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(국문/영문)강연제목: 집중 초음파 뇌 자극 패턴을 이용한 간질성 뇌 발작의 조정/ Control of Epileptiform Activities by Modulating Stimulation Patterns of Focused Ultrasound

Abstract(영문): Adverse effects caused by rebound excitations have been reported for conventional anti-epileptic therapeutics. In this study, rebound excitations with transcranial focused ultrasound for suppressing epileptiform activity were firstly demonstrated. To mimic the electrical stimulations inducing suppressive and excitatory effects, the duration, the pressure, and the interval of the ultrasonic bursts were varied. With longer stimulations, a significant reduction in the number of epileptic spikes from electroencephalography compared with that of the control group without ultrasound treatment was induced ($p = 0.009$). In contrast, a significant increase in the number of epileptic spikes with shorter stimulation ($p = 0.031$) was observed after brief suppression during stimulation. Moreover, consecutive low- and high-pressure stimuli could transform epileptiform activities from baseline to excitatory levels. Interestingly, the rebound excitatory effect could also be induced by transmitting burst-interval-reduced suppressive stimulations. The modulation of epileptiform activity was also confirmed by measuring the cerebral blood volume changes and immunohistochemistry showing c-Fos and GAD65 expression.

Brief Biosketch (간단한 이력, 연구/대외활동 소개,국문/영문)

Dr. Jinhyoung Park is currently an associate professor in Department of Biomedical Engineering at Sungkyunkwan University since 2016. Dr. Park received his B.S. and M.S. degrees in Astronomy and Biomedical Engineering, respectively, from Seoul National University, and Ph.D. in Biomedical Engineering from University of Southern California, CA, USA in 2011. As professional carriers, he spent a year in the same university as a Post-Doctoral researcher. He has industrial experiences in SIEMENS as a principal engineer from 2004 to 2008, and in Volcano Corporations, CA which became subsidiary of Philips as a senior engineer from 2013 to 2016. His research interests are the development of ultrasound transducers and systems for brain therapeutics in modulating neuronal responses, opening blood brain barrier and improving circulations of glymphatic system. He also published papers on ultrasound medical imaging techniques including intravascular ultrasound imaging and elastography.