

Cell analysis

Lightning-fast discoveries powered by high-content screening

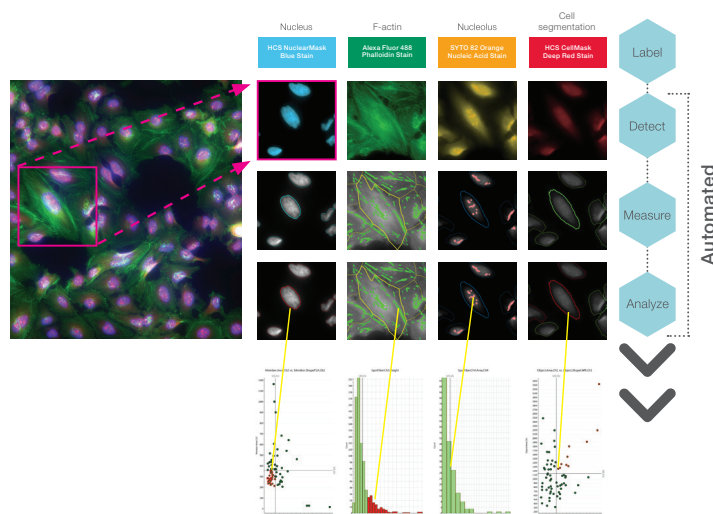
CellInsight CX5, CX7 Pro, and CX7 LZR Pro
High-Content Screening Platforms

Designed for the highest-quality analysis and fastest time-to-data possible

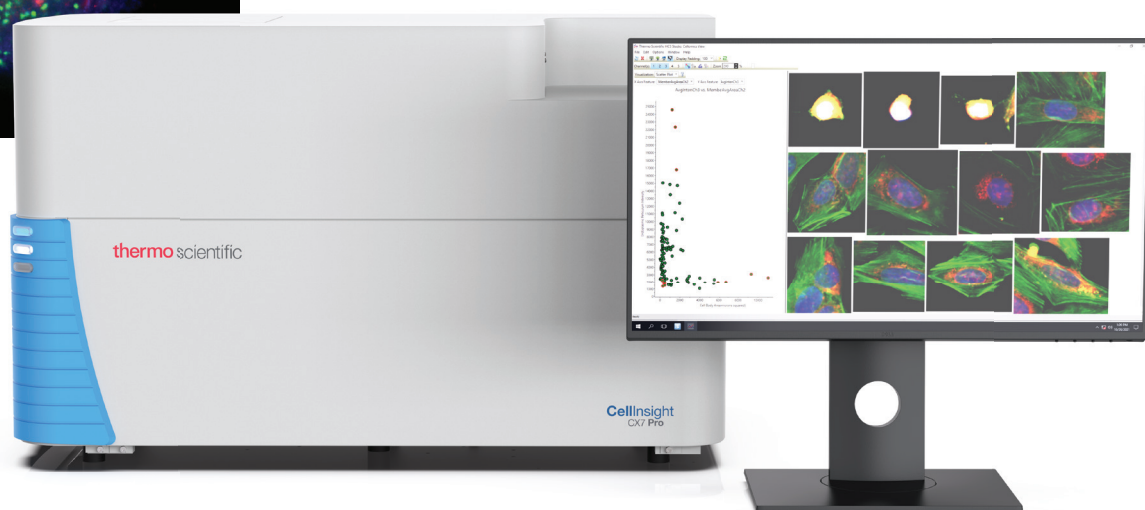
Accelerate HCS assay development and screening performance

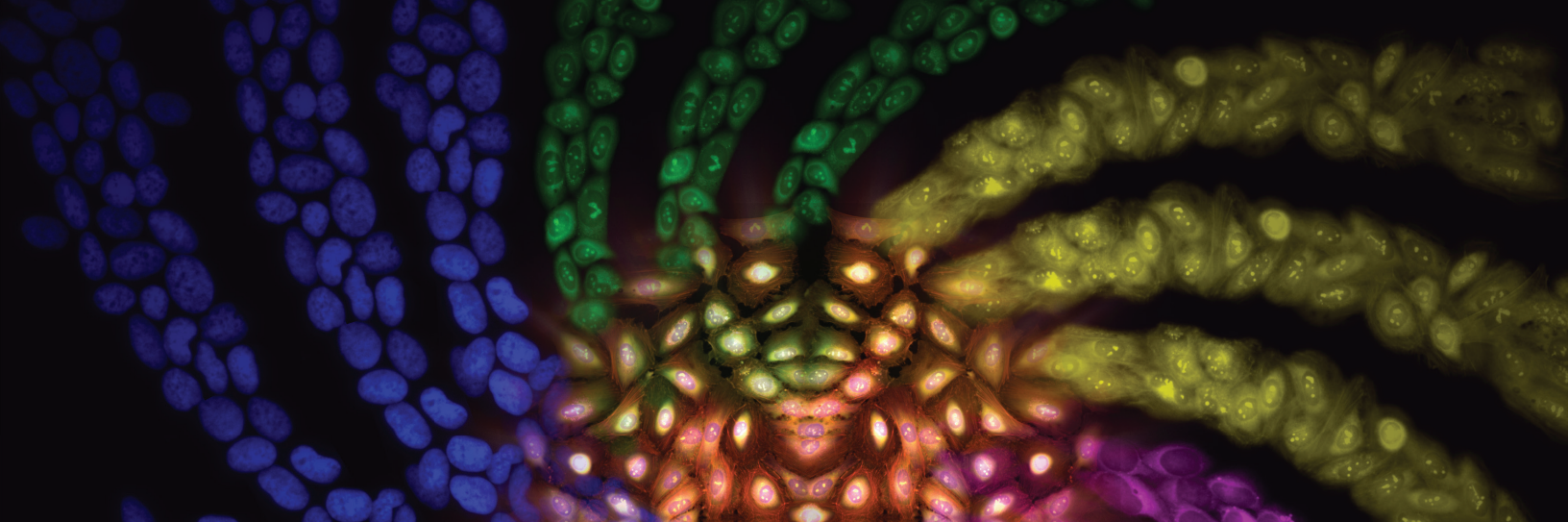
Our high-content screening (HCS) platforms, also known as high-content analysis (HCA) or high-content imaging platforms, are designed for exceptional single-cell analysis capabilities and lightning-fast time-to-data. Perform unbiased spontaneous phenotyping with intact, fixed, or live cells derived from monolayers to spheroids. Acquire complex images and high-content data in seconds with Thermo Scientific™ CellInsight™ HCS platforms powered by Thermo Scientific™ HCS Studio™ Cell Analysis Software.

Featured in over 2,000 peer-reviewed publications, the CellInsight platform and HCS Studio software combine multiparameter fluorescence microscopy with mathematical algorithms that identify and measure each cell within the fields of view. This powerful technology has enabled fundamental discoveries in basic research and advancements in drug-compound screening.



Automated imaging and quantification of multiple targets with corresponding images traced to every single cell data point for quality control.





The proof of performance is in the data

Clear, detailed publication-quality images and quantitative data are what the Thermo Scientific™ CellInsight™ CX7 Pro series HCS platforms are engineered for.

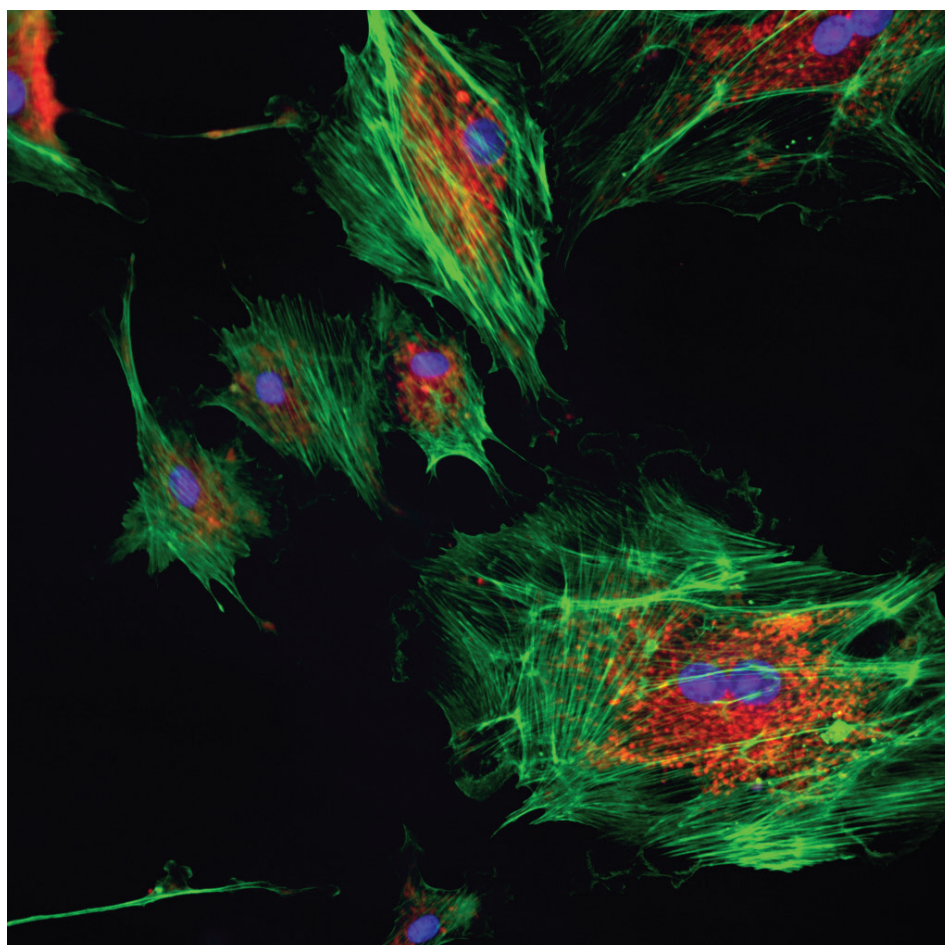
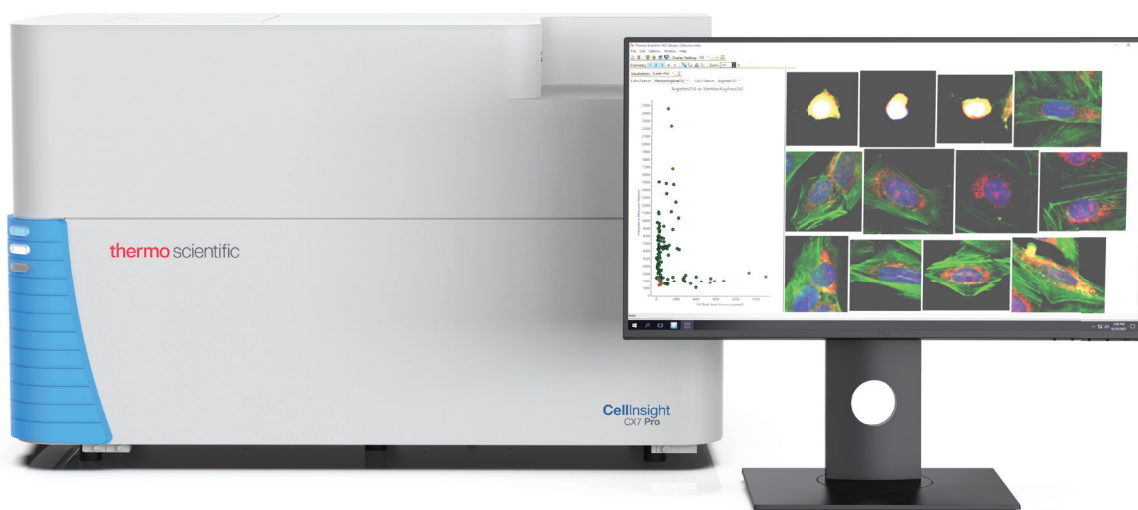


Image of bovine pulmonary artery endothelial cells (BPAEC) acquired with the Thermo Scientific™ CellInsight™ CX7 LZR Pro HCS Platform. Cells were labeled with Invitrogen™ MitoTracker™ Red CMXRos Dye (Cat. No. M46752) to stain the mitochondria in the live cells, with accumulation dependent upon membrane potential. Following fixation and permeabilization, F-actin was stained with Invitrogen™ Alexa Fluor™ 488 Phalloidin (Cat. No. A12379), and the nuclei were counterstained with the blue-fluorescent DNA stain Invitrogen™ DAPI (Cat. No. D1306). Images were acquired using the CellInsight CX7 LZR Pro platform with the 20x 0.8 NA Olympus™ X Line™ objective and widefield imaging mode.

CellInsight CX7 Pro HCS Platform

LED-based fluorescence as well as brightfield illumination and confocal capabilities



The Thermo Scientific™ CellInsight™ CX7 Pro High-Content Screening Platform is an LED-based platform that offers a choice of imaging modes to extract the information you need from your samples. Both well-by-well and channel-by-channel, you can select the right modes to read your sample—with the resolution and dynamic range that results from the high performance of the optical train and best-in-class scientific CMOS (sCMOS) camera featuring a near-perfect 95% quantum efficiency. Use the entire fluorescence spectrum to optimize your assay and select either widefield or confocal optics for any channel.

The CellInsight CX7 Pro platform also offers 5-color brightfield options for colorimetric analysis of tissue sections. The CellInsight CX7 Pro platform covers a broad range of assays for now and the future.

Next-generation sCMOS camera

The CellInsight CX7 Pro platform has been upgraded with a sCMOS camera, offering greater than 95% peak quantum efficiency and low-background 1.0-electron read noise. This quantum efficiency further accelerates high-throughput performance thanks to reduced exposure times across all wavelengths.

Olympus X Line objectives for the CellInsight CX7 Pro platform

The CellInsight CX7 Pro platform now offers validated Olympus X Line objectives to further improve the instrument's imaging quality and assay performance. Publication-quality imaging is now standard using the CellInsight CX7 Pro platform.

Live-cell experiment optimization

The CellInsight CX7 Pro system's LED light has been optimized for live-cell experiments, including reductions in both phototoxicity and photobleaching to enable kinetics assays.

Confocal imaging mode

The Crest™ high-speed 10 rpm spinning-disk confocal technology with dual 40- or 70-micron pinhole size is engineered directly into the optical path to enable high-resolution confocal imaging capabilities.

Widefield imaging mode

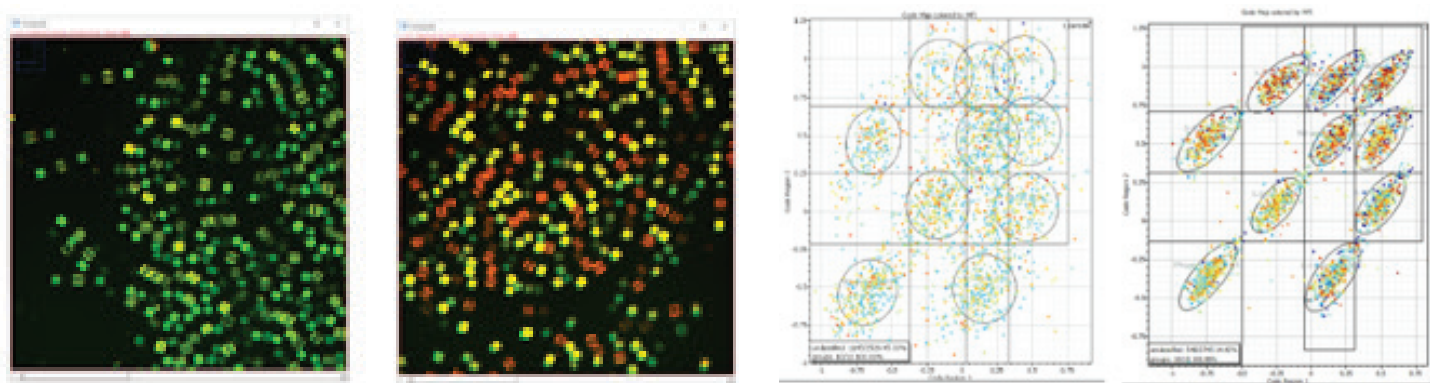
The 7-color light engine reduces switching times and intensity fluctuations to reduce scan times and boost quantitative performance.

Automation

The CellInsight CX7 Pro platform is configured for fully automated plate handling and scanning, including plug-and-play compatibility with the Thermo Scientific™ Orbitor™ RS2 Microplate Mover.

Multiplexing

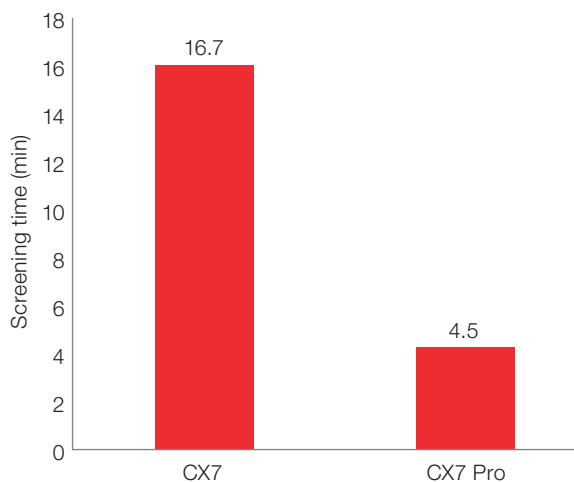
Multiplex your colorimetric absorbance data with fluorescence measurements, offering versatility for research and development applications.



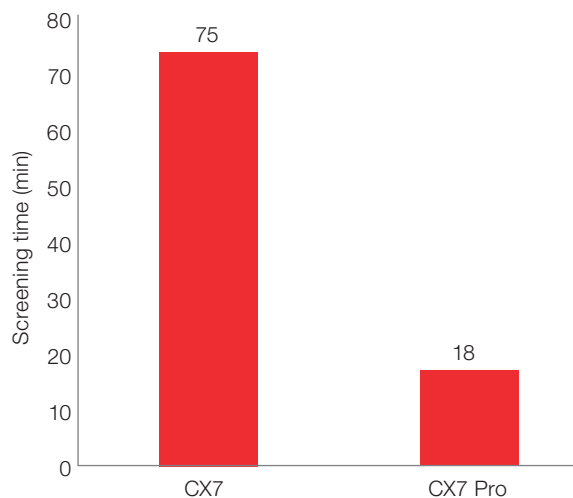
New prime camera validated to run a FirePlex immunoassay at both 15 and 16 bits for faster scan time and improved customer experience.

The Abcam™ FirePlex™ assay is validated using the CellInsight CX7 Pro HCS Platform. Comparison of the FirePlex™-HT no-wash immunoassay between the Thermo Scientific™ CellInsight™ CX7 and CX7 Pro instruments. The no-wash FirePlex assay optimized for high-throughput screening was performed according to the manufacturer's protocol for detecting both 5 and 10 analytes per well. A 10-point standard curve was quantified to assay analyte reproducibility and dynamic range windows. The resulting assay was measured using either the CellInsight CX7 or CX7 Pro platforms and quantified using the Abcam™ FirePlex™ Analysis Workbench software. Only the CellInsight CX7 Pro system was able to exceed 2.5 (15-bit) or 3.0 (16-bit) dynamic range and to achieve less than 15% intra-plate CVs.

96-well plate time-to-data comparison



384-well plate time-to-data comparison



Time-to-data comparisons between the CellInsight CX7 and CellInsight CX7 Pro HCS platforms for 96- and 384-well plates. Both instrument protocols were set for a 5-color multiparameter screen, using 386, 485, 549, 650, and 730 nm, with exposure values set to 20% image saturation in each channel. A 40x 0.95 NA objective was selected to image and analyze spot puncta within a common sample. Laser autofocus was performed on each well of either the 96- or 384-well plates. Real-time analysis was conducted in parallel of image acquisition using the Thermo Scientific™ Cellomics™ Spot Detector Bioapplication. Time values represent finalized "time-to-data" with no further processing required for drug discovery or safety assessment.

CellInsight CX7 LZR Pro HCS Platform

Accelerate HCS assay development and screening performance

The CellInsight CX7 LZR Pro HCS Platform seamlessly integrates advanced screening technologies to deliver outstanding performance for lightning-fast discovery across the life sciences. Designed to meet the challenging needs of emerging life science models, the CellInsight CX7 LZR Pro platform incorporates both laser-based fluorescence illumination and integrated Nipkow spinning-disk confocal technology for publication-quality imaging of a broad range of samples, from simple monolayers to thick spheroid samples.

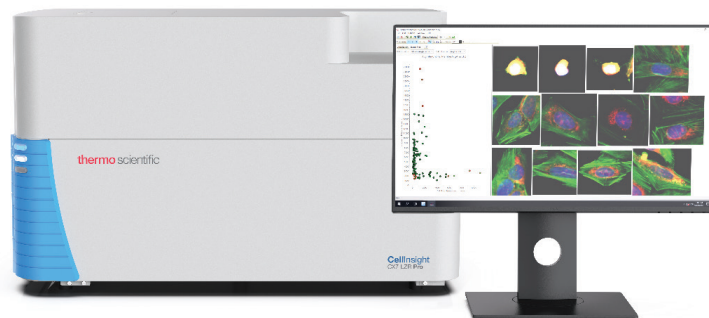
Dual-mode autofocusing software and laser autofocus methods contribute to the platform's diverse capabilities to investigate simple to complex models. On-the-fly phenotyping enables parallel image capture and analysis for multiplexed cytometry measurements in real time. The Thermo Scientific™ Amira™ Software option enables 3-dimensional analysis of the most complex research models, from 3D morphological tracing in neurons to colocalizations of immune and cancer cells within tumors to enable next-generation translational research.

Next-generation sCMOS camera

The CellInsight CX7 LZR Pro platform has been upgraded with a sCMOS camera, offering greater than 95% peak quantum efficiency and low-background 1.0-electron read noise. This quantum efficiency further accelerates high-throughput performance due to reduced exposure times across all wavelengths. Boost your experiment's assay window, with detection of up to 65,536 shades of gray, while not sacrificing background noise because of the -20°C cooling.

Olympus X Line objectives for the CellInsight CX7 LZR Pro platform

The CellInsight CX7 LZR Pro platform now offers Olympus X Line objectives to further improve the instrument's imaging quality and assay performance. Publication-quality imaging is now standard using the CellInsight CX7 LZR Pro platform.



Laser-based illumination

Seven independent lasers aligned with multiplexable fluorescent cellular labeling offer outstanding performance in speed and image quality. Laser illumination enables flatter and brighter images with low background.

Laser light engine

Illuminates the field evenly resulting in excellent image quality appropriate for quantitation. Provides up to 6x improvement in 3D confocal screening times compared to LED illumination.

Short exposure times and laser autofocus capabilities

Speed up the acquisition of your images.

Near-IR (785 nm) laser excitation

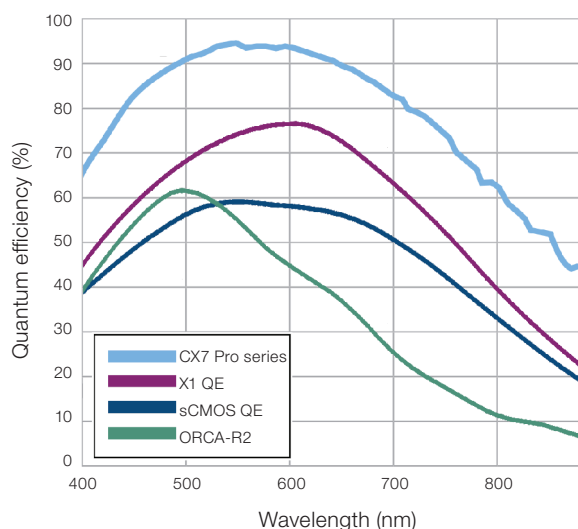
Expand your multiplexing capabilities with near-IR (785 nm) laser excitation.

Autofocus

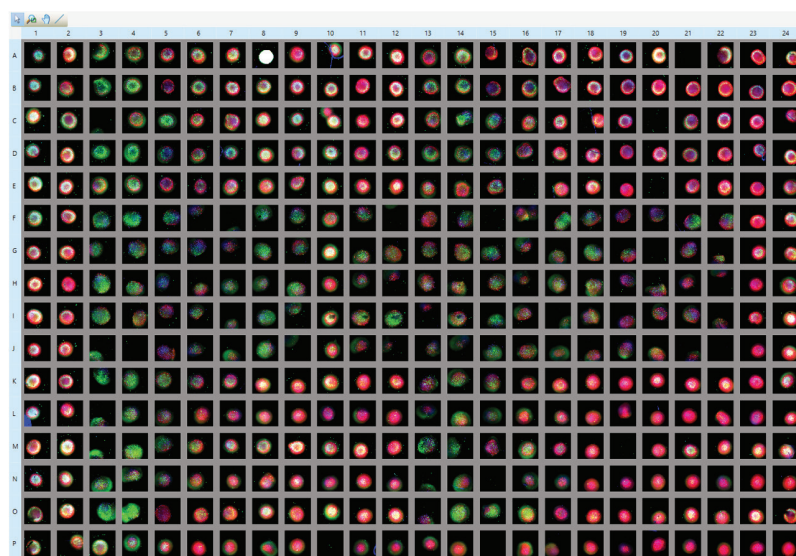
Dual-mode autofocusing software and laser autofocus modes accommodate a vast variety of sample types.

Extremely bright illumination

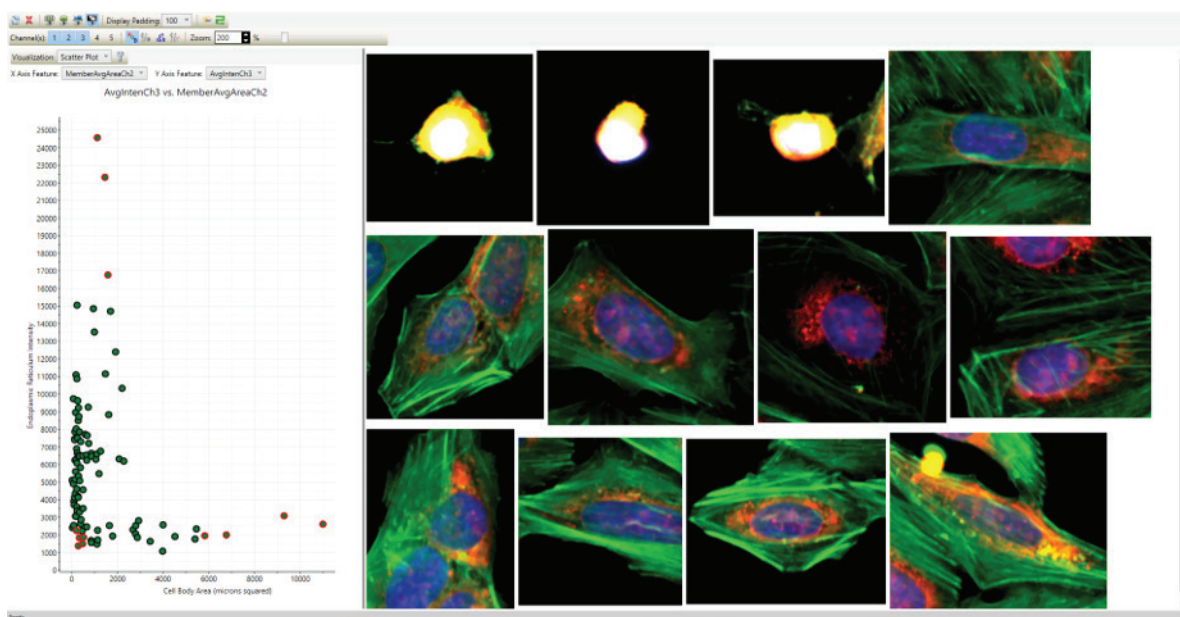
Penetrate thick samples during widefield or confocal 3D imaging.



Experience excellent quantum efficiency for all wavelengths. The state-of-the-art sCMOS camera featured in the CellInsight CX7 Pro series platform offers outstanding quantum efficiency across every wavelength. This translates to higher sensitivity to incoming fluorescent photons, reducing exposure times and minimizing photobleaching.



Penetrate thick samples during confocal 3D imaging. Samples in StemoniX™ microBrain™ 3D plates were treated with a compound of interest and then fluorescently stained with Invitrogen™ Hoechst™ 34580 dye (Cat. No. H21486), MAP2 primary antibody and Invitrogen™ Alexa Fluor™ 488 Goat Anti-Chicken IgY Secondary Antibody (Cat. No. A-11039), GFAP primary antibody and Invitrogen™ Alexa Fluor™ 647 Goat Anti-Guinea Pig IgG Secondary Antibody (Cat. No. A21450), and Invitrogen™ MitoTracker™ Orange CMTMRos dye (Cat. No. M7510). Confocal images were then acquired with the CellInsight CX7 LZR Pro platform using the Olympus X Line 10x objective and Nipkow spinning disk with a 70-micron pinhole across a 384-well glass-bottom plate.



Cell Painting multiparameter phenotyping using the Invitrogen™ Image-iT™ Cell Painting Kit and the CellInsight CX7 LZR Pro platform. U2OS cells were either untreated or exposed to various concentrations of niclosamide (0–150 μ M), gambogic acid (0–2 μ M), staurosporine (0–0.5 μ M), or amsacrine (0–100 μ M) for 24 hours within a 96-well optic thin-bottom plate. Cells were then labeled with Invitrogen™ Hoechst™ 33342 dye (Cat. No. H21486), Invitrogen™ Alexa Fluor™ 488 Concanavalin A (Cat. No. C11252), Invitrogen™ SYTO™ 14 Green Fluorescent Nucleic Acid Stain (Cat. No. S7576), Invitrogen™ Alexa Fluor™ 555 Wheat Germ Agglutinin (Cat. No. W32464), Invitrogen™ Alexa Fluor™ 568 Phalloidin (Cat. No. A12380), and Invitrogen™ MitoTracker™ Deep Red FM dye (Cat. No. M46753). After Cell Painting staining, images were acquired with the CellInsight CX7 LZR Pro platform using the 20x 0.8 NA Olympus X Line objective lens and analyzed using the Cell Painting bioapplication in the HCS Studio 5.0 software.

CellInsight CX5 HCS Platform

The Thermo Scientific™ CellInsight™ CX5 HCS Platform is small in size but massive in screening power, offering automated real-time quantitative cell analysis for every cell biology or screening lab. Transform your cell-based research by analyzing single cells in up to 5 fluorescent colors and additional brightfield multiplexing. With proprietary autofocus and integrated plate-scanning intelligence methods, the CellInsight CX5 platform brings speed and accuracy to investigate cell populations and phenotypes without sacrificing sensitivity and resolution.

Brightfield capabilities

- Designed to work with or without fluorescent labeling, the CellInsight CX5 instrument uses transmitted brightfield light, allowing you to explore more cell biology without the restriction of fluorescent dyes.

Scalable cell biology

- The CellInsight CX5 instrument addresses the problem of scale with a continuum of solutions depending on your lab's needs. It is compatible with a variety of formats from slides to 1,536-well microplates.
- The platform connects directly to the Thermo Scientific™ Orbitor™ RS2 Microplate Mover to increase processing capacity up to 80 plates. With included application programming interfaces (APIs), the CellInsight CX5 system can be integrated into any third-party automation platform.



The CellInsight CX5 HCS Platform can be equipped for automated high-throughput screening using the Orbitor RS2 plate handler. HCS Studio software can directly operate the Orbitor instrument, eliminating the need for third-party software.

Find out more at thermofisher.com/cx5

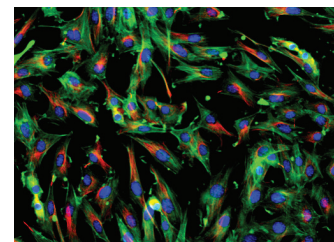
Automation with Cytomat incubators offer easy integration and ease of use

Thermo Scientific™ Cytomat™ incubators have internal database-driven inventory management and device grouping. Discover the most advanced, intelligent incubators with outstanding flexibility. Cytomat incubators, along with the Orbitor RS2 plate handler, provide a complete solution for automated, high-throughput analysis. Also, onstage incubators (OSIs) provide a solution for live-cell imaging.

- Fast response through reduced data transfer
- Plug-and-play functionality for superfast integration
- Device grouping for easy capacity ramp-up
- Simple, cost-effective upgrade for existing incubators



Mixed brightfield–widefield imaging of *Caenorhabditis elegans* in vivo samples using the CellInsight CX5 instrument. Samples were imaged using the CellInsight CX5 instrument with 4x magnification and both brightfield and 488 fluorescent imaging modes while incubated at 37°C and 5% CO₂ within the optional Thermo Scientific™ Onstage Incubator for the CellInsight CX5 instrument.



Widefield immunofluorescent imaging of HEK293 cells using the CellInsight CX5 instrument. Cells were fluorescently stained with Hoechst 33342 dye, Invitrogen™ ActinGreen™ 488 ReadyProbes™ Reagent, and Invitrogen™ MitoTracker™ Red dye. The multiplexed samples were then imaged using the CellInsight CX5 instrument with 20x magnification.



The Cytomat automated incubators are an ideal solution for automation and high-throughput needs. Cytomat incubators are complementary to the Orbitor RS2 plate handler and can be used with CellInsight CX5, CX7 Pro, and CX7 LZR Pro instruments.

HCS Studio cell analysis software

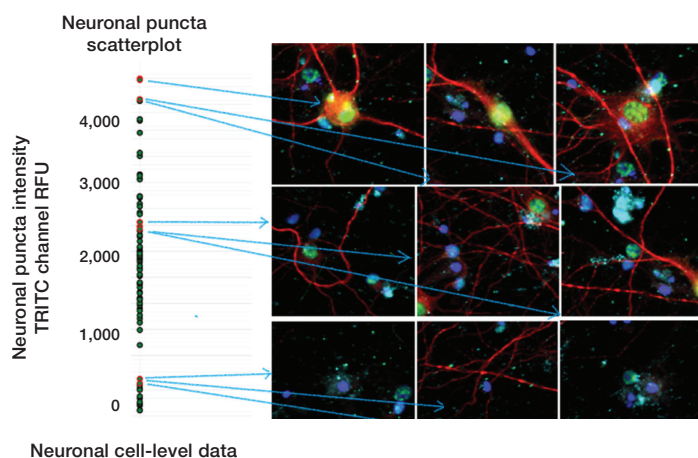
Intuitive interface and intelligent design

Scientists can study their HCS data at the individual cell-, field-, or well-level to determine the most sensitive cell phenotypes.

- On-the-fly real-time analysis enables fast results, simultaneous image acquisition, and data analyses.
- Icon-based guidance assists users in selecting specific assays easily and quickly.
- Fully customizable for experienced users, so experienced users can create their own assays.
- Features all of the validated Thermo Scientific™ Cellomics™ bioapplications, including Neuronal Profiling, Morphology Explorer, Spot Detector, Compartmental Analysis, and Colocalization, for assay development and screening.

High-content screening

- Go from image collection to tabulated results and population statistics—and backtrack each event/cell to perform analysis at the single-cell level.
- All the cellular features reported in charts or tables are available for viewing at the touch of a button, so your data are grounded in an understanding of the biology and context.

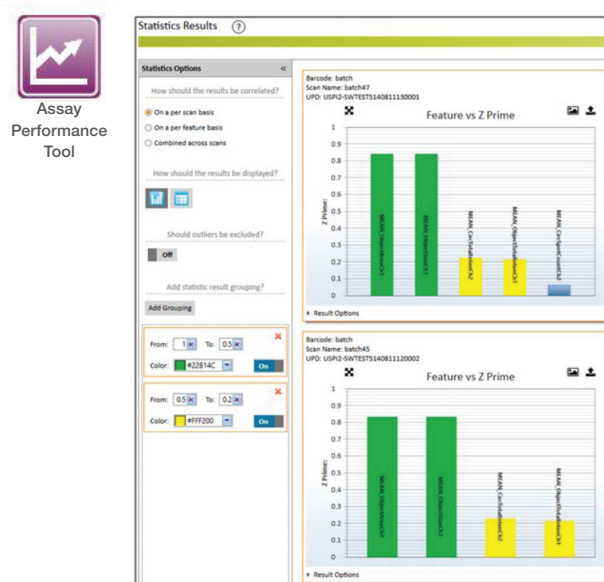


Cell-level data are seamlessly linked to the corresponding images within the HCS Studio software, providing scientists with the ultimate control to verify that biological measurements are indeed occurring in their samples.

Assay performance

- HCS Studio software helps you be confident of robust assay performance. Rank your assay parameters based on Z-prime before starting a screen, and then adjust your stop criteria to collect only the data you need for statistical significance.
- HCS Studio software allows you to ensure that you are capturing the top-performing assays with your HCS platform.

Find out more at thermofisher.com/hcsstudio



Rapid Z-prime tool to measure assay performance.

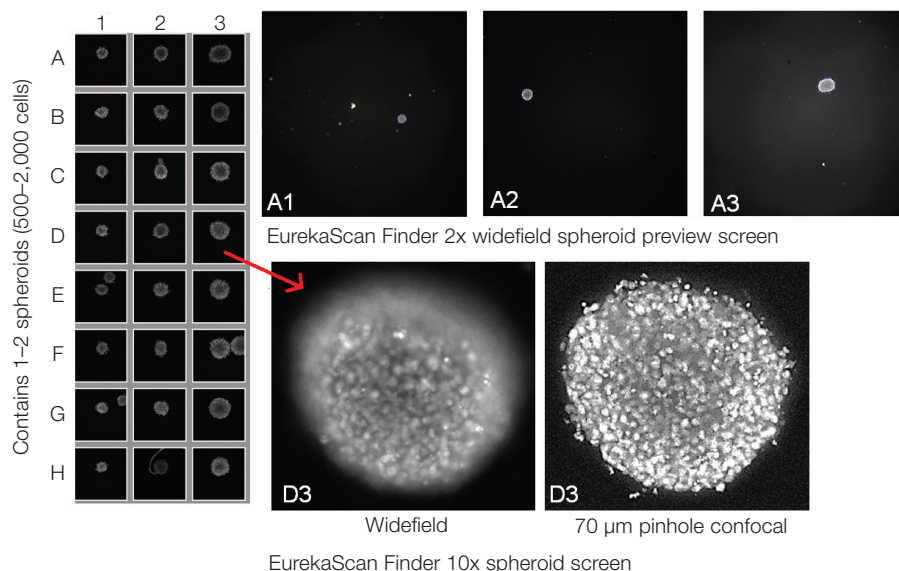
3D (2D–5D) visualization and analyses with Amira software

- Perform 2D–5D visualization and analysis using Amira software. Amira software can be used for supporting researchers in the most frequently used image-analysis techniques, such as filament tracing and editing, DTI analysis, brain perfusion analysis, and object tracking.
- With incredible speed and flexibility, Amira software supports advanced 2D–5D bioimaging workflows in research areas ranging from structural and cellular biology to tissue imaging, neuroscience, preclinical imaging, and bioengineering.

Find out more at thermofisher.com/amira-avizo

HCS Studio software: EurekaScan Finder

Thermo Scientific™ EurekaScan™ Finder “seek-and-find” functionality in the HCS Studio software



Example of low to high magnification of spheroids using the HCS Studio software with the EurekaScan Finder. This example depicts time and memory efficiencies when using the low-magnification to high-magnification seek-and-find functionality of EurekaScan Finder. Human iPSC spheroids were fluorescently labeled with DAPI nuclear counterstain and then screened on the CellInsight CX7 LZR Pro platform with either a 2x to 10x EurekaScan Finder screen or 10x screen alone. During the 10x screen, both widefield and 70 μ m pinhole confocal images were acquired using 405 nm laser excitation. EurekaScan Finder utilization produced a 9.3-fold improvement in screening time compared to the 10x screen alone. Additional efficiencies were captured when evaluating the file size of the two screens, with EurekaScan Finder showing a 25-fold improvement in memory usage to complete the screen. Data provided by Dr. Chi Yun at New York University.

Features and benefits of EurekaScan Finder:

- EurekaScan Finder is a seek-and-find feature for the CellInsight CX7 Pro and LZR Pro HCS platforms aimed at automating the identification and subsequent capture of irregularly seeded biological samples at progressively higher magnifications.
- With EurekaScan Finder applied, specimens including spheroids and tissues may be identified during “seek” operations at low magnification and once “found,” efficiently scanned at higher magnifications for optimal resolution.
- EurekaScan Finder was designed to enable multiple-pass scans, such as identifying samples at low magnification across large surface areas, capturing samples at intermediate magnification, and evaluating for rare events or improved resolution at higher magnifications.
- By applying EurekaScan Finder, efficiencies in total scan times and corresponding file memory consumption are achieved compared to non-EurekaScan Finder, high-magnification scans.
- Moreover, object identification and validation parameters are applied in real time during EurekaScan Finder operation, so scientists have confidence that the samples being adaptively examined are relevant to their research.
- EurekaScan Finder can also handle more than two passes for those scenarios that could benefit from three or more passes, such as identifying non-sparse fields at low magnification, or finding rare events at higher magnification and then evaluating them at the same or higher magnification.

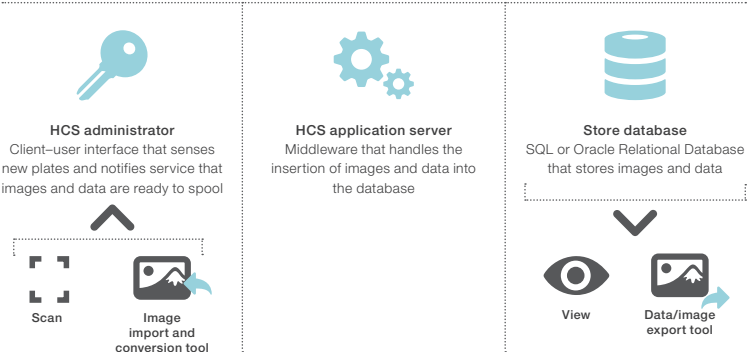
Find out more at thermofisher.com/hcsstudio

HCS data storage and accessories

Image storage and database management software

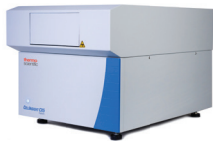
Every Thermo Scientific™ HCS platform is configured with a base version of Thermo Scientific™ Store Image and Database Management Software. With 10 GB of storage, Store Image and Database Management Software helps ensure the security of your data, allowing you to be productive from your first day of use. Although it is not a scalable solution, you always have the option to upgrade to the full version of this software as your requirements change.

With this software, you can import, convert, and spool images from any platform or client running HCS Studio software. Share data and images across your organization for a fully collaborative work environment.



Which HCS system is right for you?

Compact screening system to scale up your throughput



Designed for everyone, with maximum versatility from confocal to live-cell research



Designed to address emerging HCS assays and to illuminate a broad range of samples from simple monolayers to thick spheroid, organoid, and tissue samples



	CellInsight CX5 platform	CellInsight CX7 Pro platform	CellInsight CX7 LZR Pro platform
Illumination	5 channels	7 channels	7 channels
Camera	CCD	sCMOS	sCMOS
Widefield	5 channels	7-color solid-state LED	7-color laser excitation
Brightfield	White	4 specific LEDs plus white light for higher-contrast imaging (5 colors total)	
Confocal	NA	Spinning disk with 40 µm and 70 µm pinholes	
Objectives	2x–60x	2x–60x, including X Line objectives	2x–60x, including X Line objectives
Focus	Software	Laser and software	Laser and software
Live-cell imaging	Optional HCS Onstage Incubator with kinetic scheduling of acquisition		
Software	HCS Studio Cell Analysis Software; optional client software available		
Database	Store Image and Database Management Software included; scalable SQL or Oracle database options available		

Ordering information

Product	Cat. No.
CellInsight CX5 HCS Platform	CX51110
CellInsight CX7 Pro HCS Platform	HCSDCX7LEDPRO
CellInsight CX7 LZR Pro HCS Platform	HCSDCX7LZRPRO

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