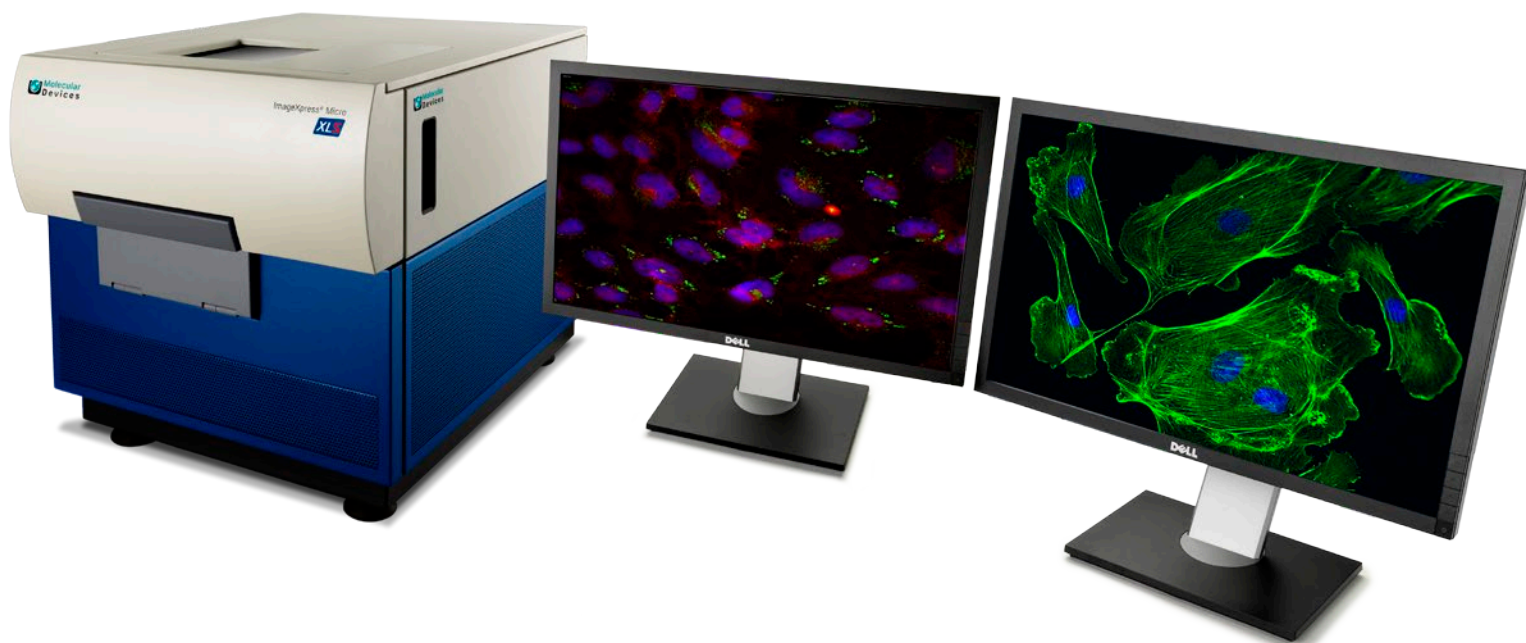# Widefield High Content Screening System

Imaging with a vision

Molecular Devices

The ImageXpress® Micro Widefield High Content Screening System is the ultimate combination of speed and flexibility in a turnkey solution to streamline the research and discovery workflow.

Built on over 25 years of cell-based imaging experience, the ImageXpress Micro System captures research-quality images with the widest range of objective lenses, enabling you to work at the resolution appropriate for your biology, including small organism, cellular or intracellular events. The system's robust design precisely locates and identifies sub-cellular features, over multi-day time-lapse experiments when required.

For researchers looking to push the boundaries of science, the XLS model of the ImageXpress Micro System leverages large field-of-view optics to map macro-structures with minimal tiling. In addition, querying of large cell populations is accelerated three fold, speeding up the characterization of highly heterogeneous samples or identification of rare sub-populations.

Combined with mature software, the custom designed ImageXpress Micro System provides a fast and robust platform to translate new discoveries into scientific breakthroughs.
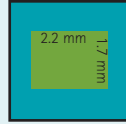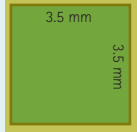
Key Features

- One system, unlimited configurations

- Accelerate screens to > 50,000 wells per day

- Expand assay window with 3-log dynamic range

- One 384-well, one image

- Reliable assays with < 5% CV of intensities across a plate

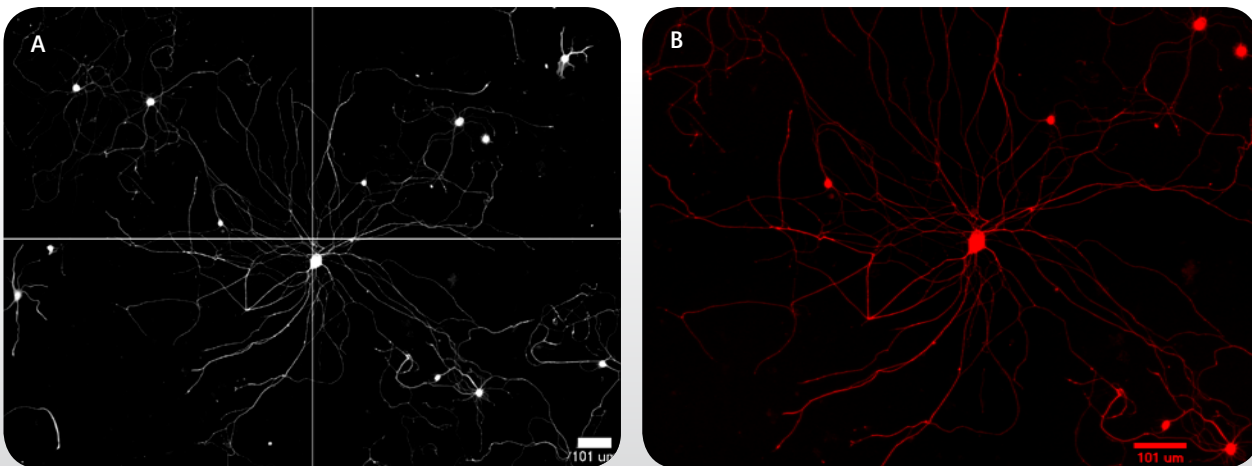- Complete solution for HCS with integrated software and database packages

The ImageXpress Micro System does not compromise your assay's throughput or quality. Offering more data points per image, the XLS model decreases your time to perform cellular- and high-resolution screens using a large field-of-view camera. Assay window and reliability are enhanced with 3-log dynamic range and < 5% CV for intensities across the plate, making certain your scientific breakthroughs are picture perfect for research publications. ImageXpress Micro Systems feature:

- Standard and XLS models*

- Adjustable field-of-view focuses on sample area most appropriate for your assay

- Widest selection (> 25) of objectives
  - 1x to 100x magnification
  - 0.05 to 0.95 numerical aperture (NA), air
  - Oil objectives with 1.4 NA available for research imaging

- Highly robust 100 nm resolution voice coil-driven X, Y, and Z stages enables:
  - Capture of intricate sub-cellular features across images
  - Monitoring of long structures (*e.g.* neurons) across high-resolution tiled or stitched images
  - Repeatability during multi-day time-lapse experiments

- High image flexibility score (IFS).
  Note: IFS = sensor size (4.66 megapixel) x magnification range (100) = 466

  * Upgrade is available from standard to XLS model

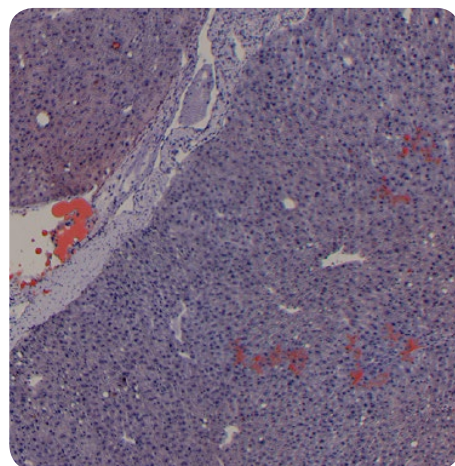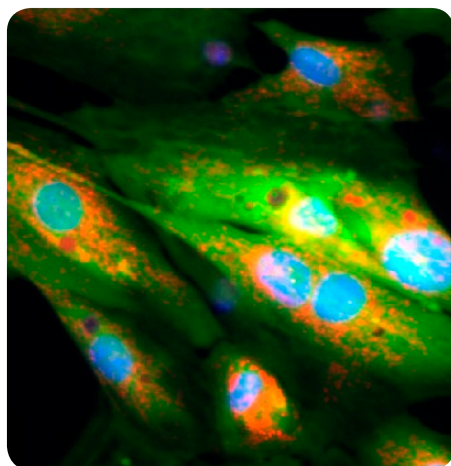|	Standard model	XLS model
Sensor	1.4 megapixel cooled CCD	4.66 megapixel scientific CMOS
Field–of–view (4x objective shown to scale on 384 well)	2.2 mm / 1.7 mm	3.5 mm / 3.5 mm
Default light source	300W xenon light source 340/380 nm (Fura-2) to > 650 nm	Solid state light source 380 nm (DAPI) to 650 nm (Cy5), > 10,000 hour life span. Other options available through customization.

Seamless tiling

Precise tiling of images possible with < 100 nm stage resolution. **A:** Image is a 2 x 2 array of images from a standard ImageXpress System. **B:** Image (red) shows neurite segmentation is not compromised when it spans multiple images.

End-to-end solution for high content imaging

- Extensive sample compatibility
  - Slides to plates
  - 6 to 1536 wells
  - Thin to thick plate bottoms
  - Glass to plastic
  - Transwell
  - Low- to high-profile
- A truly end-to-end solution for high content imaging
  - MetaXpress® Software Application Modules: turnkey solutions for your 100 most common analysis routines
  - MetaXpress Software Custom Modules: flexible toolbox for advanced assays
  - MetaXpress Software Journals: powerful macros to analyze unique applications

Fluorescent and brightfield imaging

Left: iCell cardiomyocytes stained with Hoechst for identifying nuclei (blue), MitoTracker Red for healthy mitochondria (red), and a live cell cytoplasmic reagent, Calcein AM (green). Image is taken with 40X plan fluor objective. **Right:** Slide mounted mouse liver tissue slice stained with Oil Red O (red) and hematoxylin and eosin (purple).
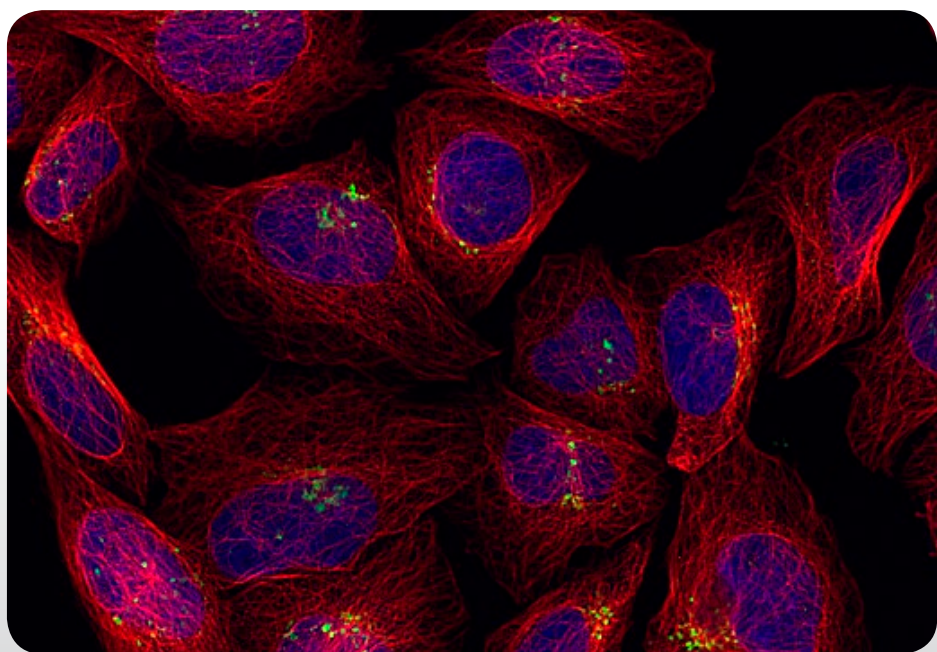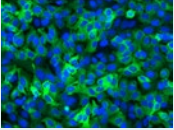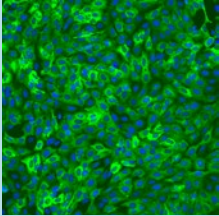
Digital confocal imaging

Image of U2OS cells stained for nuclei (blue), tubulin (red) and nuclei marker (green) was acquired using ImageXpress Micro System with digital confocal option.
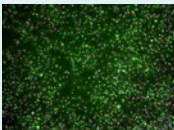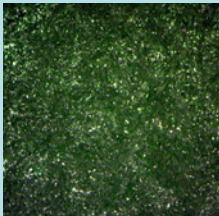
Excellent performance

Transfluor Assay
Settings: 20X Plan Apo, no binning, 2 colors, 384-well glass-bottomed plate

Model	Image	Field-of-view	Cells/field	Sites for 70% coverage of well	Assay quality
Standard		0.45 mm x 0.34 mm	200	50	Pits: Z' = 0.5 assay window = 3 Vesicles: Z' = 0.67 assay window = 11
XLS		0.7 mm x 0.7 mm	600	16	Pits: Z' = 0.64 assay window = 8 Vesicles: Z' = 0.69 assay window = 24

Cytotoxicity Assay
Settings: 4X Plan Apo, 2x binning, 3 colors, 384-well plastic-bottomed plate

Model	Image	Field-of-view	Cells/field	Sites for 70% coverage of well	Assay quality
Standard		2.2 mm x 1.7 mm	5,000	2	Cytoskeletal degradation: Z' = 0.71 assay window = 4.4
XLS		2.8 mm x 2.8 mm	> 10,000	1	Cytoskeletal degradation: Z' = 0.72 assay window = 4.3

- Low-resolution, whole-well, three-color cell scoring application
  - > 12 million cells/hour
  - > 35,000 wells/day
- High resolution two-color assay (*e.g.* Transfluor® Beta Arrestin Translocation Assay)
  - > 1.25 million cells/hour
  - > 50,000 wells/day
- Analysis scaling to be faster than acquisition

Unlimited hardware configurations

The open modular design of the ImageXpress Micro System allows for a variety of expansion options at the time of purchase or after market. Pick the right configuration and illumination module to suit your application needs. The system can also be integrated with a third-party plate loading robot or with other customized robotics solutions.

ImageXpress Micro XLS System with Transmitted Light Option installed.

ImageXpress Micro XLS System with Fluidics Option installed.

Option	Feature	Compatibility
Environmental Control	• Multi-day, live cell time-lapse imaging • Select appropriate atmospheric conditions (*e.g.* 5% or 10% CO_2) • Temperature to mimic physiological environment (30–40°C $\pm$ 0.5°C) • Control humidity and minimize evaporation (0.5 µL/well/hour for 96- or 384-well formats)	• Phase Contrast Transmitted Light • Fluidics

Phase Contrast Transmitted Light	• High contrast imaging where unstained cells are easily viewed or separated from background (4x–60x)
	  • Ideal for non-fluorescent histochemically stained samples
	• Nikon 100W Pillar Diascopic Illuminator with TE-C ELWD Condenser
	  • 0.3 NA with 65 mm WD and PhL, Ph1, and Ph2 selectable phase rings
	• Compare fluorophore-independent morphology visualization with fluorescent imaging overlay.
		• Environmental Control

Fluidics	• Single-channel pipettor • Dispense volumes from 3 µL to 200 µL ($\pm$1 µL $\pm$5%) • 96- or 384-well format FLIPR® System pipette tips • Holds two plates for compound addition or media exchange • Optional plate heating	• Environmental Control (required)

Note: all options, filters, and objectives are available at point of sale or as after market upgrades

Configuration tables shown in this brochure do not encompass all configurations available.

Technical specifications

- Fast laser autofocus
- 1x-100x Nikon objectives
- 4-position automated objective changer
- 5-position automated filter cube changer, configurable for specific fluorescent dyes and histochemical stains
- Fully automated X-Y sample stage and Z focus stage with resolution greater than 100 nm
- 20" H x 18" W x 27" D, 180 lbs. (not including options)

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