SARTORIUS

Protocol

Incucyte® Label-Free Cell Proliferation Assay

For Counting and Confluence Measurements of Adherent or Non-Adherent Cell Lines

This protocol provides an overview of the Incucyte® Label-Free Cell Proliferation Assay methodology. It is compatible with the Incucyte® Live-Cell Analysis System for kinetic, label-free analysis of cell confluence or cell counts using your choice of cells and treatments. The highly flexible assay format can be combined with our range of Incucyte® cell health and viability reagents for multiplexed measurements of cytotoxicity and apoptosis alongside proliferation in the same well.

Required Materials

- Flat bottom tissue culture plate (e.g., Corning Cat. No. 3595)

Optional Materials

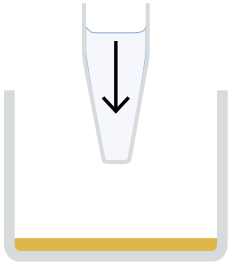
- Incucyte® Cell-By-Cell Analysis Software Module (Sartorius Cat. No. 9600-0031)
  —for label-free cell counting
- Poly-L-ornithine (Sigma Cat. No. P4957)
  —for non-adherent cells
- Fibronectin (Sigma Cat. No. F1141)
  —for non-adherent cells

General Guidelines

- Following cell seeding, place plates at ambient temperature (30 minutes for both adherent and non-adherent cell lines) to ensure homogenous cell settling.
- Remove bubbles from all wells by gently squeezing a wash bottle containing 70–100% ethanol with the inner straw removed, to blow vapor over the surface of each well.
- After placing the plate in the Incucyte® Live-Cell Analysis System, allow the plate to warm to 37 °C for 30 minutes prior to scanning.

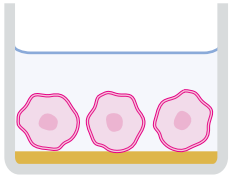
Quick Guide

1. Coat wells



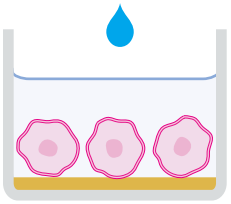
Coat wells of plate (50 µL/well) with appropriate matrix. Optional for adherent cell lines.

2. Plate cells



Seed cells (100 µL/well, 1,000–10,000 for adherent and 5,000–50,000/well for non-adherent) into a 96-well plate.

3. Add treatments



Add desired treatments (2X for both adherent and non-adherent cell lines—no media removal).

Adherent Cell Line Protocol

Day 0

1. Coat Wells (optional)

1.1 Depending on cell line used, coat a 96-well flat bottom plate with relevant coating matrix according to manufacturer's recommendation.

2. Plate Cells

2.1 Seed your choice of cells (100 µL per well) at an appropriate density into a 96-well plate, such that by day 1 the cell confluence is approximately 10–20%. The seeding density will need to be optimized for the cell line used; however, we have found that 1,000–2,500 cells per well (10,000–25,000 cells/mL seeding stock) are reasonable starting points.

a. Monitor cell growth using the Incucyte® Live-Cell Analysis System to capture phase contrast images every two hours and analyze using the integrated confluence algorithm.

Day 1

3. Add Treatments

3.1 Prepare cell treatments at 2X final assay concentration in cell culture medium. The volumes may be varied; however, we recommend preparing enough volume of each desired treatment | dilution in order to achieve 100 µL per well.

3.2 Add treatments and controls (100 µL per well) to appropriate wells of the 96-well plate.

3.3 Place the cell plate into the Incucyte® Live-Cell Analysis System and allow the plate to warm to 37 °C for 30 minutes prior to scanning.

a. Scan type: Standard or Adherent Cell-by-Cell (for cell counting)

Note: Label-free cell counting can be enabled on Incucyte® Live-Cell Analysis Sytem with use of the Incucyte® Cell-by-Cell Analysis Software Module.

b. Image channels: Phase (and fluorescence if fluorescent label or cell health reagents are used)

c. Objective: 4X, 10X (recommended for Adherent Cell-by-Cell) or 20X

d. Scan interval: Typically, every 1 to 2 hours until your experiment is complete

Quantification of cell proliferation across multiple cell types is enabled using Incucyte® AI Confluence and Basic Fluorescence Analysis, available within the base software package. For detailed instructions on setting up scans and analysis jobs refer to the Incucyte® Basic Analyzer Guidelines.

For further details of this analysis module and its application see: https://www.sartorius.com/en/applications/life-science-research/cell-analysis/live-cell-assays/cell-health-proliferation/proliferation

Non-Adherent Cell Line Protocol

Day 1

1. Seed Cells and Add Prepared Treatments

1.1 Coat a 96-well flat bottom plate with relevant coating matrix. We recommend coating with 50 µL of either 0.01% poly-L-ornithine solution or 5 µg/mL fibronectin diluted in 0.1% BSA. Coat plates for 1 hour at ambient temperature, remove solution from wells, then allow plates to dry for 30–60 minutes prior to cell addition.

1.2 Prior to cell seeding, prepare cell treatments at 2X final assay concentration in enough cell culture medium to achieve a volume of 100 µL per well.

2. Plate Cells

2.1 Seed your choice of cells (100 µL per well) at an appropriate density into a 96-well plate. The seeding density will need to be optimized for the cell line used; however, we have found that 5,000–50,000 cells per well (50,000–500,000 cells/mL seeding stock) are reasonable starting points.

Note: If studying immune cell clustering and proliferation, prepare cell activation treatments at 3X final assay concentration, and immediately add 50 µL per well containing cells. It is advised that some control wells containing only vehicle are included in the plate.

3. Add treatments

3.1 Immediately after cell seeding, add treatments and controls (100 µL per well) to appropriate wells of the 96-well plate containing cells.

3.2 Allow cells to settle at room temperature for 30 minutes. Alternatively, cells can be settled by centrifugation of the plate (50X g, 1 minute).

3.3 Place the cell plate into the Incucyte® Live-Cell Analysis System and allow the plate to warm to 37 °C for 30 minutes prior to scanning.

a. Scan type: Standard or Non-Adherent Cell-by-Cell (for cell counting)

Note: Label-free cell counting can be enabled on Incucyte® Live-Cell Analysis System with use of the Incucyte® Cell-by-Cell Analysis Software Module.

b. Image channels: Phase (and fluorescence if fluorescent label or cell health reagents are used)

c. Objective: 4X, 10X or 20X (recommended for Non-Adherent Cell-by-Cell)

d. Scan interval: Typically, every 1–2 hours until your experiment is complete

Quantification of cell proliferation across multiple cell types is enabled using Incucyte® AI Confluence and Basic Fluorescence Analysis, available within the base software package. For detailed instructions on setting up scans and analysis jobs refer to the Incucyte® Basic Analyzer Guidelines.

For further details of this analysis module and its application see: https://www.sartorius.com/en/applications/life-science-research/cell-analysis/live-cell-assays/cell-health-proliferation/proliferation

Related Products and Applications

A comprehensive range of fluorescent nuclear labeling and cell health reagents are available for use with the Incucyte® Live-Cell Analysis System to enable multiplexed measurements of cytotoxicity and proliferation alongside apoptosis.

Compatible with the Incucyte® Live-Cell Analysis System

Proliferation & Cell Cycle				
Product	**Color**	**Quantity**	**Compatibility**	**Cat. No.**
Incucyte® Nuclight Green Lentivirus (puro)		One vial: 0.2 mL	SX1, S3, SX5	4624
		One vial: 0.6 mL		4475
Incucyte® Nuclight Green Lentivirus (bleo)		One vial: 0.2 mL	SX1, S3, SX5	4626
		One vial: 0.6 mL		4477
Incucyte® Nuclight Red Lentivirus (puro)		One vial: 0.2 mL	SX1, S3, SX5 (Green | Red Optical Module)	4625
		One vial: 0.6 mL		4476
Incucyte® Nuclight Red Lentivirus (bleo)		One vial: 0.2 mL	SX1, S3, SX5 (Green | Red Optical Module)	4627
		One vial: 0.6 mL		4478
Incucyte® Nuclight Orange Lentivirus (puro)		One vial: 0.2 mL	S3 for Neuroscience, SX5	4771
Incucyte® Nuclight NIR Lentivirus (puro)		One vial: 0.2 mL	S3 for Neuroscience, SX5	4805
Incucyte® Nuclight Rapid Red Dye		One vial: 50 µL	SX1, S3, SX5 (Green | Red Optical Module)	4717
Incucyte® Nuclight Rapid NIR Dye		One vial: 50 µL	S3 for Neuroscience, SX5	4804
Incucyte® Cell Cycle Green | Red Lentivirus (puro)		One vial: 0.6 mL	SX1, S3, SX5 (Green | Red Optical Module)	4779
Incucyte® Cell Cycle Green | Orange Lentivirus (puro)		One vial: 0.6 mL	SX5	4809

Apoptosis & Cytotoxicity				
Product	**Color**	**Quantity**	**Compatibility**	**Cat. No.**
Incucyte® Annexin V Green Dye		One vial: 100 tests	SX1, S3, SX5	4642
Incucyte® Annexin V Red Dye		One vial: 100 tests	SX1, S3, SX5 (Green | Red Optical Module)	4641
Incucyte® Annexin V NIR Dye		One vial: 100 tests	S3 for Neuroscience, SX5	4768
Incucyte® Annexin V Orange Dye		One vial: 100 tests	S3 for Neuroscience, SX5	4759
Incucyte® Caspase-3/7 Green Dye		One vial: 20 µL	SX1, S3, SX5	4440
Incucyte® Caspase-3/7 Red Dye		One vial: 20 µL	SX1, S3, SX5 (Green | Red Optical Module)	4704
Incucyte® Cytotox Green Dye		Five vials: 5 µL each	SX1, S3, SX5	4632
Incucyte® Cytotox Red Dye		Five vials: 5 µL each	SX1, S3, SX5 (Green | Red Optical Module)	4633

*Pre-labeled Nuclight cell lines are also available for purchase. Please visit **www.sartorius.com/en/applications/life-science-research/cell-analysis/live-cell-assays** for more information

A complete suite of cell health applications is available to fit your experimental needs.
Find more information at www.sartorius.com/incucyte

For additional product or technical information, please email us at AskAScientist@sartorius.com

For Research Use Only. Not for Therapeutic or Diagnostic Use.

North America
Sartorius Corporation
565 Johnson Avenue
Bohemia, NY 11716
USA
Phone +1 734 769 1600
Email: orders.US07@sartorius.com

Europe
Sartorius UK Ltd.
Longmead Business Centre
Blenheim Road
Epsom
Surrey, KT19 9QQ
United Kingdom
Phone +44 1763 227400
Email: euorders.UK03@sartorius.com

Asia Pacific
Sartorius Japan K.K.
4th Floor, Daiwa Shinagawa North Bldg.
1-8-11, Kita-Shinagawa 1-chome
Shinagawa-Ku
Tokyo 140-0001
Japan
Phone +81 3 6478 5202
Email: orders.US07@sartorius.com

Find out more: www.sartorius.com/incucyte

For questions, email: AskAScientist@sartorius.com