Introduction: The inter-individual variability is one of topics in the human neuro-plasticity induced by NIBS. The aim of this paper was to study the inter-individual variability of the human motor cortical plasticity induced by quadripulse stimulation (QPS).
Methods: We performed QPS 5 for LTP induction and QPS 50 for LTD induction in 33 healthy volunteers (age 38+ 7 years old). To obtain the normal range of the size ratio in the control condition, we recorded MEPs for 30 minutes in 15 of the above subjects without any interventions. We obtained the average size ratio (5-30 minutes) by averaging the size ratios at the all times after QPS from 5 minutes to 30 minutes after QPS, and used that ratio for the following evaluations.
Results
One evaluation

The rate of responders and non-responders based on a previous paper, was 85% and 15% for LTP, and 90% and 10% for LTD.

The other evaluation

The mean + standard deviation (SD) of control average size ratio (5-30 minutes) was 0.97 +0.1. We defined the normal range as 0.77 to 1.17 (mean + 2SD), and evaluated a certain subject's results as follows: significant expected responder (ER) when the average size ratio was larger than 1.17 for LTP and smaller than 0.77 for LTD, non-significant responder (NR) when it was 0.77 to 1.17, and significant opposite responder (OR) when smaller than 077 for LTP and larger than 1.17 for LTD. The rate of ER was 85%, NR 9% and OR 6% for LTP by QPS5. Those were 67%, 30%, and 3% for LTD by QPS50.
Conclusion: QPS5/QPS50 induced the LTP/LTD like effect more constantly than other NIBS methods. Monophasic TMS pulse used in QPS, duration of 30 minutes in the induction procedure or other factors may explain the stability of QPS.

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First EEG results of the iSPOT study in Depression: EEG alpha asymmetry as a gender specific predictor of SSRI treatment outcome

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Background: Measures of alpha and theta electroencephalogram (EEG) activity often differentiate patients with major depressive disorder (MDD) from normal controls, and some evidence suggests these measures relate to overall antidepressant response. This study aimed to determine whether these measures would distinguish MDD patients from controls, whether these measures behave as overall and differential predictors of outcome to three antidepressants and to explore the effects of gender.
Methods: In the international Study to Predict Optimized Treatment Response in Depression (iSPOT-D), a multi-center, international, randomized, prospective open-label trial, 1008 MDD patients were randomized to Escitalopram, Sertraline or Venlafaxine-XR and 336 controls were assessed. Treatment response was established after eight weeks and resting state EEG was assessed at baseline.
Results: No differences in alpha for occipital and frontal cortex and alpha asymmetry were found between MDD and controls. Alpha in occipital and frontal cortex were not associated with treatment outcome. However, a gender and drug-class interaction effect was found for frontal alpha asymmetry ($p<.001$). Relatively greater right frontal alpha in women only was associated with response (ES=0.44) and remission (ES=0.55) to the SSRI Escitalopram and Sertraline but not the SNRI Venlafaxine-XR. Furthermore, decreased theta in frontal cortex and rACC was associated with response to all 3 drugs.
Conclusions: In women only, pre-treatment alpha-asymmetry predicted response and remission to Escitalopram and Sertraline, but not to Venlafaxine-XR. Future studies should separately analyse effects in EEG alpha power for men and women and elucidate the nature of the gender and drug specific effects of alpha asymmetry.

The results from these EEG predictors (frontal alpha asymmetry and rACC theta) will also be prospectively applied to an independent sample of 90 patients treated with rTMS and results will be reported.

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An open trial of EMDR as promotion for post-traumatic growth

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Objectives: Clinical applications of Post-traumatic Growth(PTG) promotion have been very limited, except for psychotherapy. The basic principle of EMDR, which deals with trauma, is expected to promote PTG. Accordingly, this study was conducted to investigate the effect of EMDR on resilience and PTG, and to explore the possibility of applying EMDR to PTG promotion.
Methods: This study was conducted on six survivors of a shipping disaster that occurred in the West Sea in April 2014. A total of eight EMDR sessions were performed by a single physician for five months, starting from five weeks after the accident. The resilience, PTSD, and PTG scores were measured before the treatment, after sessions 1, 3, 5, and 7, and after the treatment.
Results: PTG promotion was observed in the four subjects during the EMDR. The PTSD significantly decreased in two subjects (defined as CAPS reduction $\geq$ 30%). PTG promotion without PTSD improvement was observed in two subjects. As the early resilience and PTG scores were higher, the PTSD significantly decreased and the resilience and PTG scores significantly increased during EMDR. The scores for the 'spiritual change' and the 'gratitude for life,' among the five dimensions of the PTGI subscale, increased most significantly in the five subjects who completed all the EMDR sessions.
Discussion: EMDR has a positive effect on PTG promotion. PTG promotion without PTSD improvement supports the hypothesis that unlike PTSD, PTG has a different psychological and biological treatment process, which suggests that EMDR can affect only PTG, regardless of the PTSD. PTG promotion can support PTSD treatment. High degree of resilience significantly affects the PTSD improvement and the PTG promotion. Thus, resilience can be a useful tool for predicting the treatment prognosis of PTSD and PTG.

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Cathodal-tDCS induced reduction in excitability of superficial pain neuromatrix cortices is associated with sensory and pain threshold increases

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Multiple cortical areas including primary sensory cortex (S1), primary motor cortex (M1), and dorsolateral prefrontal cortex (DLPFC) are known to be part of a network called pain neuromatrix