

Japan-US Brain Research Cooperative Program
The Dispatch of Joint Researcher Report in 2008 fiscal year

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1. Affiliation/ Title/ Name:

Affiliation: Human Brain Research Center, Kyoto University Graduate School of Medicine

Title: Visiting Scientist

Name: Mitsunari ABE

2. The Project Title:

Exploring the learning mechanism underlying acquisition of new motor skills by utilizing and recycling previously-mastered ones

3. U.S. Investigator's Name, Title, and Affiliation:

Host Scientist: Dr. Leonardo G. Cohen

Title: Senior Investigator

Institution: Human Cortical Physiology Section, National Institute of Neurological Disorders and Stroke

4. The Term of Research: From 2008/June/01 To 2009/February/28 (9 Months)

5. The Abstract, the Result and the Significance of Research (300 Words):

Efficient recovery of motor impairments in stroke patients could be achieved by the restoration of their own skills that had been acquired when they were healthy. This treatment strategy should be a reasonable target in neuro-rehabilitation. Previous behavioral studies supported the view that efficient learning of new motor skills can be generalized from already-mastered key skills (i.e. memory templates); named as learning transfer effects. My long-term objective is to explore the neural mechanism of learning transfer effects, and then to apply this knowledge to the neuro-rehabilitation for patients' motor impairments. During the first three month, I reshaped my aims and hypotheses under supervision of Dr. Cohen. Discussion through labo meetings every week enabled me to re-construct the details of my experimental plan. I developed the visuomotor skill task and performed behavioral experiments during the rest of my stay. These results support that learning transfer enabled subjects to learn new motor skills effectively. I will plan to investigate the neural representation of learning transfer effects using the functional magnetic resonance imaging (fMRI) and transcranial magnetic stimulation (TMS) techniques, and to examine whether transcranial direct current stimulation (tDCS) applied over the responsible neural substrates could facilitate the effects of learning transfer. If the tDCS technique promotes learning transfer, I will apply this technique to development of neuro-rehabilitative therapy for stroke patients who impaired motor functions. This study could help our understanding of the neural mechanisms underlying learning transfer in acquisition of new motor skills, and develop the new strategic design of neuro-rehabilitative treatments that to fit the rehabilitation approach to promote efficient recovery of motor impairments.

6. The Others (Other Comments):