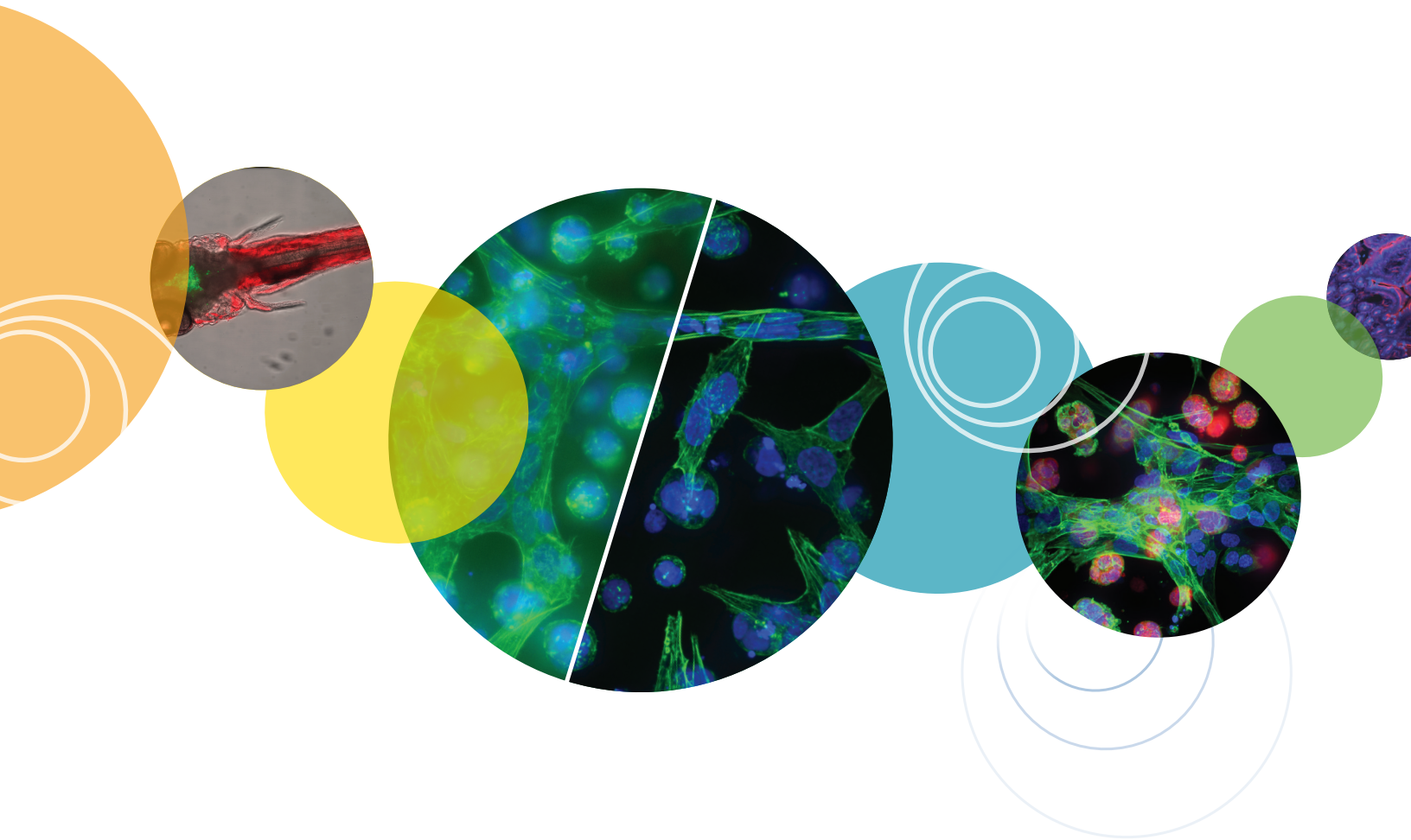


ImageXpress Micro Confocal High-Content Imaging System

The confocal solution for your complex biology

MOLECULAR DEVICES

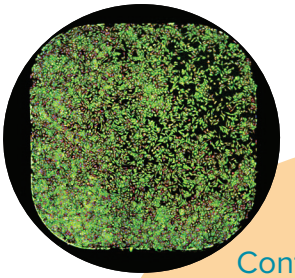
Deeper insight into complex biology

Higher quality images, faster throughput and more powerful analysis

The ImageXpress Micro Confocal High-Content Imaging System provides improved quantification for live or fixed cell assays. This versatile imaging system features a unique confocal technology which allows you to explore more physiologically relevant, complex three dimensional models including spheroids, tissues, and whole organisms and to generate publication quality images at high throughput for samples in slides or one to 1536-well microplates.

Key capabilities:

- Select a confocal geometry optimal for your assay and throughput needs
- Achieve excellent image quality without sacrificing throughput via our unique optical path technology
- Acquire statistically relevant data quickly with an advanced scientific CMOS detector, enabling >3 log dynamic range
- Large field of view enables whole-well imaging
- Expand your research capabilities with transmitted light, liquid handling, and environmental options

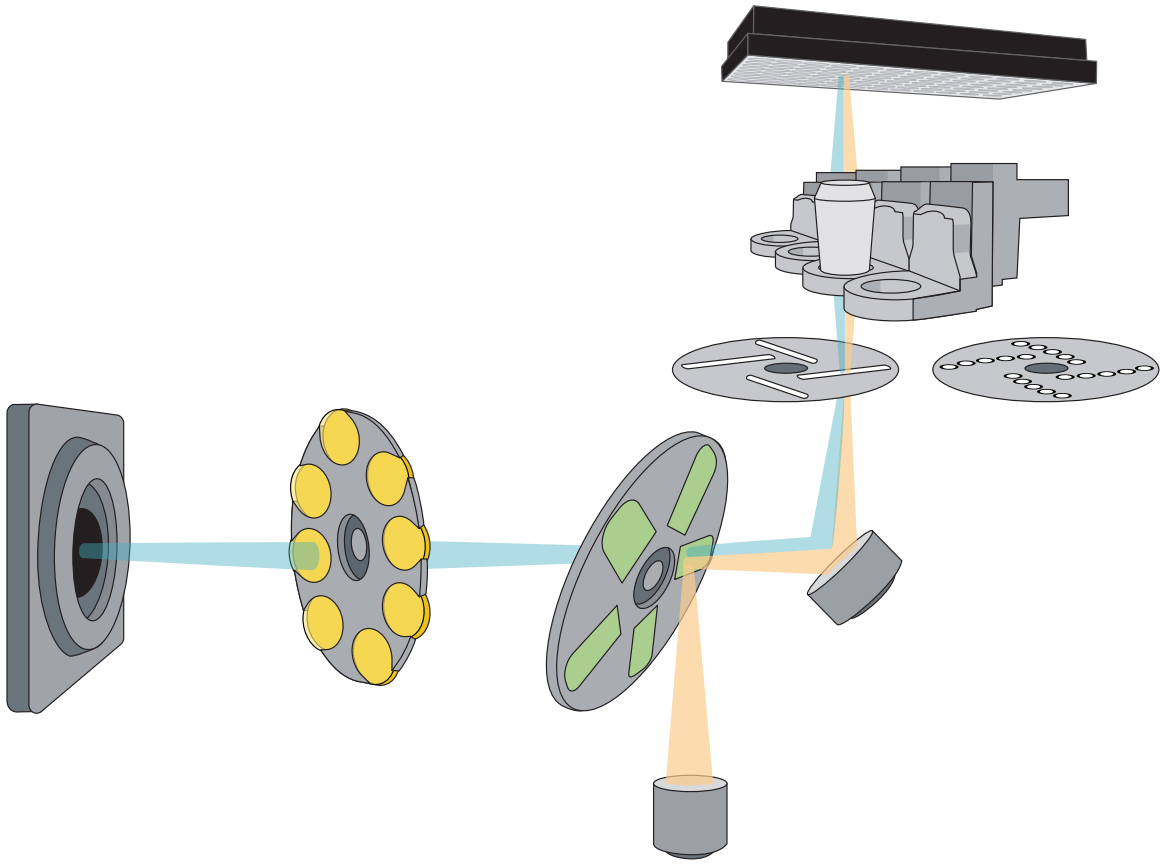


Confocal technology at the speed of widefield imaging

- Capture an entire well of a 384-well plate with a single image at 4X magnification
- Capture four wells of a 1536-well plate in a single image at 4X magnification
- Throughput of >160K wells/day confocal, >200K wells/day widefield

AgileOptix Technology at the heart of the ImageXpress Micro Confocal System

Software-selectable configurations right for your research



The ImageXpress Micro Confocal System features AgileOptix™ Spinning Disk Technology. Our optical options make it easy to select and configure your system to ensure the best read for your assay.

Select a spinning disk confocal geometry matched to your assay requirements.

	Spinning Disk Geometry		
	60 µm Pinhole (Single Disk)	60 µm Dual Disk with 50 µm Slit	60 µm Dual Disk with 42 µm Pinhole
High-sensitivity detection	●	●	●
Fast acquisition	●	●	●
>3 log dynamic range*	●	●	●
Widefield mode for flat biology	●	●	●
Most confocal applications	●	●	●
Highest resolution imaging			●
High throughput applications		●	

*Powered by our highly responsive sCMOS sensor and advanced solid state light source.

Supports subcellular assays through whole organism assays

- Widest selection (> 25) of objectives
- 1X to 100X magnification
- Oil objectives with up to 1.4 NA available
- Air objectives 0.05 to 0.95 NA

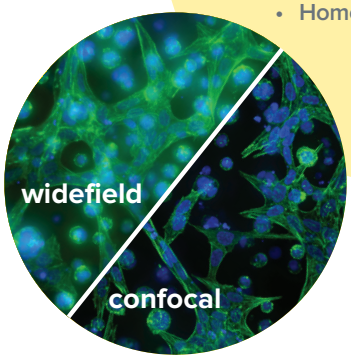
Expand your research into a new dimension

More relevant results with 3D assay models into complex biology

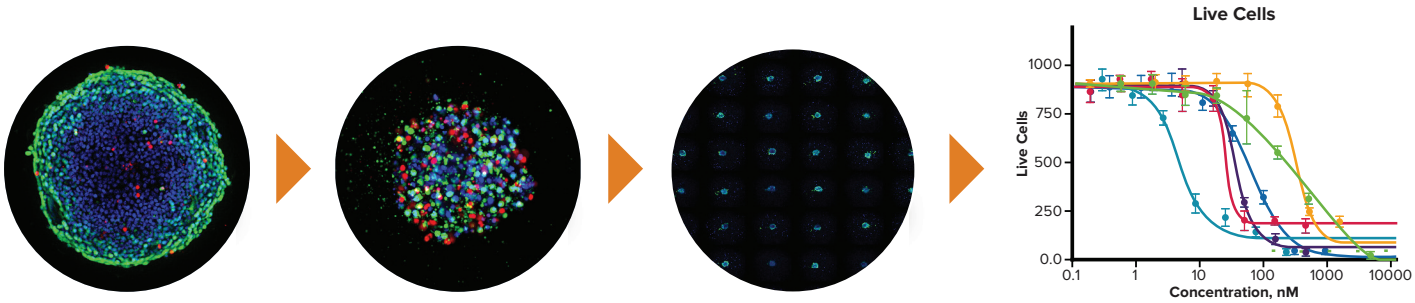
Complex, three-dimensional cellular models yield more predictive, physiologically relevant results versus monocultures or other two-dimensional cellular models. Explore the complexities of these models faster and gain better results even in samples grown in a thick extracellular matrices using the ImageXpress Micro Confocal. The imaging system provides flexible imaging options to meet your specific research needs, allowing you to easily capture images from different sample formats, including hanging drops and in round or flat bottom plates and monitoring cell health kinetics under environmental control for seconds, minutes, hours, or days.

Clearer images and improved quantitative screening for

- Spheroids
- Thick tissue samples
- Zebrafish and *C. elegans*
- Homogenous no-wash assays



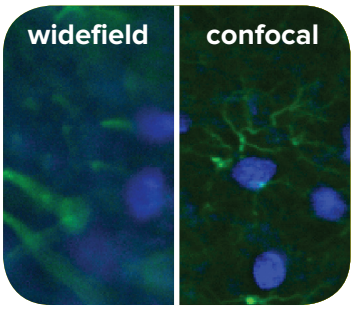
Cell stained for nuclei or actin growing in a 3D gel. Projection image of seven planes acquired with a 40X Plan Apo objective.

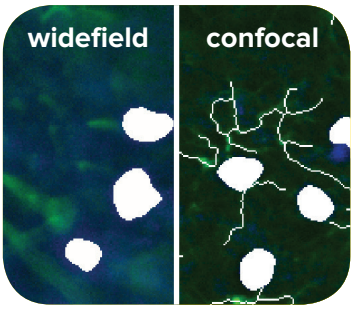


Spheroids in round bottom plates. Dose–dependent effects of selected compounds. Image montage of the 384 plate. Entire spheroid is captured with one image, example segmentation of spheroid and 4-parametric curve fits for the number of live cells in spheroids.

Improve visualization and quantitation with 3D assay models

Confocal capability improves image clarity and data quality



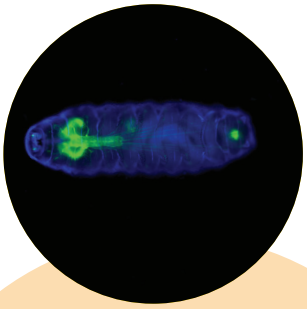


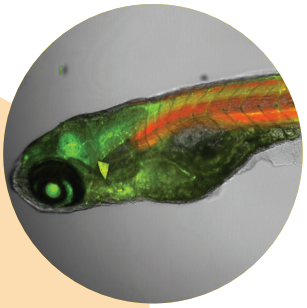
Rat brain section, stained for nuclei and neural outgrowths. Images taken with a 20X Plan Fluor ELWD objective, confocal with 60 µm pinhole. Left without segmentation and right with image segmentation with Neurite Outgrowth module.

Compared with widefield imaging, images of thick samples captured with confocal have reduced background and improved sharpness, resulting in improved image segmentation.

Enhanced imaging of tissues and 3D matrices

- Select specific cells of interest in 3D matrices such as neurons and stem cells
- Reject high-background fluorescence in thick tissue samples
- Acquire Z-stacks easily with 3D reconstruction capability





Clearer imaging of whole organisms

- Large field of view enables imaging of an entire well of a 384-well plate with a single image
- Organisms remain in focus for the duration of the experiment
- Perform sophisticated analysis of images and create time-lapse videos

A complete solution for screening your most complex biological questions

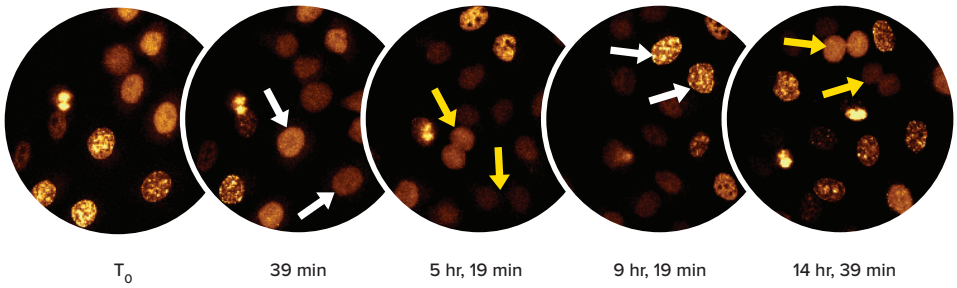
Delivers seamless workflows from image acquisition to data analysis

Enjoy the benefits of a streamlined high-content screening (HCS) workflow in a fully integrated environment with our complete imaging solution for your most complex biological questions.

Acquire

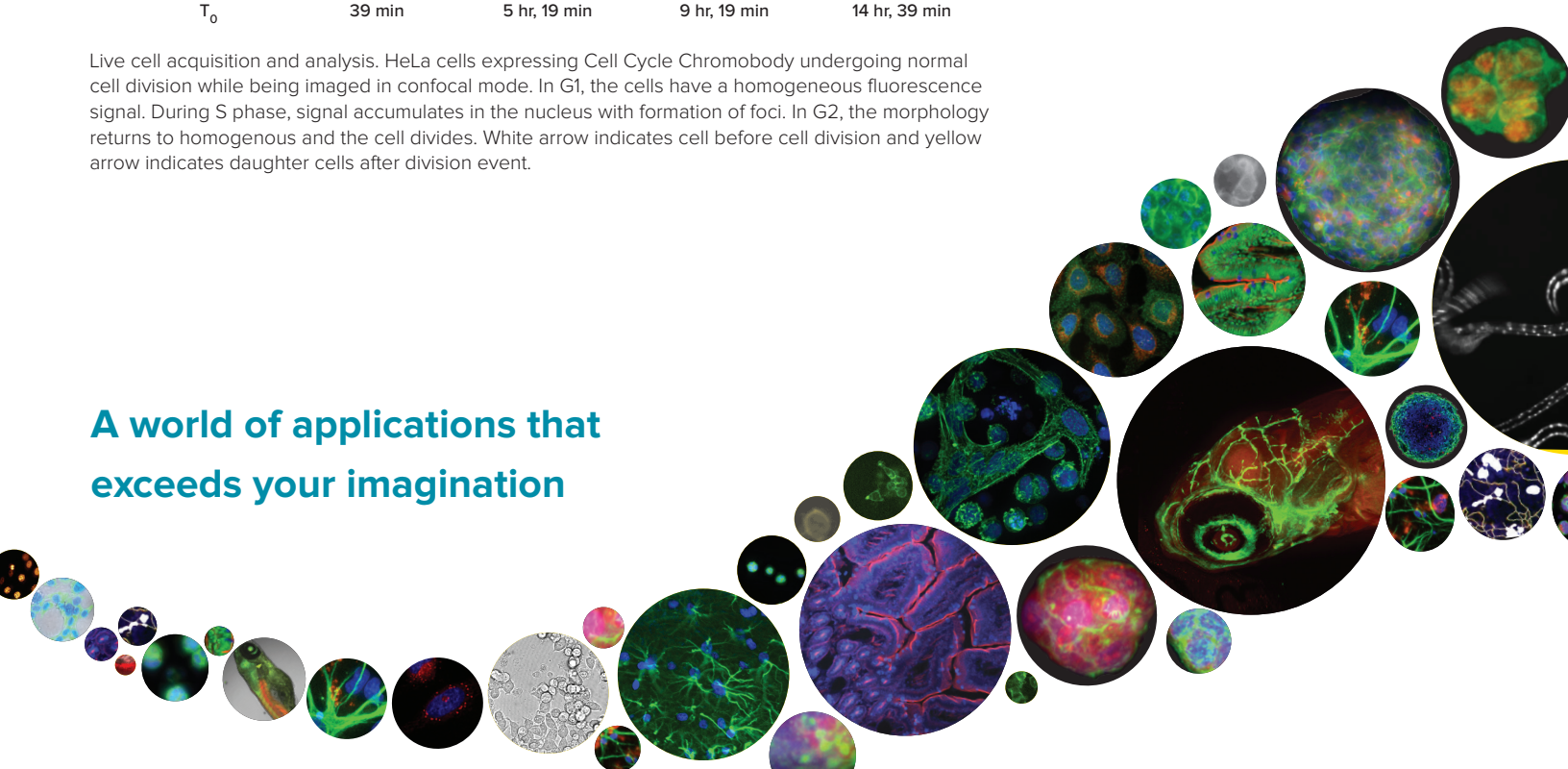
MetaXpress® Software powers our ImageXpress Micro Confocal system, giving you precise control over image acquisition and analysis, all within a unified interface.

- Acquisition wizard for the entire workflow avoids image import/export steps
- Laser-based and software configurable image-based auto-focusing system ensures robust focus across a range of sample types
- Acquisition of live cell images enables monitoring of cell growth, death, differentiation, and migration; viral or bacterial invasion, cancer metastasis, chemotaxis, drug toxicity, or translocation



Live cell acquisition and analysis. HeLa cells expressing Cell Cycle Chromobody undergoing normal cell division while being imaged in confocal mode. In G1, the cells have a homogeneous fluorescence signal. During S phase, signal accumulates in the nucleus with formation of foci. In G2, the morphology returns to homogenous and the cell divides. White arrow indicates cell before cell division and yellow arrow indicates daughter cells after division event.

A world of applications that exceeds your imagination



Analyze

Avoid delays in image analysis and data processing using our MetaXpress Software with application modules that allow you to quickly and easily analyze your data.

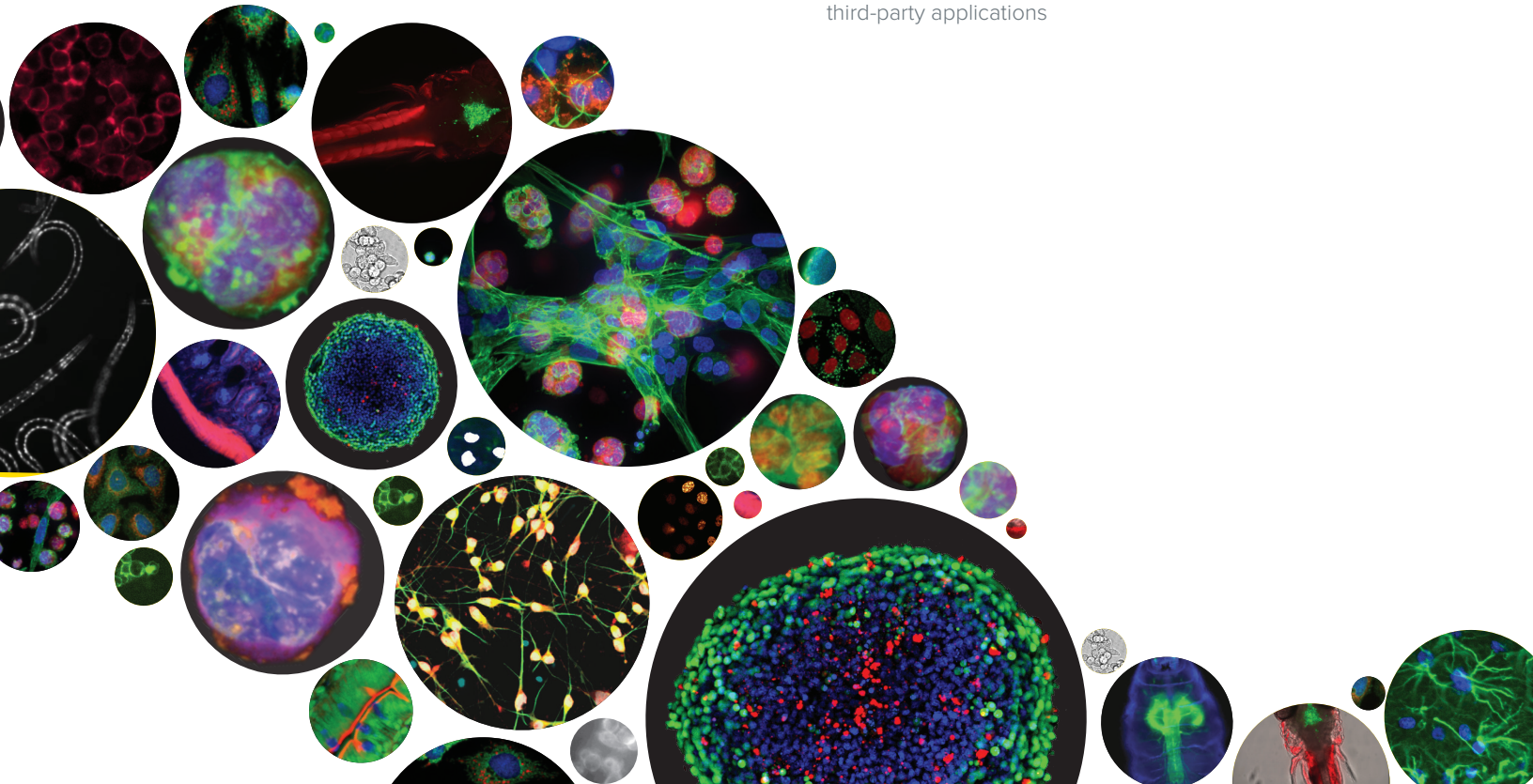
- Plug-and-play application modules can be adapted to hundreds of image-based analysis workflows
- Custom module editor empowers you to further tailor your image analysis routines for a perfect fit
- Adaptive Background Correction™ adjusts image segmentation to the local intensity ranges and features within and between cells for better quantitation
- 2D projection algorithms include best focus, maximum and minimum, and sum projection for easy interpretation of 3D image data
- Save as cell-by-cell and/or image-by-image data

AcuityXpress™ Informatics Software, data visualization, mining and hit selection are ready to use upon system installation.

Store

Regardless of the acquisition system used, images taken can be stored in the secure MDCStore™ Data Management Solution.

- Accessible for sophisticated analysis by the MetaXpress® High Content Image Acquisition and Analysis Software
- Data migration portal for integration with third-party imaging systems or analysis tools to external host databases or third-party applications



Specifications

System

- High-speed laser autofocus with integrated image autofocus option
- Linear encoded voice coil driven X, Y, and Z stages with < 100 nm resolution
- 4-position automated objective changer*
- 5-position software selectable dichroic filter wheel*
- 8-position software selectable emission filter wheel*
- Sample compatibility: slides and one to 1536-well microplates, round or flat bottom, low to high profile

AgileOptix Optical Path

- AgileOptix™ technology enables the ImageXpress Micro Confocal system to deliver the sensitivity and throughput needed for demanding applications by combining a powerful solid-state light engine, high-quantum efficiency 16-bit scientific CMOS sensor and selectable confocal geometries.
- Large field of view (1.96 mm^2 at 10X) imaging to maximize collection of publication quality images and statistically relevant data
- >3 log dynamic range in both widefield and confocal modes
- Confocal can be purchased in one of the following 3 configurations:
  - » Single-disk configuration with 60 µm confocal pinhole and widefield modes
  - » High-throughput dual disk configuration with 60 µm confocal pinhole, unique and exclusive 50 µm slit confocal and widefield modes
  - » High-resolution dual disk configuration with 60 µm and 42 µm confocal pinholes and widefield modes

*user changeable

Option	Feature
Environmental Control	• Multi-day, live cell time-lapse imaging • Provides appropriate atmospheric conditions (e.g. 5% or 10% CO_2) • Mimics physiological environment (30–40 °C ± 0.5 °C) • Controls humidity and minimizes evaporation (0.5 µL/well/hour for 96- or 384-well formats)
Phase Contrast	• 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 • Fluorophore-independent morphology visualization with fluorescent imaging overlay
Liquid Handling	• Single-channel pipettor • Dispense volumes from 3 µL to 200 µL (±1 µL; ±5%) • Compatible with 96- or 384-well format FLIPR System pipette tips • Holds two plates for compound addition or media exchange • Optional plate heating • Environmental control

Note: all options, filters, and objectives are available at point of sale or as after market upgrades. Configuration shown in this datasheet do not encompass all configurations available. Contact your sales and support team today to identify the system configuration most suitable for your applications.

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