



# IN VITRO ASSAYS FOR NEUROSCIENCE

## EXPERIMENTAL PLATFORMS

### ELECTROPHYSIOLOGY PLATFORMS

- Automated Qpatch-48
- Manual Patch Clamp EPC10 USB, 700B
- Multi-electrode Array MED64 System

### MORPHOLOGY PLATFORMS

- Confocal laser scanning microscope
- High content image analysis system

## ION CHANNEL TARGET ELECTROPHYSIOLOGICAL TESTING

### VOLTAGE-GATED ION CHANNELS

- (Na<sup>+</sup>) Nav1.1, Nav1.5, Nav1.7
- (K<sup>+</sup>) hERG, Kir2.1, Kv1.5, Kv4.3, Kv7.1
- (Ca<sup>2+</sup>) Cav1.2

### ION CHANNELS ON PRIMARY NEURONS

- DRG neuron
- Hippocampal neuron
- Cortical neuron

### LIGAND-GATED ION CHANNELS

- 5-HT<sub>3</sub>
- GABA<sub>A</sub>R ( $\alpha 1\beta 2\gamma 2$ )
- nAChR ( $\alpha 4\beta 2$ )
- NMDA (GRIN1/GRIN2B)
- TRPR (TRPV1, V3, C6)

## CELL ASSAYS BASED ON PRIMARY NEURONS

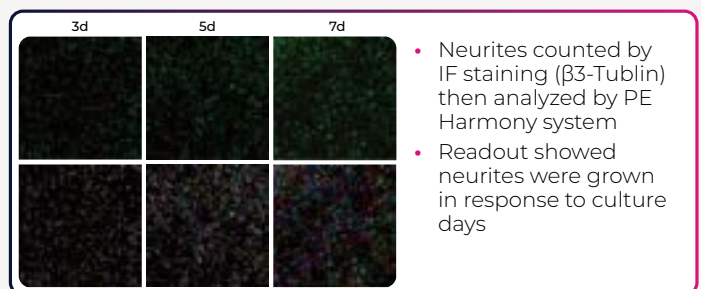
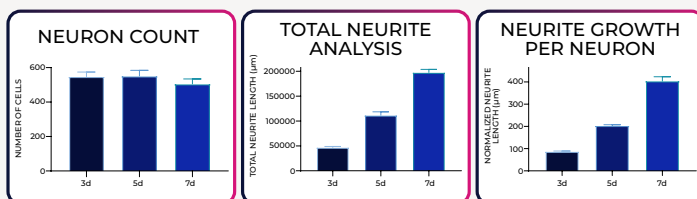
### NEURITES GROWTH TESTING

- Paclitaxel-induced neurites degeneration of DRG neurons
- Neurites growth testing in hippocampal neurons

### CELL MODEL ASSAYS

- Cell oxygen-glucose deprivation (OGD) model assay of cortical neurons
- Oxidative stress model assay of cortical neurons

## NEURITE GROWTH TESTING IN HIPPOCAMPAL NEURONS



# ELECTROPHYSIOLOGY BASED ON BRAIN SLICES

## VARIOUS BRAIN REGIONS

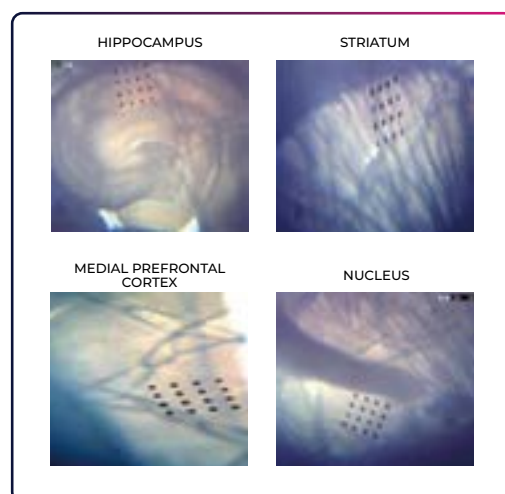
- Hippocampus (CA1, CA3, DG)
- Frontal cortex
- Cortex-Striatum
- Nucleus Accumbens
- Amygdala
- Interpeduncular nucleus

## POST-SYNAPTIC CURRENT

- Rodent brain slices
- Manual patch clamp (Axon)
- Pyramidal neuron
- Frequency and amplitude

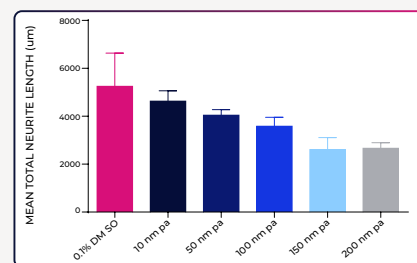
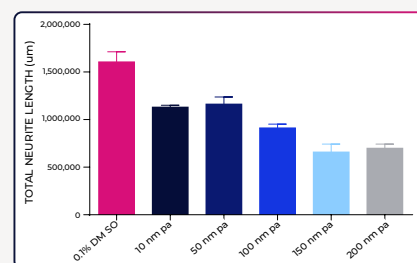
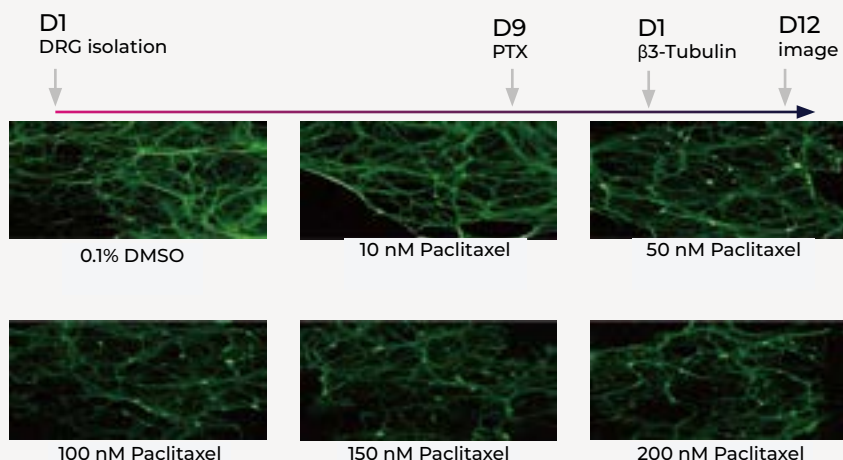
## NEURONAL EXCITABILITY

- Rodent brain slices
- Manual patch clamp (Axon)
- Interneuron and pyramidal neuron
- Threshold
- Action potential numbers
- Currents

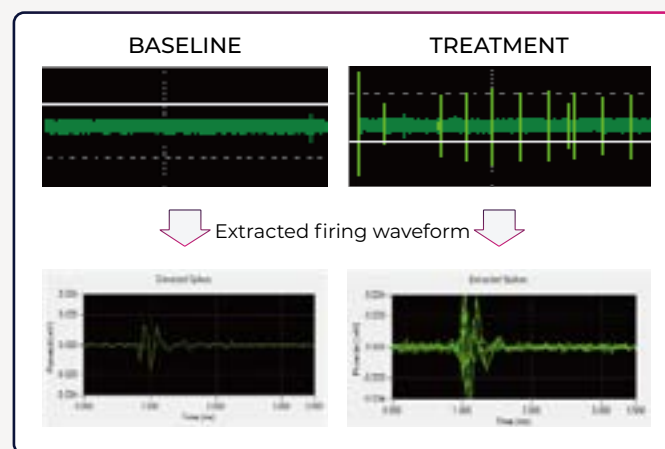
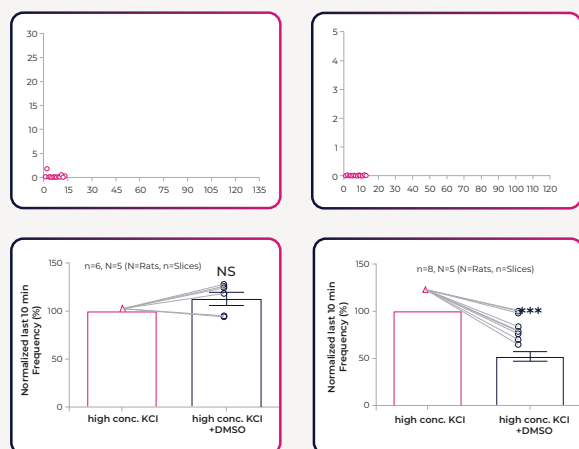


## CASE STUDIES

### PACLITAXEL-INDUCED NEURITES DEGENERATION OF DRG NEURONS READOUT WITH OPERETTA CLS HIGH CONTENT IMAGE ANALYSIS SYSTEM

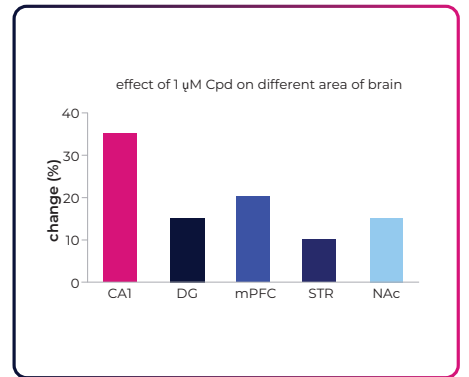
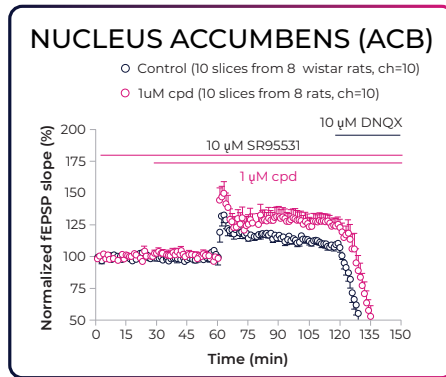
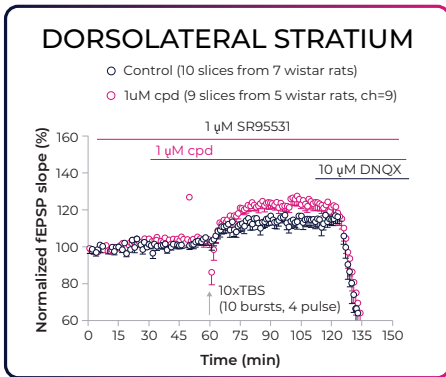
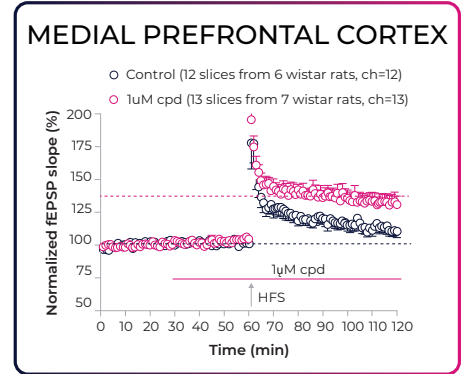
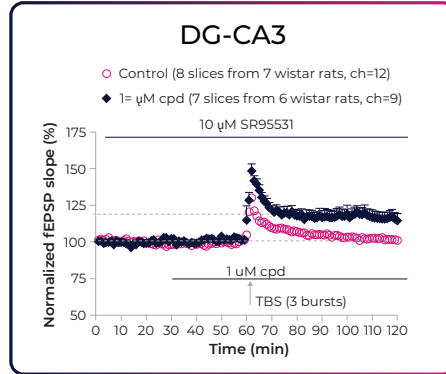
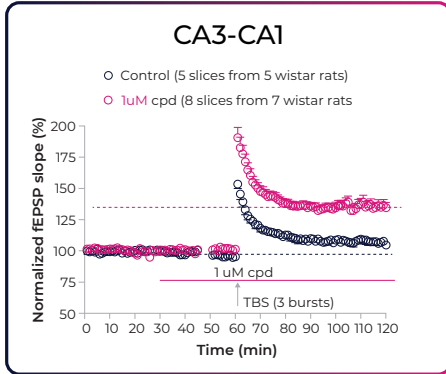


### EPILEPTIFORM ACTIVITY FIRING INDUCED BY HIGH CONCENTRATION KCL ACSF (WISTAR)



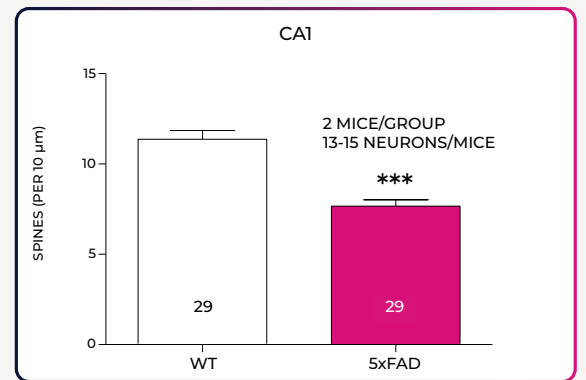
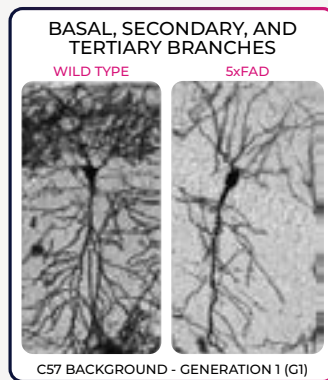
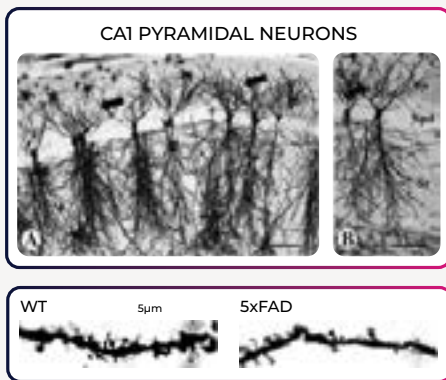
# CASE STUDIES

## BRAIN SLICE LTP RECORDING IN DIFFERENT BRAIN REGIONS



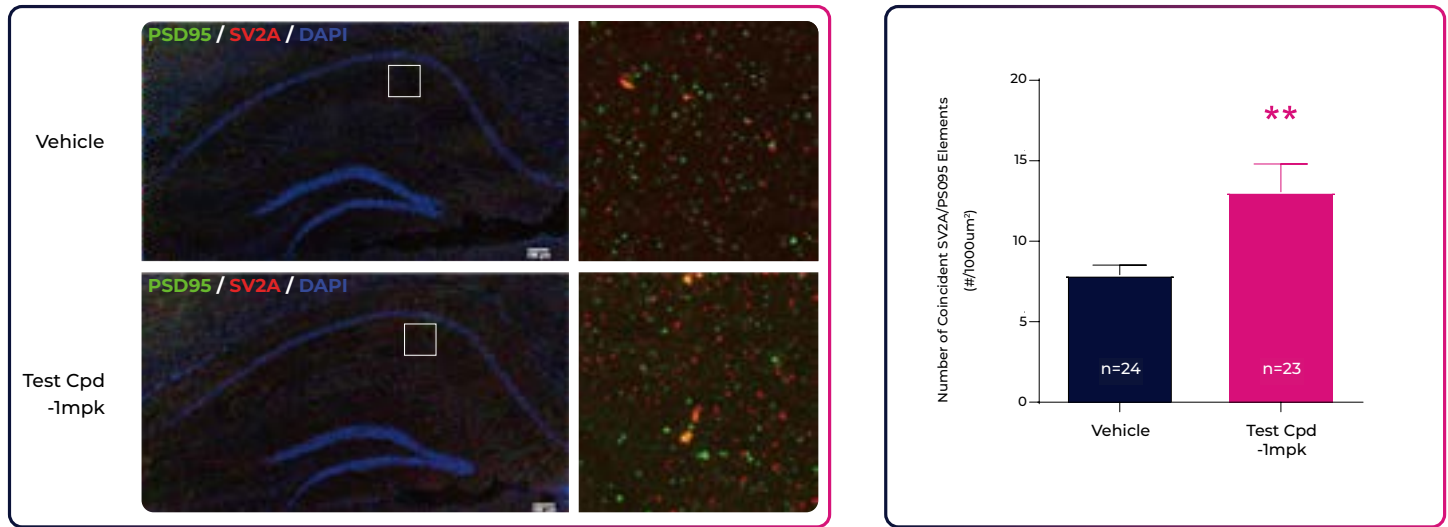
## SPINE DENSITY WITH GOLGI STAINING

Decreased spine density of pyramidal neurons in hippocampal CA1 in 9 month old 5xFAD mice



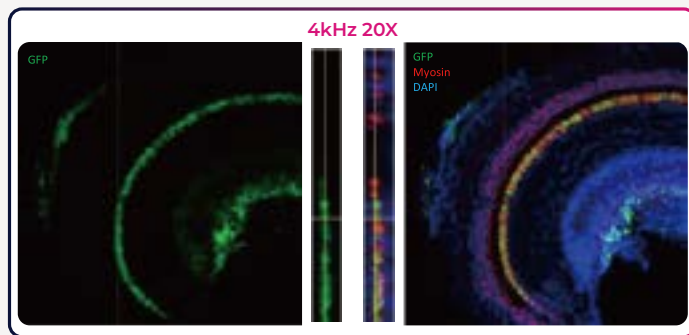
# CASE STUDIES

## PRE/POST-SYNAPTIC ELEMENTS SV2A AND PSD95 IN HIPPOCAMPAL CA1



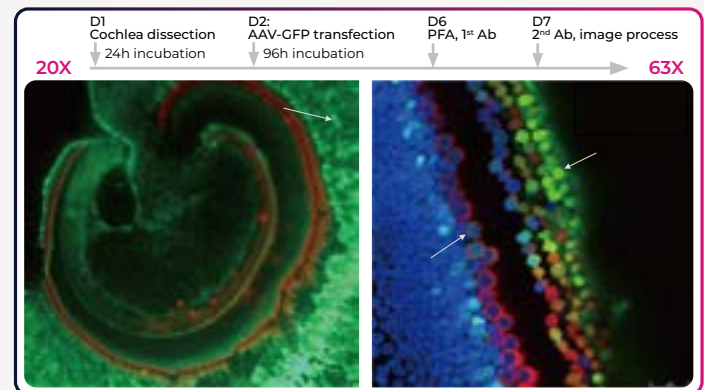
## AAV-GFP TARGETED EXPRESSION IN COCHLEA INNER HAIR CELLS OF C57 MICE

AAV-GFP introduced by intralabyrinth infusion achieved targeted expressed in inner hair cells



## AAV-GFP EXPRESSION IN EX PLANTED COCHLEA TISSUE

AAV-XXX expression in inner hair cells, some outer hair cells, and many non-sensory cell types



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