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Agilent BioTek Cytation 7 Cell Imaging Multimode Reader

The most comprehensive Agilent BioTek cell imaging multimode reader

10 Years

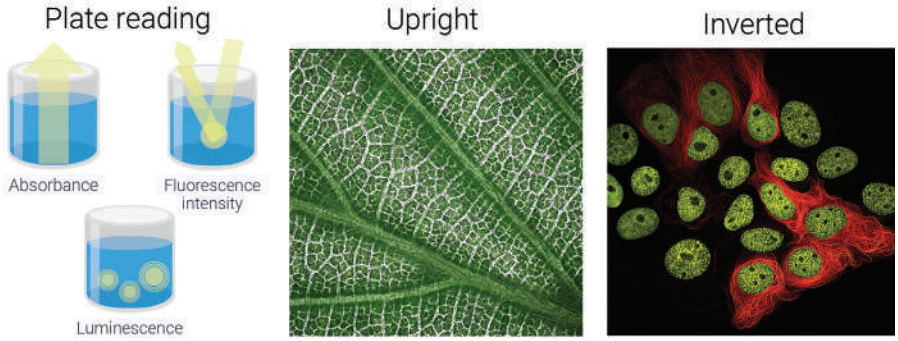
Agilent BioTek
Celebrating a decade of Imaging & Microscopy

Agilent BioTek Cytation 7 Cell Imaging Multimode Reader

The Agilent BioTek Cytation 7 cell imaging multimode reader is the most comprehensive imaging plate reader, with both inverted and upright microscopy enabling a wide range of applications, all in a compact and easy-to-use instrument.

Cytation 7 shown with CO_2/O_2 gas controller and dual-reagent injector.

Multimode plate reader with sophisticated imaging

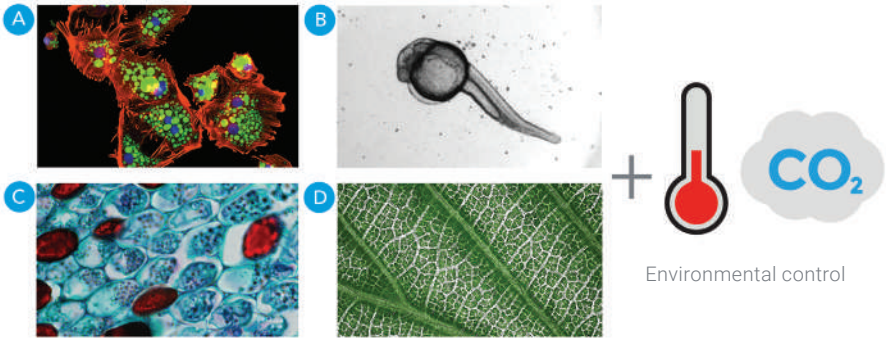


Cytation 7 builds on the legacy of the Agilent BioTek line of Synergy and Cytation readers with modular and upgradable modes. Cytation 7 includes both upright and inverted microscopy optics, which open up a wide range of cellular and reflected-light applications that cannot be performed on a standard plate reader. Information on cell morphology, localization of signal, cell count, object identification, and quantification can be obtained using the imaging modes of the Cytation 7. The monochromator plate reader optics allow the running of all standard plate-reader assays.

"Cytation 7 is incredibly easy and quick to use after initial setup. Installation of microscope lens and fluorescence cubes was very easy and straightforward, especially with the guide provided by the customer support team. The Cytation 7 yields consistent results and wonderful images."

– **Brian Freidhof,**
University of Arizona

- 3D cell culture
- Nucleic acid quantification
- Live cell imaging
- Biochemical assays
- Label-free cell counting
- Histology
- Calcium flux
- Apoptosis and necrosis
- Cell migration and invasion
- Cell proliferation
- Cell viability and toxicity
- Confluence
- Fast kinetics
- Genotoxicity
- Immunofluorescence
- Microbiology
- Phenotypic assays
- Stem cell differentiation
- Transfection efficiency
- Whole-organism imaging
- Normalization
- Phagocytosis
- Signal transduction
- Translocation



A. Fluorescence, **B.** Brightfield
C. Color brightfield, **D.** Upright reflected brightfield

Ready for any assay

With its combination of flexible plate reading and advanced microscopy mode, Cytation 7 is truly ready for any assay.

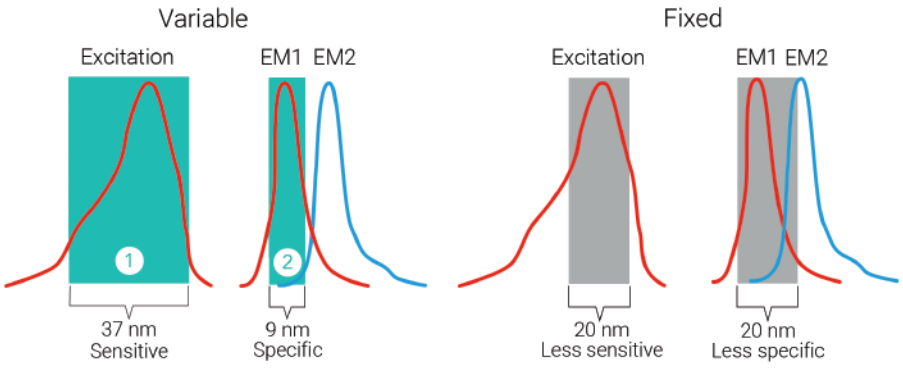
Comprehensive imaging solution

The inverted microscopy module of the Cytation 7 supports fluorescence, brightfield, and color brightfield from 1.25x to 60x to analyze both large objects and intracellular details. The upright, reflected-light imaging module enables a broad range of applications, such as ELISpot, colony counting, material inspection, and much more.

Flexible hardware: Six-objective turret, 1.25x to 60x, 20+ colors available, wide FOV camera.

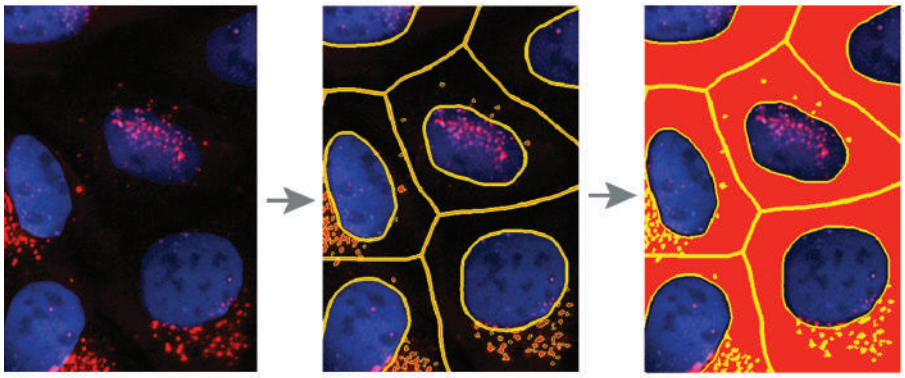
Full automation: Automated stage, autofocus, automated turret.

Live cell imaging: Temperature and gas (CO_2 and O_2) control for time-lapse live cell imaging.



Variable bandwidth for sensitivity and specificity

The plate reader optics of Cytation 7 use a quad monochromator design with variable bandwidth. The bandwidth can be set anywhere between 9 and 50 nm in 1 nm increments. Large bandwidth settings provide increased sensitivity and lower limits of detection. Small bandwidth settings provide increased specificity when multiple signals are present, which reduces signal crosstalk and enhances assay performance.

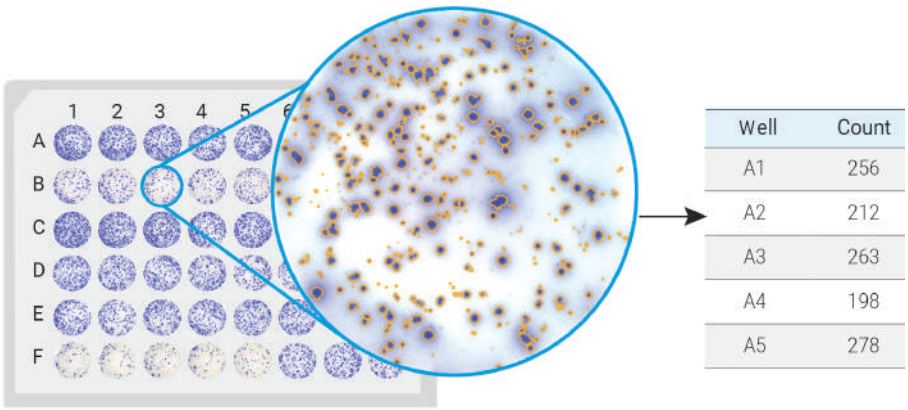


Powerful image processing and analysis

No need to process and analyze images one by one on a dedicated computer. In Gen5, preprogram your analysis tasks and walk away.

Image processing: stitching, z-projection, deconvolution, digital phase contrast

Image analysis: cell count, confluence, cytoplasm analysis, intracellular analysis, subpopulation analysis, signal translocation, and much more.



ELISpot imaging

The upright imaging module of the Cytation 7 can be used to automate assays such as ELISpot, in which cell secretions are rendered visible through the use of a colorimetric reaction. Cytation 7 fully automates image acquisition, processing, image analysis, and object count.

Cytation 7

Cytation 7 brings an advanced level of automated microscopy plus multimode detection into one platform. This system, driven by Agilent BioTek Gen5 microplate reader and imager software, enables myriad applications in imaging and biochemical research workflows.

Hit picking–multimode detection and imaging saves time and data storage

(1) Plate reader quickly identifies GFP-positive wells.

(2) Only GFP-positive wells are imaged, saving both time and computer memory.

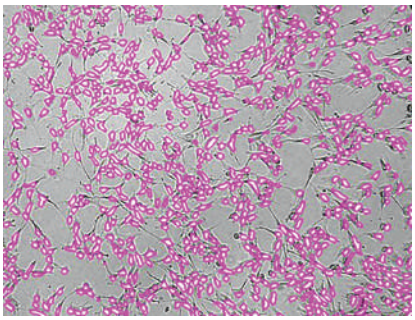
Microvolume analysis with the Take3 microvolume plate

Enable microvolume analysis with the Cytation 7 using the Agilent BioTek Take3 microvolume plate. Measure up to 16 or 48 samples in one run and save time compared to using single-sample devices. Gen5 microplate reader and imager software has customizable protocols for ssDNA, dsDNA, RNA, and protein quantification in 2 µL.

Applications–imaging and multimode detection

Label-free cell counting

Imaging



Use high-contrast brightfield imaging for accurate, label-free cell counting without the need for cell-labeling dyes.

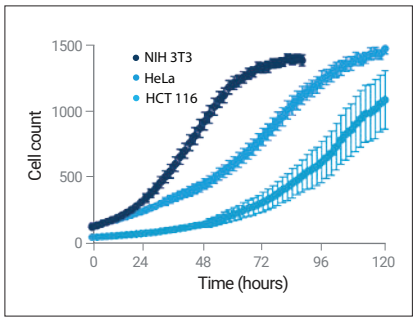
Calcium kinetics

Imaging

Dual-reagent injectors enable capture and analysis of fast inject/image assays like calcium kinetics.

Time-lapse live cell imaging

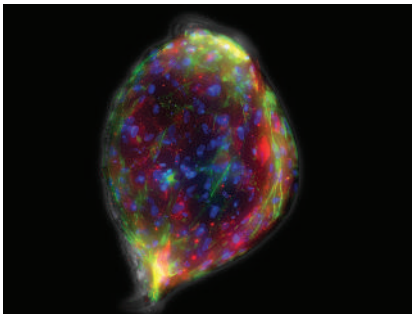
Imaging



Cell proliferation studies require controlled environments. Cytation 7 automates image capture through analysis.

3D cell culture

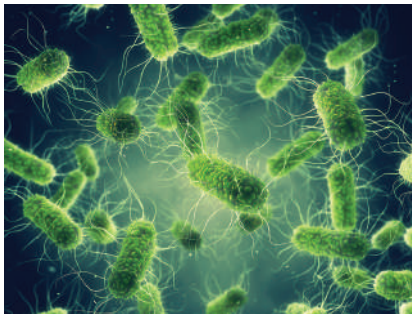
Imaging



Automate 3D spheroid and tumoroid assays using environmental control and Agilent BioTek Automated Media Exchange with an Agilent BioTek liquid handler. Z-stack, Z-project, and analyze with Gen5 microplate reader and imager software.

Microbiology

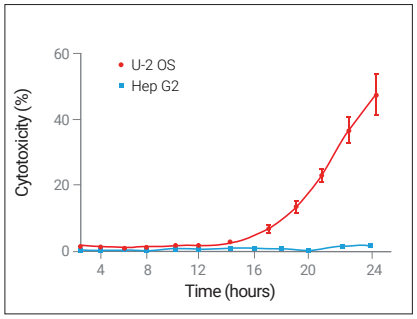
Imaging



High-magnification objectives, multiple imaging channels, and advanced image analysis capabilities enable analysis of a variety of microorganisms.

Cell viability/toxicity

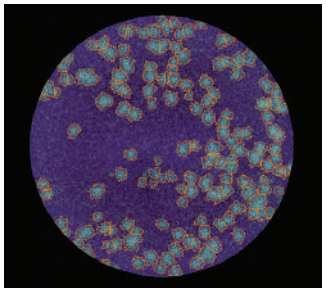
Imaging



Classic live/dead assays use fluorescent probes or membrane-impermeable dyes; viability or toxicity is measured in real time.

Virology

Imaging



The flexibility of the Cytation 7 and Gen5 software enable a variety of assays to be imaged and analyzed when performing viral research.

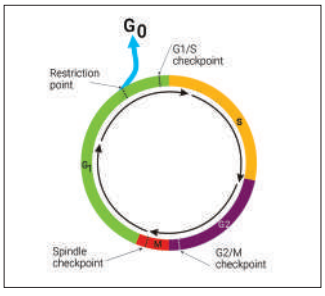
Whole-organism imaging

Imaging

Essential to current drug screening methods, whole organisms like zebrafish and nematodes are effectively imaged and analyzed with Cytation 7 and Gen5 microplate reader and imager software.

Cell cycle analysis

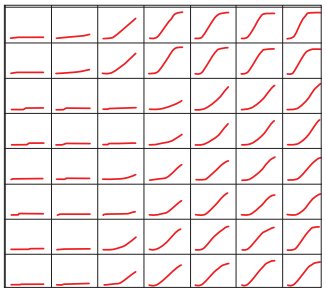
Imaging



The progression of cell growth though the cell cycle is a highly regulated process. Automated histogram analysis of objects facilitates threshold definition.

Cell growth

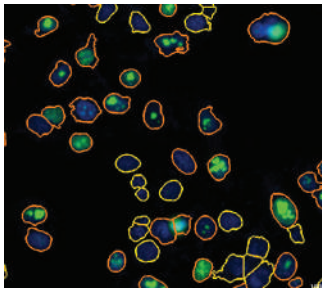
Multimode detection



Microbial growth assays, including those using yeast and bacteria, can be measured by several methods such as turbidimetric measurements with Cytation 7.

Transfection efficiency

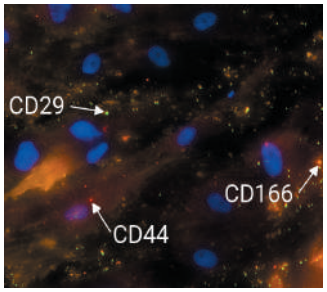
Imaging



Cytation 7 provides intuitive image analysis for automating the assessment of transfection efficiency.

Stem cell differentiation

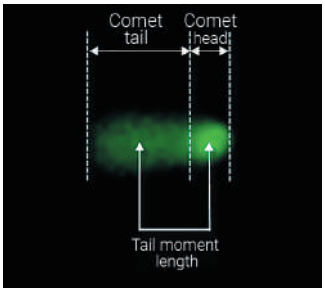
Imaging



Cytation 7, when integrated with the Agilent BioTek BioSpa 8 automated incubator and MultiFloFX multimode dispenser, automates analysis of the lengthy process of stem cell differentiation to find highly physiologically relevant cells for drug discovery.

Genotoxicity

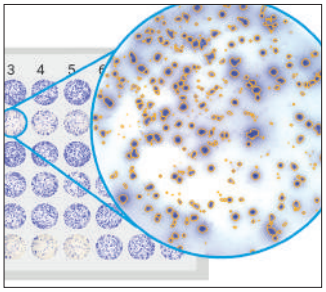
Imaging



The destructive effects of mutagens such as high-energy radiation and chemicals on nuclear DNA are measured with the comet assay and γH2AX immunofluorescence assays. Cytation 7 is an ideal imaging platform for these assays.

ELISpot

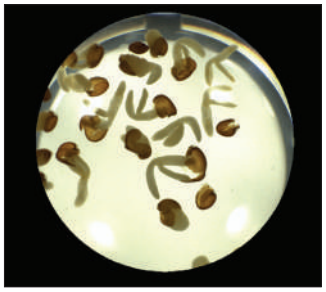
Imaging



ELISpot assays, in which cell secretions are made visible via colorimetric reactions, can be automated using the upright microscope of the Cytation 7.

Plant model imaging

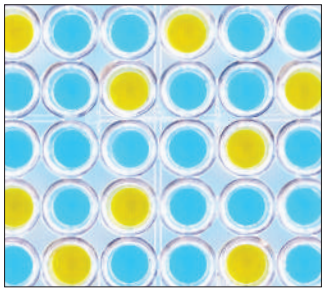
Imaging



The upright color camera on the Cytation 7 enables imaging of a variety of plant and animal models.

ELISA

Multimode detection



ELISA methods with colorimetric, fluorescent, and luminescent substrates are easily detected on Cytation 7.

Luciferase reporter assays

Multimode detection

Luciferase-based reporter assays measure luminescent signal. This enables users to quantify the activity of factors that affect particular signaling pathways.

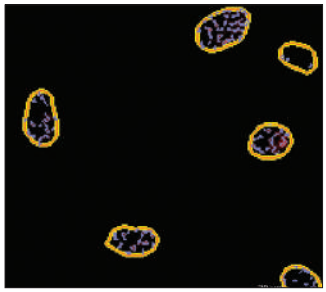
Nucleic acid and protein quantification

Multimode detection

Nucleic acid and protein quantification assays can be executed by spectrophotometric or fluorescent determination with Cytation 7, in microplates or in microvolumes with the Take3 microvolume plate.

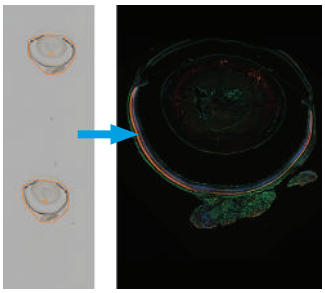
Applications–advanced imaging modules and overlays

Spot counting



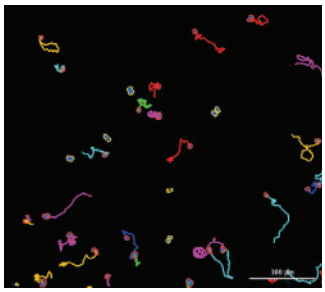
The Agilent BioTek spot counting module allows the user to gain information about a second set of objects within primary and/or secondary mask compartments, which are tied to the original primary mask data.

Automatic region of interest



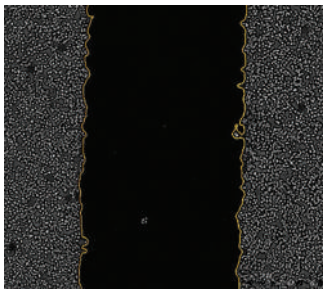
The automatic region-of-interest (AutoROI) module is a three-step process to eliminate superfluous image capture. A low-magnification step quickly images the entire area. The regions of interest are automatically identified, and high-magnification imaging of the areas then occurs.

Single-cell object tracking



The Agilent BioTek Gen5 object tracking module provides the ability to track single objects over time. Relative motility can be visualized by selecting single cells or entire populations within an image. Calculated metrics include total distance, Euclidean distance, and mean, median, and maximum object velocity.

Scratch Assay application



The Agilent BioTek Scratch Assay app provides an integrated workflow to capture images of, and analyze, 2D scratch wound healing assays. Predefined protocols for 24- and 96-well plates include auto-exposure, built-in image processing, and analysis to calculate average wound width, percent wound confluence, and maximum wound healing rates.

Peripherals

BioStack microplate stacker

The BioStack microplate stacker manages up to 50 microplates for automated imaging or multimode operations, including de and relidding of microplates used with cell-based assays.

CO_2/O_2 controller

The compact gas controller maintains control of CO_2 and O_2 levels in the Cytation 7 to support live cell assays.

BioSpa 8 automated incubator

The environmental controls and labware handling capabilities of the BioSpa 8 integrate with Cytation 7 to facilitate long-term live cell kinetic imaging processes for up to eight microplates and other labware.

Peltier cooling module

The Peltier cooling module cools the interior of the Cytation 7 after incubated processes, enabling efficient switching between multiple applications without unwanted temperature influences. The cooling module maintains environmental stability, allowing less than a 1 °C rise in ambient temperature, regardless of external and internal temperature fluctuation.

Take3 microvolume plate

Measure multiple 2 µL samples at a time with the Take3 microvolume plate, which can be used with Cytation 7. Microvolume nucleic acid and protein quantification are fast and easy.

Agilent BioTek Cytation 7

Technical Details

General	
Multimode Reading Methods	End point, kinetic, spectral scanning, well-area scanning
Detection Modes	UV-Vis absorbance, fluorescence intensity, luminescence
Imaging Methods	Single color, multicolor, montage, time lapse, Z-stacking
Autofocus Methods	Image-based and laser autofocus
Microplate Types	Multimode detection: 6- to 384-well plates Imaging: 6- to 1,536-well plates
Other Labware Supported	Microscope slides, Petri and cell culture dishes, cell culture flasks (T25), counting chambers (hemocytometers), Take3 microvolume plates
Environmental Controls	Temperature control to 45 °C CO_2/O_2 controller Peltier cooling module
Automation	BioSpa 8, BioStack, and third-party automation capability
Modularity and Configurability	Cytation 7 can include inverted and upright, or upright only, microscopes, with or without multimode detection Modules can be added as laboratory needs change
Inverted Microscope	
Imaging Modes	Fluorescence, color brightfield, user-selectable/high-contrast brightfield
Camera	Wide field of view WFOV monochrome camera
Imaging Objectives/Capacity	1.25x to 60x magnification/six-position automated turret
Imaging Filter Cubes	More than 20 filter/LED cubes available
Image Filter Cube Capacity	Four color channels plus brightfield
Upright Microscope	
Imaging Modes	Reflected- and transmitted-light microscopy
Camera	(WFOV) color camera
Lenses	Finder scope, 2x, 4x, and 8x magnification

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