Neurostimulation for the treatment of cognition dysfunction in neurodegenerative dementias

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Abstract

Dementia is a chronic syndrome characterized by a progressive decline in cognition, behavior, and everyday activities that affects mainly older people and, with the population aging at a fast rate worldwide, its burden is destined to increase dramatically. To date, no pharmacological treatment is available to prevent or cure dementia, thus highlighting the urgent need for new, effective, therapeutic strategies. In recent years, non-invasive brain stimulation (NIBS) is emerging as a promising rehabilitation tool for a number of neurodegenerative diseases. Non-invasive brain stimulation (NIBS) techniques, such as transcranial magnetic stimulation (TMS) and transcranial direct current stimulation (tDCS) have been developed and are currently under investigation in patients with dementia. During TMS, transient rapid-changing magnetic fields are used to induce secondary electric currents in the underlying cortical surface, which, in turn, trigger neuronal action potentials, also throughout tDCS, a weak electrical current is directly applied to the scalp to modulate neuronal membrane potentials without directly inducing synchronized neuronal discharge. The investigation of brain neurotransmitters in relation to NIBS effects can provide insight into the mechanisms of action of NIBS. Indeed, neuronal plasticity depends upon a complex balance between excitatory and inhibitory neurotransmitters: glutamate (Glu) is the main brain excitatory neurotransmitter, while the γ-amino butyric acid (GABA) is the main inhibitory neurotransmitter NIBS is increasingly used to improve cognitive/behavioral deficits in neurodegenerative dementias or as a possible cognitive enhancer in preclinical stages In this review, the authors summarize insights from studies The combination of NIBS with neuroimaging is a promising approach to better understand the mechanisms of neuromodulation and to design targeted interventions for neurocognitive diseases..

Biography:

Marta Acín-Albiac got her Bsc. in Food Science at University of Barcelona (UB) and she got specialized during her Msc. In Bioengineering at Sarrià Chemical Institute (IQS-URL, Spain). Currently, she is pursuing her PhD in Food Engineering and Biotechnology at the Free University of Bolzano (UNIBZ) under Prof. Di Cagno supervision.

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