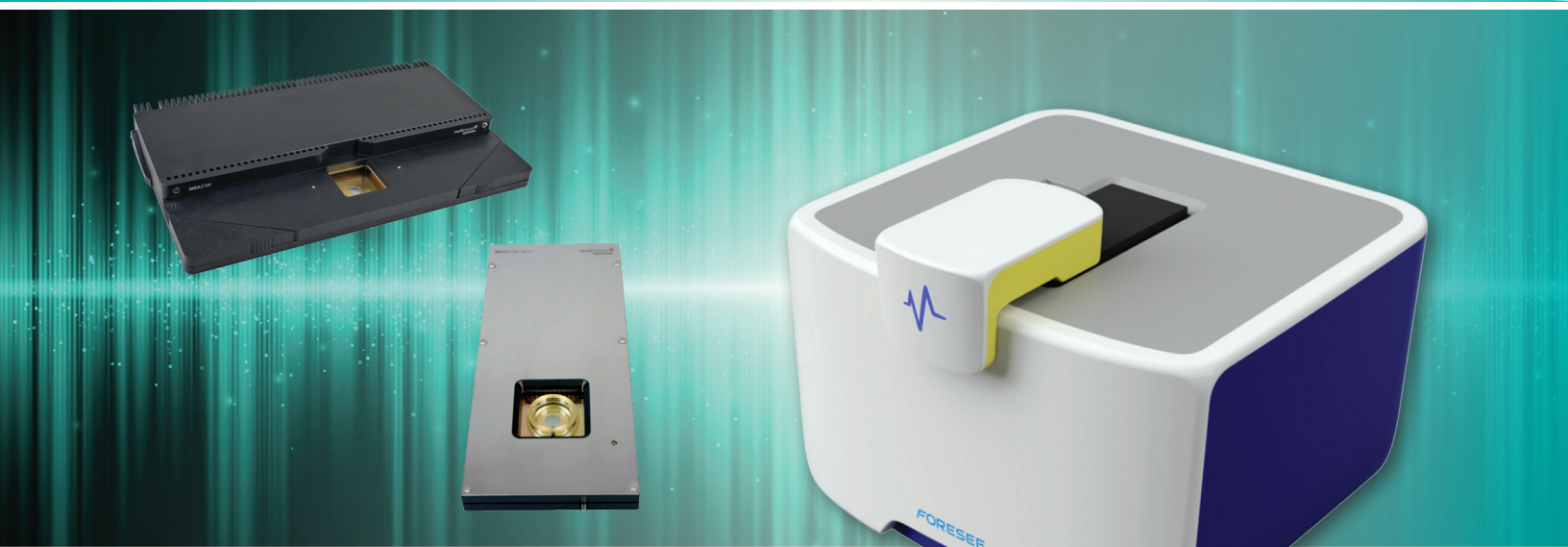




# IntraCell

**Laser-based optoporation system** for acute and long-term *in vitro* electrophysiological recordings



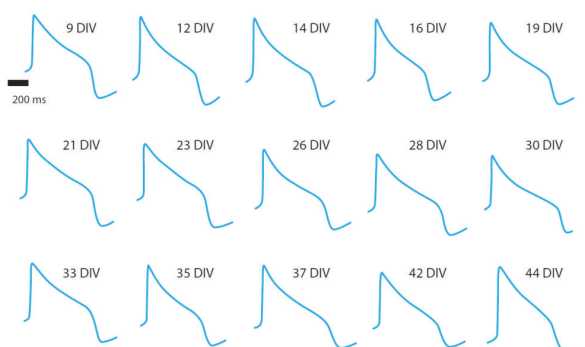
- New technology to record intracellular action potential on MEAs
- Easier to use, higher success rate, and higher throughput than existing technologies
- Minimally-invasive laser allows for the generation of long-term recordings for the first time

# Repeated recordings of intracellular action potentials from the same cell

The IntraCell laser-based optoporation system from our partner Foresee Biosystems allows researchers to capture high-quality intracellular action potentials (APs) from both 2D cardiac monolayers and 3D cardiac organoids.

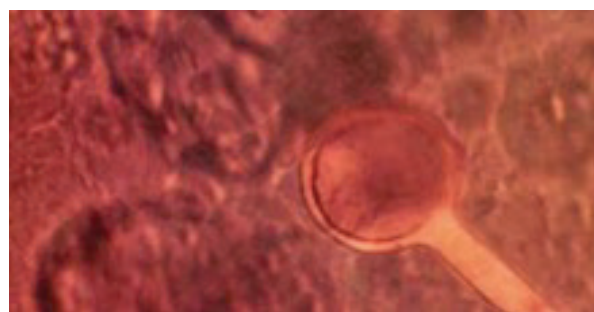
## For both acute and long-term studies

Detect intracellular action potentials and extracellular field potentials within your cell culture for 35+ days.



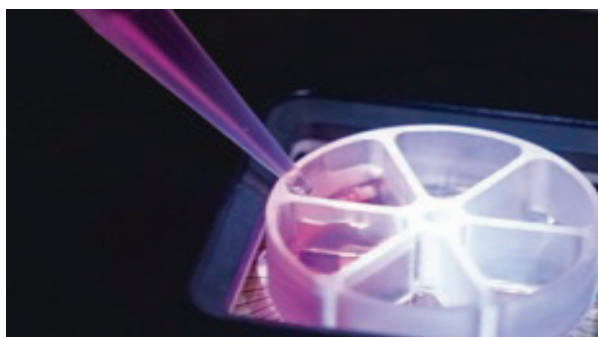
## Combined electrophysiology measurements and optical imaging from the same cell

Easily observe beating cells and correlate electrophysiological data with contractility measurements.

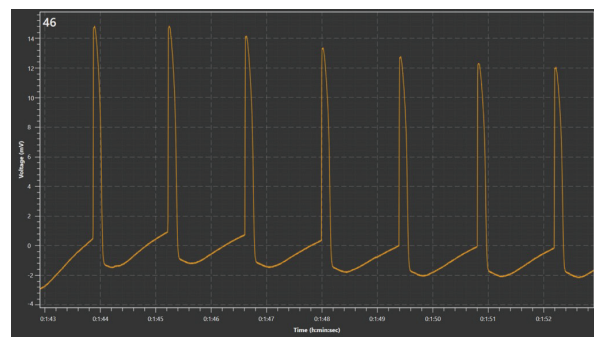


## Increase throughput

Up to nine wells per experiment, in a scalable experimental setup.

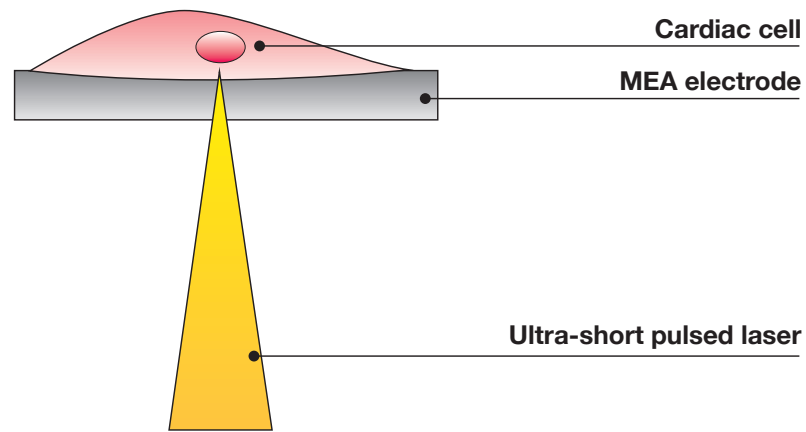


## Ideal for cardiomyocytes or cardiac organoids



# How it works

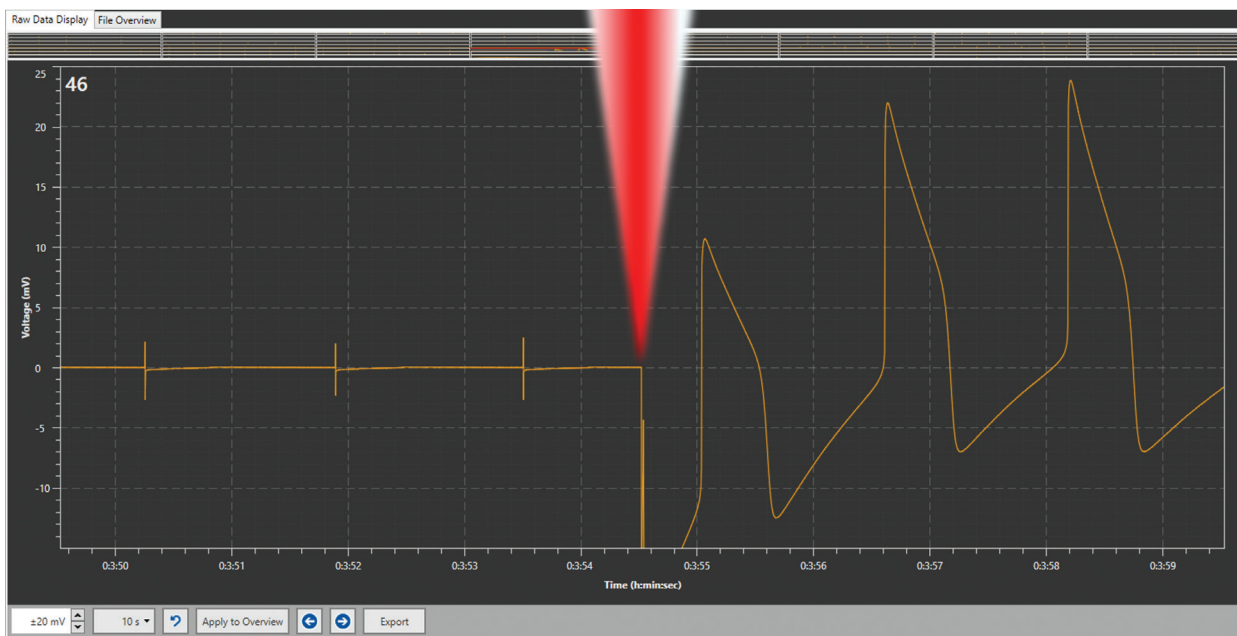
The IntraCell system uses an ultra-short pulsed laser to create transient nanopores in the membranes of cardiac cells cultured on a multielectrode array (MEA). This process allows for the recording of action potentials directly from the cells.



## Laser-based optoporation

The laser alignment and scanning process is fully guided by the software, and specific MEA layouts and electrodes can be selected for monitoring.

The system enables **immediate transition** from field potential to action potential recordings, allowing you to record both at the same time within the same sample (extra and intracellular).



**Extracellular Signal (Field Potential)**

Multielectrode Array

**Intracellular Signal (Action Potential)**

IntraCell Laserporation + Multielectrode Array

# Why use IntraCell?

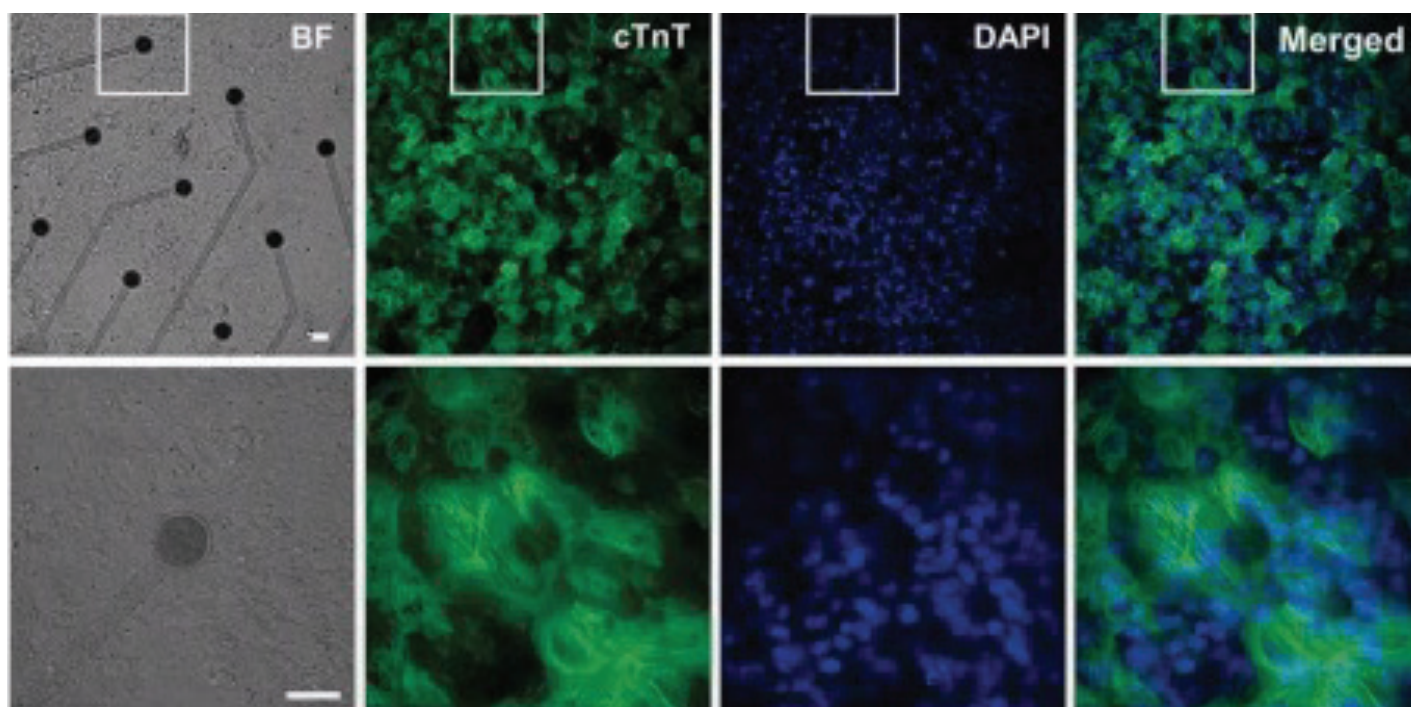
IntraCell offers a minimally-invasive, medium-throughput solution for chronic and acute cardiotoxicity studies, enabling **repeatable, prolonged recording sessions without compromising cell viability**. You'll be able to record intracellular action potentials with a higher success rate, higher throughput, and in far less time than with existing technologies – and cells will remain viable even after repeated optoporation procedures, making long-term recordings from the same cell culture possible.

## Preserve cell viability and prolong your experiments

Unlike patch clamp technology, the IntraCell system is minimally-invasive and locally opens nanopores within the cell membrane. It **does not impact** cell viability, meaning that you can reliably obtain insights into chronic adverse effects of drugs.

## Ideal for:

- Toxicology and cardiac safety
- hiPSC differentiation
- Disease modeling
- Cell signalling

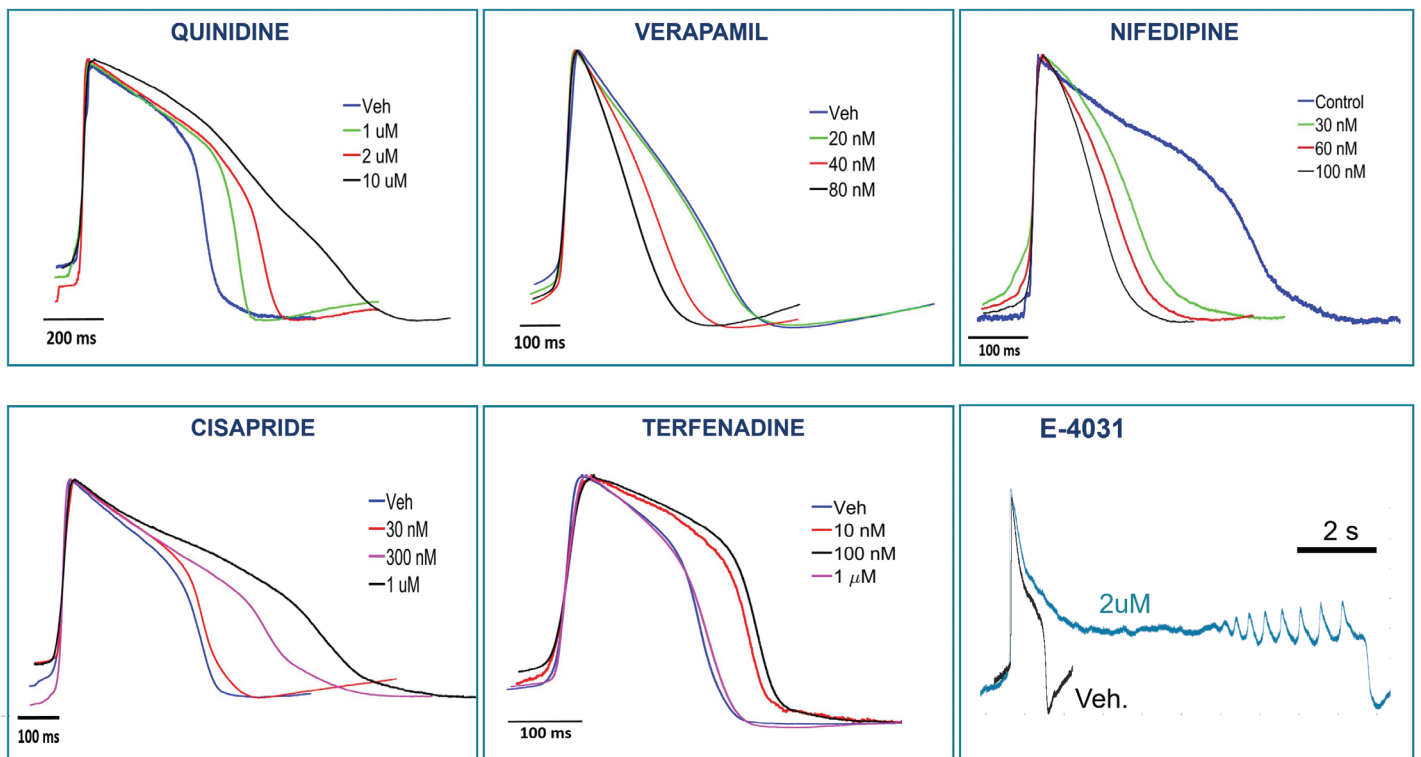


cTnT staining is particularly important for evaluating cardiac cell cultures and studying cardiotoxicity, cardiac differentiation, and cellular responses in cardiovascular research.

DAPI staining is often used alongside other fluorescent markers, such as those for specific proteins or cell structures, allowing researchers to study nuclear organization, cell count, cell viability, and DNA content, as well as to localize other molecules in the context of cell structure. Article reference: Iachetta et. al., Archives of Toxicology, 2023.

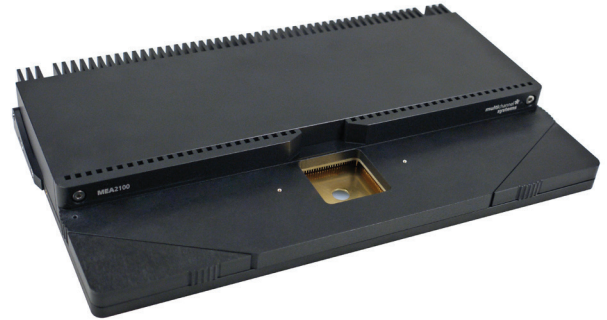
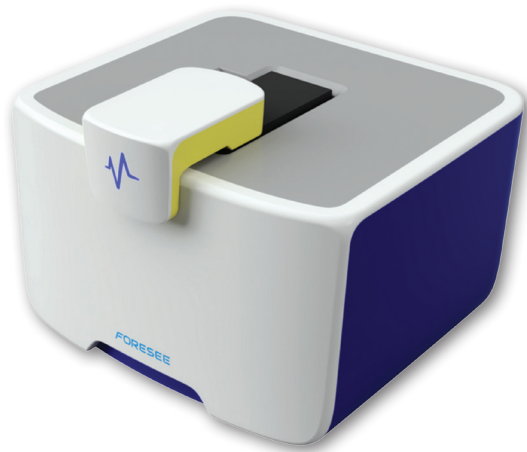
# Acute Cardiotoxicity

IntraCell's advanced technology facilitates detailed analysis of cardiac cell behavior, including real-time video recordings and contractility measurements, and is a powerful tool for studying the effects of various compounds on heart cells.



Effects of several compounds on action potential duration (APD) following laser optoporation on microelectrode arrays. Quinidine, verapamil, nifedipine, cisapride, and terfenadine dose dependently lengthened APD, whereas treatment with E-4031 induced cardiac arrhythmia. These drug effects on MEA are consistent with those observed using patch clamp electrophysiology.

# Our Solution



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Our solution consists of two components that work together. The IntraCell unit is compatible with multiple Multi Channel Systems' headstage models, and can be purchased separately if you already own a Multi Channel Systems MEA headstage.

Our Technical Support representatives are available to help you choose the headstage that's right for your unique research needs.

## Compatible Multi Channel Systems headstage

- MEA2100 Mini 60
- MEA2100 Mini 120
- MEA2100 256

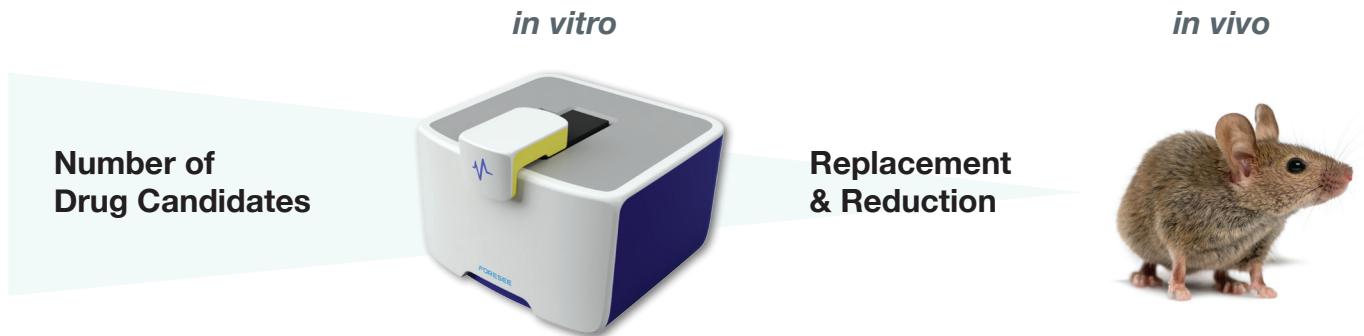
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## Flexible and multi-purpose MEA system

Unlike patch clamp technology, the IntraCell system is minimally-invasive and locally opens nanopores within the cell membrane. It **does not impact** cell viability, meaning that you can reliably obtain insights into chronic adverse effects of drugs.

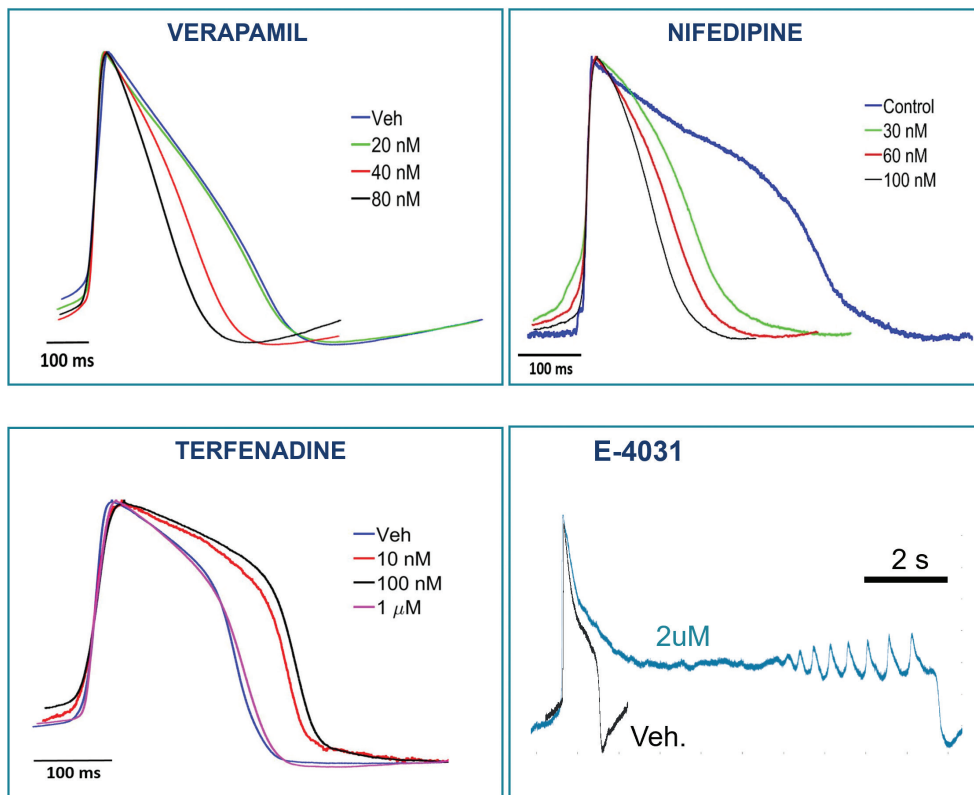
# Replace, Reduce, Refine

By utilizing human stem-cell derived cardiomyocyte assays and organoids, researchers can effectively assess the proarrhythmic potential of new drugs without using animal models. The IntraCell solution allows for easy observation of beating cells *in vitro* and can help labs meet their 3 R's goals (Replacement, Reduction, Refinement).



## Validation Solution

The IntraCell solution has been validated with several compounds listed within CiPA (Comprehensive In Vitro Proarrhythmia Assay) guidelines, demonstrating its ability to successfully detect acute drug effects on ion channels.



# Our MEA Solutions



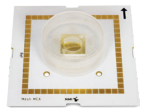
**MEA2100-Beta-Screen**  
Diabetes Electrophysiology



**W2100**  
Wireless *In Vivo* Electrophysiology



**ME2100**  
Tethered *In Vivo* Electrophysiology



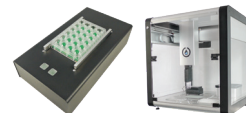
**Mesh MEA**  
Organoid electrophysiology



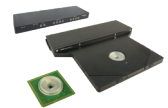
**IntraCell**  
Laser-based optoporation



**MEA2100 Mini**  
Flexible, modular, scalable single-well MEA Electrophysiology



**Multiwell-MEA & MEA Xpress**  
High throughput compound screening and functional cell monitoring



**CMOS-MEA**  
Subcellular Signal Propagation



= Cardiomyocytes, organoids and whole heart	= Cell cultures and stem cell applications
= Neuronal cultures, acute slices and organotypic tissue culture (OTC)	= Diabetes
= Retina	= Acute tissue slices
= Preclinical Research	= Pancreatic Islets

## Ready to learn more?

Contact Multi Channel Systems to learn more about laser-based optoporation and schedule a demo today!



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