Poster #P1058

Efficacy of a Cell Therapy Drug on Kainic Acid-Induced Seizures in Mice

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Introduction

Epilepsy is one of the most commonly diagnosed neurological disorders, and effective treatments are urgently needed. Cell therapy drugs have shown significant potential in disease prevention and treatment.
The aim of this study was to investigate the efficacy of an cell therapy drug (hereafter referred to as compound) in a kainic acid (KA)-induced seizure model in mice and to explore its potential as a novel approach for epilepsy treatment.

Experimental design

Male C57BL/6J mice (n=30) were divided into three groups to assess the therapeutic effects of the compound in the KA-induced seizure model. All groups received a unilateral intra-hippocampal injection of KA (20 mM solution in sterile 0.9% saline) to induce seizures. After a 5–7-day recovery period, Group I (vehicle, n=10) received phosphate-buffered saline (PBS) injection. Group II (low dose, n=10) and Group III (high dose, n=10) received low and high doses of the compound respectively, administered into the same lateral hippocampus as the KA injection. Three to four weeks post-treatment, all animals were implanted with DSI transmitters to monitor EEG and spontaneous seizures for 7 days. Seizure severity was evaluated using the Racine scale.

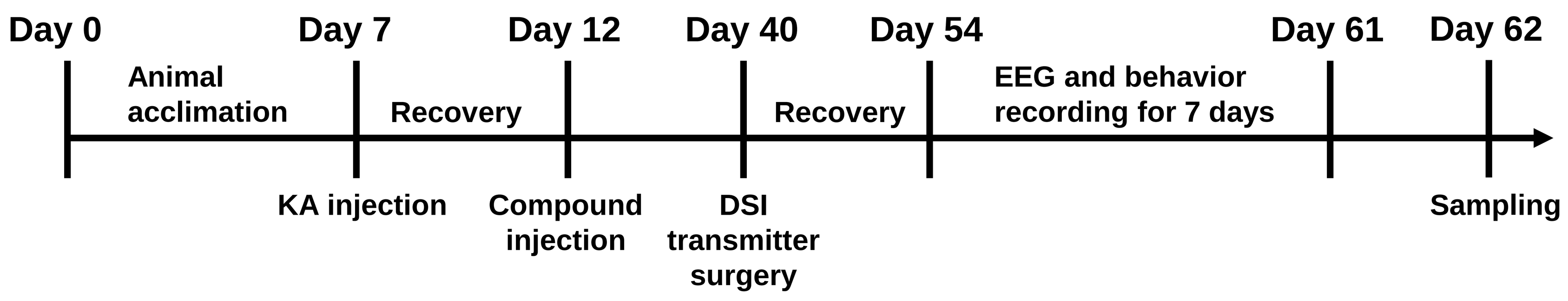

Figure 1. Experimental procedure

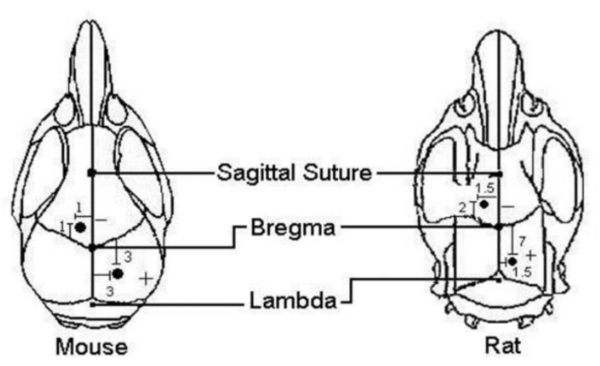

Figure S1. Electrodes' implantation position

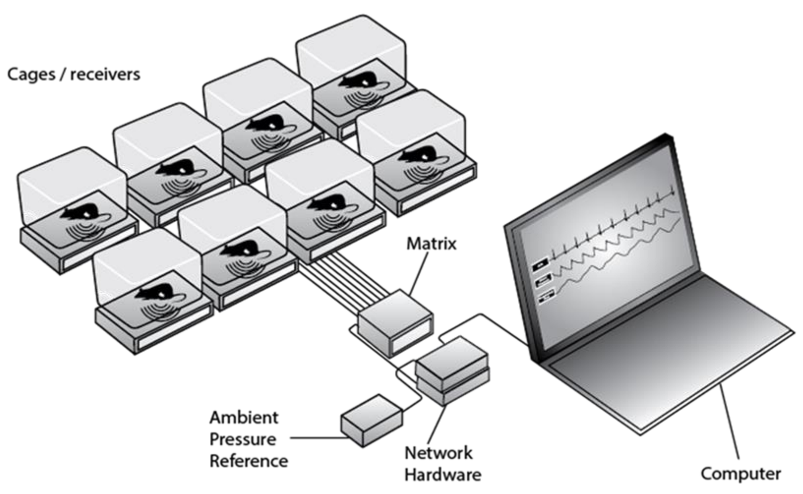

Figure S2. Implantable Telemetry System

Results

KA injection induced severe epilepsy, as indicated by the Racine scale (Figure 2) and EEG recordings, which showed spasms (Figure 4), epileptiform discharge events (Figure 5) and epileptiform discharge duration (Figure 6) in Group I. The compound significantly reduced seizure severity in a dose-dependent manner, as demonstrated by improvements in the Racine scale (Figure 2) and amelioration of seizure symptoms (Figure 4-6). The oscillation power of different frequency bands also showed differences after compound treatment (Figure 7).

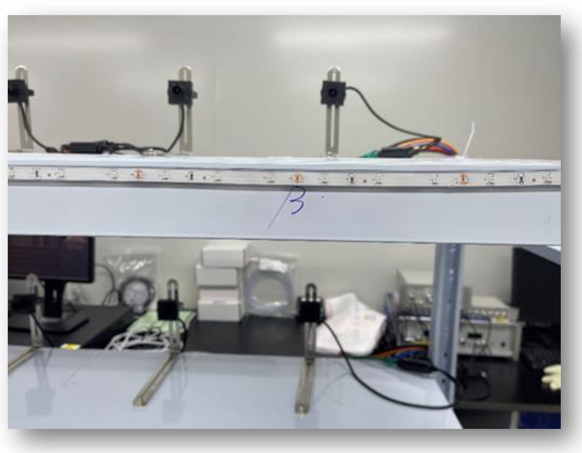

Figure S3. The Video Monitoring System in WuXi could launch 72 rodent animals at the same time for 24 hours

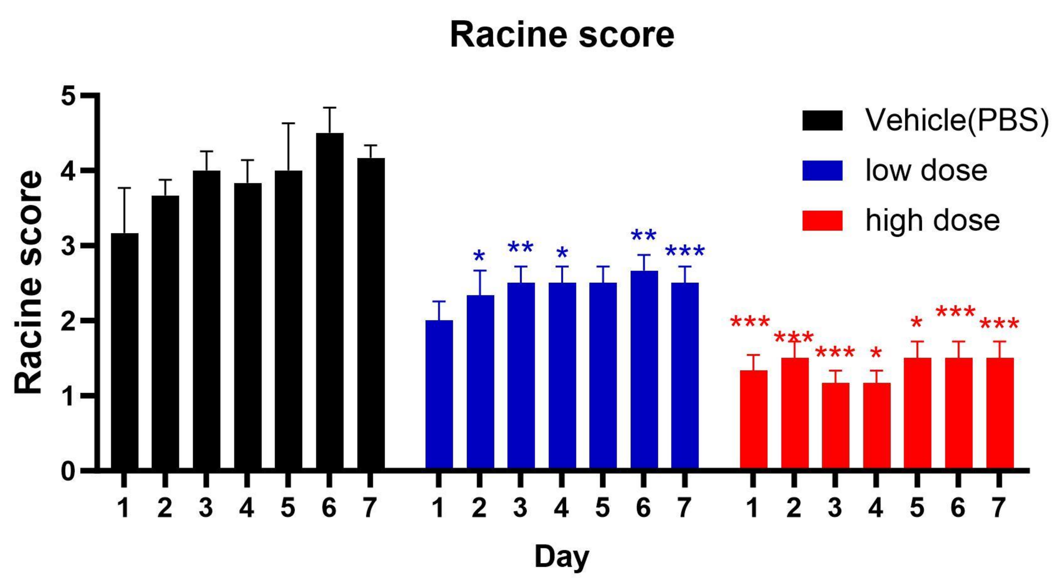

Figure 2. Racine Scale of mice

Figure S4. DSI Implantable Telemetry System in WuXi could launch 32 rodent animals at the same time

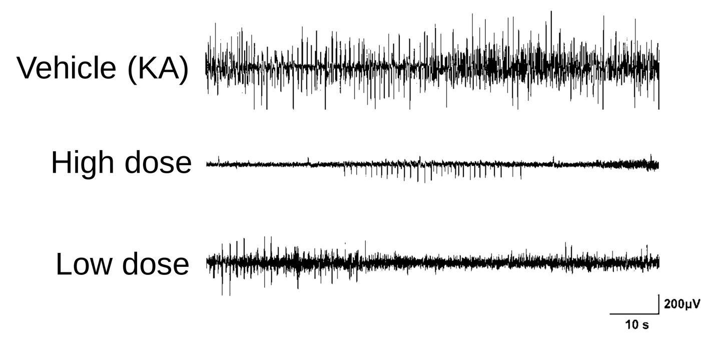

Figure 3. EEG trace for each group

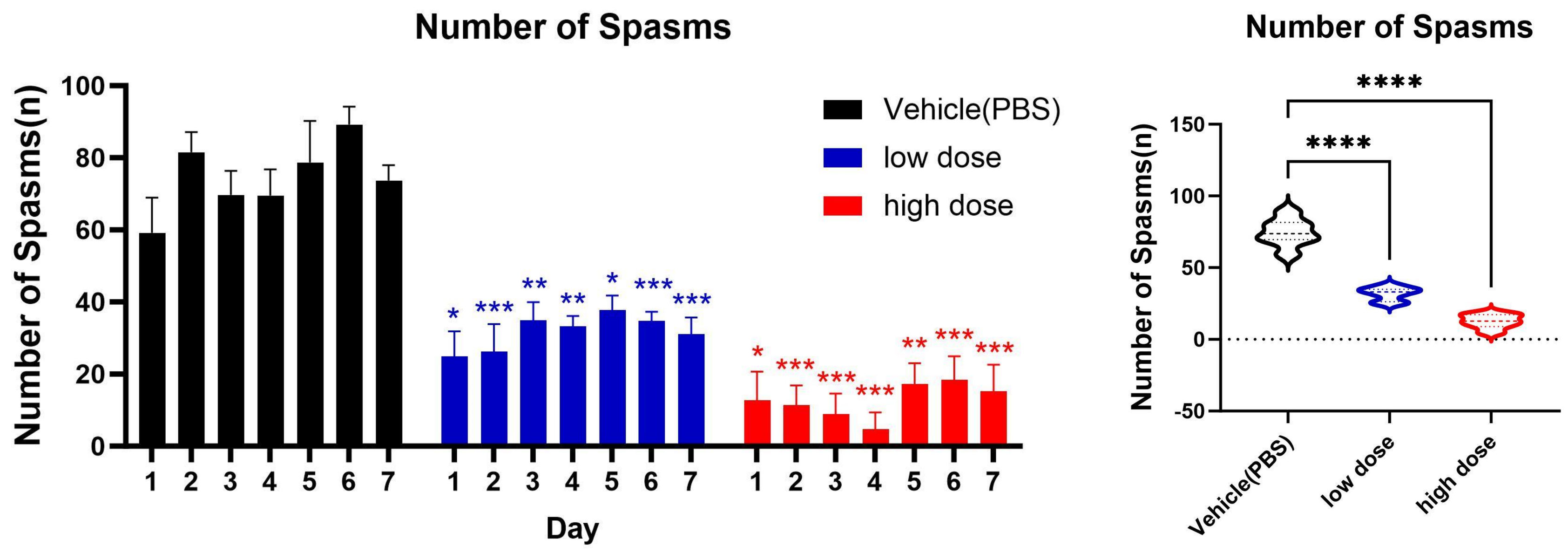

Figure 4. Number of Spasms

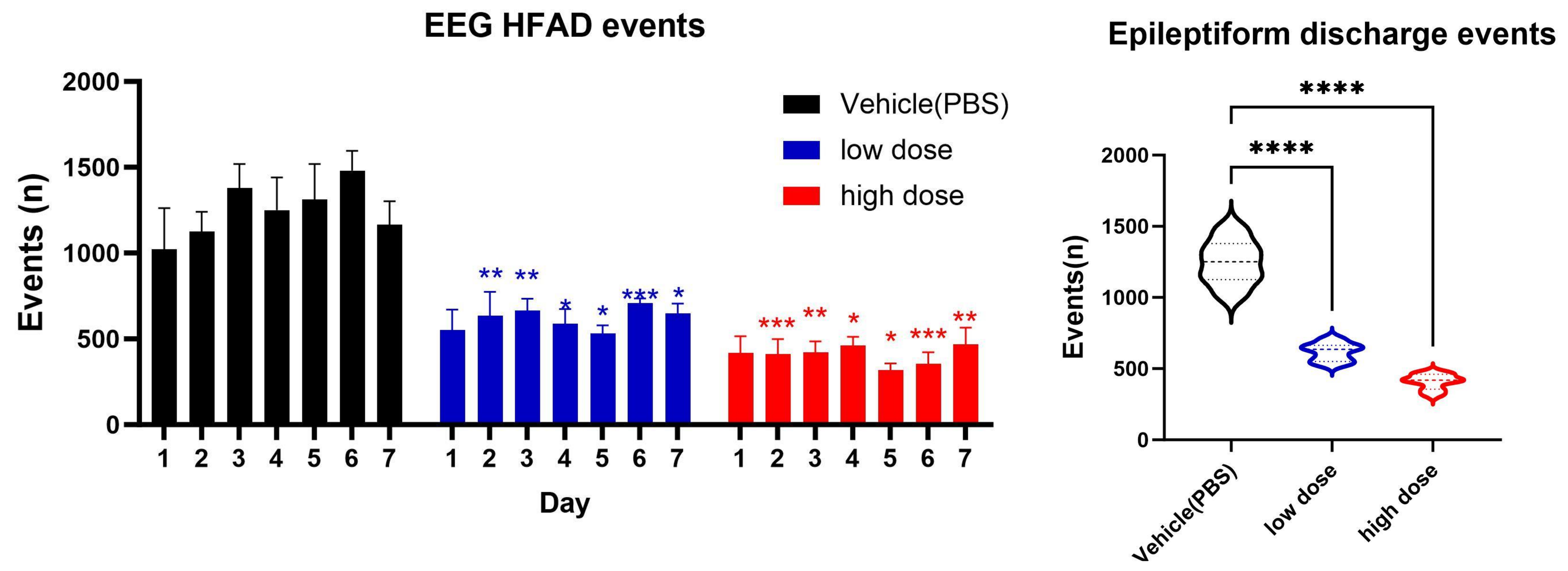

Figure 5. Epileptiform discharge events

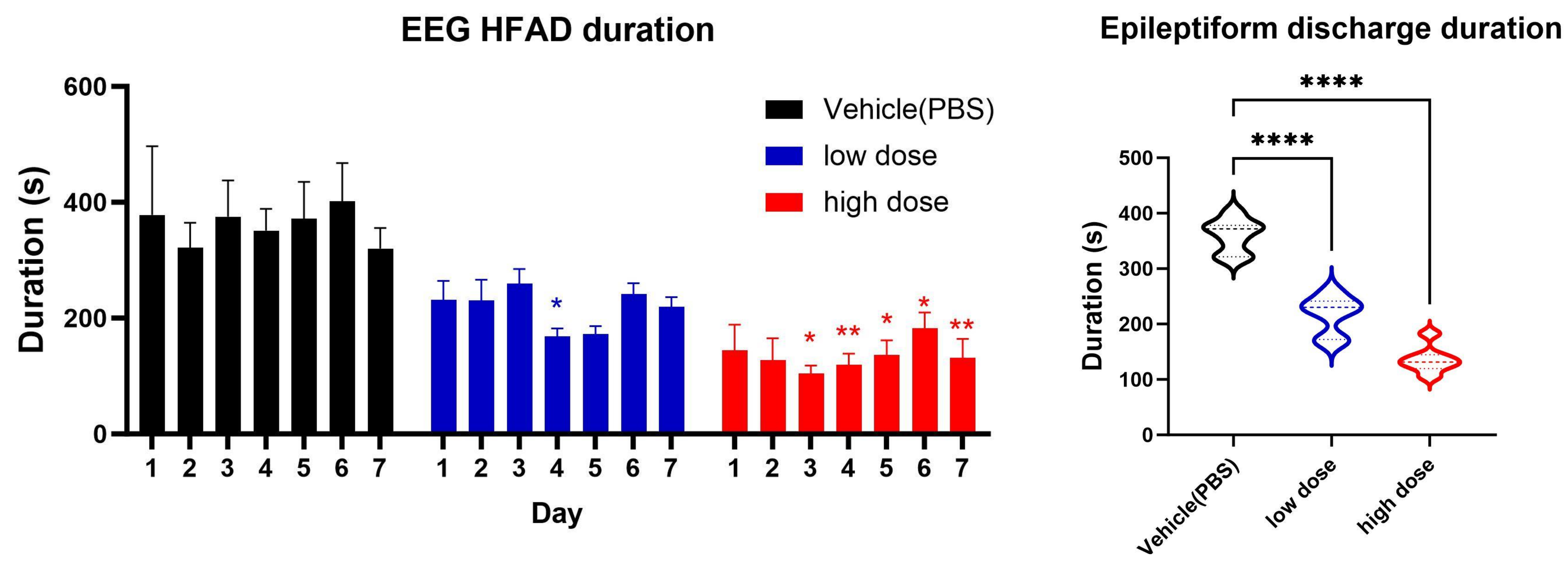

Figure 6. Epileptiform discharge duration

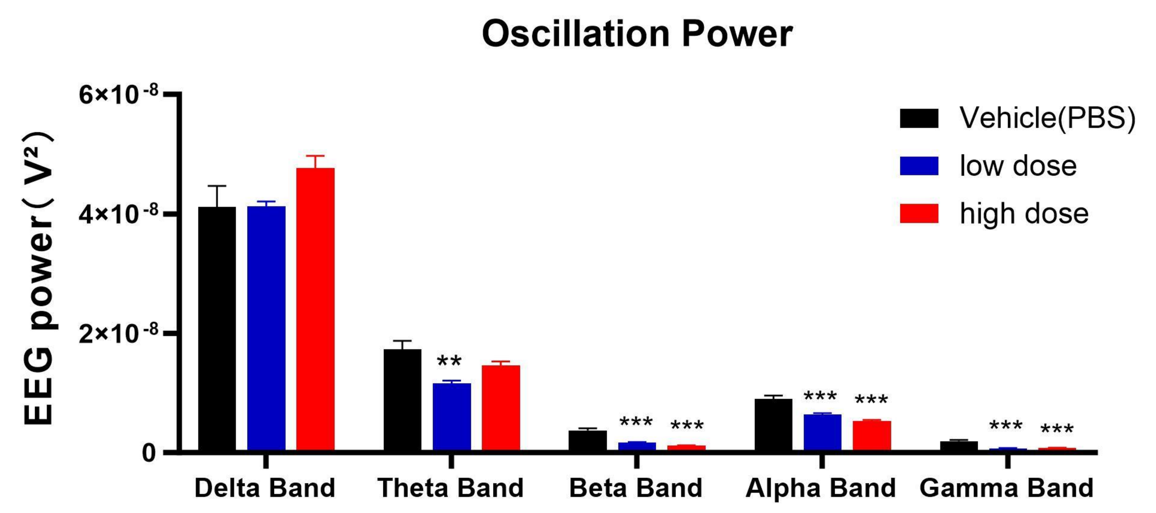

Figure 7. Oscillation power in different frequency bands

Conclusions

These findings suggest that the compound effectively modulates epileptic activity in the KA-induced mouse model and may have therapeutic potential for treating epilepsy.

References

1. Thijs, Roland D et al. *Lancet*. 2019;
2. Fernandez-Baca Vaca, G et al. *Seizure*. 2020
3. Vikas Kumar et al. *Epilepsy Res*. 2019