

# CYTATION|5

cell imaging multi-mode reader

Powerful imaging & microscopy and  
advanced multi-mode detection



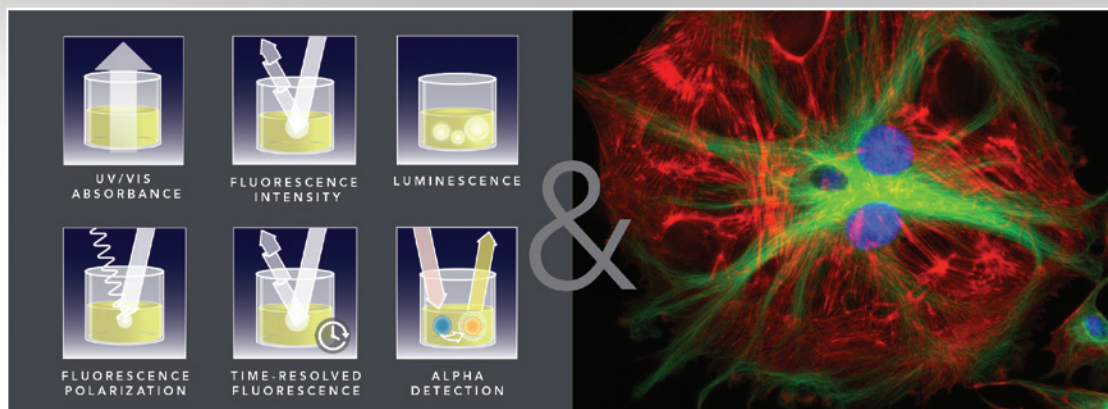
# CYTATION|5

cell imaging multi-mode reader

Cytation™ 5 combines automated digital microscopy and conventional microplate detection in a configurable, upgradable platform. This patented design, along with Gen5™ Software, enables automated workflows across a vast range of biochemical and imaging applications.



## Multi-mode plate reader with sophisticated imaging

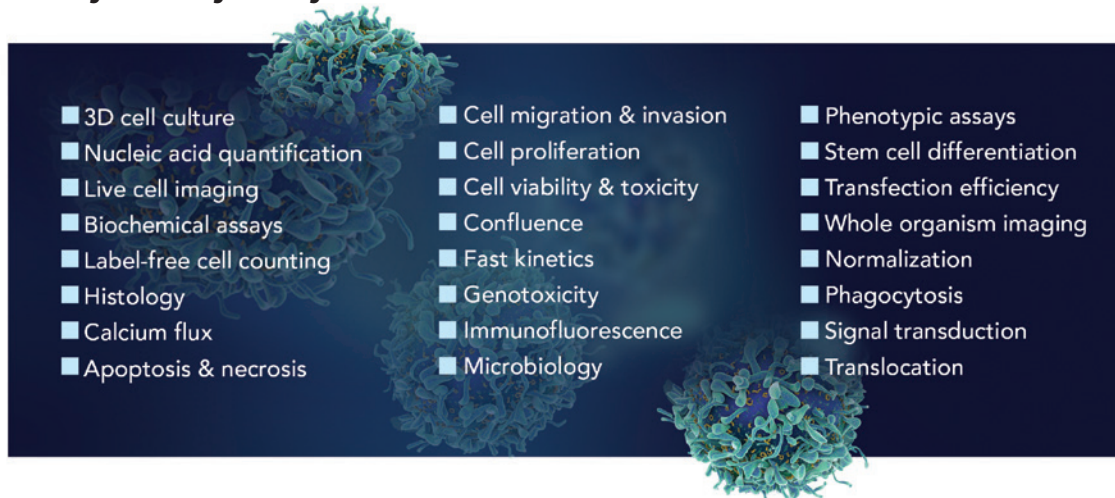


Cytation 5 extends the legacy of BioTek's multi-mode plate readers with a modular and upgradable imaging mode. Imaging opens up a range of applications for cell-based assays that cannot be performed on a standard plate reader. Information on cell morphology, localization of signal, cell count and more is obtained with Cytation 5's imaging mode.

**Plate reading:** absorbance, fluorescence; luminescence; advanced read modes

**Imaging:** fluorescence; phase contrast; high contrast brightfield; brightfield; color brightfield

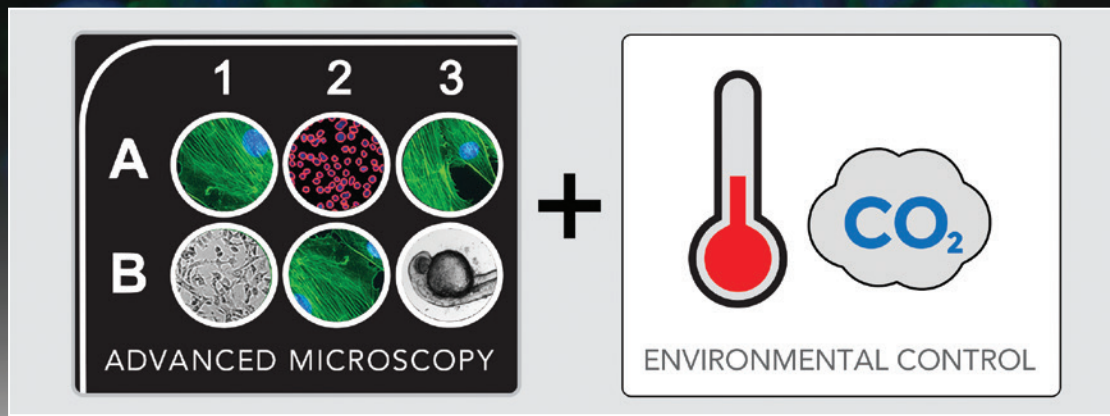
## Ready for any assay



With its combination of hybrid plate reader and advanced microscopy mode, Cytation 5 is truly ready for any assay. Contact us to learn how Cytation 5 can transform your lab and greatly increase your productivity.



## Advanced microscopy: Unlimited possibilities



Cytation 5 automates many traditionally manual microscopy tasks, from slide scanning to time-lapse live cell assays; from low to high magnification. Cytation 5 is ready for any imaging assay.

**Flexible hardware:** 6-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<sub>2</sub> and O<sub>2</sub>) control for time-lapse live cell imaging

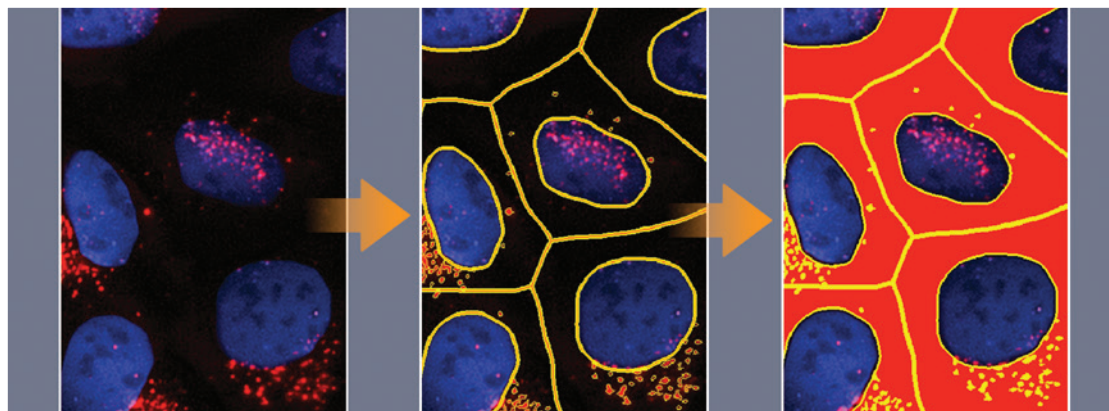
## Hit-picking: Multi-mode detection + imaging saves time and data storage

1	1	2	3	2	1	2	3
A	1989	13885	1157	A			
B	1960	3703	16597	B			
C	13209	3132	1629	C			

(1) Plate reader quickly identifies GFP positive wells.

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

## Powerful image processing and analysis

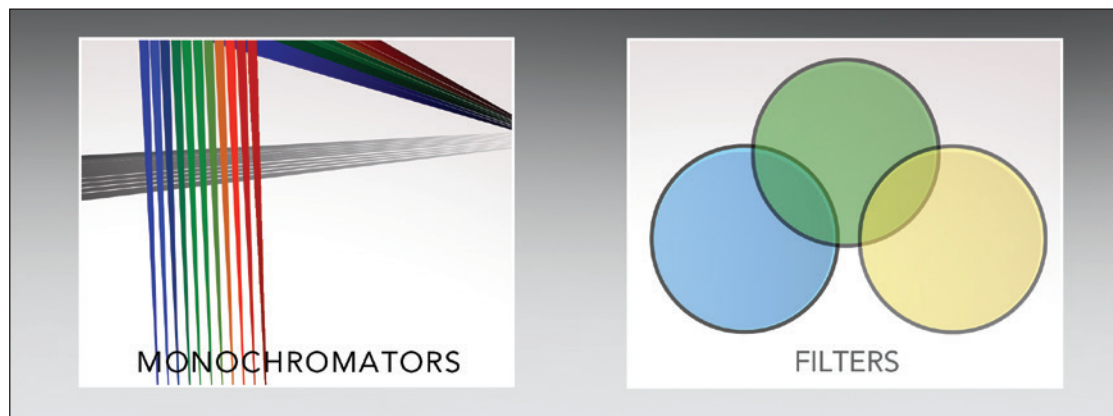


No need to process and analyze images one by one on a dedicated computer. In Gen5, pre-program your analysis tasks and walk away.

**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.

## Hybrid plate reader: Flexibility and performance

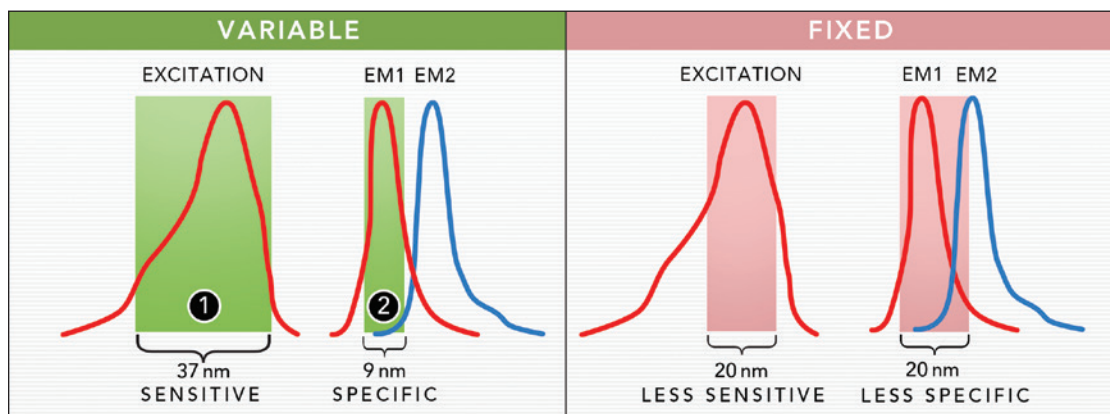


With its patented combination of monochromator and filter optics, Cytation 5 is an advanced plate reader that delivers both the flexibility and performance you need for any microplate assay in your lab.

**Monochromator:** variable bandwidth, absorbance, fluorescence, luminescence

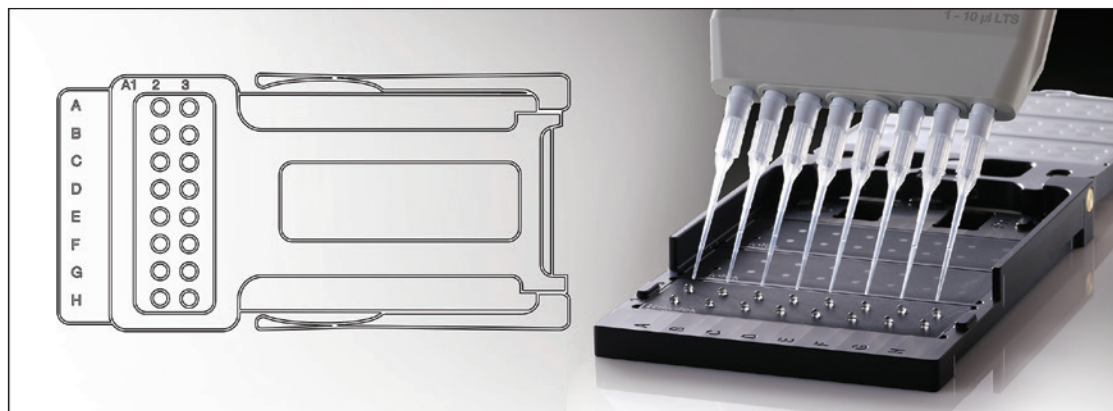
**Filters:** fluorescence polarization, time-resolved fluorescence, Alpha laser

## Variable bandwidth for sensitivity and specificity



The plate reader optics of Cytation uses a quad monochromator design with variable bandwidth. The bandwidth can be set anywhere between 9 and 50 nm in 1 nm increment. Large bandwidth (1) settings provide increased sensitivity and lower limits of detection. Small bandwidth settings (2) provide increased specificity when multiple signals are present, which reduces signal crosstalk and enhances assay performance.

## Micro-volume analysis with Take3 plate

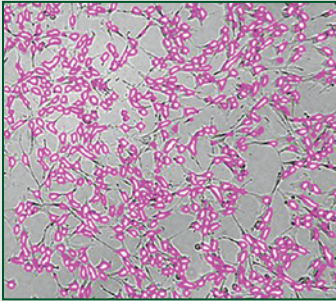


Turn your Cytation 5 into a micro-volume analysis system with Take3. You can run 16 or 48 samples in one run to save a lot of time compared to single-sample devices. Gen5 is pre-programmed for ssDNA, dsDNA, RNA and protein quantification in 2  $\mu$ L.

# APPLICATIONS:IMAGING

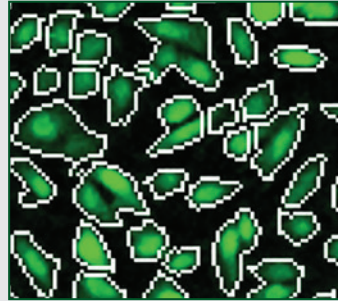
BioTek's Cytation 5, along with Gen5 software, can automate a broad range of application workflows. Here are several examples of important applications in Imaging & Microscopy and Multi-mode Detection that are easily managed with Cytation 5 Cell Imaging Multi-mode Reader.

## Label-free cell counting



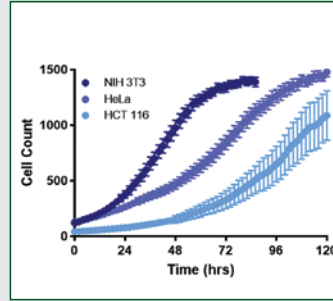
Use high contrast brightfield imaging for accurate label-free cell counting without the need for cell labeling dyes.

## Calcium kinetics



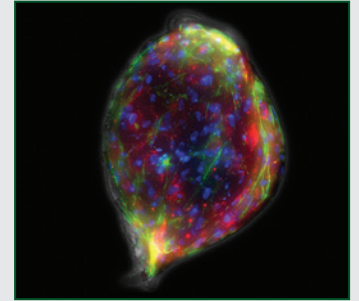
Cytation 5's dual reagent injectors enable capture and analysis of fast inject/image assays like calcium kinetics.

## Time-lapse live cell imaging



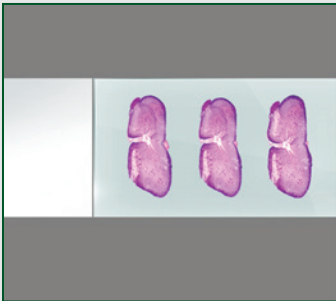
Cell proliferation studies require controlled environments. Cytation 5 automates image capture through analysis.

## 3D cell culture



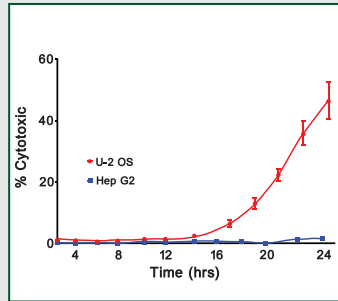
Automate 3D spheroid and tumoroid assays using environment control and automated media exchange with a BioTek liquid handler. Z-stack, z-project and analyze with Gen5.

## Slide scanning



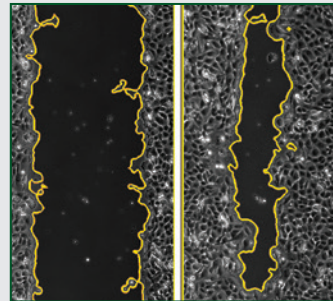
H&E staining and color brightfield allow easy, rapid image capture and analysis. Automate and increase throughput by integrating Cytation 5 to BioStack™ Microplate Stacker.

## Cell viability/toxicity



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

## Cell migration



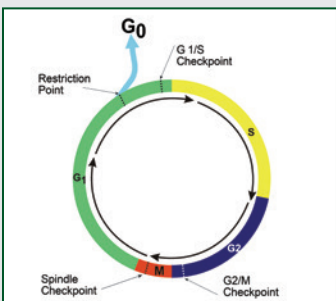
High throughput cell migration assays are enabled with AutoScratch Wound Making Tool, with time-lapse imaging under environmental controls in Cytation 5.

## Whole organism imaging



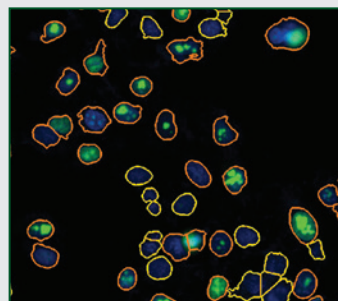
Essential to current drug screening methods, whole organisms like zebrafish and nematodes are effectively imaged and analyzed with Cytation 5 and Gen5 software.

## Cell cycle analysis



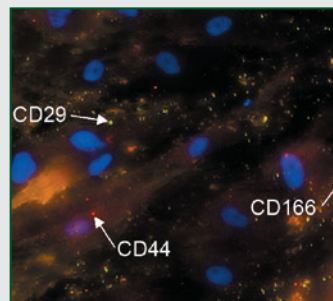
The progression of cellular growth through the cell cycle is a highly regulated process. Automated histogram analysis of objects facilitates threshold definition.

## Transfection efficiency



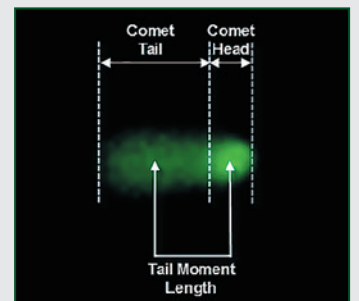
Cytation 5 provides intuitive image analysis for automating the assessment of transfection efficiency.

## Stem cell differentiation



Cytation 5, integrated with BioSpa Automated Incubator and MultiFlo™ FX Multi-Mode Dispenser automate analysis of the lengthy process of stem cell differentiation to find highly physiologically relevant cells for drug discovery.

## Genotoxicity

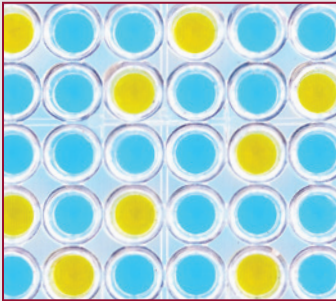


The destructive effects of mutagens such as high energy radiation and chemicals on nuclear DNA are measured with the comet assay and γH2AX immunofluorescence assays. Cytation 5 is an ideal imaging platform for these assays.



# APPLICATIONS: MULTI-MODE DETECTION

## ELISA



ELISA methods with colorimetric, fluorescent and luminescent substrates are easily detected with Cytation 5.

## Luciferase reporter assays



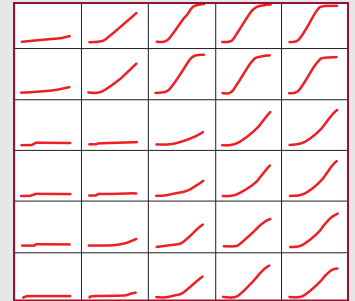
Luciferase-based reporter assays measure luminescent signal, allowing the quantification of the activity of factors affecting the signaling pathways under investigation.

## Nucleic acid & protein quantification



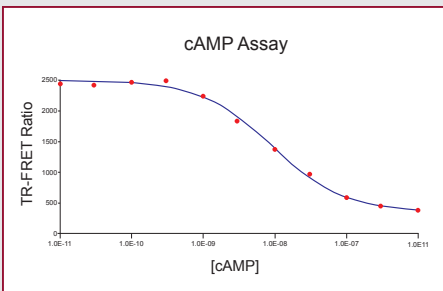
Nucleic acid and protein quantification assays can be executed by spectrophotometric or fluorescent determination with Cytation 5, in microplates or in micro-volumes with the Take3 Plate.

## Cell growth



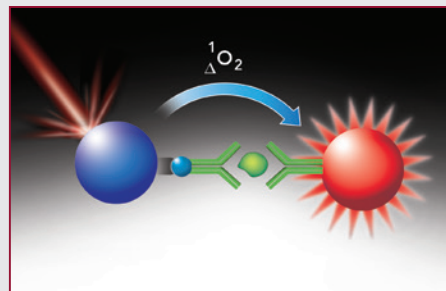
Microbial growth assays including yeast and bacteria can be measured by several methods, including turbidimetric measurements with Cytation 5.

## TR-FRET



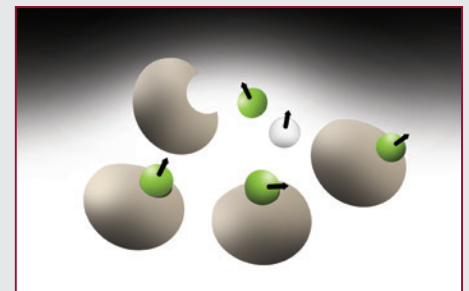
TR-FRET and HTRF<sup>®</sup> are sensitive, robust methods. Cytation 5 and Gen5 provide excellent sensitivity for optimal Z' factors.

## AlphaScreen



AlphaScreen<sup>®</sup> technology provides high signal:background ratios. The measurable energy transfer is emitted in the 520-620 nm.

## Fluorescence polarization



FP is widely used in research labs to study molecular binding or dissociation events and in screening labs to screen for drug candidates.



# PERIPHERALS

BioTek offers peripherals and accessories to facilitate imaging and multi-mode workflows with Cytation 5. Here, we've highlighted a few key peripherals; See the Peripherals and Accessories sections on [www.biotek.com](http://www.biotek.com) for more.



## BioSpa 8 Automated Incubator

BioSpa's environmental controls and labware handling capabilities, integrated with Cytation 5, facilitate long term live cell kinetic imaging processes for up to 8 microplates and other labware.



## BioStack Microplate Stacker

BioStack manages up to 50 microplates for automated imaging or multi-mode operations, including de-lidding and re-lidding of microplates used with cell-based assays.



## Scratch Assay Starter Kit

The Scratch Assay Starter Kit includes the AutoScratch Wound Making Tool and Scratch Assay App, plus everything else a researcher needs to implement automated, kinetic cell migration and scratch wound assays. Prepare your plates, and capture, process and analyze the kinetic images.



## 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 Cytation 5 to support live cell assays.

## Dual Reagent Injector

The dual reagent injector module enables fast inject/image or inject/read processes. Angled injector tips protect cell monolayers from shear stress during injection.



## 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 5, allowing <1 °C rise in ambient temperature, regardless of external and internal temperature fluctuation.



## Take3 Micro-Volume Plate

Measure multiple 2 µL samples at a time with the Take3™ Micro-Volume Plate, used with Cytation 5. Micro-volume nucleic acid and protein quantification made fast and easy.

## TECHNICAL DETAILS

General	
Microplate types	Monochromator: 6- to 384-well plates Filters: 6- to 1536-well plates Imaging: 6- to 1536-well plates
Other labware supported	Microscope slides, Petri and cell culture dishes, cell culture flasks (T25), counting chambers (hemocytometer) Take3 Micro-Volume Plates
Environmental controls	Temperature control to 65 °C CO <sub>2</sub> /O <sub>2</sub> controller Peltier cooling module
Shaking	Linear, orbital, double-orbital
Automation	BioSpa 8, BioStack and 3rd party automation capable
Modularity and configurability	Cytation 5 has many available configurations, including imaging only, multi-mode only and combinations. Modules can be added as laboratory needs change.
Imaging	
Imaging modes	Fluorescence, brightfield, high contrast brightfield, color brightfield, phase contrast
Imaging methods	Single color, multi-color, montage, time-lapse, z-stacking
Light source	Long-life LEDs
Camera	16-bit Sony CMOS, standard or wide FOV
Imaging objectives/capacity	1.25x to 60x magnification/6 position automated turret
Imaging filter cubes	More than 20 filter/LED cubes available
Imaging filter cube capacity	4 color channels plus brightfield
Autofocus methods	Image-based and laser autofocus
Multi-Mode Detection	
Detection modes	UV-Vis absorbance Fluorescence intensity Luminescence Fluorescence polarization Time-resolved fluorescence Alpha
Reading methods	Endpoint, kinetic, spectral scanning, well area scanning



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