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강연제목: Early screening of Alzheimer's disease (AD) using olfactory stimulation and a potential of 40Hz transcranial ultrasound as a nonpharmacological treatment for AD

Abstract:

Alzheimer's disease (AD), the leading cause of dementia, requires early screening to manage its progression as there is no way to reverse its effects. We employed olfactory stimulation across various AD stages (normal, MCI, and AD), measuring prefrontal cortical hemodynamic responses via functional near-infrared spectroscopy (fNIRS). Results indicated a superior ROC curve area compared to amyloid-beta PET and MRI structural imaging. Despite extensive efforts to develop a pharmaceutical treatment, no cure for AD exists. However, non-pharmaceutical approaches, such as 40 Hz gamma-band entrainment through sound and light, show promise. In a 5xFAD mouse model, 40 Hz pulsed ultrasound reduced amyloid-beta levels with minimal brain damage. These findings underscore the potential of non-invasive techniques, such as optical and ultrasound methods, for early screening and treatment of AD.

Brief Biosketch

Dr. Kim is a Professor in the Department of Biomedical Science and Engineering at GIST and also serves as the Dean of International and Public Affairs. His research focuses on developing medical technologies to address unmet clinical needs. Additionally, he is the CEO of TEDI MEDI, a startup whose first product, "Curasomn," uses photobiomodulation to improve sleep quality and reduce sleep latency.