Agilent Cell Viability Workstation

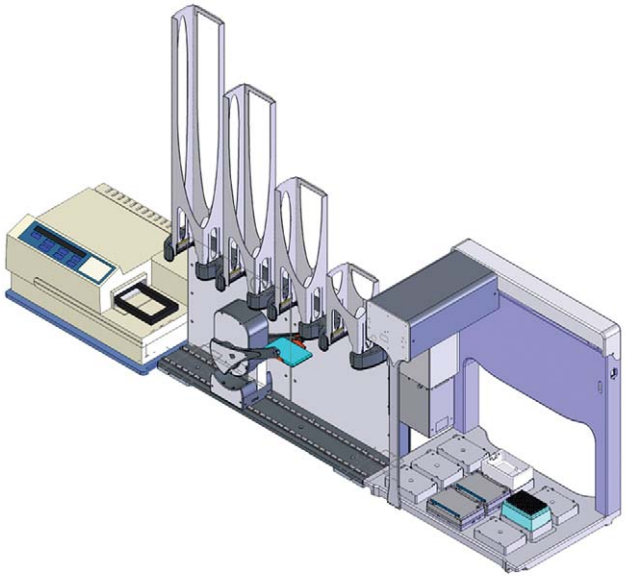
Application Bulletin

Summary

- Small footprint workstation for automated cell viability testing
- Up to 65 microplates can be processed in one run, without user intervention
- Microplate processing time about 3 hours for a 50-microplate run

Introduction

Cell viability testing is an important part of ADME/Tox compound profiling. The demand for this type of assay is high because of the increasing output from high-throughput screening (HTS) and the pressure to front load as much toxicity testing as possible during the drug discovery process. There are a number of different approaches for cell viability testing. Viable cells contain ATP. Therefore measuring the amount of ATP in a cell population reveals the number of viable cells in this population. The CellTiter-Glo kit creates a luciferase reaction, generating luminescence that can be detected on the workstation. The amount of luminescence is directly proportional to the amount of ATP present.



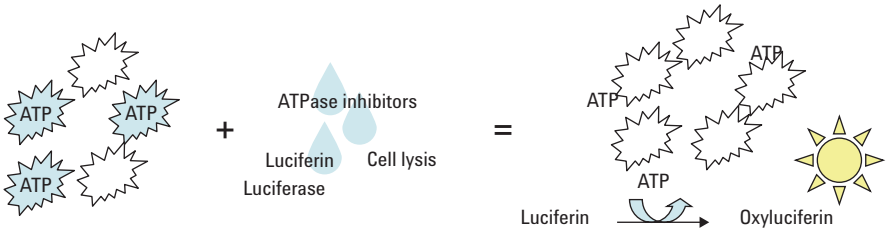
Agilent Cell Viability Workstation consisting of a Molecular Devices SpectraMax M5 (left), an Agilent BenchCel Microplate Handling Workstation integrated with an Agilent Bravo Automated Liquid Handling Platform (right)

System Description

The Promega CellTiter-Glo kit is ideally suited for adaptation on automated workstations. The integration of the Agilent Bravo Platform with the Agilent BenchCel Workstation enables the user to run high-throughput assays with maximum walk-away time. The BenchCel robot delivers microplates to the Bravo Platform where reagents are added, and microplates are placed on shaking stations. Pipetting can be performed without tip touching, preventing cross-contamination and eliminating the need to change tips. The BenchCel robot retrieves the microplates for room-temperature incubation, directly followed by signal detection in the Molecular Devices SpectraMax M5 device. The BenchCel Microplate Handling Workstation provides microplate-orientation sensing so all microplates enter the reader in the same orientation, ensuring that the data output is consistent from the first microplate to the last.

Agilent VWorks Automation Control software manages all processes and incubation times to ensure reliable and repeatable results. Drag-and-drop protocol creation and modification is simple using the VWorks software, which schedules all of the necessary steps to allow simultaneous microplate processing for optimal throughput.

This application bulletin outlines a protocol for the Promega CellTiter-Glo kit using the cell viability workstation.



Overview of the science behind the Promega CellTiter-Glo kit. ATP in viable cells is converted into directly proportional light signal, utilizing the luciferase reaction.

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Materials

Component List

- Agilent BenchCel Workstation (R-series with 4 stackers)
- Agilent Bravo Platform with gripper, 384ST disposable-tip pipette head, reservoir, 2 Orbital Shaking Stations
- Molecular Devices SpectraMax M5
- Agilent VWorks Automation Control software

Labware List

- Microplate A: Greiner 96PS black, tissue-culture treated
- Tipbox A: Agilent Tips 384 ST 70 µL

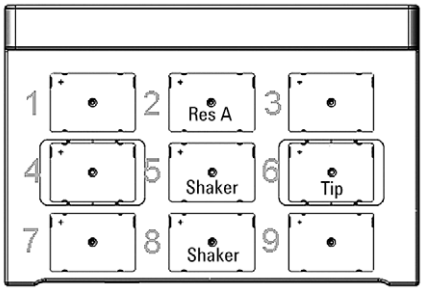
Reagent List

- Reservoir A: CellTiter-Glo reagent

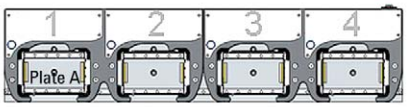
Protocol Workflow

1. Move microplate A from BenchCel stacker 1 to Bravo deck location 7.
2. Press on tips at Bravo deck location 6.
3. Aspirate 25 µL CellTiter-Glo from reservoir A and dispense into microplate A.
4. Move microplate A from deck location 7 to 5 (shaker).
5. Shake for 2 min.
6. Move microplate A from deck location 5 to 7.
7. Move microplate A from Bravo deck location 7 to BenchCel stacker 2.
8. Incubate for 10 min.
9. Move microplate A from BenchCel stacker 2 to the SpectraMax device.
10. Read microplate A on the SpectraMax device.
11. Move microplate A from the SpectraMax device to BenchCel stacker 4.

Instrument Layout



Agilent Bravo deck layout: locations 5 and 8 are configured with Orbital Shaking Stations (shaker) for enhanced throughput. A reservoir and a tipbox are placed manually at locations 2 and 6, respectively, before the protocol starts.



Agilent BenchCel stacker layout: stacker 1 contains microplate A (can store up to 65 microplates), stackers 2 and 3 are used for incubation, and stacker 4 receives the processed microplates.

Conclusions

The Agilent Cell Viability Workstation using the Promega CellTiter-Glo kit provides a reliable, high-throughput solution for analyzing cell viability. The integration of microplate handling, liquid handling, and microplate reading enables up to 65 microplates to be processed in one run without user intervention. Following the guidelines set by Promega, the typical throughput for this setup is about 3 hours for 50 microplates, depending on exact protocol and liquid-handling steps.

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