# ADVANCED EEG TELEMETRY MEASUREMENTS IN MICE: APPLICATIONS FOR SEIZURE PHENOTYPING, QUANTITATIVE EEG, AND SLEEP ARCHITECTURE

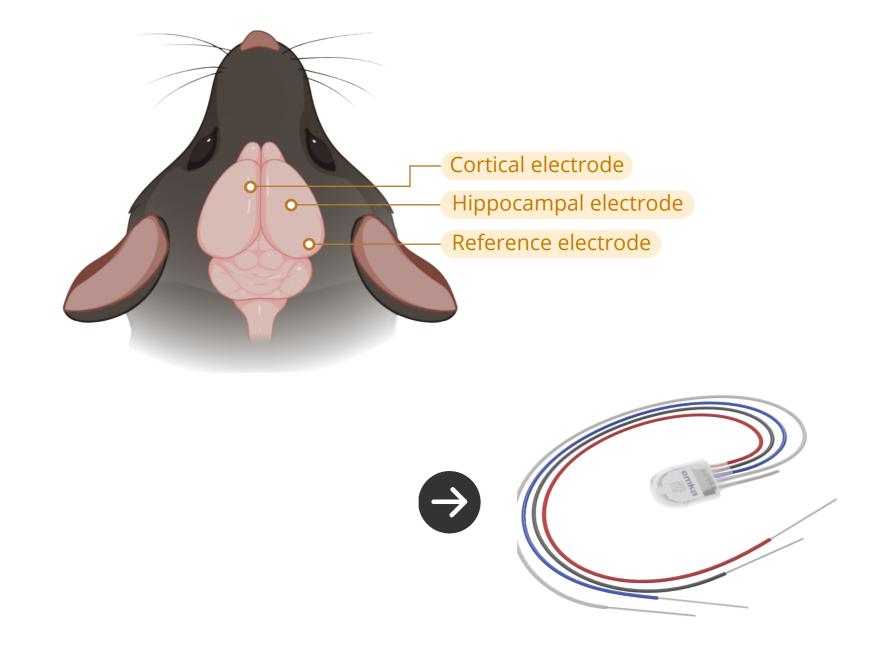
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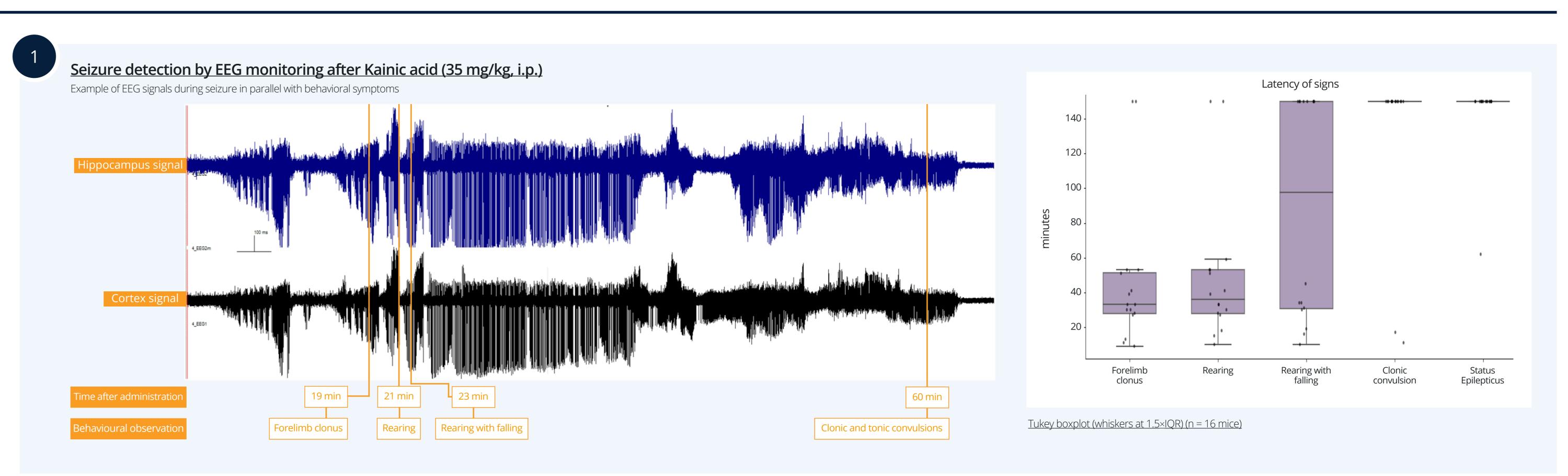
## INTRODUCTION

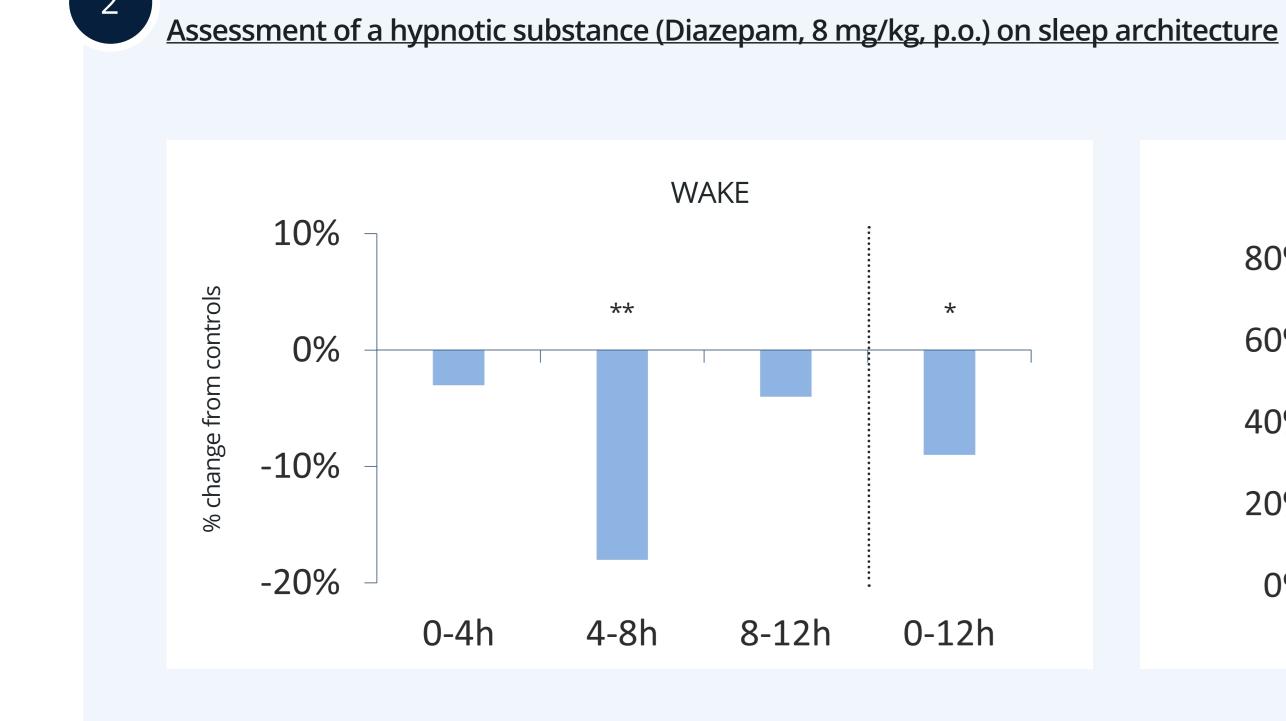
Electroencephalographic (EEG) recordings in rodents are essential for translation and neuropharmacology. The aim of this project was to evaluate the sensitivity and reliability of detecting modulation in brain activity, in response to major events in the mouse. We present the versatility of the easyTEL+ implantable digital telemetry system (emkaTechnologies) for EEG acquisition and analysis in mice, applied to three distinct experimental paradigms: 1 Seizure assessment in a convulsive model 2 Long-term sleep architecture analysis 3 Acute spectral band quantification.

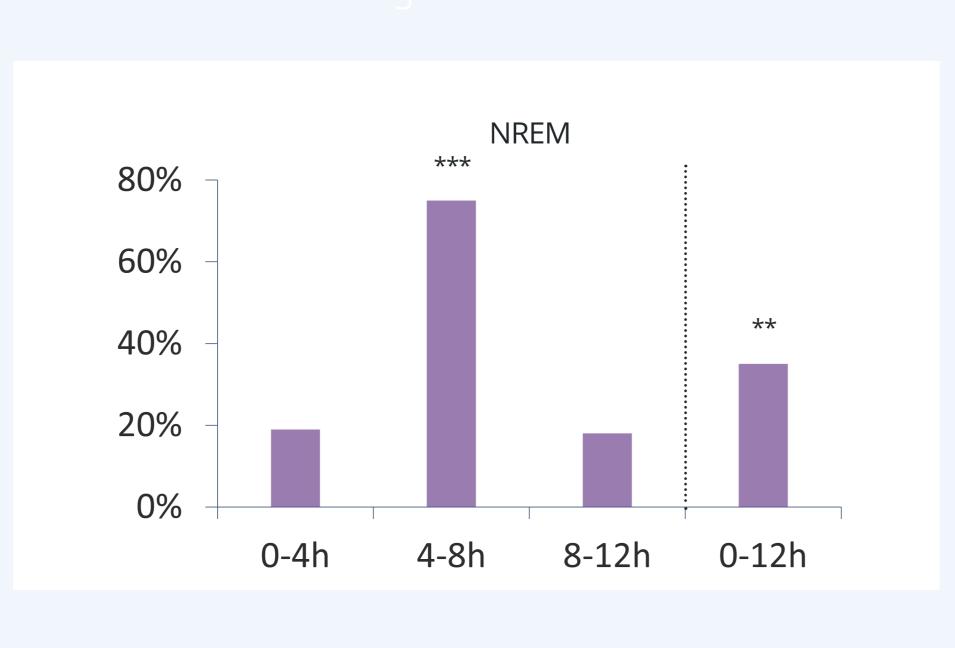
### METHODS AND RESULTS

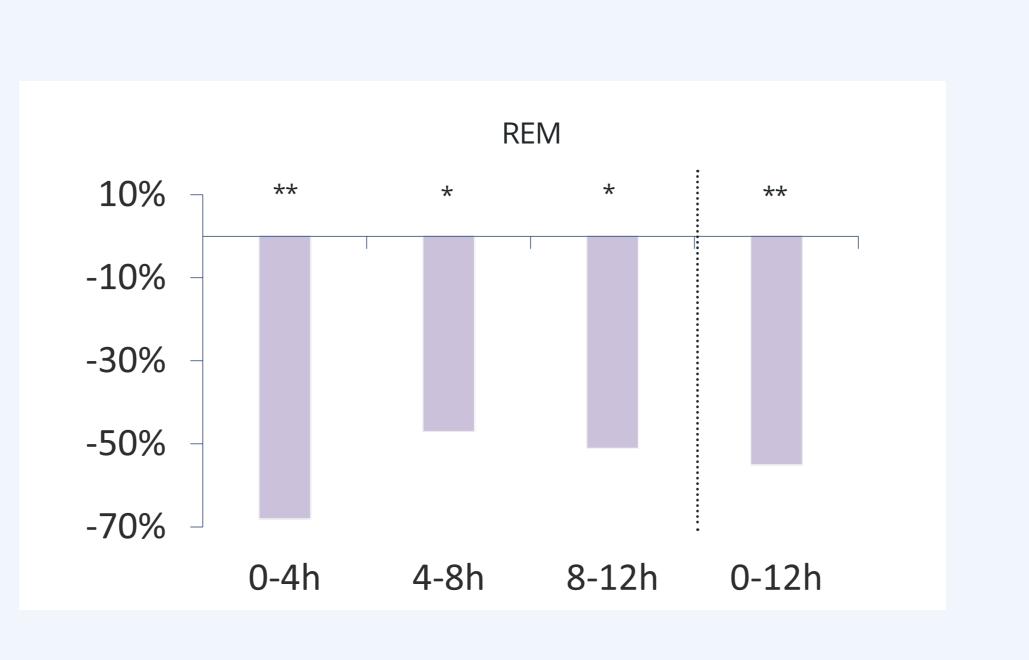
Easytel+S implants with two bipolar EEG channels (ET-S-BEES-N, emkaTechnologies) were used. The implant body was located dorsally, with wires going subcutaneously to the cranial electrodes. Cortical electrodes consisted of screws fixed to the skull, whereas hippocampal electrodes were twisted wires inserted into the brain using a stereotaxic guide. The receiver was placed 2 meters aways from the animals, allowing for group housing or in combination with behavior tests. IOX and ecgAUTO software were used to collect and analyze EEG signals (sleep scoring, Seizure detection, spectral analysis).

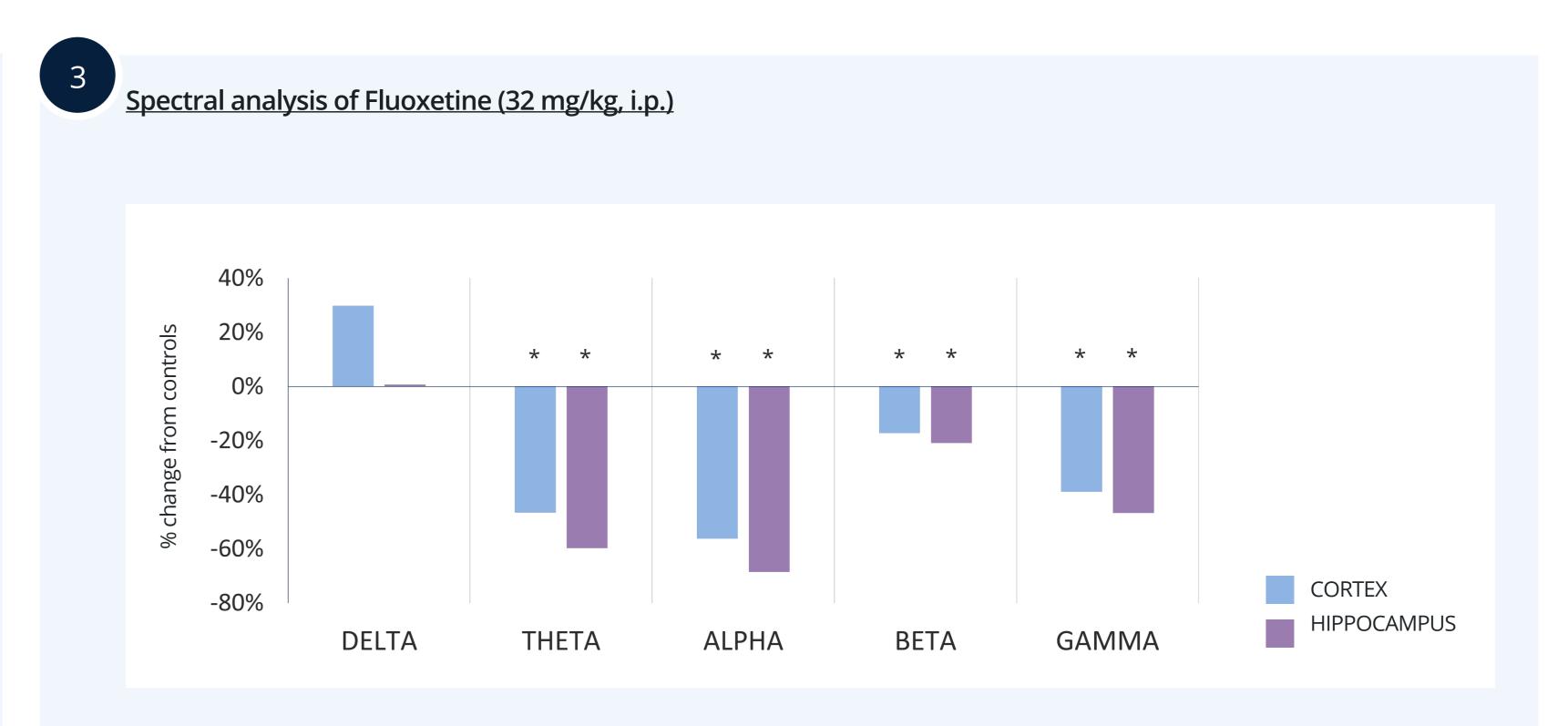














Comparison with baseline EEG recording (n=8 mice) Paired Student's test: \* = p < 0.05; \*\* = p < 0.01; \*\*\* = p < 0.001

#### CONCLUSION

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This study highlights the value of wireless EEG telemetry in mice for monitoring brain activity across different CNS applications.

Behavioral seizure events induced by kainic acid were temporally correlated with EEG abnormalities, confirming the sensitivity of the system for integrated seizure analysis. Continuous 24-hour EEG recordings allowed for a detailed evaluation of the sleep-wake cycle in mice. Administration of Diazepam, a sedative agent, altered sleep duration while modestly reducing REM sleep. Quantitative EEG (qEEG) analysis revealed minor changes in power distribution induced by Fluoxetine across the different frequency bands.

These data demonstrate the robustness and reliability of the easyTEL+ telemetry platform for investigating neuroactive compounds and neurological phenotypes in mice. Its ability to combine high-quality EEG acquisition with behavioral analysis, while group housing animals, makes it a powerful tool to be used in preclinical neuroscience research.

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