

# NEUROTOX MAESTRO ASSAYS

## SUPERIOR SEIZUROGENIC STUDIES

### Why use the Maestro™ Pro and Edge?

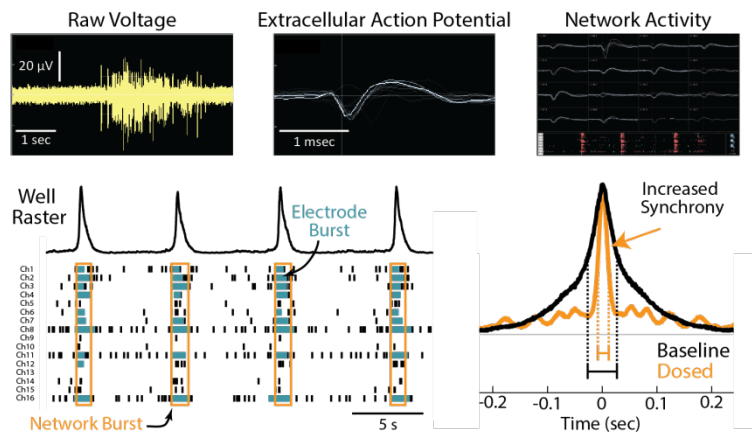
Comprehensive evaluation of seizurogenic activity and proconvulsant risk requires analysis of single neuron and network activity. Axion BioSystems' Maestro™ multiwell microelectrode array (MEA) platforms provide a high-throughput and label-free benchtop platform to evaluate multiple layers of neural activity for *in vitro* screens of neuroactive and neurotoxic compounds. Environmental controls provide stability for both acute and chronic screens, while our industry-leading array density provides high quality spatiotemporal resolution for comprehensive evaluation of network function.

### Comprehensive assessment of network function

Axion's Integrated Studio software – AxIS – provides an intuitive approach to the set-up, execution, and analysis of multiwell MEA experiments. AxIS allows the user to explore multiple layers of neural activity, from single neuron firing to plate-wide trends in network activity, with real-time visualization and easy-to-use analysis tools. Data can be viewed as continuous voltage, overlaid spike waveforms, network-wide rasters, and plate-wide activity maps. AxIS then computes a variety of metrics describing single neuron firing, network bursting, and synchrony. Finally, offline tools provide additional metrics, visualization, export options, and endpoint comparisons across treatments and time points.



Axion's Maestro™ Pro MEA Platform and AxIS



AxIS and Axion's offline neural analysis tools provide visualization and quantification of neural activity ranging from single action potentials to well-wide network bursting and plate-wide activity trends.

## THE MAESTRO™ ADVANTAGE

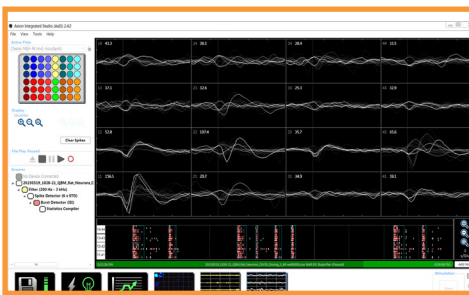
- Label-free, non-invasive voltage recording enables long-term monitoring of neural cultures
- Industry-leading number of electrodes (768) provides high quality spatiotemporal resolution
- Environmental controls provide a stable benchtop environment for both acute and chronic toxicity studies
- Fast data collection rate (12.5 kHz) accurately captures depolarization magnitudes
- Scalable format (12-, 48-, and 96-well plates) allows throughput flexibility all on one system



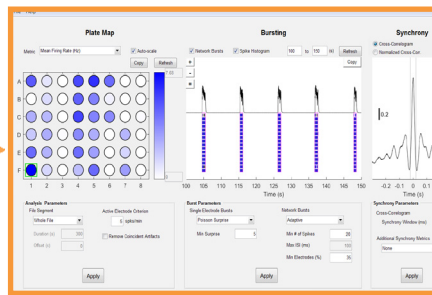
## CLASSIFY COMPOUNDS WITH MEASURES OF NEURAL ACTIVITY

The Maestro multiwell MEA platform is effective for high-throughput *in vitro* screens of neuroactive compounds (McConnell et al 2012, Valdivia et al 2014). Basic metrics, such as weighted mean firing rate, are sensitive to most neuroactive compounds, while advanced metrics of network bursting and synchrony provide reliable identification of compounds that increase or suppress seizuregenic activity and, more broadly, affords discrimination between various compound classes. In the example below, 16 compounds were dosed sequentially with 6 replicates across 2 plates.

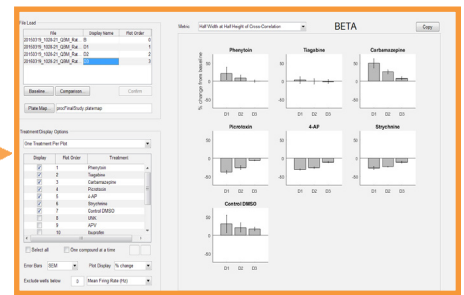
**AxIS facilitates experimental design, execution, and real-time visualization of spiking and bursting.**



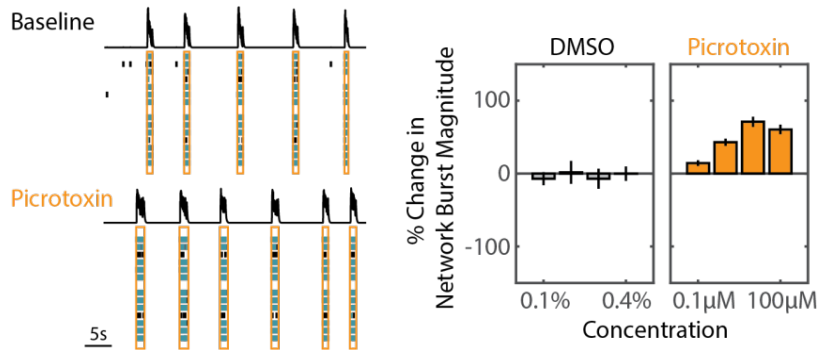
**The Neural Metric Tool enables exploration of network bursting and synchrony metrics.**



**The AxIS Metric Plotting Tool compiles endpoints across time and compounds for rapid interpretation of results.**



**Network burst magnitude, measured as the number of spikes per burst, clearly discriminates proconvulsants, such as picrotoxin, from vehicle control. Other metrics, such as network burst duration, afford similar discrimination.**



**Synchrony, as measured by the full width at half height of the cross correlogram (FWHH), provides excellent discrimination of proconvulsant compounds from other classes. Proconvulsant compounds exhibit increased synchrony, reflected as significant decreases in FWHH, while antiepileptics exhibit decreased synchrony.**

