Neural Activity

Accelerate your research
with functional neural data.

Learn more at ***axionbio.com***

Know your cells

Understanding neuronal activity is the first step in understanding the mechanisms of disease. While the biology can be complex, measuring it doesn't have to be. At Axion BioSystems, we offer your lab the tools to get the most out of your neural cultures. See why ***Maestro microelectrode array (MEA)*** has become a staple in many neurobiology labs:

500+ peer-reviewed publications

15+ years of expertise

2 million+ cell cultures

How do you measure activity?

The Maestro MEA platform gives you a simple, noninvasive method to gain deep insights into *in vitro* neural models. Our platform offers the best combination of **throughput, resolution, and ease of use.** When deciding how you want to measure neural function, see how it compares to Maestro:

Information-rich neural data

Capture dynamic network behavior, activity, LFPs, and more

Flexible throughput

Simultaneously record from 6 to 96 wells

Powerful, intuitive software

Easily access results for an in-depth analysis

Easy, hands-free method

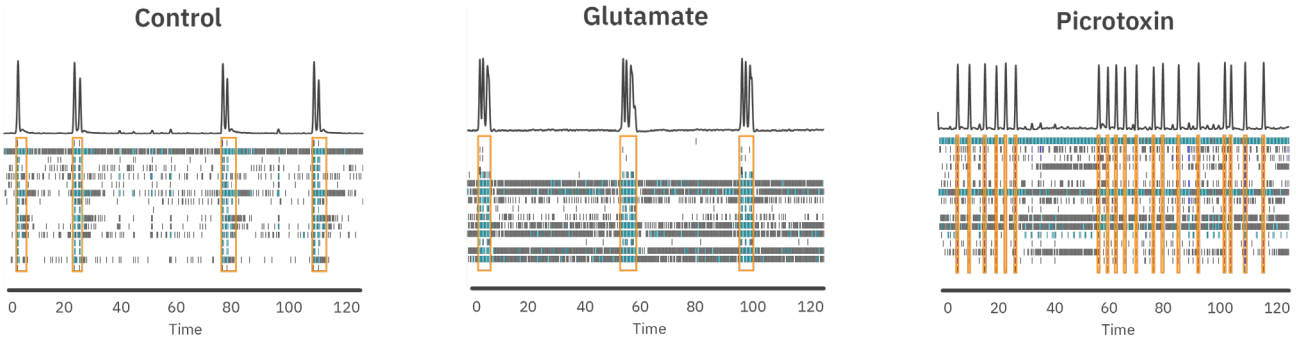
Plate your cells and record them as often as you'd like

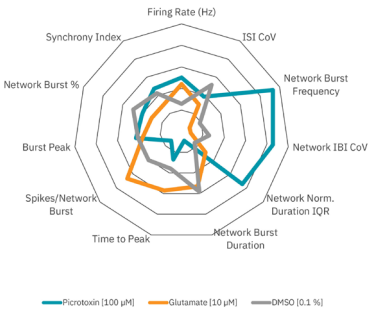
Reveal functional phenotypes >>

There are many types of neurons displaying many types of activity. Measuring activity can give context to your other assays. How impactful is a mutation? Is a compound neurotoxic? What do your neurons act like? Activity can reveal a robust phenotype waiting to be discovered.

One neuron can't tell the full story

MEA shows how neurons communicate across a network, where unique properties emerge that cannot be observed in single cell recordings. The raster plots of this culture demonstrate distinct firing patterns when exposed to neuroactive compounds. ***Learn more***





It takes a network

Quantify neural firing patterns with ***key metrics*** to gain new insights. Easily answer important questions about your culture:

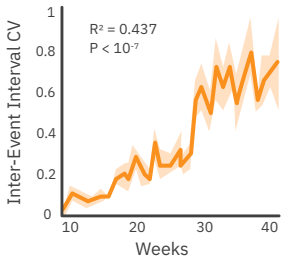
- >> Are your neurons active?
- >> Do they form synapses?
- >> Do they form networks?

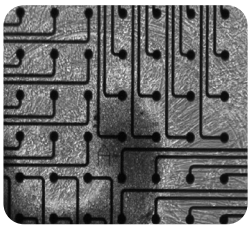
Characterizing multivariate neuroactivity patterns of environmental compounds

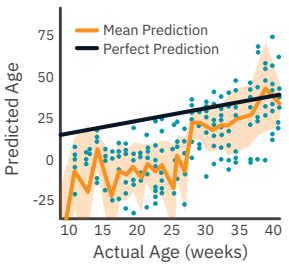
Screening for ***neurotoxicity***? See how researchers create neural activity phenotypes to classify compounds. ***Watch more***

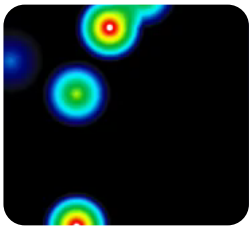
Explore monolayers, organoids, and more >>

Primary or stem cell-derived, monolayers, organ-on-a-chip, cocultures, slices, or ***organoids***, – the Maestro MEA platform can record your neurons.





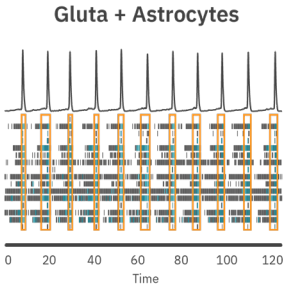


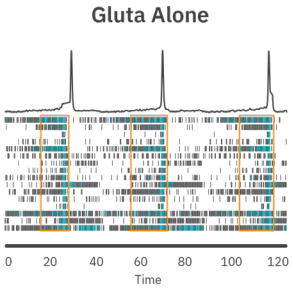


Dive into organoids to model brain development

MEA is an ideal platform to monitor development and the emergence of complex patterns of activity like LFPs. In this example, researchers from UC San Diego show how organoids can be used to mimic brain development. ***Watch here***

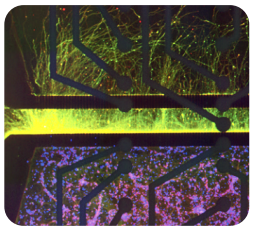
View additional organoid webinars, protocols, and publications: ***Read more***

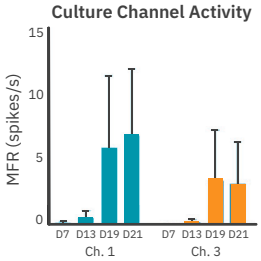


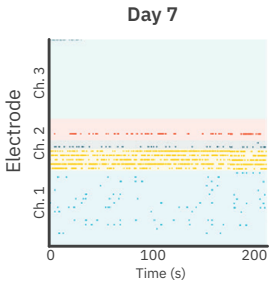


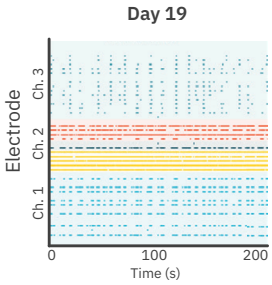
Investigate the effects of neuron -glial cocultures

In this example, glial cells provide critical support and structure for neurons. While they may not directly fire, astrocytes increase the synchrony of glutamatergic neurons. ***Read more***









Develop powerful organ-on-a-chip models

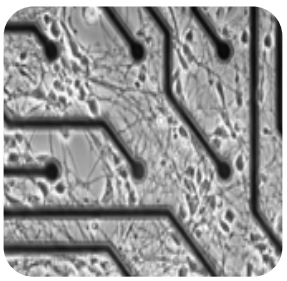
To track neurite growth and development, glutamatergic neurons were cultured in one chamber of the Maestro-compatible DuaLink MEA plates (***NETRI***). Neurite growth is detected as activity in the second chamber, useful for studying innervation. ***Read more***

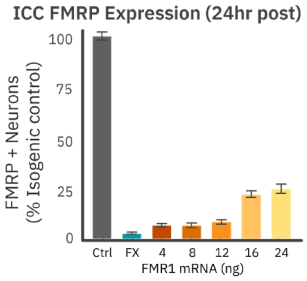
Discover new insights into neural disease >>

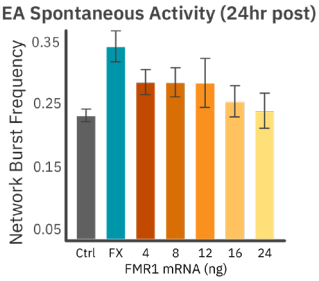
To develop effective treatments, understanding the biology and behavior of neurons is essential.

Translate expression data to function

After identifying a reduction in FMR1 expression in Fragile X neurons, researchers discovered a hyperexcitable phenotype on MEA. A relatively small increase in FMR1 expression corrects this phenotype, offering hope for therapeutic development. ***Watch here***

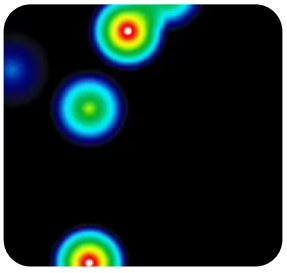


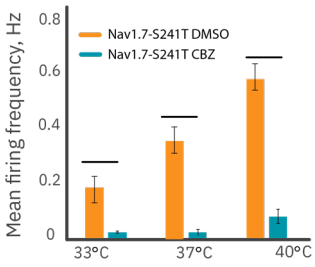




Screen treatments in vitro

iPSCs and MEA are ideal for personalized medicine and drug screening. Here, patient-derived neurons identify treatments for erythromelalgia or burning man syndrome. ***Watch here***





More Resources

Featured Publications

- >> ALS
- >> Alzheimer's disease
- >> Neuroimmune
- >> Parkinson's disease
- >> Pain

Customer Stories

- >> The spectrum in a dish: Using neurophysiology to build an iPSC-model of autism
- >> Remodeling of human neural circuits by glioblastoma
- >> Brain tumors that cause epilepsy
- >> Modeling pediatric epilepsy with iPSC-based technologies
- >> Seizure prediction using AI
- >> Neuromuscular disorders: Controlling contractions with light

Maestro MEA

Electrical activity and more >>

Monitor dynamic cellular activity and perform complex functional experiments with only basic cell culture.

Demo today

>> Learn more about Maestro MEA and how you can try it in your lab

Industry-leading microelectrode array

Noninvasive activity monitoring

Customizable environmental control

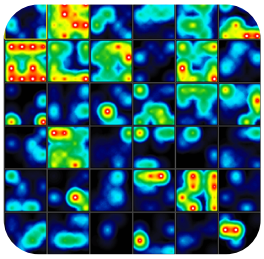
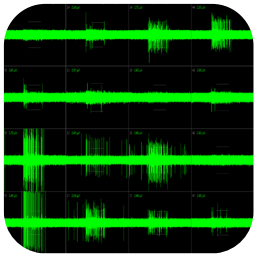
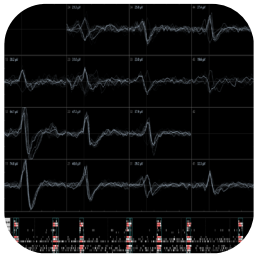
Features	Maestro Edge	Maestro Pro
MEA throughput	6- and 24-well	6-, 24-, 48-, and 96-well
Impedance throughput	96-well	96- and 384- well
Stimulation	Electrical & Optical	Electrical & Optical
Environmental	Built-in	Built-in
Barcode plate tracking	✓	✓
Automation API	✓	✓

Software tools to accelerate analysis >>

Get powerful analysis with intuitive software. The AxIS suite of software tools provides a comprehensive ***neural analysis package*** designed to deliver fast, accurate results and generate publication-ready figures.

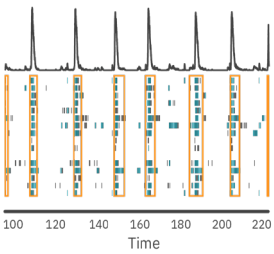
AxIS Navigator

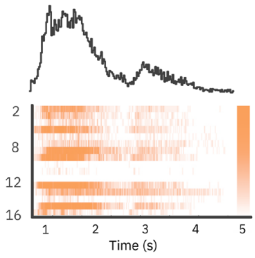
View real-time data from the entire plate down to an individual electrode. Manage your experiment, stimulate, record, and analyze. ***Watch video***

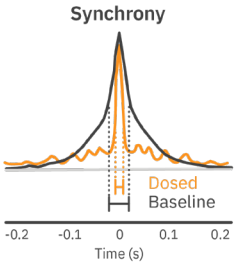




Neural Metric Tool

In-depth analysis of network activity, synchrony, LFPs, and more. Quickly navigate your results and export key figures. ***See metrics***

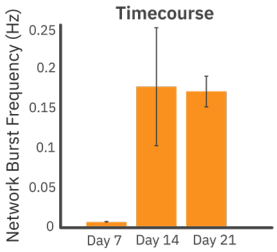


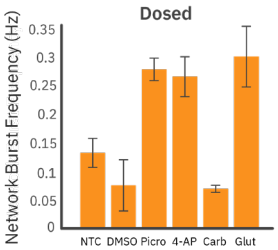


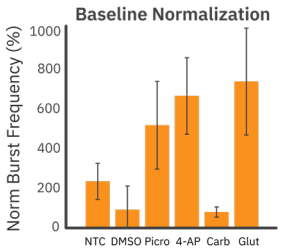


AxIS Metric Plotting Tool

Generate graphs or automated reports with just a few clicks. Compare time points, apply controls, and easily plot conditions.







Want to learn more?

Click the figures in the digital version for additional resources and an in-depth look.

Our commitment to our customers

With over **15 years of experience** bringing innovative new products to our customers, we strive to accelerate your research by making live, functional biology more accessible. Our design philosophy is to ensure all of our products are:

Flexible

Hardware designed for broad, integrated functionality in one instrument

Easy to use

Intuitive instruments, consumables, and software for fast, easy adoption

Smart technology

Easy to run with no complicated steps, saves time and money.

Contact our scientists to discuss how we can help your neural research:
axionbiosystems.com/contact