manitoba neuroscience network

Modulating Brain Activities using Transcranial Direct Current Stimulation (tDCS)

SEMINAR & VISITING SPEAKER SERIES

DATE
Friday, April 30, 2021
9:00AM

ZOOM LINK
https://us02web.zoom.us/j/83948652686?pwd=OFlURDh4dUZtbHh6K3JwaWdjTUcxQT09

MEETING ID
839 4865 2686

PASSCODE
547062

SPEAKER
Ji Hyun Ko, PhD

Associate Professor, University of Manitoba, Dept of Human Anatomy and Cell Science
Principal Investigator, Kleysen Institute for Advanced Medicine, Neuroscience Research Program
Core Member, University of Manitoba, Graduate Program in Biomedical Engineering

BIO

Dr. Ji Hyun Ko received his BSc in electrical and computer engineering at Hanyang University (Seoul, South Korea). Then he received PhD in neurological science at McGill University (Montreal). He did his first post-doctoral fellowship at the University of Toronto under the supervision of Dr. Antonio Strafella and trained in functional brain imaging in Parkinson's disease. Then, he moved to New York to join in Dr. David Eidelberg's group and trained in multivariate brain imaging analysis in Parkinson's disease. In 2014, He got appointed to an Assistant Professor in the department of Human Anatomy and Cell Science at the University of Manitoba. He is currently an Associate Professor in the same department.

The overall theme of his research is the realization of "bench to bedside" via developing quantifiable brain imaging-based biomarkers which can be used for more accurate diagnosis as well as an outcome measurement for novel interventions. His expertise in network analysis and machine learning has been well recognized. His research has been funded by CIHR, NSERC, Weston Brain Institute, Parkinson Canada, Workers Compensation Board of Manitoba, and CFI, totaling >$3M as a PI since 2014. His H-index is 25. The impact of his research has been recognized by the Terry G. Falconer Memorial Rh Institute Foundation Emerging Researcher Awards in 2017. He has been also selected as CBC Manitoba's Future 40 Finalists in the same year.

RESEARCH

Transcranial direct current stimulation (tDCS) is one of the two most common non-invasive brain stimulation techniques for treating drug-resistant depression and chronic pain. However, the underlying mechanisms of the tDCS is still not clearly understood. And, the lack of focality (i.e., it stimulates surrounding brain tissues of the target brain region which may reduce its efficacy and increase side effects) is a major limitation of tDCS technique.

In this presentation, I will briefly talk about the underlying mechanisms of the tDCS and our recent tDCS-fMRI study with healthy individuals. We showed that tDCS on the dorsolateral prefrontal cortex changes the caudate connectivity and improved Stroop task performance, which measures one's executive inhibitory control. Then, I will introduce the High definition tDCS (HD-tDCS) which can provide a focal stimulation, and review our on-going clinical trials using HD-tDCS in Winnipeg.

OBJECTIVES

1. To understand how transcranial direct current stimulation (tDCS) works

2. To introduce High-Definition tDCS (HD-tDCS)

3. To discuss what can be done with HD-tDCS

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