

xCELLigence

Real-Time Cell Analyzer



Non-Invasive. Label-Free. Real-Time.
The New Paradigm for Cell-Based Assays



Are You Still Using End-point Assays?

The xCELLigence® biosensor instruments provide a powerful yet simple solution for live cell analysis.

Why xCELLigence?

LABEL-FREE: No markers or dyes required.
Compatible with orthogonal assays.

REAL-TIME KINETIC READOUTS: Obtain data continuously over assay windows that span anywhere from seconds to days.

FAST: Read an entire 96-well plate in just 7 seconds.
Simultaneously monitor up to 6 plates, without scheduling conflicts.

EASY WORK FLOW: Simply plate cells and begin monitoring.

BROAD APPLICATIONS: Suitable for many different cellular analysis applications with high accuracy and reproducibility.



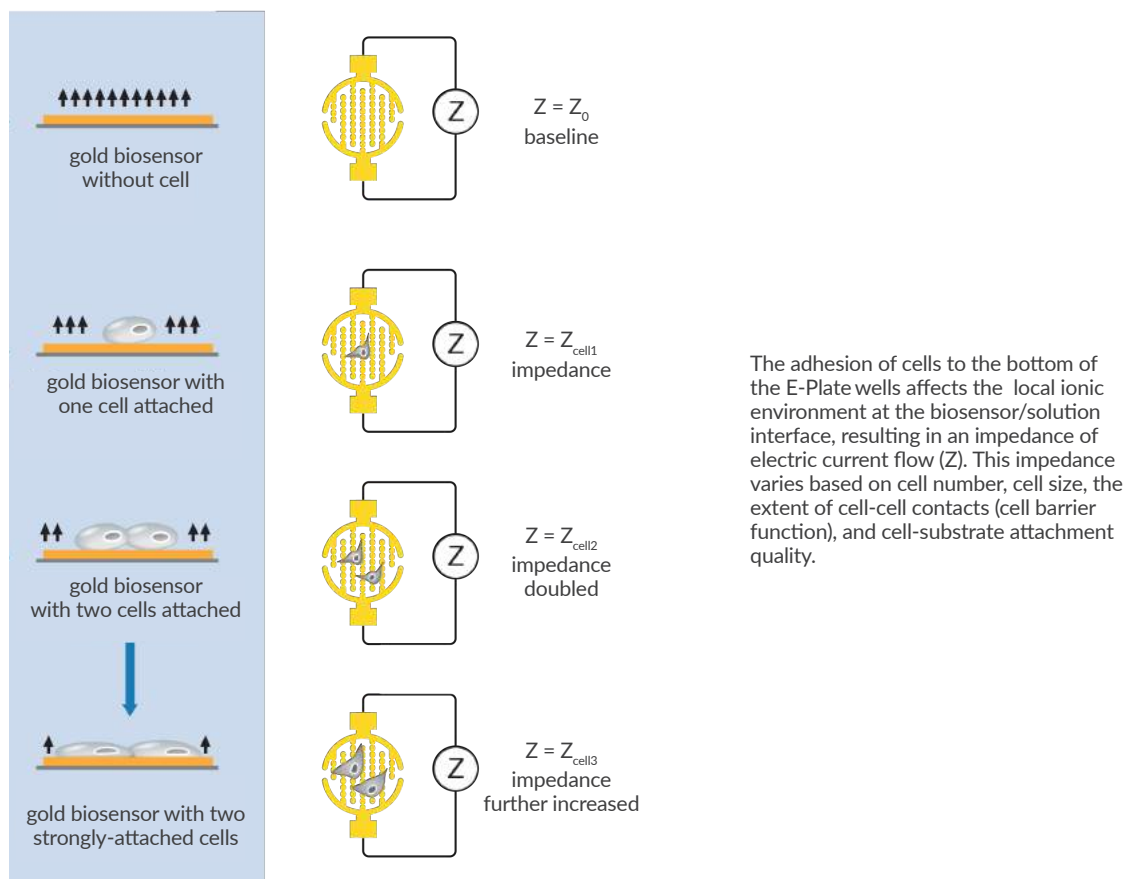
xCELLigence Instruments –
Discover what you've been missing between end points.

Technology Behind xCELLigence

Non-Invasive and Label-Free Monitoring of Cells

The xCELLigence Real-Time Cell Analysis (RTCA) instruments utilize patented microtiter plates (E-Plates®) which contain gold biosensors embedded in the bottom of each well. These biosensors continuously and non-invasively monitor changes in cell number, cell size, cell barrier function, and cell-substrate attachment quality.

Within E-Plate wells adherent cells act as insulators, restricting the flow of a miniscule electric current between the biosensors. This signal is measured automatically, at a frequency defined by the user (every 10 seconds, once per hour, etc.), and provides a dynamic view of cell health and behavior at an unprecedented level of detail.



Compatible with a Wide Range of Cell-Based Assays

Because dynamic changes in cell number, cell size, cell barrier function, and cell-substrate attachment quality are influenced by a large number of biochemical pathways, xCELLigence can be used for dozens of different applications. These include, but are not limited to:

- Immune cell killing
- Cell invasion and migration
- Cardiotoxicity testing
- Drug discovery/development
- Receptor signaling
- Virus cytopathic effects
- Biofilm dynamics
- Cell-cell interactions



RTCA DP (Dual-Purpose)

- 3 x 16 well format: Run up to three 16-well plates simultaneously and independently to maximize productivity.
- Cell invasion and migration: Measures cell number, size, morphology, and attachment properties, with the added ability of performing kinetic analysis of cell invasion/migration (CIM).
- Versatile: Choose from three types of 16-well plates: E-Plate 16, E-Plate VIEW 16, or CIM-Plate® 16.



RTCA SP (Single-Plate)

- 1x 96-well format
- Rapid measurement: Average read time is approximately 7 seconds for a 96-well plate.
- Compact design: Station fits conveniently in regular cell culture incubator.
- Intuitive software: Set up and customize assay protocols quickly and easily.



RTCA MP (Multi-Plate)

- 6 x 96-well format: Run up to six 96-well plates simultaneously and independently to maximize productivity.
- Integrated data analysis tools facilitate processing large amounts of real-time data. These include diverse plot types and the calculation of parameters such as IC_{50} , KT_{50} , etc.

Assays	RTCA DP	RTCA SP	RTCA MP
Cell Characterization / QC	✓	✓	✓
Proliferation / Cytotoxicity	✓	✓	✓
Adhesion	✓	✓	✓
Receptor Signaling	✓	✓	✓
Cell Invasion / Migration	✓		
Cardiotoxicity			
Extracellular Recording			
Specs			
Format	3x16 wells	1x96 wells	6x96 wells
Maximum Throughput	48 wells	96 wells	576 wells



RTCA HT (High Throughput)

- 384-well format. Up to four instruments can be integrated and controlled by a single control unit, giving a total of 1536 wells.
- Automated screening: Integrate into a high-throughput workflow using a liquid handler for fully automated screening applications.



RTCA Cardio

- Cardiomyocyte contractility and viability: Monitor cardiomyocyte beating in real-time for cardiotoxicity assessment.
- Physiologically relevant: No labels are needed for studying stem cell-derived, induced pluripotent stem cell (iPSC)-derived, or primary cardiomyocytes.



RTCA CardioECR

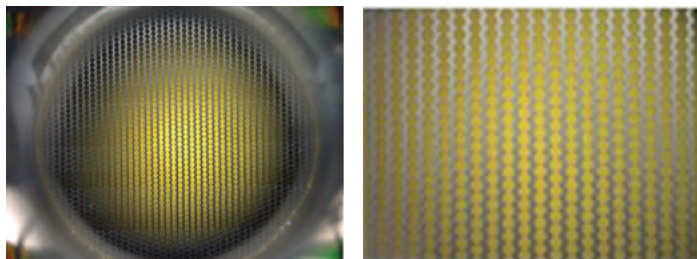
- Cardiomyocyte contractility, viability, field potential, and pacing: Has all the functionalities of the RTCA Cardio instrument with the added capacity to measure extracellular field potential and perform cardiomyocyte pacing. Pacing protocols can be used to functionally mature cardiomyocytes, which is especially useful when screening inotropic compounds.
- Versatile: Monitor cells over both short and long duration, allowing for assessment of structural cardiotoxicity.

RTCA HT	RTCA Cardio	RTCA CardioECR
✓	✓	✓
✓	✓	✓
✓	✓	✓
✓	✓	✓
	✓	✓
		✓
		✓
1×384 wells	1×96 wells	1×48 wells
384 wells	96 wells	48 wells

E-Plates for xCELLigence

E-PLATE: GOLD-BASED BIOSENSORS ENABLE DYNAMIC MONITORING IN A LABEL-FREE MANNER

E-Plates are single use, disposable devices used for performing cell-based assays on the xCELLigence instruments. Plate dimensions and well spacing are similar to industry standards. As seen in the images below, the gold biosensors cover ~80% of the well bottom. This design enables large populations of cells to be monitored simultaneously and thereby provides exquisite sensitivity to dynamic changes in the physical properties of the cells.



Left: View looking down into an E-Plate well. Right: Zoomed in view of E-Plate biosensors.

E-PLATE VIEW: VISUALIZE CELLULAR CHANGES

Combine real-time biosensor-based monitoring of cell behavior with visual inspection in a single plate. The sensor free window makes it possible to correlate the biosensor signal with changes in physical parameters such as cell number or size.

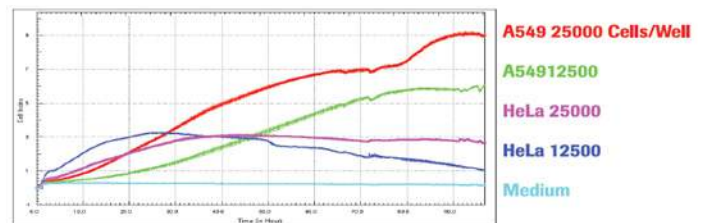


Left: View looking down into an E-Plate VIEW well. Center and right: Views of cells within the electrode-free region.

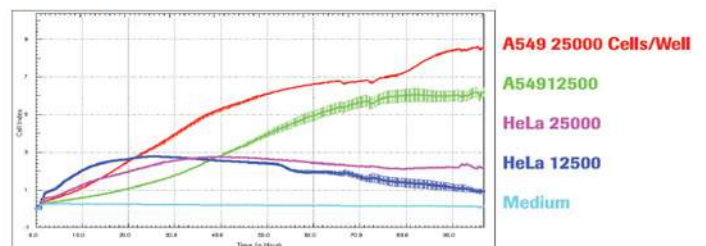
E-PLATE PET: SAME PERFORMANCE, LOWER COST

In ACEA's standard E-Plates the gold biosensors are integrated into glass-bottomed wells. As an alternative to glass, polyethylene terephthalate (PET) plates are also available. While cell adhesion to, and proliferation on, PET is typically very similar to glass (see figure to the right), some cell types display a preference for one substrate over the other. The availability of both plate types enables another level of optimization during xCELLigence assay development.

PET E-Plate



Glass E-Plate

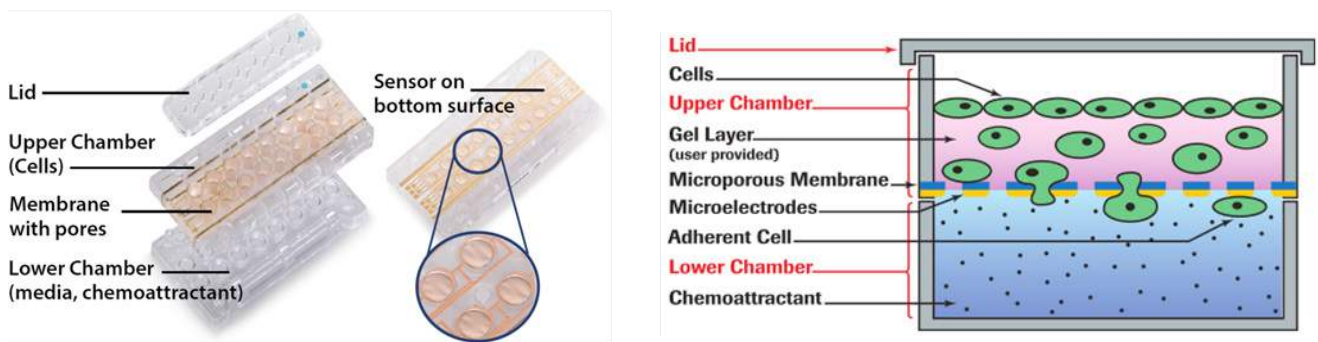


Cell proliferation in standard glass vs. PET E-Plates.

CIM-PLATES: STUDY CELL INVASION AND MIGRATION IN REAL TIME

ACEA's Cell Invasion and Migration plate (CIM-Plate®; used exclusively with the xCELLigence RTCA DP system) contains electronically integrated Boyden chambers that provide, in real-time and without the use of labels, quantitative kinetic data for migration/invasion with minimal hands-on time by the researcher.

As cells move from the upper chamber towards chemoattractant in the lower chamber, they pass through a membrane containing 8 µm pores and then adhere to gold biosensors. The resultant change in signal perfectly correlates with the number of cells attached to these electrodes, enabling easy collection of highly reproducible data over time ranges spanning from minutes to days.



Left: Components of the CIM-Plate®. Right: Schematic of an invasion assay.

E-PLATE INSERTS: CO-CULTURE TO EASILY MEASURE INDIRECT CELL-CELL INTERACTIONS

The E-Plate Insert enables investigation of specific cell-cell interactions in real-time, while maintaining the cells in separate compartments. Co-culture different cell types under physiological conditions for a broad range of applications.

The photograph shows three E-Plate inserts. One is a 16-well insert, and two are 96-well inserts. They are clear plastic inserts designed to fit into a multi-well plate.

- Easily add compounds or replace media during an experiment using an access port in the E-Plate Insert.
- Perform real-time co-culture experiments under physiological conditions.
- The 16-well E-Plate Insert is compatible with multiple E-Plate formats.

Instruments - Bundled Product	Cat. No.
Bundle - SP	00380601030
Bundle - MP	00380601040
Bundle - DP	00380601050
Bundle - HT	00380601070
Bundle - Cardio	00380601060
Bundle - CardioECR	00380601210

Consumables	Cat. No.
E-Plate 16 (1x6 plates)	05469830001
E-Plate 16 (6x6 plates)	05469813001
E-Plate VIEW 16 (1x6 plates)	06324738001
E-Plate VIEW 16 (6x6 plates)	06324746001
E-Plate VIEW 16 PET (1x6 plates)	00300600890
E-Plate VIEW 16 PET (6x6 plates)	00300600880
E-Plate Insert 16 (6x16 well inserts)	06465382001
E-Plate 96 (1x6 plates)	05232368001
E-Plate 96 (6x6 plates)	05232376001
E-Plate VIEW 96 (1x6 plates)	06472451001
E-Plate VIEW 96 (6x6 plates)	06472460001
E-Plate VIEW 96 PET (1x6 plates)	00300600910
E-Plate VIEW 96 PET (6x6 plates)	00300600900
E-Plate Insert 96 (36x16 well inserts)	06465412001
E-Plate Insert 96 Accessories (6 receiver plates & lids)	06465455001
E-Plate 384 (2x5 plates)	05867681001
E-Plate 384 (8x5 plates)	05867673001
RTCA CIM Plate 16 (1x6 plates)	05665817001
RTCA CIM Plate 16 (6x6 plates)	05665825001
E-Plate Cardio 96 (1x6 plates)	06417051001
E-Plate Cardio 96 (6x6 plates)	06417035001
E-Plate CardioECR 48 (1x6 plates)	00300600940
E-Plate CardioECR 48 (6x6 plates)	00300600950



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