

# Agilent BioTek Cytation 7 Cell Imaging Multimode Reader

The most comprehensive Agilent BioTek cell imaging multimode reader



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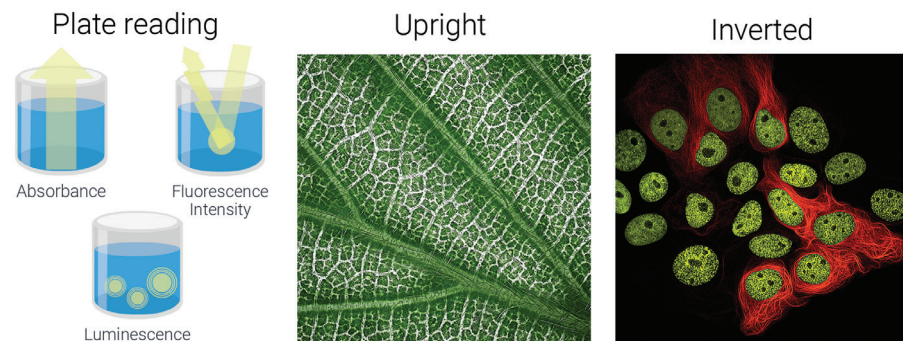


The Agilent BioTek Cytation 7 is the most comprehensive imaging plate reader, with both inverted and upright microscopy enabling a wide range of applications in a compact and easy-to-use instrument.



Cytation 7 shown with  
CO<sub>2</sub>/O<sub>2</sub> gas controller and  
dual reagent injector.

## Multimode plate reader with sophisticated imaging

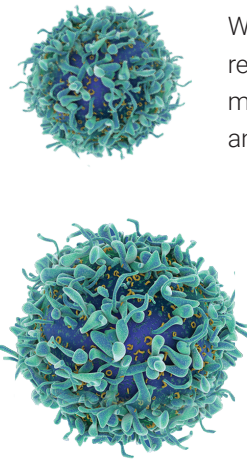


Cytation 7 builds on the legacy of the BioTek line of Synergy and Cytation readers with modular and upgradeable modes. Cytation 7 includes both upright and inverted microscopy optics which opens up a wide range of cellular and reflected-light applications that cannot be performed on a standard plate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

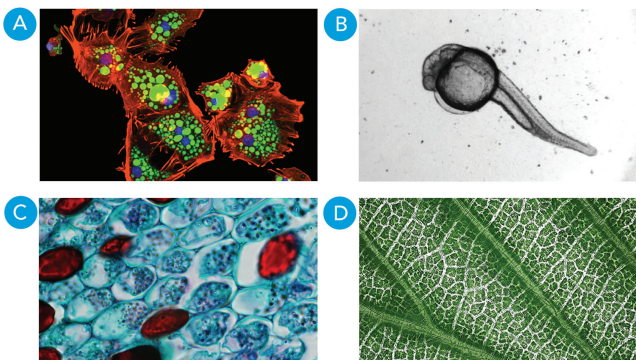
– **Brian Freidhof,**  
University of Arizona

- 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



### Ready for any assay

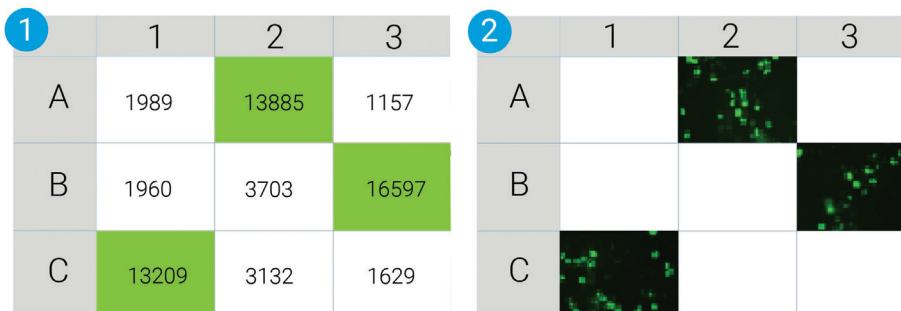
With its combination of flexible plate reader and advanced microscopy mode, Cytation 7 is truly ready for any assay.



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

### Comprehensive imaging solution

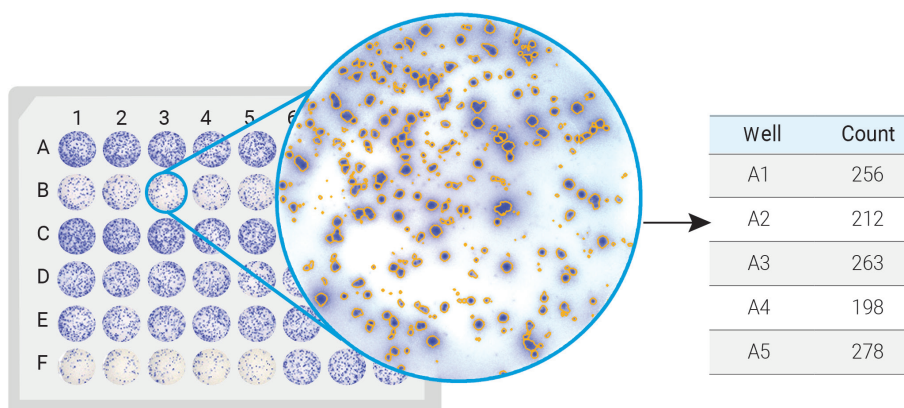
The inverted microscopy module of the Agilent BioTek Cytation 7 supports fluorescence, brightfield, and color brightfield from 1.25x to 60x to analyze both large objects and intracellular details. The upright reflected light imaging module enables a broad range of applications, such as ELISpot, colony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



## Hit-picking: multimode detection + imaging saves time and data storage

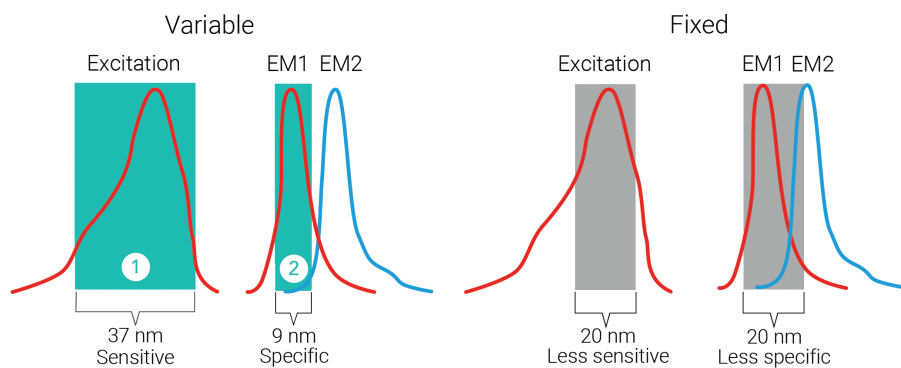
**(1)** Plate reader quickly identifies GFP-positive wells.

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



## 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.



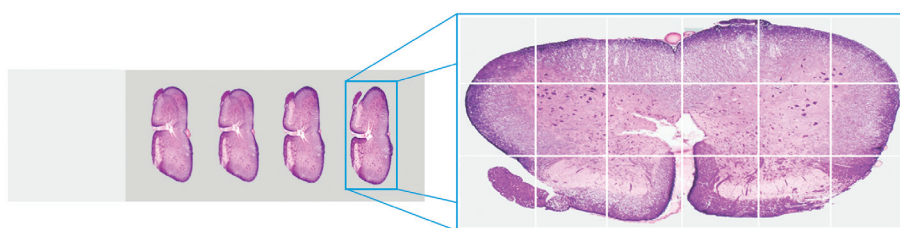
## Variable bandwidth for sensitivity and specificity

The plate reader optics of Cytation 7 uses 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.



## Agilent BioTek Cytation 7

Cytation 7 brings an advanced level of automated microscopy, plus multi-mode 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.

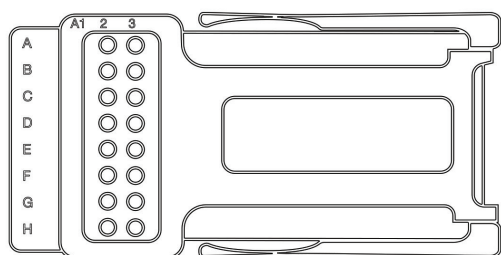


**A** Low-magnification scan and ROI identification

**B** High-magnification imaging

## ROI identification feature

Cytation 7 and Agilent BioTek Gen5 microplate reader and imager software facilitate ROI identification. Cytation 7 scans samples at low magnification and is capable of automatically identifying regions of interest to be imaged at high magnification. This greatly accelerates the process of imaging ROIs in batches of complex microscopic samples.



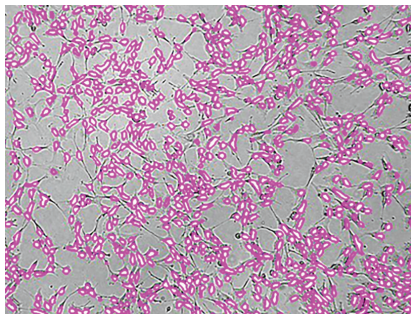
## Microvolume analysis the Agilent BioTek Take 3 microvolume plate

Enable microvolume analysis with the Cytation 7, using the Agilent BioTek Take 3 microvolume plate. Measure up to 16 or 48 samples in one run and save a lot of time, compared to single-sample devices. Agilent BioTek Gen5 microplate reader and imager software has customizable protocols for ssDNA, dsDNA, RNA, and protein quantification in 2  $\mu$ L.

# Applications: imaging and multimode detection

## Label-free cell counting

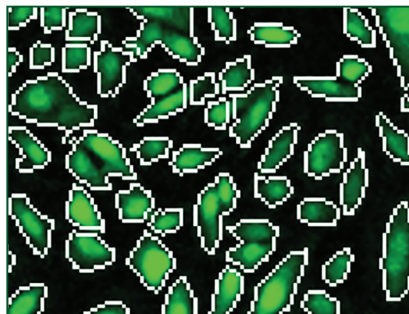
Imaging



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

## Calcium kinetics

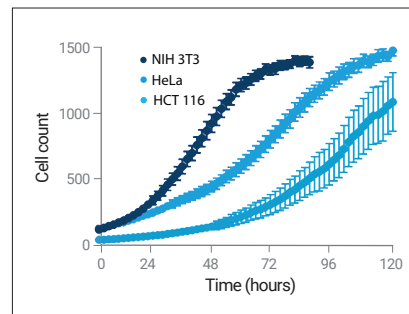
Imaging



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

## Time-lapse live cell imaging

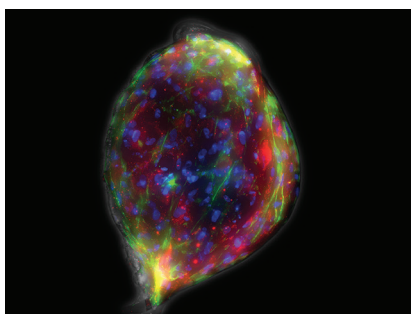
Imaging



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

## 3D cell culture

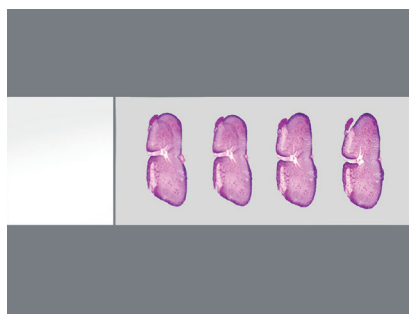
Imaging



Automate 3D spheroid and tumoroid assays using environmental control and automated media exchange with a BioTek liquid handler. Z-stack, z-project, and analyze with Agilent BioTek Gen5 microplate reader and imager software.

## Slide scanning

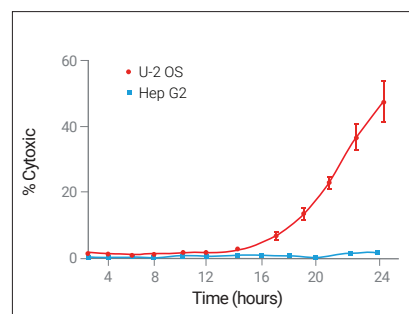
Imaging



H&E staining and color brightfield allow easy, rapid image capture and analysis. Automate and increase throughput by integrating Cytation 7 with BioStack microplate stacker.

## Cell viability/toxicity

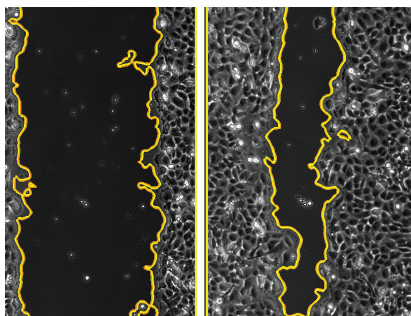
Imaging



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

## Cell migration

Imaging



High-throughput cell migration assays are enabled with AutoScratch Wound Making Tool, with time-lapse imaging under environmental controls in Cytation 7.

## Whole organism imaging

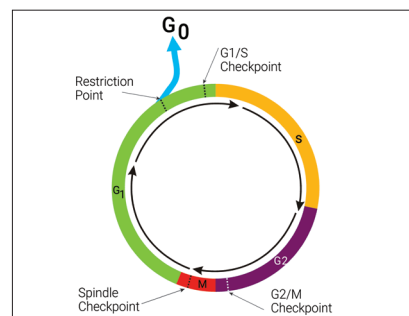
Imaging



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

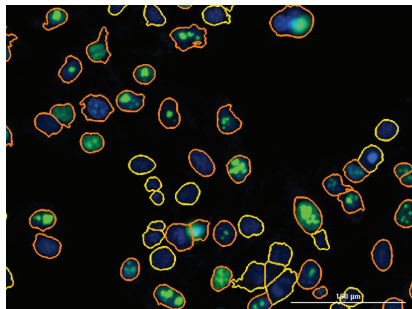
Imaging



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

## Transfection efficiency

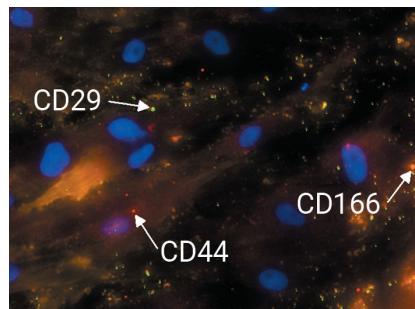
Imaging



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

## Stem cell differentiation

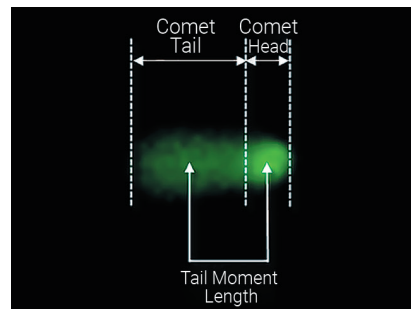
Imaging



Cytation 7, integrated with BioSpa, automated incubator and MultiFlo FX, multimode dispenser automate analysis of the lengthy process of stem cell differentiation to find highly physiologically relevant cells for drug discovery.

## Genotoxicity

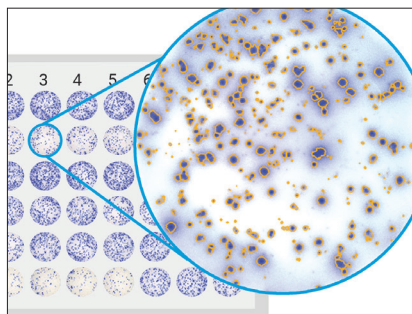
Imaging



The destructive effects of mutagens such as high-energy radiation and chemicals on nuclear DNA are measured with the comet assay and  $\gamma$ H2AX immunofluorescence assays. Cytation 7 is an ideal imaging platform for these assays.

## ELISpot

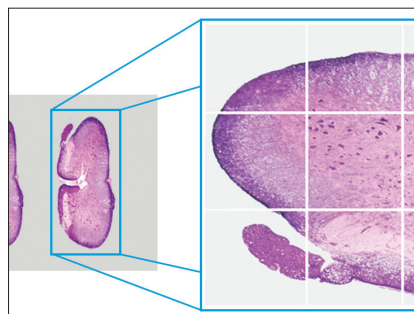
Imaging



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

## ROI identification

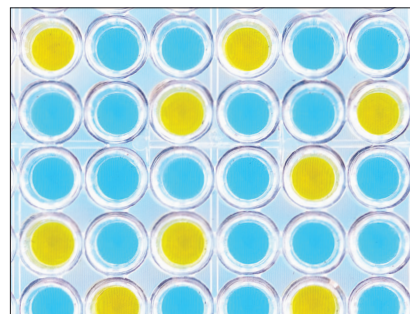
Imaging



An accelerated process for imaging ROIs in complex microscopic samples: use the functionality in Cytation 7 to scan samples at low magnification to find ROIs, then scan at higher magnification.

## ELISA

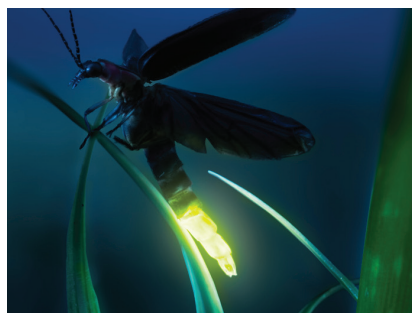
Multimode detection



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, allowing quantification of the activity of factors affecting the signaling pathways under investigation.

## Nucleic acid and protein quantification

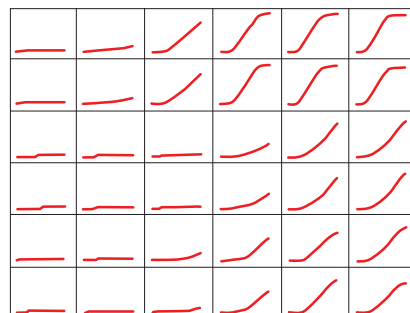
Multimode detection



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 Plate.

## Cell growth

Multimode detection



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

# Peripherals



## Agilent BioTek BioStack microplate stacker

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



## CO<sub>2</sub>/O<sub>2</sub> controller

The compact gas controller maintains control of CO<sub>2</sub> and O<sub>2</sub> levels in the Cytation 7 to support live cell assays.



### Agilent BioTek 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 after incubated processes, enabling efficient switching between multiple applications without unwanted temperature influences. The cooling module maintains environmental stability within Cytation 7, allowing  $<1$  °C rise in ambient temperature, regardless of external and internal temperature fluctuation.



### Take 3 microvolume plate

Measure multiple 2  $\mu$ L samples at a time with the Take3 microvolume plate, used with Cytation 7. Microvolume nucleic acid and protein quantification are made fast and easy.



# Technical Details



| General                        |                                                                                                                                                                |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Multimode reading methods      | Endpoint, 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<br>Imaging: 6- to 1,536-well plates                                                                                 |
| Other labware supported        | Microscope slides, Petri and cell culture dishes, cell culture flasks (T25), counting chambers (hemocytometers)<br>Take3 microvolume plates                    |
| Environmental controls         | Temperature control to 45 °C<br>CO <sub>2</sub> /O <sub>2</sub> controller<br>Peltier cooling module                                                           |
| Automation                     | BioSpa 8, BioStack and third-party automation capable                                                                                                          |
| Modularity and configurability | Cytation 7 can include inverted and upright microscopes or upright only, with or without multimode detection. Modules can be added as laboratory needs change. |
| Inverted Microscope            |                                                                                                                                                                |
| Imaging modes                  | Fluorescence, color brightfield, user-selectable brightfield/high contrast brightfield                                                                         |
| Camera                         | Wide field of view (WFOV) monochrome camera                                                                                                                    |
| Imaging objectives/capacity    | 1.25x to 60x magnification/6 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 light and transmitted light microscopy                                                                                                               |
| Camera                         | Wide field of view (WFOV) color camera                                                                                                                         |
| Lenses                         | Finder scope, 2x, 4x, and 8x magnification                                                                                                                     |

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