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WCN17-0738

SHIFT 2 - EPILEPSY

Positive rate of giant somatosensory evoked potential (giant SEP) and c reflex in benign adult familial myoclonus epilepsy (BAFME)

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Background: Benign adult familial myoclonus epilepsy (BAFME), an autosomal dominant trait with high penetration, is charaterized by cortical tremor mimicking essential tremor and infrequent generalized tonic-clonic seizures. Most of the BAFME patients also showed cortical reflex myoclonus electrophysiologically.

Objective: To clarify the positive ratio of giant somatosensory evoked potential (giant SEP) and C reflex in BAFME.

Patients and Methods/Material and Methods: We retrospectively analyzed positive ratio of giant SEP and C reflex in19 patients with BAFME from 14 pedigrees (5 men and 14 women, age: 51 ± 16 years).

Results: Positive rate of giant SEP and C reflex was 17/19 (89%) and 16/18 (88%) respectively. However, 3 younger patients (27, 30, 34 years old) showed no giant SEP or no C reflex.

Conclusion: Positive ratio of giant SEP and C reflex is quite high in BAFME as in the previous studies. However, some younger patients did not show giant SEP and/or C reflex. Therefore, family history of both clinical and electrophysiological findings is crucial for the diagnosis of BAFME since BAFME showed autosomal dominant trait with high penetration.

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WCN17-1455

SHIFT 2 - EPILEPSY

Validation of a fully integrated closed-loop neuromodulation SoC with wireless power and bidirectional data telemetry for real-time seizure control: preliminary results from swine model

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Background: Neuromodulation has been an alternative treatment in patients with drug-resistant epilepsy, especially when patients who are not candidates for surgical intervention. A system-on-chip (SoC) including a 16-ch signal acquisition unit, a bio-signal processor, a 16-ch adaptive stimulator, and wireless telemetry designed for human seizure control is under development.

Objective: Utilizing swine to develop an acute epilepsy model, we validated the accuracy of seizure detection and efficiency of seizure control of the system.

Patients and Methods/Material and Methods: Swine were induced with initial intramuscular injection of azaperone and atropine, and later injection of Teletil. After prone positioning, craniectomy, and dural opening, bilateral hemispheric planar grid-electrodes implant was assessed. Benzyl-penicillin (PCN) was injected 5mm beneath brain surface when the swine were anesthetized under continuous fentanyl with low dose isoflurane. Thereafter, low frequency electrocortical stimulation was carried out. Through the setting, the functionality of the fabricated closed-loop neuromodulation SoC in 0.18μm CMOS technology was verified.

Results: The most complex epileptiform activity (spikes and polyspike-bursts) was inducible reliably in 3 pigs. Polyspike bursting evolved to continuously discharge every 1 to 2 seconds when the PCN dosage was titrated. Generalized seizure like events (diffuse spike-wave discharging for 1-2 minutes) were reproducibly evoked by 2 Hz of cortical stimulation. A period of extremely low brain EEG activity indicating seizure suppression could be obtained by 3mA pulsatile electro-stimulation when the SoC was working.

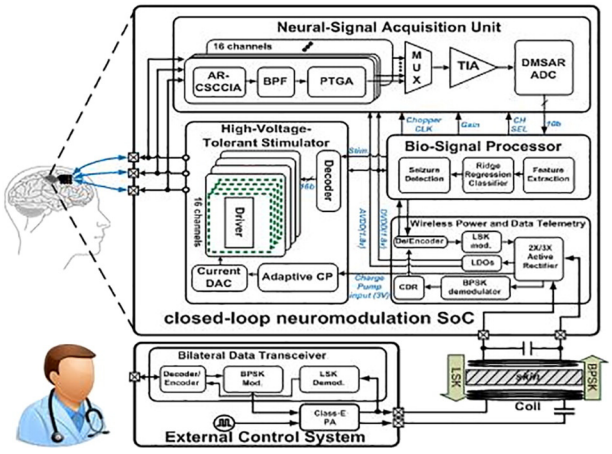

Fig. 1. Architecture of SoC.

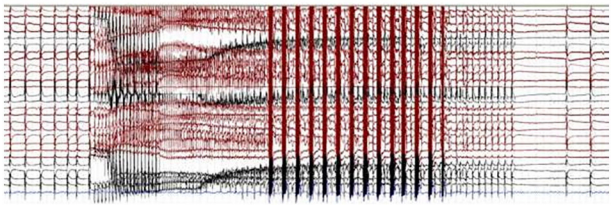

Fig. 2. Seizure induced and discontinued.

Conclusion: We successfully established an acute epilepsy model utilizing swine. Accordingly, the closed-loop neurostimulation SoC worked excellently to suppress seizure activity.

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SHIFT 2 - EPILEPSY

Aids and epilepsy

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Background: AIDS can cause epilepsy through different mechanism: **(1)** HIV doesn't directly infect nerve cells. HIV may either infect or disturb cells (macrophages and microglia) that nurture and maintain the brain. The infected macrophages and microglia then produce toxins that set off a chain reaction that kill neurons. (**2**) AIDS-