In Vivo Electrophysiology Recording During Optogenetic Manipulation via UCNPs

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Method Article

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Abstract

This describes the flow of in vivo electrophysiology recording during optogenetic manipulation via UCNPs.

Introduction

Reagents

Sterile buffered saline : 150 mM NaCl, 2.5 mM KCl, 10 mM HEPES, pH 7.4.

Equipment

Silicon electrode (A4x8-5mm, Neuronexus, US), micromanipulator (Scientifica, US), multichannel data acquisition system (Bio-Signal Technologies, China).

Procedure

1. Mice were head-fixed on stereotaxic setup (Thorlabs Inc, US).
2. A respiratory mask was placed around the nose and mouth to deliver 1.5 % isoflurane for anaesthetization during surgery, and turned down to 0.5 % isoflurane during electrophysiology recording.
3. The eyes were covered with erythromycin ointment to block the environmental light.
4. After removing the scalp, a craniotomy window was created stereotaxically on V1. The craniotomy was filled with fresh warm sterile buffered saline throughout the entire recordings.
5. The dura was carefully removed.
6. The silicon electrode (A4x8-5mm, Neuronexus, US) was slowly inserted into V1 at a depth about 0.4-0.6 mm by a micromanipulator (Scientifica, US).
7. Electrical signals were recorded at 30 kHz and amplified $\times 200$ by multichannel data acquisition system (Bio-Signal Technologies, China).
8. Spikes were high-pass filter at 300 Hz, detected as events exceeding a threshold of $5 \times$ s.d. below the noise, raster plot and peri stimulus time histogram (PSTH) were made.
9. The spike waveforms were sorted off-line by OfflineSorter (Plexon, US).