

## CURRICULUM VITAE

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#### EDUCATION

2006      PhD. in Neurosurgery, Graduate School, Korea University. Thesis: Possible role of monocarboxylates accumulation in hypoxic synaptic depression which is not mediated by adenosine A1-receptor  
1996      MD. College of Medicine, Korea University

#### EMPLOYMENT HISTORY

2015-present      Professor, College of Medicine, Korea University  
2013-2014      Visiting scientist, Neurological Surgery, Johns Hopkins Hospital  
2010-2013      Associate Professor, College of Medicine, Korea University  
2009-2010      Assistant Professor, College of Medicine, Korea University  
2008-2009      Clinical Assistant Professor, Department of Neurosurgery, Korea University Guro Hospital  
2006-2008      Research Fellow, Neurological Surgery, Johns Hopkins University, School of Medicine  
2006-2006      Visiting scientist, Neurological Surgery, Johns Hopkins Hospital  
2005-2006      Clinical Assistant Professor, Department of Neurosurgery, Korea University Guro Hospital  
2004-2005      Clinical Fellow, Department of Neurosurgery, Korea University Guro Hospital  
2001-2004      Captain as a medical officer, Daegu Military Hospital, Republic of Korea Army  
1997-2001      Residency, Department of Neurosurgery, Korea University Medical Center  
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## Recent Advances of Neuroimaging for Movement Disorders: Therapeutic Aspects

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The 'standard' technique of the deep brain stimulation (DBS) has been following procedures: (1) preoperative calculation of target coordinates using MRI, (2) mapping through intraoperative microelectrode recording and (3) test stimulation of clinical effectiveness and side effects. Thanks to recent advances of neuroimaging, these procedures seem to be modified in near future. Advances in MRI definition from 1.5 Tesla (T) to 3.0 T, and even 7.0 T enabled higher signal-to-noise ratio to define anatomical target structures for DBS. Several groups successfully performed DBS with direct targeting method using 7.0 T MRI. Not only STN and GPi on 7 T MRI but thalamic nuclei could be visualized using susceptibility-weighted-image (SWI) of 7.0 T MRI. There is a concern of geometrical distortions at 7.0 T MRI but Duchin et al. showed those are acceptable in central brain regions where target nuclei are located.

Diffusion tensor imaging (DTI) has been used to demonstrate the proximity of effectively implanted DBS leads to axon fiber tracts which are preferentially activated by electrical stimulation. This technique can be applied to stimulate lenticular fasciculus and dentatorubrothalamic tract for STN and Vim DBS. Other technique using DTI like defining "connectome" of the subcortical target has been tried. Novel techniques of visualizing postoperative electrode location are being developed not only using fusion technique with preoperative MRI and postoperative CT but using individualized 3-D atlas.

However, the result of these studies were from small series and research purposes until now. If the novel techniques are sufficiently studied and consensus are made, current DBS procedure may be largely changed from awake surgery to surgery under general anesthesia without, possibly, the need of microelectrode recordings in the future.

MEMO

