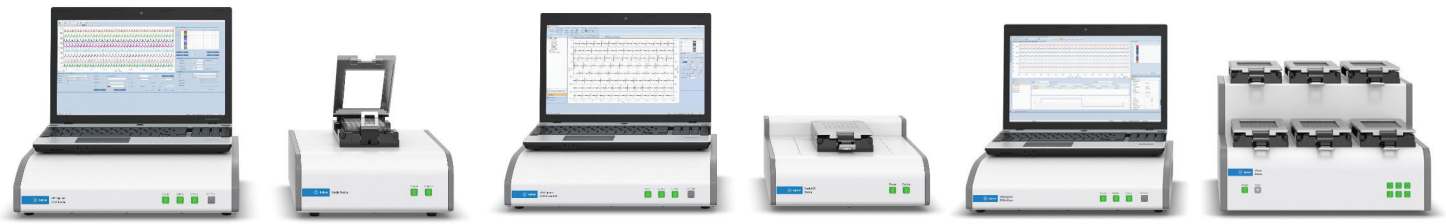
Agilent
Trusted Answers

Agilent xCELLigence RTCA Cardio Systems

A comprehensive solution for in vitro cardiac safety assessment, disease model, and drug discovery research



Three Instruments for Your Cardiomyocyte Research

Agilent offers three instruments for cardiac safety/toxicity assessment, drug discovery, and evaluation of cardiovascular disease models:

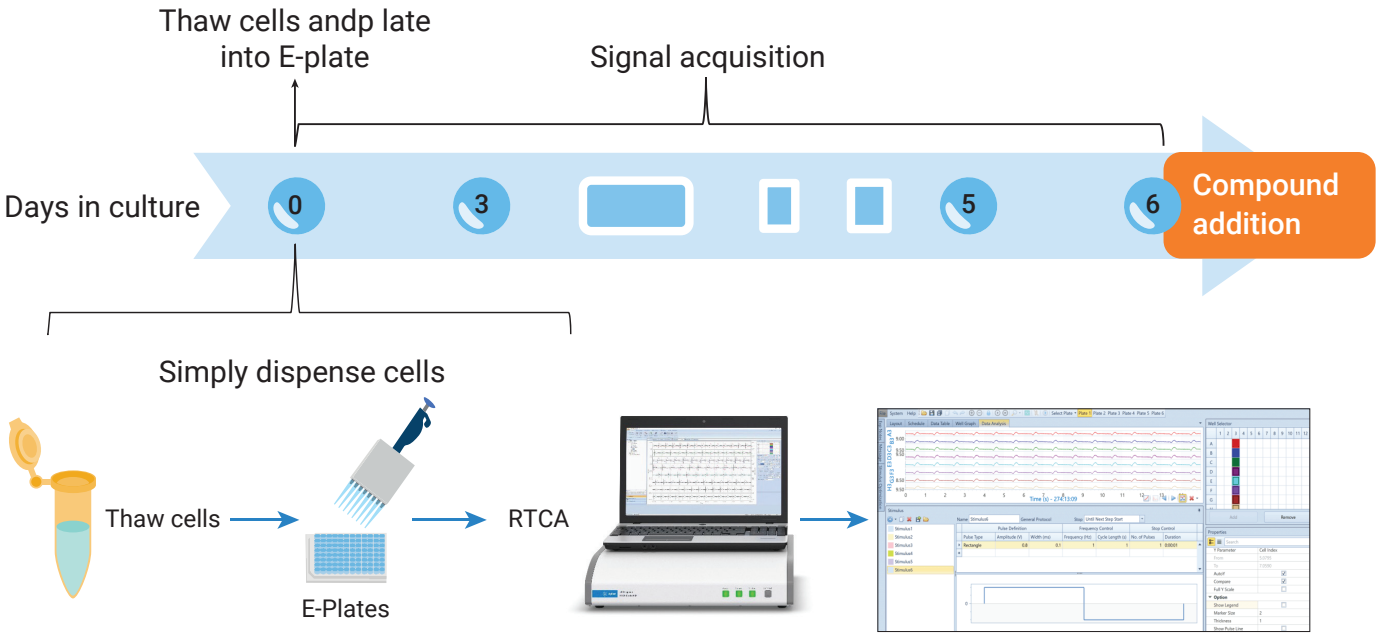
- Agilent xCELLigence RTCA ePacer and Cardio, which measure viability and contractility
- Agilent xCELLigence RTCA CardioECR, which measures viability and contractility, with the added benefit of observing ion channel activity and functional maturation of cardiomyocytes

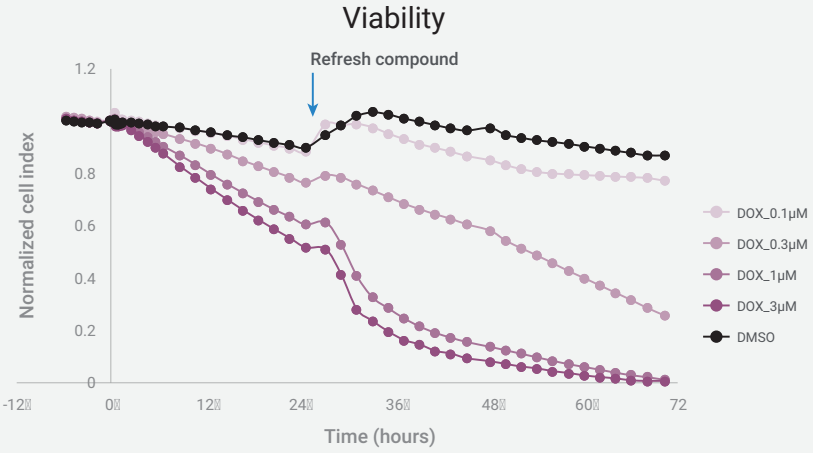
Agilent xCELLigence RTCA CardioECRCardio and ePacer systems

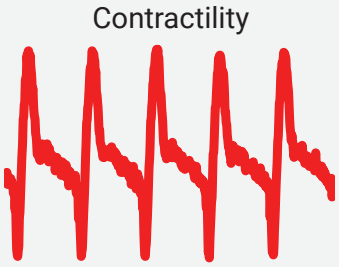
The Agilent xCELLigence real-time cell analysis (RTCA) Cardio and ePacer systems expand upon Agilent microelectronic biosensor technology. Your laboratory can monitor the key functional properties of beating cardiomyocytes, to assess cardiotoxicity and evaluate cell health viability.

- Exceptionally fast: the xCELLigence RTCA Cardio and ePacer systems employ a proprietary noninvasive electrical impedance technology to monitor contractility in milliseconds
- Label-free: no fluorescent dyes interfere with the physical and functional properties (contractility and viability) of the cardiomyocytes- simply plate your cells and go
- Flexible time course studies: monitor cell responses in milliseconds, or monitor temporal changes over days and weeks
- High throughput: 96-well plate (Cardio system), 48-well plate (CardioECR system) and up to 6 × 96-well plates or 6 × 48-well plates (ePacer system) format enables rapid compound evaluation and screening of lead compounds
- Optimally designed for use in incubator: easily accommodated within a standard CO2 incubator or hypoxia chamber to maintain a physiologically relevant environment

For an Easy Workflow, Simply Plate Your Cells and Go







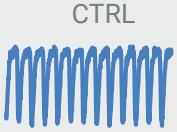
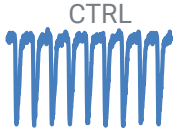
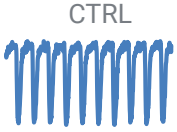
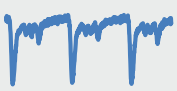
Noninvasive measurement of cellular impedance

Impedance readout provides a measure of cell viability. The significant drop of impedance after compound addition suggests compound-induced cell death.

Under high-frequency data acquisition, the ability of impedance to capture temporal rhythmic changes in cell morphology, and the degree of cell attachment to the plate associated with contraction allows for measurement of contractility.

Is Your Current Technology Truly Predictive of Proarrhythmia?

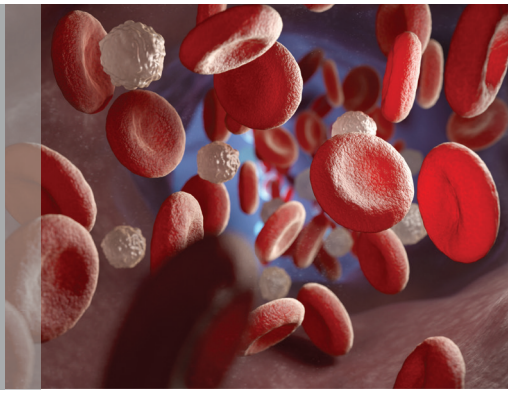
The xCELLigence RTCA Cardio system and ePacer system remove much of the guess work from the rapid screening of potentially toxic compounds. Proarrhythmia and cardiotoxicity screens can be evaluated via impedance readout, which is conducted in a matter of minutes or hours after compound addition, providing actionable information on a new drug candidate.

Sertinodole	Terfenadine	Amiodarone	Erythromycin	Cisapride
CTRL 	CTRL 	CTRL 	CTRL 	CTRL 
0.04 uM 	0.04 uM 	0.12 uM 	0.37 uM 	0.04 uM 
0.33 uM 	0.33 uM 	3.3 uM 	11.1 uM 	0.11 uM 
1 uM 	1 uM 	10 uM 	33.3 uM 	0.33 uM 
3 uM 	3 uM 	30 uM 	100 uM 	1 uM 

Pharmacological assessment of hERG channel blockers using the xCELLigence RTCA Cardio system

Human induced pluripotent stem cell (hiPSC)-derived cardiomyocytes were treated with multiple concentrations of each compound. Representative time points shown are from 0.5 to 24 hours.

Unlock the Full Potential of Cardiomyocyte Models with the xCELLigence RTCA CardioECR System



Powerful multiplexing

Experience evolutionary technology that can simultaneously monitor ion channel activity, contractility, and viability.

Captures the intricate excitation-contraction coupling relationship

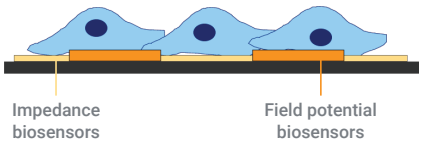
Monitor the impact of drugs on integrated ion channel activity and downstream contractility.

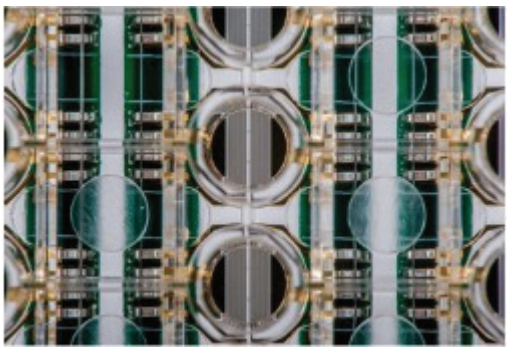
Powerful pacing feature

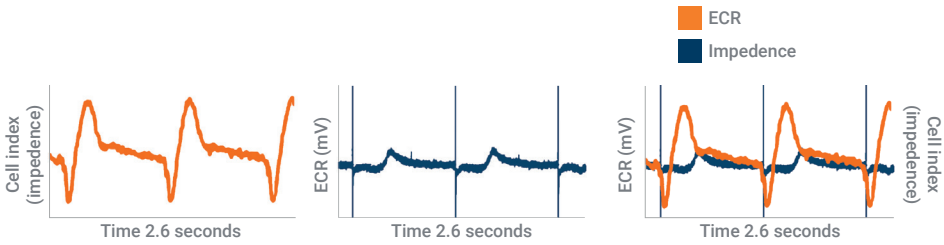
Eliminate variability and increase confidence in your results.

Technology

The principle of detection for the Agilent xCELLigence RTCA CardioECR system is based on impedance and field potential measurements. The interdigitated gold impedance (IMP) biosensors are interspersed with two field potential (FP) biosensors. These biosensors are designed for simultaneous measurement of field potential and contractility within each well. This proprietary design allows for the identification and measurement of adverse compound action on integrated ion channel activity, contractility, and long-term viability. These measurements in turn provide a highly predictive assay system for cardiac risk assessment and cardiovascular drug discovery.



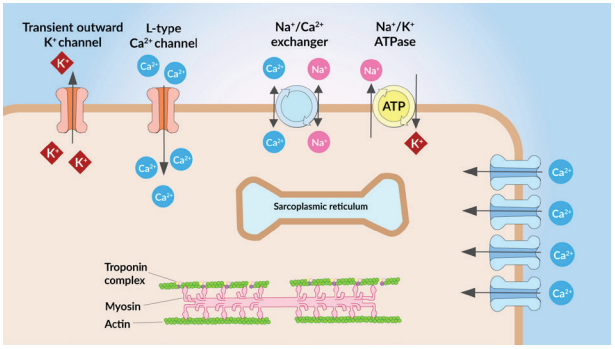


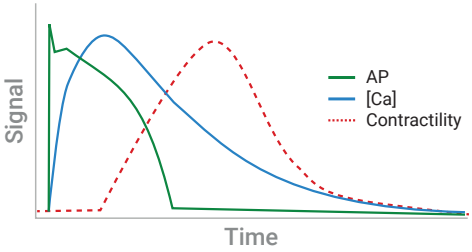


The Agilent xCELLigence RTCA CardioECR system simultaneously measures cardiomyocyte contraction and integrated ion channel activity at millisecond time resolution. The Agilent CardioECR software can display and overlay the data in real time.

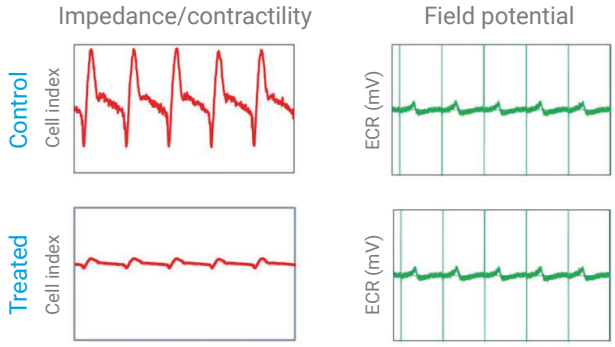
Simultaneously Monitor Contractility, Viability, and the Excitation Coupling Relationship

For rapid screening of potentially toxic compounds, the xCELLigence RTCA CardioECR system removes much of the guess work. Proarrhythmia and cardiotoxicity screens can be conducted minutes or hours after compound addition, providing actionable information on a new drug candidate.





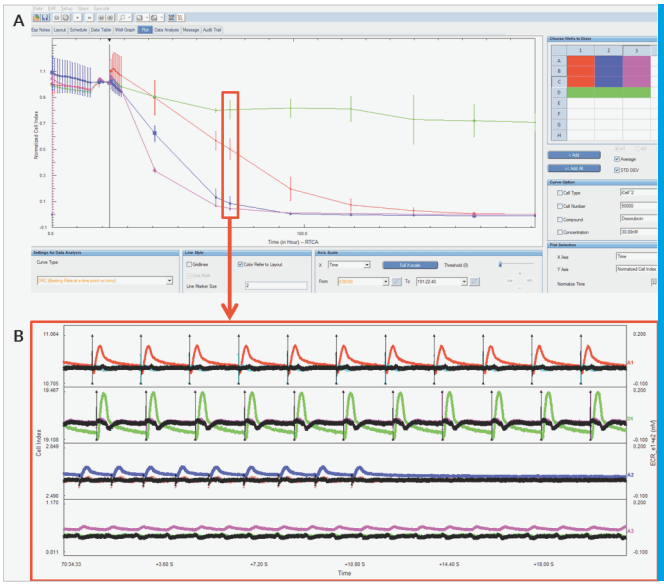
During the cardiac action potential (AP), Ca2+ entry into the cells triggers Ca2+ release from the sarcoplasmic reticulum. The combination of Ca2+ influx and release raises the free intracellular Ca2+ concentration, leading to sarcomere shortening and contractility



Cardiac excitation-contraction coupling

The xCELLigence RTCA CardioECR instrument simultaneously measures electrophysiological signals and contractility.

Blebbistatin, a myosin inhibitor, does not inhibit the ion channel signal of treated cells (green), but greatly impairs the mechanical contraction and beating (red). The ability to monitor this excitation-contraction coupling relationship provides a complete picture for assessment of compounds during drug development.



Integrated software provides continuous monitoring and data analysis

Whether you are screening for toxicity, novel use, or familial disorders, the xCELLigence RTCA CardioECR software is the ideal tool for data analysis.

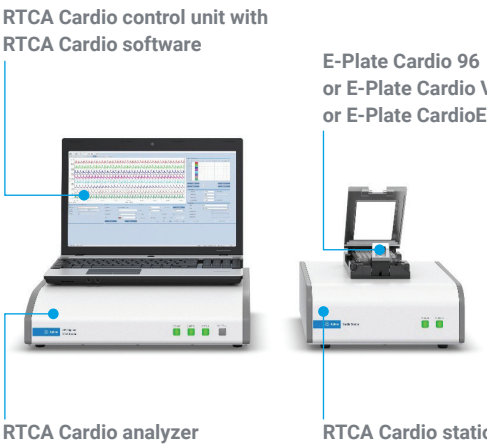
Fast turnaround: automatically generates reports on beating rate, beating amplitude, firing rate, and field potential

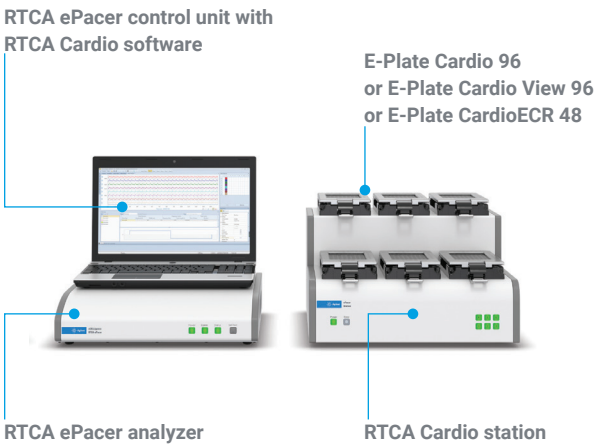
Powerful cell status assessment: cell status quality control ensures compound addition is conducted when cells are fully ready

Intuitive data evaluation and comparison: easily overlay beating rates, beating amplitudes, and field potential waveforms across different samples, time points, and experiments.

Comparing ePacer, Cardio, and CardioECR

		Cardio	ePacer	CardioECR
Recording in incubator		✓	✓	✓
System				
IMP electrodes		✓	✓	✓
FP electrodes				✓
Electrical pacing			✓	✓
Device				
Plate		E-Plate cardio/ E-Plate cardio view (96-well)	E-Plate Cardio/E-Plate Cardio View (96-well) or E-Plate CardioECR (48-well)	E-Plate CardioECR (48-well)
Application				
Cell attachment and viability		✓	✓	✓
Contractility		✓	✓	✓
FP (ion channels) assessment				✓
Acute assay (seconds to minutes)		✓		✓
Long-term assay (hours to days)		✓	✓	✓
Recording	Sampling rate	12.9 ms	4 ms	2 ms
	Field potential sampling rate	N/A	N/A	10 kHz
	Sampling capability	Simultaneous recording of impedance in 96-wells	Column by column	Simultaneous recording of impedance and field potential electrodes in all 48-wells
Stimulation	Stimulation voltage range	N/A	−2.5 V to +2.5 V	−2.5 V to +2.5 V
	Simultaneous stimulation	N/A	Prespecified columns or entire plate	Prespecified columns or entire plate
Deployment		Tissue culture incubator	Tissue culture incubator	Tissue culture incubator





xCELLigence RTCA CardioECR system

Product	Part number
xCELLigence RTCA CardioECR – Complete system bundle	00380601210
xCELLigence RTCA CardioECR – Analyzer	00380601180
xCELLigence RTCA CardioECR – Station	00380601190
xCELLigence RTCA CardioECR – Control unit (laptop with preinstalled software)	00380601200
E-Plate CardioECR 48 (6 plates)	300601110
E-Plate CardioECR 48 (36 plates)	300601120

xCELLigence RTCA Cardio system

Product	Part number
xCELLigence RTCA Cardio – Complete system bundle	00380601060
xCELLigence RTCA Cardio – Analyzer	06416993001
xCELLigence RTCA Cardio – Station	06417019001
xCELLigence RTCA Cardio – Control unit (laptop with preinstalled software)	06200184001
E-Plate Cardio 96 (6 plates)	300601050
E-Plate Cardio 96 (36 plates)	300601060
E-Plate Cardio View 96 (6 plates)	300601080
E-Plate Cardio View 96 (36 plates)	300601090

xCELLigence RTCA ePacer system

	Part Number	Product Name	Configuration	Product Description
	00380601520	xCELLigence RTCA ePacer Analyzer	W680	
	00380601530	ePacer Station with 6 Cardio Cradles	6 × 96 (Cardio)	
	00380601540	ePacer Station with 6 CardioECR Cradles	6 × 48 (CardioECR)	
Instrument	00380601550	ePacer Station with 3 Cardio Cradles and 3 CardioECR Cradles	3 × 96 (Cardio) + 3 × 48 (CardioECR)	
	00380601560	ePacer Station-Customer Configuration	6 × 96 (Cardio)/ 48 (CardioECR)	Combination of up to 6 Cardio Cradles and CardioECR Cradles
Consumables	00300601050	E-Plate Cardio 96 (6 plates)	1 box of 6 plates	
	00300601060	E-Plate Cardio 96 (36 plates)	6 boxes of 6 plates	
	00300601080	E-Plate Cardio View 96 (6 plates)	1 box of 6 plates	
	00300601090	E-Plate Cardio View 96 (36 plates)	6 boxes of 6 plates	
	00300601110	E-Plate CardioECR 48 (6 Plates)	1 box of 6 plates	
	00300601120	E-Plate CardioECR 48 (36 Plates)	6 boxes of 6 plates	
Computer	00380601590	RTCA ePacer Control Unit		Computer same as RTCA SP/MP/Cardio Control Unit

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U.S. and Canada
1-800-227-9770
agilent_inquiries@agilent.com

Europe
info_agilent@agilent.com

Asia Pacific
inquiry_lsca@agilent.com

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