IN Cell Analyzer
High-Content Cellular Analysis System
Visualize.
Analyze.
Realize.

The power to probe deeper
with IN Cell Analyzer
1. Cells and assays

2. High-throughput cellular imaging with IN Cell Analyzer systems

3. Image analysis with IN Cell Investigator and data management with IN Cell Miner HCM

4. Deeper insights and improved productivity
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IN Cell Analyzer 6000 optical system incorporates an adjustable iris-like aperture
What is high-content analysis?

Cellular research typically involves using techniques such as biochemical assays, microscopy, Western blotting, and flow cytometry to investigate cell responses. Whilst these techniques can be highly valuable, they can also have limitations in throughput, can disrupt the cell’s integrity, or can be highly labor intensive. This puts constraints on the number and complexity of assays that can be handled and limits the understanding of the results in a relevant biological context.

High-content analysis (HCA) is a powerful technique for high-throughput microscopic analysis of cells. HCA involves probing whole cells, in a plate or on microscope slides, with single or multiple fluorescent sensors; capturing images of the cells very rapidly with a high-resolution imaging instrument; and then extracting detailed information from the images with powerful software.

The automation and throughput provided by HCA allows you to ask more questions and to answer them more quickly:

**Deeper insights:**
HCA can use multiple probes in one assay and is performed on whole cells rather than cell extracts, it therefore leads to a deeper understanding about complex cellular mechanisms and interactions.

**Higher throughput and productivity:**
In addition to providing the researcher with deeper insights, HCA often reduces assay time from days to hours or from hours to minutes.

**HCA: A valuable tool for research and drug discovery**

The benefits of deeper insights and increased productivity mean that scientists in both drug discovery and research are using HCA as a valuable tool in many diverse applications.

In drug discovery, productivity advantages make HCA a valuable technology for target identification, for example through the use of RNAi screens, whilst deeper insights lead to more information and confidence in both hit selection and safety and efficacy performance, prior to lead candidate selection.

In research, the insights and cellular context of HCA is proving highly valuable in the study of complex disease research in areas such as cancer, neurology, immunology, and infectious diseases.
IN Cell Analyzer HCA system overview

IN Cell Analyzer 2000

Cell analysis just got easier
IN Cell Analyzer 2000 is a highly flexible, lamp-based high-content imaging instrument impressively enabling for a wide range of assays and techniques:

- From investigative microscopy to high-content screening
- From organelles to cells to whole organisms
- From end point assays to extensive live cell studies

IN Cell Analyzer 6000

Cell analysis redefined
The latest addition to the IN Cell Analyzer family, IN Cell Analyzer 6000 is a high-end, laser-based confocal imaging platform for the most demanding high-content assays and screens. Featuring a novel and proprietary optical system that incorporates an iris-like variable aperture design and next-generation sCMOS technology, IN Cell Analyzer 6000 balances speed and image quality for challenging and variable assays.

- Fully adjustable imaging along the wide-field to confocal spectrum for each channel of an assay, maximizing user-control of speed and image quality

- Designed for challenging applications and high-resolution imaging, IN Cell Analyzer 6000 extends the reach of HCA into applications more typically associated with low-throughput confocal microscopy, such as 3D imaging, co-localization studies and assays with low signal.

- Throughput without compromise. Designed to enable increased throughput for a wide variety of assay and sample types, without compromising image quality.
IN Cell Investigator Image Analysis Software

**Intuitive. Adaptive. Powerful**

**Expanding the limits of image analysis**

IN Cell Investigator is the image analysis software for the IN Cell Analyzer system. Offering three levels of analysis tools to suit the varied complexity of different assay types, and also to match different skill levels, it is suitable for both beginners, and those already experienced at image analysis.

![IN Cell Investigator Levels](image1)

**IN Cell Analyzer Compliance Manager**

Regulatory authorities require equipment in a GxP environment to be validated before use and periodically evaluated to confirm they remain in a validated state. GE Healthcare offers a comprehensive suite of validation services, which in conjunction with IN Cell Analyzer Compliance Manager Software (Title 21 CFR Part 11 control software) and documentation, supports IN Cell Analyzer technologies through the entire instrument lifecycle.

**IN Cell Miner High-Content Manager (HCM)**

**data management system**

**Locate. Correlate. Communicate**

**Critical information at your fingertips**

IN Cell Miner HCM provides you and others within your organization the capacity to annotate, archive, retrieve, and store high-content images and data, ensuring that the full value of your data is captured and realized.

- A relational data base that helps you organize, find, share, compare, and publish your data.
- Use as a stand-alone solution or integrate into existing systems.
- Based on the established EMC™ Documentum™ platform.

**GE Healthcare commitment**

IN Cell Analyzer system components have been subjected to rigorous accelerated lifetime testing using GE’s Six Sigma performance guidelines to ensure reliability.

Behind the scenes, our team of dedicated experts is ready and willing to support you. Together with the security of Bio InSite™ remote support software, this user-focused approach underscores our commitment to help you get the most out of your cellular analysis.
IN Cell Analyzer 2000 is a flexible, modular lamp-based HCA system for fast, automated imaging in fixed and live cells. The features of IN Cell Analyzer 2000 make it a valuable and flexible research tool, compatible with a wide range of cell analysis methods, assays, and sample types. IN Cell Analyzer 2000 complies with the FDA guidelines for 21 CFR Part 11. (Independent audit by a Federal Expert Witness)

**Feature highlights**

**Preview scan:** Quickly preview a selected area of your sample at any magnification before starting an acquisition run. This avoids the need to image unwanted areas and can significantly increase speed.

**High-performance large-chip CCD camera:** An optional large-chip CCD camera (2048 x 2048 pixel array) enables superior optical zooming and captures approximately four-times the field-of-view compared with a standard-chip camera. Sufficient cells for statistically robust results may be imaged in a single field-of-view, saving time.

**Standard-chip camera:**
CoolSNAP ES2, 1.4Mp camera captures 23 cells at 40x magnification

**Large-chip camera:**
CoolSNAP K4, a 4.2Mp camera, captures 95 cells at 40x and four times as much information, improving productivity and throughput
Whole-well imaging: The combination of a 2× objective and large-chip CCD camera enables rapid capture of an entire well with a single image (96-well plate); for imaging whole wells, large tissue sections, or small organisms. This enables the region of interest to be quickly identified prior to higher magnification imaging and ensures rare events are not missed.

Manual microscope mode: A smooth transition from manual microscopy to automated, high-content analysis, for easy optimization of imaging conditions. Work with images at full-screen resolution; zoom in and manually adjust image properties; adjust filters, objectives, and z-height in real-time before full image acquisition.

Imaging modes: A choice of six imaging modes (2D and 3D deconvolution) ensure you get the most quantitatively accurate images possible from the system for your sample type. These image restoration options make maximum use of signal, particularly important for dim signals, and are capable of removing noise, increasing contrast, and improving resolution in both the lateral (X–Y) and axial (Z) dimensions.

Use of 2D deconvolution results in more accurate image segmentation (right) than 2D imaging alone (left).

Rapid image acquisition: A proprietary, optimized optical path and bright 200 W metal halide lamp enable imaging of a 96-well plate in under 3 min, while the large-chip CCD camera option enables up to 4× more information to be gathered in a single image.

<table>
<thead>
<tr>
<th>Standard Instrument</th>
<th>Optional modules/accessories</th>
</tr>
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<tbody>
<tr>
<td>High-performance standard-chip CCD camera (1392 × 1040 pixels) or optional large-chip CCD camera (2048 × 2048 pixels)</td>
<td>Additional 3D restoration options</td>
</tr>
<tr>
<td>200 W metal halide lamp</td>
<td>Temperature control</td>
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<tr>
<td>Image restoration software</td>
<td>Environmental control</td>
</tr>
<tr>
<td>Manual microscope mode capability</td>
<td>Liquid handling</td>
</tr>
<tr>
<td>Preview scan capability</td>
<td>Transmitted light imaging (Bright-field, DIC, and phase contrast)</td>
</tr>
<tr>
<td>Whole-well imaging capability</td>
<td>Slide imaging module</td>
</tr>
<tr>
<td>Contrast based software autofocus</td>
<td>A wide range of additional objectives (2 to 100×) including high numerical aperture (NA) options</td>
</tr>
<tr>
<td>Laser-based hardware autofocus</td>
<td>IN Cell Analyzer GxP Compliance Manager</td>
</tr>
<tr>
<td>Selected filters and objectives</td>
<td></td>
</tr>
<tr>
<td>Automated objectives, correction collar, and polychroic changing</td>
<td></td>
</tr>
<tr>
<td>Compatible with 6-, 12-, 24-, 48-, 96-, 384-, and 1536-well microplates</td>
<td></td>
</tr>
<tr>
<td>Compatible with commercially available laboratory automation systems</td>
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IN Cell Analyzer 6000 is a high-end, laser-based confocal imaging platform for the most demanding high-content assays and screens. Featuring a novel and proprietary optical system that incorporates an iris-like variable aperture design and next-generation sCMOS technology, IN Cell Analyzer 6000 enables you to optimize for speed and image quality for challenging and variable assays.

Feature highlights

**Fully adjustable imaging with proprietary optical system**

**Confocality redefined:** Inspired by the anatomy of the eye, the optical system delivers a new level of control for image acquisition, to maximize performance.

While conventional confocal technology is optimal when using high-power objectives, lower and mid-power objectives are typically used for everyday cellular assays. The iris-like variable aperture technology of the IN Cell Analyzer 6000 enables flexibility across a range of objectives, delivering the benefits of confocal technology across a broad spectrum of high-content challenges.

- Use in open aperture mode to maximize speed
- Use in full confocal mode for efficient background rejection
- Select any aperture setting between 1 and 3 AU to suit your specific biology
- Optimize the degree of confocality required for each channel of an assay with the simple click of a mouse

**Imaging optimized for different sample conditions**

**Assays with dim signal:** Non confocal (open aperture) imaging mode may be used to image assays with a dim signal (e.g., EGFP-STAT3 expressing cells).

**Thick and 3D samples:** Middle section of 60-μm thick sample of Cytiva™ Cardiomyocytes, stained with Cy5 labeled anti-troponin I and Hoechst™ 33342.

**Cells in medium with strong fluorescent background:** EGFP-2xFYVE cell line with Hoechst 33342 nuclear stain and free FiTC in media. (A) Field-of-view captured in non confocal (open aperture) mode and (B) Same field-of-view captured using confocal mode, reducing background.
Suitable for challenging applications

IN Cell Analyzer 6000 extends the reach of automated imaging into samples and assays that are typically challenging to perform in a high-throughput format.

Flexible imaging for multiplexed assays

Multiplexed assays that encompass multiple signals of different intensity can be managed comprehensively for both signal quality and throughput. Optimal imaging conditions can be selected for each individual signal, enabling capture of all of the assay biology.

Sensitivity for imaging dim assays

The use of a highly sensitive, low-noise sCMOS-based camera coupled with laser-based illumination provides tremendous sensitivity to weak signals. This generates high-quality data from signals that would typically be lost in the noise.

Versatility for a range of sample types

Whether imaging 3D biological structures, low-abundance endogenous biomolecules, or co-localized proteins of interest, IN Cell Analyzer 6000 delivers the control and performance to adapt assays more typically associated with low-throughput confocal microscopy to a high-throughput format.

Throughput without compromise

IN Cell Analyzer 6000 is designed to enable increased throughput without compromising image quality.

- Configurable confocality to balance speed and image quality to specific requirements
- A 5.5 Mp large field-of-view sCMOS camera, almost 4x larger than traditional 1.4 Mp CCD cameras, so fewer images need to be acquired to capture statistically robust data, saving time
- A high-sensitivity next-generation sCMOS detector chip, with typically 5x less noise than CCD cameras, delivering significantly increased sensitivity, and reducing exposure times
- Fast, precision stages that reduce non-imaging time

Image acquisition flexibility

IN Cell Analyzer 6000 also encompasses user-friendly image acquisition features described for IN Cell Analyzer 2000, including:

- Preview scan
- Manual microscope mode
- Whole-well imaging

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<th>Standard Instrument</th>
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<tr>
<td>sCMOS 5.5 Mp camera (2560 × 2160 pixels)</td>
<td>Environmental control</td>
</tr>
<tr>
<td>Four lasers (405, 488, 561, and 642 nm)</td>
<td>Temperature control</td>
</tr>
<tr>
<td>Imaging modes: Line confocal mode - confocal aperture adjustable from 1-3 AU in Open aperture (widefield) mode</td>
<td>Liquid handling</td>
</tr>
<tr>
<td>Preview scan capability</td>
<td>Transmitted light imaging (Bright-field, DIC, and phase contrast)</td>
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<td>Whole-well imaging capability</td>
<td>Slide imaging module</td>
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IN Cell Investigator Image Analysis Software
Intuitive. Adaptive. Powerful

Expanding the limits of image analysis
IN Cell Investigator Image Analysis Software supports both IN Cell Analyzer systems. Comprising three levels of analysis capability in a single package, it is suitable for both beginners and expert users, and with the same GUI and workflows across the tools, aids easy transition from analysis of simple to complex assays.

Level 1
Incorporates preconfigured image analysis routines suited for entry-level image analysis. The user is presented with a menu of application-specific parameters and measures, with basic filters and minimal parameter adjustments, for quick and easy set up. This level is designed to enable the user to rapidly embark on HCA with minimal image analysis experience, providing an easy interface to create robust analysis routines that are fast but also very sensitive and accurate. Simply adjust parameters, select measures and run analysis.

Level 2
Builds on Level 1 and provides guided image analysis, which takes the user through the selection of more advanced image analysis options in a structured way. This level gives access to powerful segmentation options, more than 75 measures of cellular features, cell tracking, population filtering, and classification and enables users with some image analysis experience to rapidly create advanced image analysis routines. For example, decision trees are an easy way to divide cells into subpopulations based on user defined criteria. Interactive histograms and scatter plot displays assist in setting appropriate thresholds for each decision point, to automate assignment of cells into sub populations.

Level 3
As preconfigured analysis routines cannot cover every eventuality, Level 3 gives you the flexibility to build your own protocols and measures, and the ability to analyze almost any assay type. Custom analysis routines can be created using a comprehensive range of image analysis tools, such as advanced segmentation and image processing, predefined and user-defined measures, and macro subroutines, enabling you to build your own protocol for unique assays.
Spotfire DecisionSite data visualization

IN Cell Investigator has an embedded link to Spotfire DecisionSite analytics software, aiding easy access to a wide range of data visualization tools, while crucially maintaining the trail from image to data.

Improved workflows with IN Cell Investigator v2.0

In addition to incorporating powerful analysis tools, IN Cell Investigator v2.0 is designed to deliver enhanced usability, using the latest Web based technologies. With features that improve workflow and make image analysis even simpler, IN Cell Investigator v2.0 advances the high-content user experience and provides an innovative, image-centric interface that combines familiar features with new functionality.
IN Cell Miner High–Content Manager

Locate. Correlate. Communicate. Critical information at your fingertips

IN Cell Miner HCM is a relational database that can be used as a stand-alone high-content data management solution for a small workgroup, or can be integrated into an existing system.

Based on the stable and established EMC Documentum platform, IN Cell Miner HCM incorporates open standards and is easy to use, easy to integrate, and completely scalable.

Organize, find, share, compare, and publish your data - quickly and easily

- Store different types of data including images, protocols, results, and annotations
- Manage data at project, screen, run, and plate level
- Associate protocols, materials, or compound lists with the appropriate project levels
- Associate multiple image stacks with one plate
- Associate results from different analysis protocols with one set of images
- Retrieve data using guided query tools

Once data has been retrieved, it can be reviewed using table and graphing functions within IN Cell Miner HCM or transferred for further visualization and analysis to applications such as IN Cell Investigator, Spotfire DecisionSite, and Microsoft® Excel®.
GE Healthcare Validation Services, in conjunction with IN Cell Analyzer Compliance Manager Software (Title 21 CFR Part 11 control software) and IQ/OQ documentation, can ensure efficient verification of your IN Cell Analyzer for GxP compliance through the instrument life cycle, from purchase planning to decommission.

**Decommissioning**
When it is time to decommission your system or prove the status of a validated system after the last production, appropriate sections of the validated process will be repeated.

**Maintenance and Utilization**
During preventative maintenance visits, our service engineers will perform a Continuous Verification of the system. Change Control Procedure (CCP) helps verify the compliance status of your equipment after software or hardware changes.

**Purchase Planning**
IN Cell Analyzer systems include Title 21 CFR Part 11 compliant functionality - software, IQ/OQ documentation, and services. Validation Services for the IN Cell Analyzer platform include GxP impact assessments, installation, and operational qualifications, change controls, and continuous verifications.

**Installation**
IQ/OQ is performed in conjunction with the equipment installation by trained and certified service engineers and the results are summarized in a final report.
Visualize. Analyze. Realize. The power to probe deeper with IN Cell Analyzer

Related products

Reagents for predictive toxicity testing

Cytiva Cardiomyocytes
Relevant. Reliable. Confident. A new era in safety testing with human cell models

Cardiotoxicity is a common cause of drug safety liabilities and withdrawal of drugs during development.

Our Cytiva Cardiomyocytes are derived from human embryonic stem cells (hESC) and provide a biologically relevant alternative to current cell models and primary cells, for predictive toxicity testing.

Reagents for cell cycle analysis

Cell Cycle Phase Marker Assays and Cell Proliferation Fluorescence Assay

Cell Cycle Phase Marker (CCPM) Assays enable non-destructive real-time examination of cell cycle phases in individual cells. The G1/S CCPM Assay resolves cells at the G1 to S transition point and the G2M CCPM Assay resolves cells at the G2 to M transition point.

The Cell Proliferation Fluorescence Assay offers a precise, fast, and simple assay based on BrdU incorporation during DNA synthesis of proliferating cells. When used in conjunction with the G1/S and G2/M CCPM Assays, all stages of the cell cycle may be identified.

Automation solutions for IN Cell Analyzer systems

We work directly with specialists in the field of laboratory automation to provide IN Cell Analyzer users with a complete automated solution for their needs. Providing innovative hardware and software for laboratory automation and an experienced team of project managers, computer scientists, and engineering consultants, integration of automation into your HCA workflow can be simplified and managed for you.

Our optional service for automation includes:

- System supply and installation
- Integration and consultation services
- Fully validated automation solutions, FAT and SAT
- Workflow design
- One-call service support
### Ordering information

**IN Cell Analyzer 2000**

<table>
<thead>
<tr>
<th>Product</th>
<th>Code number</th>
</tr>
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<tbody>
<tr>
<td>IN Cell Analyzer 2000, with large chip CCD camera</td>
<td>28-9535-10</td>
</tr>
<tr>
<td>IN Cell Analyzer 2000, with large chip CCD camera (United States only)</td>
<td>28-9672-09</td>
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<tr>
<td>IN Cell Analyzer 2000, with standard chip CCD camera</td>
<td>28-9534-63</td>
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<tr>
<td>IN Cell Analyzer 2000, with standard chip CCD camera (United States only)</td>
<td>28-9672-08</td>
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<td>IN Cell Analyzer 2000 Live Cell Package C</td>
<td>28-9798-74</td>
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<tr>
<td>(Includes Temperature Control, Liquid Handling, and Environmental Control Modules)</td>
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<tr>
<td>IN Cell Analyzer 2000 3D Deconvolution Software</td>
<td>28-9534-86</td>
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<tr>
<td>IN Cell Analyzer 2000 Transmitted Light Module</td>
<td>28-9534-87</td>
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<tr>
<td>IN Cell Analyzer 2000 Slide Handling Module</td>
<td>28-9544-75</td>
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<tr>
<td>IN Cell Analyzer IQ/OQ Documentation (Compliance Manager)</td>
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**IN Cell Analyzer 6000**

<table>
<thead>
<tr>
<th>Product</th>
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<tbody>
<tr>
<td>IN Cell Analyzer 6000 (United States only)</td>
<td>28-9938-51</td>
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<td>IN Cell Analyzer 6000</td>
<td>28-9939-14</td>
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<tr>
<td>IN Cell Analyzer 6000 Live cell package C (includes: Temperature Control, Liquid Handling, and Environmental Control modules)</td>
<td>28-9798-74</td>
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<tr>
<td>IN Cell Analyzer 6000 Transmitted Light Module</td>
<td>28-9534-87</td>
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<tr>
<td>IN Cell Analyzer 6000 Slide Handling Module</td>
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**IN Cell Investigator and IN Cell Miner HCM**

<table>
<thead>
<tr>
<th>Product</th>
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<tbody>
<tr>
<td>IN Cell Investigator, 1 seat, Web download</td>
<td>Please inquire</td>
</tr>
<tr>
<td>IN Cell Investigator, 1 seat network, Web download</td>
<td>Please inquire</td>
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<tr>
<td>IN Cell Miner HCM, data management system, academic use</td>
<td>28-9342-29</td>
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<tr>
<td>IN Cell Miner HCM, data management system, commercial use</td>
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**Cytiva Cardiomyocytes**

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<tbody>
<tr>
<td>Cytiva Cardiomyocytes (1E5)</td>
<td>$1 \times 10^5$ cardiomyocytes</td>
<td>28-9774-35</td>
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<tr>
<td>Cytiva Cardiomyocytes (1E6)</td>
<td>$1 \times 10^6$ cardiomyocytes</td>
<td>28-9763-98</td>
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<tr>
<td>Cytiva Cardiomyocytes (5E6)</td>
<td>$5 \times 10^6$ cardiomyocytes</td>
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For a full list of products and modules please visit our Web site at www.gelifesciences.com.
# Cell Cycle Reagents

<table>
<thead>
<tr>
<th>Product</th>
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<tbody>
<tr>
<td>G1S Cell Cycle Phase Marker (licensed for screening use)</td>
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<tr>
<td>G2M Cell Cycle Phase Marker (licensed for screening use)</td>
<td>67-6101-54</td>
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<td>Cell Proliferation Fluorescence Assay (500 wells)</td>
<td>25-9001-89</td>
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