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Trusted Answers

Agilent xCELLigence Real-Time Cell Analysis

RTCA DP – a compact, versatile instrument to fit your diverse research needs

The Agilent xCELLigence RTCA DP

Increased flexibility, complete data, more insight

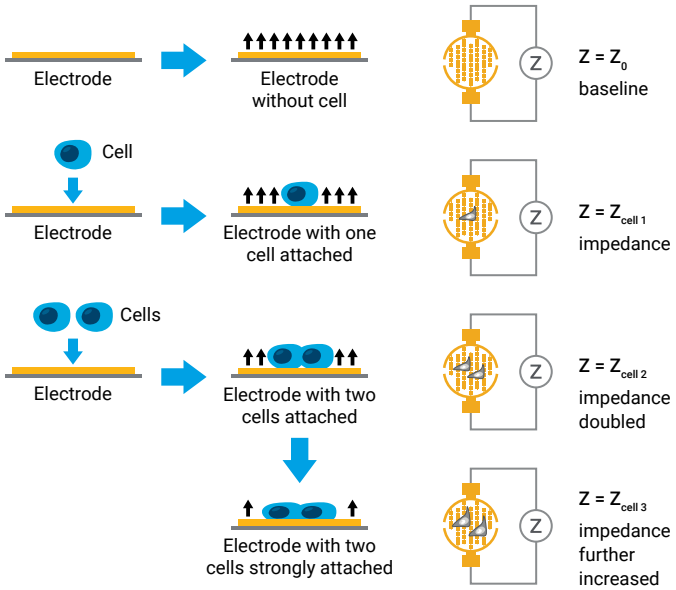
The Agilent xCELLigence RTCA DP system expands the throughput and application options of the xCELLigence Real-Time Cell Analysis (RTCA) portfolio. Featuring a dual-purpose (DP) format, the instrument measures impedance-based signals in both cellular proliferation and cell invasion/ migration assays – without the use of exogenous labels. With outstanding application flexibility, the RTCA DP system supports multiple users performing short-term and long-term cell-based assays.

Impedance-based biosensor technology

The functional unit of a cellular impedance assay is a set of gold electrodes fused to the bottom surface of a microtiter plate well. The presence of adherent cells affects the local ionic environment at the electrode-solution interface, leading to an increase in cellular impedance.

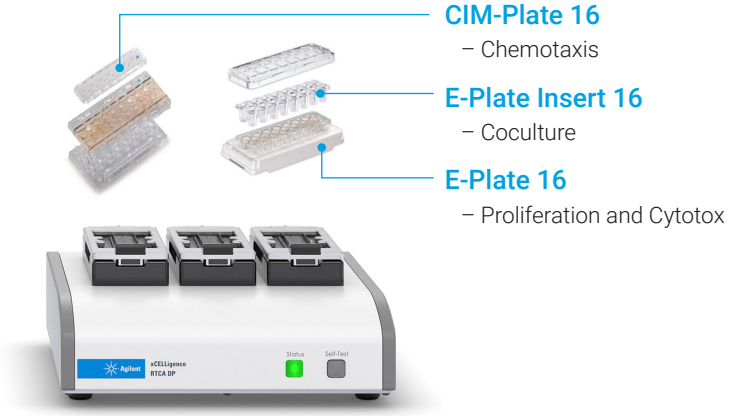
The magnitude of this impedance is dependent on the number of cells, their size and shape, cell barrier function formation, and the cell-substrate attachment quality.

Thus, electrode impedance, displayed as Cell Index values, can be used to monitor cell viability, number, morphology, and adhesion in several cell-based assays. In addition, the electronic signal (22 mV) used is noninvasive to the living cells, and has no effect on cell health or behavior.



Compact, convenient, versatile

The xCELLigence RTCA DP system consists of two components: the RTCA control unit and the RTCA DP instrument, with three integrated cradles for measuring cell responses in parallel or independently.



Control Unit with State-of-the-Art Software

- Simple Assay Setup
- Streamlined Real-Time Data Acquisition and Analysis
- Powerful Immunotherapy Analysis Tools
- Support for 21 CFR Part 11 Compliance

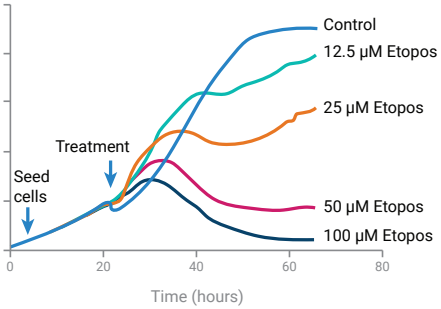
RTCA DP Instrument

- Interfacing with E-Plate 16 and CIM-Plate 16
- High Temporal Resolution (4 seconds)
- Independent Cradles for Multiple Users
- Designed for Culture Incubator

Experience the advantages of real-time cell monitoring

Simple walk-away operation and data analysis

Simply add cells to the E-plate/CIM plate and start monitoring cell number, cell migration/invasion, cell proliferation rate, cell morphology, and cell attachment in real-time.



Seed Cells
Label-free

Real-Time Monitoring at Physiological Conditions

Automated Recording of Kinetic Response Curves

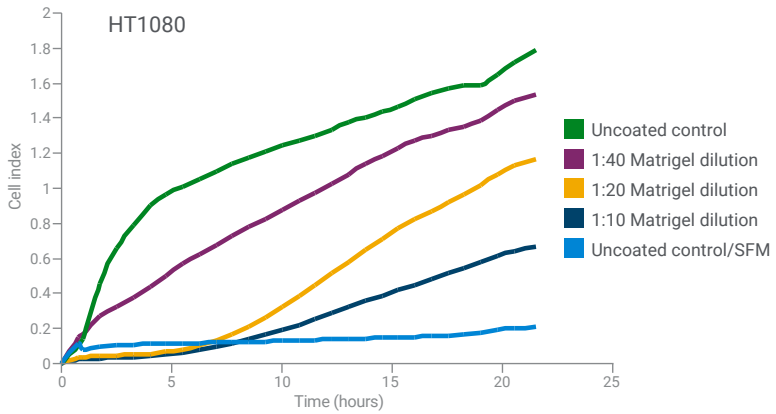
Explore a wide range of applications

- Cell invasion and migration (CIM)
- Cell proliferation
- Compound and cell-mediated cytotoxicity
- Cell adhesion and cell spreading
- GPCR-mediated signaling
- Cell barrier function
- Virus mediated cytopathic effect (CPE)
- Cell-mediated and antibody-dependent cell mediated cytotoxicity (ADCC)
- Cell-cell interaction (coculture)

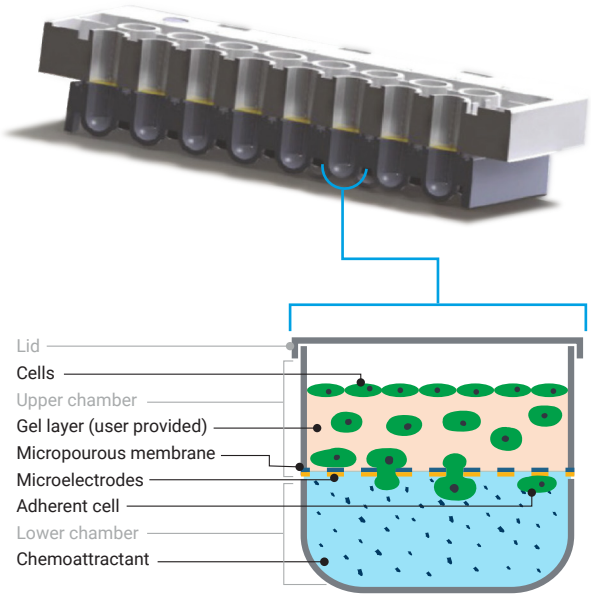
Application Highlights

Cell invasion and migration

- Quantitative monitoring of cell invasion or migration in real time
- Label-free assay requires no fixation, staining, or any other sample processing, dramatically reducing hands-on time
- Easy quantification of the rate of migration or invasion
- Rapid optimization of cell density and extracellular matrix density conditions
- Noninvasive nature allows for further analysis (e.g. sequencing) of migrated/invaded cells upon completion

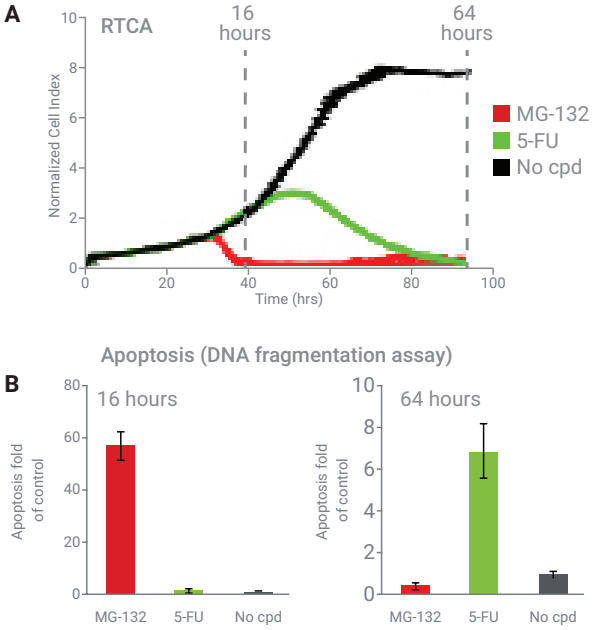


Dynamic monitoring of cell invasion and migration



Compound-mediated cytotoxicity and apoptosis

- Kinetic cytotoxic responses can be predictive of mechanism of action
- Continuous monitoring ensures no meaningful time points are missed
- Real-time data allows identification of optimal times for compound treatment and data collection
- The noninvasive assay is performed in a tissue culture incubator, enabling analysis by standard viability assays at any point during the experiment
- Easy quantification of onset and kinetics of cytotoxic response

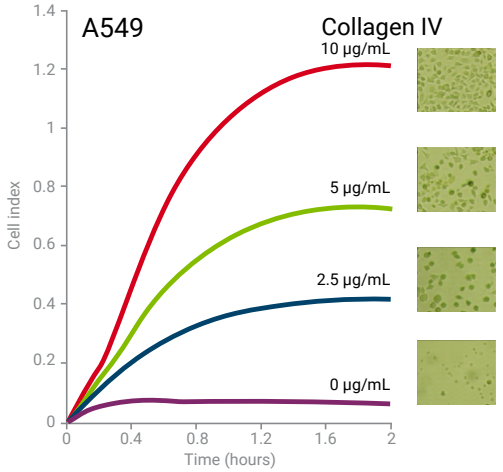


Dynamic monitoring of compound-mediated cytotoxicity and apoptosis

Application Highlights

Cell adhesion and spreading

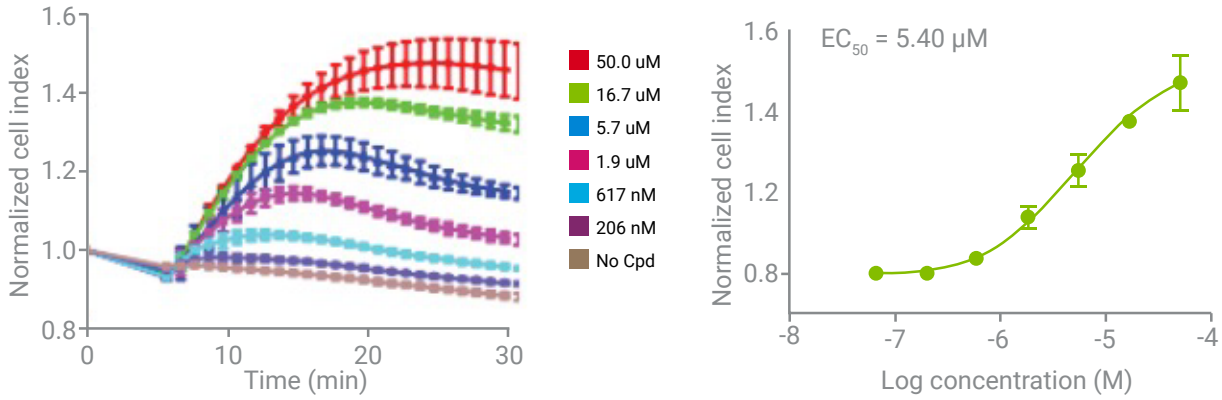
- Real-time monitoring of cell adhesion and spreading
- Label-free assay requires no fixation, staining, or sample processing
- Easy quantification of adhesion and spreading kinetics
- Rapid optimization of cell density and extracellular matrix coating conditions



Dynamic monitoring of cell attachment and spreading

Functional monitoring of GPCR signaling

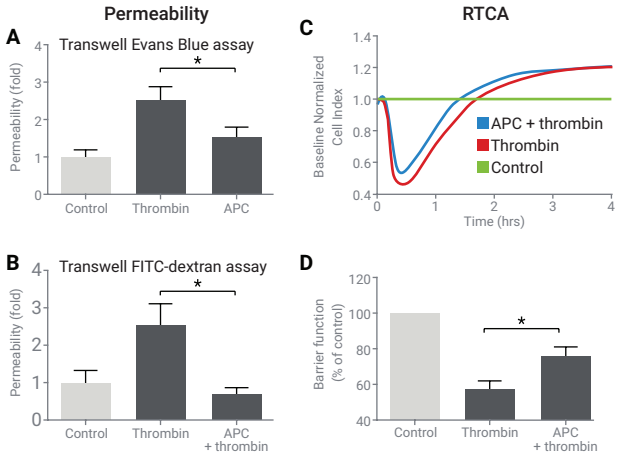
- Assay endogenous GPCRs with primary cells, stem cells, and other disease-relevant cell lines
- Simultaneous screening of GPCR function across all coupling classes: Gs, Gi, Gq, G12/13
- Detection of traditionally difficult classes Gi and G12/13
- Detection of functional selectivity and de-orphaning GPCRs



Pharmacological study of endogenous histamine GPCR function

Cell barrier function

- A label-free alternative to solute permeability and transendothelial electrical resistance assays
- Real-time assay is conducted under normal tissue culture conditions, enabling monitoring of barrier function disruption and recovery
- Non-invasive nature of the readout allows for orthogonal assays conducted on the same instrument, including visual monitoring of cell density by microscopy

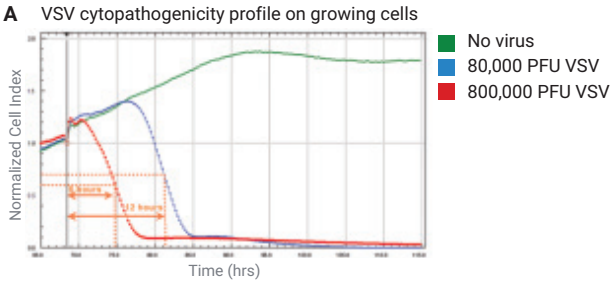


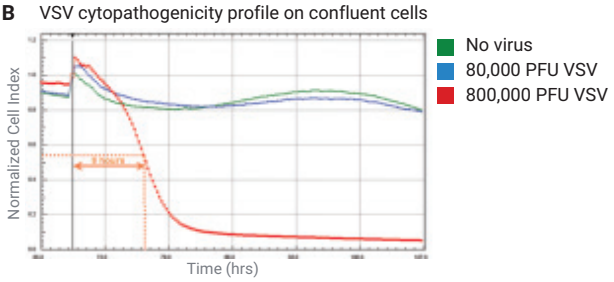
The protective effect of Activated Protein C on endothelial barrier function assessed by solute permeability assays and RTCA platform

Application Highlights

Virus-mediated cytopathogenicity

- A simple alternative method to the plaque assay to measure virus lytic activity
- Provides quantitative information about viral-mediated cytopathic effects (CPE) onset and kinetics
- Rapidly identify the optimal viral titer and assay timepoint for screening of inhibitory compounds, neutralizing antibodies, and neutralizing serums



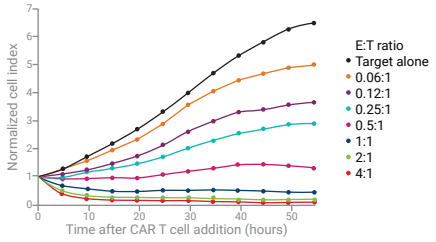


Dynamic monitoring of HEK 293 cells during viral infection.

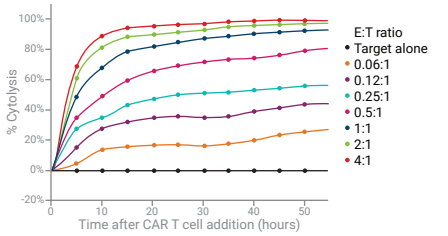
Cell-mediated and antibody-dependent cell-mediated cytotoxicity (ADCC)

- Real-time monitoring of cell-mediated cytotoxicity and ADCC
- Optimized for both adherent and liquid tumors
- Direct, sensitive, and specific measurement of target cell changes
- Homogenous assay for easy quantification of cytotoxic response kinetics, both short and long-term
- Rapid cell density and effector/target ratio optimization

HEK-293-CD19 killing by CD19 CAR T cells



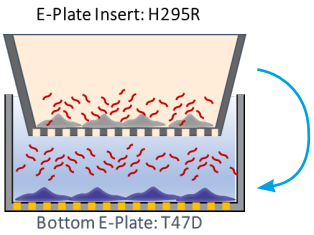
Percent cytolysis derived by RTCA Software Pro

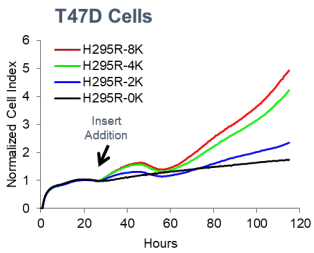


Cell-cell interaction: Coculture

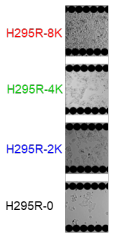
- E-plate insert offers an easy to set up coculture platform with minimal handling
- Real-time data provides comprehensive information on cell responses over long time periods
- Kinetic response profiles may be indicative of specific pathways
- Allows for drug screening in a coculture condition

Estrogen progesterone





Imaging of T47D cells

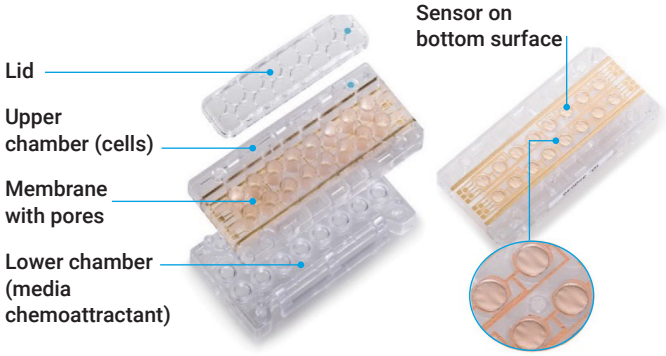


More flexibility. More data. More insight.

Obtain detailed information about your cells with the versatile RTCA DP system, which supports two biosensor plate types – E-Plate and CIM-plate. Together with the coculture device and immunotherapy kits, the RTCA DP system provides diverse assay options for your research needs.

E-plate 16, E-Plate VIEW 16, and E-Plate 16 PET: Cellular assay in a 16-well format

- Quantitatively monitor changes in cell number, cell adhesion, cell viability, and cell morphology
- Easily add compounds during an experiment
- With the E-Plate VIEW 16, observe measured changes using microscopes
- Assess short- and long-term cellular effects



CIM-Plate 16: Real-time tracking of cell invasion and migration (CIM) without exogenous labels

A microporous membrane separates the two main chambers of the CIM-Plate 16. Gold biosensors are attached to the underside of the membrane. Cells seeded in the upper chamber move through the microporous membrane into the lower chamber that contains a chemoattractant. Cells adhering to the impedance sensors are measured in real-time by the RTCA DP instrument

- Identify optimal migration and invasion time points
- Eliminate time-consuming manual detection

E-Plate Insert 16: Coculture in real-time

- Continuously monitor indirect cell-cell interactions
- Assess short- and long-term cell response without labor-intensive labeling and microscopy
- Coculture different cell types under physiological conditions for a broad range of applications, including cancer research, immunology, toxicology, and stem cell research

xCELLigence immunotherapy kits

Use xCELLigence immunotherapy kits with your real-time cell analysis system for a non-invasive solution to a broad range of liquid cancer immunotherapies and suspension tumor cell-killing applications. Determine the potency of immune cells against liquid tumors in vitro.

Liquid Tumor Tethering Specificity	Effector Cells	Target Cells
anti-CD40	NK-92, CAR-T, primary CD8+ T cells	Daudi, Raji, Ramos, MEC2
anti-CD29	NK-92	K562, HEL 92.1.7
anti-CD19	NK-92, primary CD8+ T cells	Raji
anti-CD9	NK-92	NALM6, RS4;11, RPMI 8226
anti-CD71	NK-92	K562

Ordering information

Description	Pack size	Part number
Agilent xCELLigence RTCA DP system	1 bundled package includes: 1 DP instrument (5469759001), 1 control unit (standard laptop PC) 5454417001AA, 3 RTCA software basic single license key (5454433001), 1 box of E-plate 16 PET (300600890), 1 box of CIM-plate 16 (5665817001)	380601050
E-Plate 16 PET	1x6 plates	300600890
E-Plate 16 PET	6x6 plates	300600880
E-Plate VIEW 16	1x6 plates	300601140
E-Plate VIEW 16	6x6 plates	300601150
E-Plate Insert 16	1x6 units	6465382001
CIM Plate 16	1x6 plates	5665817001
CIM Plate 16	6x6 plates	5665825001
IMT assay (anti-CD40) sample kit	Tethering reagent (90 µL), buffer and cytolysis reagent (for up to 12 × 16 well E-plate)	8100006
IMT assay (anti-CD29) sample kit	Tethering reagent (45 µL), buffer and cytolysis reagent (for up to 12 × 16 well E-plate)	8100009
IMT assay (anti-CD19) sample kit	Tethering reagent (90 µL), buffer and cytolysis reagent (for up to 12 × 16 well E-plate)	8100012
IMT assay (anti-CD9) sample kit	Tethering reagent (90 µL), buffer and cytolysis reagent (for up to 12 × 16 well E-plate)	8100015
IMT assay (anti-CD71) sample kit	Tethering reagent (90 µL), buffer and cytolysis reagent (for up to 12 × 16 well E-plate)	8100018
RTCA software basic single license	1 license key	5454433001
RTCA software basic site license	20 seats keys	3101002100
RTCA software IMT single license for DP	1 license key	310100270
RTCA software IMT site license for DP	20 seats keys	310100280
RTCA software compliance single license	1 license key	S2807-90004
RTCA software compliance site license	20 seats keys	S2807-90005
RTCA software virology single license	1 license key	S2807-90089
RTCA software virology site license	20 seats keys	S2807-90086

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