Research Category and Technology and Methods
Clinical Research: 6. Pulsed Ultrasound (pUS)
Keywords: focused ultrasound, microbubble, epilepsy, Lacosamide

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Abstract key: PL- Plenary talks; S- Regular symposia oral; FS- Fast-Track symposia oral; OS- On-demand symposia oral; P- Posters

P1.081
CHANGES IN THE BRAIN IN TEMPORAL LOBE EPILEPSY WITH UNILATERAL HIPPOCAMPAL SCLEROSIS: INITIAL CASE SERIES
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Abstract
Temporal lobe epilepsy (TLE) is a network disorder of the brain; network disorders predomi-nately involve dysregulation of hippocampal function caused by neuronal hyperexcitability. However, the relationship between the macro- and microscopic changes in specific brain regions is uncertain. In this study, the pattern of brain atrophy in patients with TLE and hippocampal sclerosis (HS) was investigated using volumetry, and microscopic changes in specific lesions were observed to examine the anatomical correspondence with specific target lesions using diffusion tensor imaging (DTI) with statistical parametric mapping (SPM). This retrospective cross-sectional study enrolled 17 patients with TLE and HS. We manually measured the volumes of the hippocampus (HC), amygdala (AMG), entorhinal cortex, fornix, and thalamus (TH) bilat-erally. The mean diffusivity and fractional anisotropy of each patient were then quantified and analyzed by a voxel-based statistical correlation method using SPM8. In right TLE with HS, there was no evidence of any abnormal diffusion properties associated with the volume reduction in specific brain regions. In left TLE with HS, there were significant changes in the volumes of the AMG, HC, and TH. Despite the small sample size, these differences in conditions are considered meaningful. Chronic left TLE with HS might cause structural changes in the AMG, HC, and TH, unlike right TLE with HS.

Acknowledgment
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2. This study was already published as ’Lim SC, Oh JH, Hong BY, Lim SH(Corresponding). Changes in the Brain in Temporal Lobe Epilepsy with Unilateral Hippocampal Sclerosis: An Initial Case Series. Healthcare 2022; 10(9), 1648; https://doi.org/10.3390/healthcare10091648.

Research Category and Technology and Methods
Clinical Research: 24. Structural Brain Imaging
Keywords: Temporal lobe epilepsy, hippocampal sclerosis, TLE, Epilepsy

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Abstract key: PL- Plenary talks; S- Regular symposia oral; FS- Fast-Track symposia oral; OS- On-demand symposia oral; P- Posters

P1.082
TISSUE EFFECTS OF ALTERNATE CURRENT TRANSCRANIAL TEMPORARY INTERFERING ELECTRIC FIELDS (TIEF) STIMULATION IN THE RAT.
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Abstract
To perform TIEF electric stimulation, two silver wire electrodes (0.015 mm diameter) were placed inside 0.2 mm polyamide tubes filled with saline solution and glued to the left skull surface at 1mm and 3.8 mm from the midline (Bregma -3.6 mm). Each of these electrodes was paired with a 1 cm-autoadhesive electrode placed on the chest. These two circuits were activated, one with 2000 Hz and the other with 10 Hz with an intensity of 0.12 mA in a 30-min single session. 40 minutes after the end of the stimulation, rats were perfused and alternate coronal serial sections were processed for Nissl staining and for c-Fos, GFAP and Ib1 immunocyto-chemistry. A sham operated group (SC) and a non-TIEF group with the same frequency current (2000 Hz) in both circuits were processed in a similar way. High resolution mosaics were taken with the software NeuroLucida to obtain full section microphotographs. C-Fos immunoreactive neurons were analyzed densitometrically and morphometrically after density thresholding segmentation (ImageJ). To evaluate changes in immunore-activity induced by the currents, data collected were graphically repre-sented in full sections (coded activity maps) by using the software MATLAB.

Activity maps show an asymmetric distribution of c-Fos positive neurons in serial coronal sections about 3 mm far from the electrodes, which seems to indicate deep brain activation. No tissular damage was detected with Nissl staining and Ib1 immunocytochemistry. Here we also report a po-tential vascular reaction in the electrode’s placement area of the brain in TIEF group, suggested by an increase of c-Fos immunoreactivity of cells from perforating arteries wall (smooth muscle myocytes and pericytes), and a thicker and denser GFAP immunostaining of perivascular astrocytes (Blood brain barrier). These effects (vascular and neuronal activation) were seen in the TIEF group but not in the non-TIEF (2000-2000 Hz) and SC group.

Research Category and Technology and Methods
Basic Research: 8. Transcranial Alternating Current Stimulation (TACS)
Keywords: Brain mapping, Immunocytochemistry, c-Fos, Glia

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Abstract key: PL- Plenary talks; S- Regular symposia oral; FS- Fast-Track symposia oral; OS- On-demand symposia oral; P- Posters

P1.083
OVERLAP OF FUNCTIONAL AND CYTOARCHITECTONIC MAPS IN THE HUMAN INSULA EXPLORED WITH INTRACRANIAL EEG RECORDINGS AND DIRECT CORtical ELECTRICAL STIMULATION.
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Abstract
Functions of the human insula have been explored extensively, with neuroimaging studies highlighting the activation of its specific subparts in a specific subset of functions. Few clinical electrical stimulation studies in the last decades have also documented the subjective correlates of elec-trical perturbations applied to various subregions of the human insula. However, it remains to be determined if the electrically induced subjective state changes are related to activations seen during experimental settings. Additionally, it is yet to be known how the causal evidence from electrical stimulation procedures maps to the recent findings of specific anatomical cytoarchitectonic maps of the human insula. The current study addresses these unknowns in 15 patients with intracranial electrodes. In total, 34 pairs of electrodes were stimulated across various insula regions. Of these, 33 (39%) induced a change in the conscious state of the individual participant in the categories of pain/temperature (42%), visceral /auto-nomic (24%), somatosensory (15%), emotion (12%), and taste/olfactory sensations (6%). Probabilistic cytoarchitectonic mapping demonstrated a clear difference between subregions whose stimulation-induced pain/temperature and somatosensory changes in the posterior insula and those inducing visceral/emotional sensations in the anterior insula. Interestingly, sites with emotional or visceral sensory responses coalesced in the cytoarchitectonic area ld6. Of note, these sites were non-overlapping at the neuronal population levels, and the only emotional change was in the realm of heightened arousal and anxiety. Recordings during a previously validated experimental task (gradCPT) documented significant time-locked high-frequency broadband activations when odd stimuli were presented and even higher when the subject made errors in their re sponses. Our findings provide the first causal evidence linking the sub jective changes induced by electrical perturbation of a specific subpopulation of neurons in specific cytoarchitectonic regions of the