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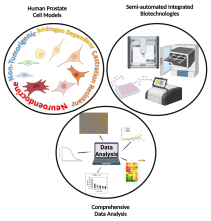
Automation, live-cell imaging, and endpoint cell viability for 96-well plate drug screens



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We use this collection and it's working

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Keywords: live-cell imaging, endpoint cell viability, 96-well plate drug screens, integrated drug screen, drug efficacy across multiple cell line, cell imaging platform, active cancer therapeutic, cell imaging, future cancer research study, single drug screen, drug screen, well plate drug screen, glo endpoint viability assay, cancer model system, incucyte zoom, cell viability, drug efficacy, cell line, cytotoxic effect, panel of cell line, screen compound, well plate cell growth condition, cell specific morphological change, multiple cell line

Abstract

To streamline the identification of potentially active cancer therapeutics, here we describe a highly adaptable semi-automated approach to screen compounds simultaneously across a panel of cell lines. These protocols leverage automation to enhance robustness, reproducibility, and throughput while integrating the IncuCyte ZOOM live-cell imaging platform and the CellTiter-Glo endpoint viability assay to assess drug efficacy. The integration of both evaluative methods strategically bypasses the shortcomings of each approach individually allowing for more thorough and detailed analysis within a single drug screen. The expected output from protocol utilization includes traditional dose-response curves, IC50, area-under the curve (AUC), GR50, area-over the curve (AOC) as well as live-cell imaging to identify cell specific morphological changes, cytostatic, or cytotoxic effects of 72-hour drug treatments. This adaptable protocol can be employed across cancer model systems and represents a reproducible procedure to optimize 96-well plate cell growth conditions compatible with the integrated drug screen and simultaneously assess drug efficacy across multiple cell lines in future cancer research studies.

Attachments

PDF

S1.pdf
1.3MB

Materials

For this protocol you will need:

CellTiter-glo (Promega, Cat# G7572) Luminescence Viability Assay or comparable endpoint cell viability assay

Luminometer compatible with the Promega CellTiter-Glo assay. This protocol features the Promega GloMax (Promega, Cat# GM3500) Explorer Multimode Microplate Reader.

A liquid handler system. This protocol features the Opentrons OT-2 Robot liquid handler system.

OT-2 Required attachments:
- P300 Single-Channel GEN2 Pipette
- P300 8-Channel GEN2 Pipette
- Opentrons 96 Tip Racks 300 µL
- 12-Channel Reservoirs for Automation (USA Scientific, Cat# 1061-8150)

White opaque welled, clear bottom 96-well tissue culture compatible plates. This protocol features Greiner Bio-one Cell culture microplate, 96 well, PS, F-Bottom, µClear (Sigma Aldrich,M0437-32EA)

Sartorius IncuCyte ZOOM Live-cell analysis system or any comparable live cell imaging platform.
- Compatible IncuCyte ZOOM Live cell analysis software.

Sterile tissue culture hood

Standard 8-channel p200 multi-channel pipette

White Opaque Lab Tape

Standard 25 mL reagent reservoirs (VWR, Cat# 89094-662)

Standard tissue culture reagents

Standard 96-well plate (clear)

Standard 24-well plate (clear)

Attachments

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S1.pdf
1.3MB

Files

SEARCH

Protocol

NAME

96-well plate cell growth optimization for integrated live-cell and endpoint viability drug screening assay

VERSION 1

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Protocol

NAME

96-well plate OT-2 liquid handler integrated live-cell and endpoint viability drug activity screen

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