



Department of Psychiatry
Columbia University, College of P&S **NYS**
Psychiatric Institute

DIVISION OF BRAIN STIMULATION AND THERAPEUTIC MODULATION

JOURNAL CLUB

CHI-MING CHEN, PHD

POSTDOCTORAL FELLOW
DIVISION OF BRAIN STIMULATION AND THERAPEUTIC MODULATION
DEPARTMENT OF PSYCHIATRY
COLUMBIA UNIVERSITY

will present the following paper

**Julkunen P, Jauhiainen AM, Westerén-Punnonen S, Pirinen E, Soininen H, Könönen M,
Pääkkönen A, Määtä S, Karhu J.**

**Navigated TMS combined with EEG in mild cognitive impairment and Alzheimer's disease:
A pilot study. J Neurosci Methods. 2008 Apr 29. [Epub ahead of print]**

Wednesday January 14, 2009

1:00 PM to 2:00 PM

**Location: New York State Psychiatric Institute, 1051 Riverside Drive
Board Room, Room 6601**

ABOUT CHI-MING CHEN, PHD: Dr. Chi-Ming Chen is a postdoctoral fellow with the Division of Brain Stimulation and Therapeutic Modulation, Department of Psychiatry, Columbia University.

SELECTED RECENT PUBLICATIONS OF DR. CHI-MING CHEN

Rajkai C, Lakatos P, Chen CM, Pincze Z, Karmos G, Schroeder CE. Transient cortical excitation at the onset of visual fixation. *Cereb Cortex*. 2008 Jan;18(1):200-9. Epub 2007 May 10.

Lakatos P, Chen CM, O'Connell MN, Mills A, Schroeder CE. Neuronal oscillations and multisensory interaction in primary auditory cortex. *Neuron*. 2007 Jan 18;53(2):279-92.

Chen CM, Lakatos P, Shah AS, Mehta AD, Givre SJ, Javitt DC, Schroeder CE. Functional anatomy and interaction of fast and slow visual pathways in macaque monkeys. *Cereb Cortex*. 2007 Jul;17(7):1561-9. Epub 2006 Sep 1.

PAPER FOR JOURNAL CLUB

Julkunen P, Jauhiainen AM, Westerén-Punnonen S, Pirinen E, Soininen H, Könönen M, Pääkkönen A, Määttä S, Karhu J. Navigated TMS combined with EEG in mild cognitive impairment and Alzheimer's disease: A pilot study. *J Neurosci Methods*. 2008 Apr 29. [Epub ahead of print]

Abstract

Our aim was to assess the potential of navigated transcranial magnetic stimulation (TMS)-evoked electroencephalographic (EEG) responses in studying neuronal reactivity and cortical connectivity in Alzheimer's disease (AD) and in mild cognitive impairment (MCI). We studied 14 right-handed subjects: five patients with AD, five patients with MCI and four healthy controls. Fifty TMS-pulses at an intensity of 110% of individually determined motor threshold were delivered to the hand area of primary motor cortex (M1) with navigated brain stimulation (NBS). Spreading of primary NBS-evoked neuronal activity was monitored with a compatible 60-channel EEG, and analyzed in time, frequency and spatial-domains. We found significantly reduced TMS-evoked P30 (time-locked response 30 ms after the magnetic stimulation) in the AD subjects. This reduction was seen in the temporo-parietal area ipsilateral to stimulation side as well as in the contralateral fronto-central cortex corresponding to the sensorimotor network, which is anatomically interconnected with the stimulated M1. In addition, there was a significant decrease in the N100 amplitude in the MCI subjects when compared with the control subjects. Thus, the combination of NBS and EEG revealed prominent changes in functional cortical connectivity and reactivity in the AD subjects. This pilot study suggests that the method may provide a novel tool for examining the degree and progression of dementia.