

# Curriculum Vitae

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## Education

1989-1996 China Medical University, Taichung, Taiwan (M.D.)

2007-2010 Johann Wolfgang Goethe-Universität, Frankfurt, Germany (Ph.D.)

## Post-graduate experience

1996-1998 Army Physician (Taiwan military service)

1998-2001 Resident Doctor of Neurology, China Medical University Hospital (CMUH)

2001-2002 Chief Resident Doctor of Neurology, CMUH

2002-2007 Attending Physician, Department of Neurology, CMUH

A member of the Neuroscience Laboratory, Department of Neurology, CMUH

2007-2010 Fellowship and Ph.D. student in Johann Wolfgang Goethe-Universität, Frankfurt, Germany

2008-2012 Lecturer of School of Medicine, CMU

2010-present Attending Physician, Department of Neurology, CMUH

2012-present Assistant Professor of School of Medicine, CMU

## Certificating Board

Subspecialty Board of Neurology, Taiwan Neurological Society

## Professional Affiliation

Taiwan Neurological Society

Taiwan Movement Disorders Society

Taiwan Society of Clinical Neurophysiology

Movement Disorders Society

## Honor and Award

Physician scientist, China Medical University Hospital, 2011-2013

Outstanding attending physician, China Medical University Hospital, 2012

## Research Interest

### Human motor control

1. Movement-related cortical potentials
2. Repetitive transcranial magnetic stimulation and paired associative stimulation

### Neurophysiology in movement disorders

## Publication

### Article

1. Lyu MK, Liu CH, Lin CD, Tsai CH. Clinicoanatomical correlation of upbeat nystagmus: report of a case. *Mid Taiwan J Med* 2002;7(3):183-188.
2. Tsai CH, Lu MK. Electrophysiological investigation in movement disorders. *Acta Neurol Taiwan* 2003;12 (suppl 1):356-359 (in Chinese).
3. Tsai CH, Lu MK. Myoclonus. *Acta Neurol Taiwan* 2003;12 (suppl 1):91-93 (in Chinese).
4. Tsai PC, Chang FC, Tsai CH, Jang FR, Shen AN, Huang YT, Lai SC, Yeh TH, Lu MK, Lu CS. Focal hand myoclonus caused by a small hematoma underneath the cerebral motor cortex. *Eur Neurol* 2003;50(2):114-117.
5. Tsai CH, Chang FC, Su YC, Tsai FJ, Lu MK, Lee CC, Kuo CC, Yang YW, Lu CS. Two novel mutations of the glycine receptor gene and electrophysiological manifestation in a family with autosomal recessive hereditary hyperekplexia. *Neurology* 2004;63(5):893-896.
6. Yi PL, Tsai CH, Lu MK, Chen YJ, Yang YW, Chang FC. Effects of a brief light pulse and intracerebroventricular injection on sleep-wake activity in rats. *Mid Taiwan J Med* 2004;9(4):211-218.
7. Tsai CH, Chang FC, Lu CS, Lee ST, Huang YT, Lu MK, Chen RS, Wu T, Lee JD, Weng YH, Chang HC. Pallidotomy effect on the cortical excitability in patients with severe Parkinson's disease. *Mov Disord* 2005;20(4):463-470.
8. Yang YW, Chang FC, Tsai CH, Wu JC, Lu CS, Kuo CC, Lu MK, Chen WL, Lee CC. Clinical and magnetic resonance imaging manifestations of Holmes tremor. *Acta Neurol Taiwan* 2005;14(1):9-15.
9. Lu MK, Chang FC, Yang YW, Lin YC, Lee CC, Tsai CH. Abnormal movement-related cortical potential in patients with subcortical heterotopia. *Brain Dev* 2006;28(9):560-565.
10. Yang YW, Tsai CH, Chang FC, Lu MK, Chiu PY. Reversible paraneoplastic limbic encephalitis caused by a benign ovarian teratoma: report of a case and review of literatures. *J Neurooncol* 2006;80(3):309-312.
11. Yi PL, Tsai CH, Lu MK, Liu HJ, Chen YC, Chang FC. Interleukin-1 $\beta$  mediates sleep alteration in rats with rotenone-induced parkinsonism. *Sleep* 2007;30(4):413-425.
12. Huang KJ, Lu MK, Kao A, Tsai CH. Clinical, imaging and electrophysiological studies of corticobasal degeneration. *Acta Neurol Taiwan* 2007;16(1):13-21.
13. Yang CP, Huang WS, Shih HT, Lin CY, Lu MK, Kao CH, Hsieh TC, Huang KJ, Lee YH, Tsai CH. Diminution of basal ganglia dopaminergic function may play an important role in the generation of akinetic mutism in a patient with anterior cerebral arterial infarct. *Clin Neurol Neurosurg* 2007;109(7):602-606.

14. Shih HT, Huang WS, Liu CH, Tsai TC, Lu CT, Lu MK, Chen PK, Tseng CH, Jou SB, Tsai CH, Lee CC. Confusion or delirium in patients with posterior cerebral arterial infarction. *Acta Neurol Taiwan* 2007;16(3):136-142.
15. Liu YL, Lu MK, Tsai CH. Propriospinal myoclonus: report of a case. *Acta Neurol Taiwan* 2007;16(4):238-241.
16. Lu MK, Shih HT, Huang KJ, Ziemann U, Tsai CH, Chang FC, Chen YC, Lin YT, Huang WS, Lee CC, Liu CS. Movement-related cortical potential in patients with Machado-Joseph disease. *Clin Neurophysiol* 2008;119(5):1010-1019.
17. Lu MK, Bliem B, Jung P, Arai N, Tsai CH, Ziemann U. Modulation of preparatory volitional motor cortical activity by paired associative transcranial magnetic stimulation. *Hum Brain Mapp* 2009;30(11):3645-3656.
18. Wu CC, Tsai CH, Lu MK, Chen CM, Shen WC, Su KP. Theta-burst repetitive transcranial magnetic stimulation for treatment-resistant obsessive-compulsive disorder with concomitant depression. *J Clin Psychiatry* 2010;71(4):504-506.
19. Lu MK, Jung P, Bliem B, Shih HT, Hseu YT, Yang YW, Ziemann U, Tsai CH. The Bereitschaftspotential in essential tremor. *Clin Neurophysiol* 2010;121(4):622-630.
20. Chen JC, Hsu YT, Chiou TSM, Lu MK, Lin YC, Kao CH, Huang WS, Tsai CH. Cortical and non-cortical myoclonus of Creutzfeldt-Jakob disease. *Eur Neurol* 2010;64(5):265-267.
21. Huang HC, Chen JC, Lu MK\*, Chen JM, Tsai CH\*. Posthypoxic cortical myoclonus mimicking spinal myoclonus-electrophysiological and functional MRI manifestations. *Eur J Neurol* 2011;18(1):e4-5.  
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22. Krivánková L, Lu MK, Bliem B, Ziemann U. Modulation of excitability in human primary somatosensory and motor cortex by paired associative stimulation targeting the primary somatosensory cortex. *Eur J Neurosci* 2011;34(8):1292-1300.
23. Arai N, Müller-Dahlhaus F, Murakami T, Bliem B, Lu MK, Ugawa Y, Ziemann U. State-dependent and timing-dependent bidirectional associative plasticity in the human SMA-M1 network. *J Neurosci* 2011;31(43):15376-15383.
24. Lu MK, Arai N, Tsai CH, Ziemann U. Movement related cortical potentials of cued versus self-initiated movements: double dissociated modulation by dorsal premotor cortex versus supplementary motor area rTMS. *Hum Brain Mapp* 2012;33(4):824-839.
25. Hsu YT, Lai HY, Chang YC, Chiou SM, Lu MK, Lin YC, Liu YL, Chen CC, Huang HC, Chien TF, Lin SZ, Chen YY, Tsai CH. The role of the subthalamic nucleus in volitional movement termination in Parkinson's disease. *Exp Neurol* 2012;233(1):253-263.
26. Hsu CS, Wu YC, Lu MK, Hsu YT, Chiou TSM, Tsai CH, Chen JC. 99mTc ECD and 99mTc TRODAT-1 SPECT in Hashimoto's encephalopathy. *Clin Nucl Med* 2012;37(4):e86-e88.
27. Jung P, Klein JC, Wibrall M, Hoehstetter K, Bliem B, Lu MK, Wahl M, Ziemann U. Spatiotemporal Dynamics of Bimanual Integration in Human Somatosensory Cortex and Their Relevance to Bimanual Object Manipulation. *J Neurosci* 2012;32(16):5667-5677.

28. Hsu YT, Duann JR, Lu MK, Sun MC, Tsai CH. Polyglandular autoimmune syndrome type 4 with GAD antibody and dystonia. *Clin Neurol Neurosurg* 2012;114(7):1024-1026.
29. Arai N, Lu MK, Ugawa Y, Ziemann U. Effective connectivity between human supplementary motor area and primary motor cortex: a paired-coil TMS study. *Exp Brain Res* 2012;220(1):79-87.
30. Lu MK, Tsai CH, Ziemann U. Cerebellum to motor cortex paired associative stimulation induces bidirectional STDP-like plasticity in human motor cortex. *Front Hum Neurosci* 2012;6:260.
31. Murakami T, Müller-Dahlhaus F, Lu MK, Ziemann U. Homeostatic metaplasticity of excitatory and inhibitory intracortical neural circuits in human motor cortex. *J Physiol* 2012;590(Pt 22):5765-5781.
32. Hsu YT, Duann JR, Chen CM, Yang YW, Tsai CH\*, Lu MK\*. Anatomical and electrophysiological manifestations in a patient with congenital corpus callosum agenesis. *Brain Topogr* 2013;26(1):171-176. (\*correspondence)
33. Chen KF, Lai SC, Wu YC, Lu CS, Lu MK, Tsai CH. Functional neuroimages of cortical myoclonus altered by levetiracetam in a patient with sialidosis. *J Clin Neurosci* 2013;20(2):324-325.
34. Lin CH, Chen CM, Lu MK, Tsai CH, Chiou JC, Liao JR, Duann JR. VBM reveals brain volume differences between Parkinson's disease and essential tremor patients. *Front Hum Neurosci* 2013;7:247.
35. Tsai CH, Huang HC, Liu BL, Li CI, Lu MK, Chen X, Tsai MC, Yang YW, Lane HY. Activation of N-methyl-D-aspartate Receptor Glycine Site Temporally Ameliorates Neuropsychiatric Symptoms of Parkinson's Disease with Dementia. *Psychiatry Clin Neurosci* 2014;68(9):692-700.
36. Chiou SM, Lin YC, Lu MK, Tsai CH. Bilateral subthalamic stimulation for advanced Parkinson disease: early experience at an Eastern center. *Neurol Sci* 2014 Nov 14 (in press).
37. Huang HC, Tsai CH, Muo CH, Lin KH, Lu MK, Sung FC, Kao CH. Risk of Parkinson's disease following zolpidem use: a retrospective, population-based cohort study. *J Clin Psychiatry* 2015;76(1):e104-10.
38. Lu MK\*, Chiou SM, Ziemann U, Huang HC, Yang YW, Tsai CH\*. Resetting tremor by single and paired transcranial magnetic stimulation in Parkinson's disease and essential tremor. *Clin Neurophysiol* 2015 (in press) (\*correspondence)

#### *Conference Presentation*

1. Lu MK, Liu CH, Lin CD, Tsai CH. Clinicoanatomical correlation of upbeat nystagmus: report of a case. *Bulletin of the Taiwan Neurological Society, Taiwan, 2002*
2. Lu MK, Kuo CC, Yang YW, Chang FC, Lee CC, Tsai CH. Source analysis of scalp-recorded movement-related cortical potentials in congenital mirror movement: report of a case. *Bulletin of the Taiwan Neurological Society, Taiwan, 2003*
3. Lu MK, Yang YW, Kuo CC, Chang FC, Lee CC, Tsai CH. Source analysis of movement-related cortical potentials in essential tremor. *Bulletin of the Taiwan Neurological Society, Taiwan, 2004*
4. Lu MK, Chang FC, Yang YW, Kuo CC, Lee CC, Tsai CH. Movement-related cortical potentials in essential tremor. *Mov Disord* 2004;19(Suppl 9):pp.S67-S68
5. Lu MK, Chang FC, Chen YJ, Lee CC, Tsai CH. Abnormal movement-related cortical potentials in

- subcortical heterotopia-report of a case. Bulletin of the 8<sup>th</sup> international evoked potentials symposium, Fukuoka, Japan, 2004
6. Lu MK, Chang FC, Yang YW, Kuo CC, Lee CC, Tsai CH. Movement-related cortical potentials in Holmes' tremor and cerebellar degeneration. Bulletin of the Taiwan Neurological Society, Taiwan, 2005
  7. Lu MK, Tsai CH, Shih HT, Lin YT, Chen YJ, Lee CC. Movement-related cortical potential in Machado-Joseph disease. Bulletin of the International Congress of Neuroscience and Molecular Imaging, Taiwan, 2005
  8. Lu MK, Yang YW, Shih HT, Chen YJ, Lee CC, Tsai CH. Abnormal movement-related cortical potential in corpus callosum agenesis. Bulletin of the Taiwan Neurological Society, Taiwan, 2006.
  9. Lu MK, Tsai CH, Liu CS, Chen YJ, Lee CC. Abnormal offset cortical potential in Machado-Joseph disease. Bulletin of the 28<sup>th</sup> International Congress of Clinical Neurophysiology, Edinburgh, Scotland. Clin Neurophysiol 2006;117(Suppl 1):pp.S261.
  10. Lu MK, Chen YJ, Yang YW, Shih HT, Kuo CC, Tsai CH. Discordant movement-related cortical potential findings in untreated Parkinson's disease patients with and without prominent tremor. Bulletin of the 10<sup>th</sup> International Congress of Parkinson's Disease and Movement Disorders, Kyoto, Japan. Mov Disord 2006;21(Suppl 15):pp.S369.
  11. Lu MK, Tsai CH, Lee CC. Cortico-cortical inhibition in congenital mirror movement. Bulletin of the Taiwan Neurological Society, Taiwan, 2007.
  12. Lu MK, Bliem B, Jung P, Arai N, Ziemann U. Modulation of movement related cortical potentials by paired associative transcranial stimulation. Bulletin of the 3<sup>rd</sup> International Conference on Transcranial Magnetic and Direct Current Stimulation, Göttingen, Germany. Brain Stimulat 2008;1(3):258.
  13. Lu MK, Jung P, Arai N, Tsai CH, Kössl M, Ziemann U. Effects of dorsal premotor cortex rTMS on preparatory volitional motor cortical activity studied by contingent negative variation and Bereitschaftspotential. Bulletin of the Bernstein Conference on Computational Neuroscience, Frankfurt/Main, Germany. 2009. Abstract Book pp.139-140.
  14. Lu MK, Arai N, Jung P, Tsai CH, Ziemann, U. Effect of dorsal premotor cortex rTMS on volitional motor cortical activity studied by contingent negative variation and Bereitschaftspotential. Bulletin of the 29<sup>th</sup> International Congress of Clinical Neurophysiology, Kobe, Japan, 2010. Clin Neurophysiol 2010;121(suppl 1):pp. S322.
  15. Lu MK, Tsai CH, Chen CM, Duann JR. Frontal midline movement-related cortical potential is reduced in agenesis of corpus callosum. Bulletin of the 15<sup>th</sup> International Congress of Parkinson's Disease and Movement Disorders, Toronto, Canada, 2011.
  16. Lu MK, Tsai CH, Chen CM, Duann JR. Motor cortical activities represented by Bereitschaftspotential and paired associative stimulation-induced plasticity in Parkinson's disease and essential tremor. Bulletin of the 16<sup>th</sup> International Congress of Parkinson's Disease and Movement Disorders, Dublin, Ireland, 2012.
  17. Lu MK, Duann JR, Chen CM, Tsai CH. Coupling of the sensorimotor cortical activation explored by blood-oxygenation-level-dependent signal navigated and traditional magnetic evoked potential recordings. Bulletin of the 5<sup>th</sup> International Conference on Non-invasive Brain Stimulation, Leipzig, Germany, 2013.

18. Lu MK, Duann JR, Chen CM, Ziemann U, Tsai CH. Distinct abnormalities of movement related cortical activation and motor cortical plasticity between Parkinson's disease and essential tremor. Bulletin of the 1<sup>st</sup> Taiwan International Congress of Parkinson's Disease and Movement Disorders, Taipei, Taiwan, 2013.
19. Lu MK, Tsai CH. Abdominal dystonia as a manifestation of multiple system atrophy: report of a case. Bulletin of the 17<sup>th</sup> International Congress of Parkinson's Disease and Movement Disorders, Sydney, Australia. Mov Disord 2013;28 (Suppl 1):790.
20. Lu MK, Yang YW, Huang HC, Hsu YT, Ziemann U, Tsai CH. Tremor resetting by multi-focal single and paired transcranial magnetic stimulation in Parkinson's disease and essential tremor. Bulletin of the 30th International Congress of Clinical Neurophysiology, Berlin, Germany, 2014. Clin Neurophysiol 2014;(suppl ):pp. P1240.
21. Lu MK, Chen CM, Duann JR, Ziemann U, Tsai CH. Motor cortical plasticity and corticospinal tract diffusion tensor image in patients with Parkinson's disease and essential tremor. Bulletin of the 1<sup>st</sup> International Brain Stimulation Conference, Singapore, 2015 March.

### **PI initiated Research Project**

1. Movement-related cortical potentials in patients with Parkinson's disease (DMR-94-011). Principle investigator. Duration: 2004/7/1-2005/6/30. Supported by CMUH.
2. Evaluating the effect of theta burst stimulation (TBS) to the human activated primary motor cortex (M1) by functional MRI (DMR-96-009). Co-Principle investigator. Duration: 2006/08/01-2007/07/31. Supported by CMUH.
3. Motor cortical plasticity alterations in Parkinson's disease and essential tremor. A combined transcranial magnetic stimulation (TMS), electroencephalography and diffusion tensor image (DTI) study (NSC99-2314-B-039-017-MY2). Principle investigator. Duration: 2010/08/01-2012/07/31. Supported by NSC.
4. Effect of multi-focal paired transcranial magnetic stimulation on tremor resetting (NSC101-2314-B-039-038-MY2). Principle investigator. Duration: 2012/08/01-2014/07/31. Supported by NSC.
5. Neuropsychobiology of brain theta-burst stimulation: A mind-body interface for depression (NHRI-EX101-10144NI)(NHRI-EX102-10144NI)(NHRI-EX103-10144NI). Co-principle investigator. Duration: 2012/1/1-2014/12/31. Supported by NHRI.
6. Neuroplasticity induced by cerebellum to motor cortex paired associative stimulation in aged humans and animal models (MOST103-2314-B-039-032-MY2). Principle investigator. Duration: 2014/8/1-2016/7/31. Supported by MOST.