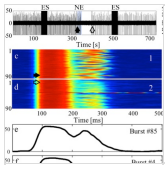

Electrophysiology

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Working

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ABSTRACT

Electrophysiology by MEA. Electrical recording and stimulation of the cultures using MEA set-up (by Multichannel Systems).

PROTOCOL STATUS

Working

We use this protocol in our group and it is working

MEA set-up preparation

1 For extracellular voltage recording and stimulation of cortical cultures use MEA (60MEA200/30iR-Ti-gr and 60MEA500/30iR-Ti-pr; Multichannel Systems), utilizing low noise pre-amplifier board (MEA- 1060-BC, amplifier, gain x1100; Multichannel Systems)
For recording simultaneously with calcium imaging: Place the amplifier under the microscope, connect the camera to the MC-card in the computer and to the stimulator (see instructions bellow, step 3) in order to record the time stamps of the camera and apply an external trigger for the camera to start recording (see MEA manual by Multichannel Systems for exact directions of cable connections).

MEA software preparation

2 Use MC-RACK data acquisition software by Multichannel Systems to record the voltage signals and the triggers applied on the culture. For detailed use of the software, see MC-Rack manual.

MEA electrical stimulation set-up

3 Perform electrical stimulation using a dedicated four-channel stimulus generator (STG 2004; Multichannel Systems). Connect the stimulator to the computer, MEA amplifier, and camera. See manual in Multichannel Systems website.

MEA electrical stimulation software

4 Use 'MEA select' tool to choose which electrodes will stimulate.
Use MC-stimulus software:
1. To send an external trigger to activate the camera.
2. To program an electrical stimulation protocol. For example: Rectangular and biphasic 400 µs-long current pulses of 25-35 µA (1.4-1.7 mC/cm2) at frequencies of 2-40 Hz.
For more download the manuals from the Multichannel Systems website:https://www.multichannelsystems.com/downloads/documentation