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NON-INVASIVE tDCS OF THE DORSOLATERAL PREFRONTAL CORTEX INCREASED THE RELEASE OF BRAIN NEUROTRANSMITTERS AND ENZYMES

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ABSTRACT

Transcranial direct current stimulation (tDCS) is capable of modulating brain activity significantly and it has emerged as a promising treatment for schizophrenia and pain, and also to inhibit cravings. However, there is a rapid increase on the use of this neuro-stimulation method to enhance cognitive ability in healthy people. The present study investigated the release of neurotransmitters such as dopamine, acetylcholine and serotonin, and enzymes like cytochrome C-oxidase and glucose-6-phosphate dehydrogenase after tDCS on the dorsolateral prefrontal cortex. Thirty two adult male Wistar rats were used for this study. The rats were divided into six groups with each group having six rats with exception of the control and sham groups which had four rats each. Groups T5, T10, T15 and T20 were stimulated for 5, 10, 15 and 20 minutes daily with 2.3 mA consecutively for the period of fourteen days. The animals were sacrificed by cervical dislocation after the experiment and each animal's brain was carefully removed. The prefrontal cortex was dissected and homogenized for enzymes and neurotransmitters assay. The results showed significant increase in the levels of both the brain neurotransmitters and enzymes (except in cytochrome C-oxidase) in the treated groups compared to the control which was duration dependent. This suggests that tDCS does not have any side effect on the activities of brain neurotransmitters and enzymes but could be effective in the treatment of different brain disorders that is due to the decreased levels of brain neurotransmitters and enzymes.

Key words: *tDCS, Prefrontal Cortex, Cerebrum, Stimulator, Neurotransmitters*

INTRODUCTION

Transcranial direct current stimulation (tDCS) is a non-invasive, painless neuro-stimulation treatment that involves the use of constant but yet controlled current delivered to the brain area of interest through the use of electrode to the scalp or forehead. tDCS is a technique that is capable of modulating brain activity significantly and as shown promising effects in the treatment of various diseases such as schizophrenia, neuropathic pain, and also inhibit food

cravings (Lefaucher et al. 2017). It was developed to help patients with different type of neurodegenerative diseases which include depression, Parkinson's and Alzheimer's and but not limited to pain treatments. Transcranial direct current stimulation is an emerging non-invasive technique of neurostimulation for treat-

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