
Title: Remote Modulation of Network Excitability during Deep Brain Stimulation for Epilepsy

Authors: Dong-Hong Li, Xiao-Feng Yang

PII: S1059-1311(17)30153-X
DOI: http://dx.doi.org/doi:10.1016/j.seizure.2017.02.016
Reference: YSEIZ 2904

To appear in: *Seizure*

Received date: 26-9-2016
Revised date: 20-1-2017
Accepted date: 28-2-2017

Please cite this article as: Li Dong-Hong, Yang Xiao-Feng.Remote Modulation of Network Excitability during Deep Brain Stimulation for Epilepsy.*SEIZURE: European Journal of Epilepsy* http://dx.doi.org/10.1016/j.seizure.2017.02.016

# Remote Modulation of Network Excitability during Deep Brain Stimulation for Epilepsy

Dong-Hong Li [a,b], Xiao-Feng Yang [a,b*]

[a] Neuroelectrophysiological Laboratory, Xuanwu Hospital, Capital Medical University, Beijing, China
[b] Center of Epilepsy, Beijing Institute for Brain Disorders, Capital Medical University, Beijing, China

[*] Correspondence to: Xiaofeng Yang, Email: xiaofengyang@yahoo.com.

## Highlights

- DBS is a promising treatment for epilepsy.
- Though DBS is widely used, its therapeutic mechanisms for epilepsy remain poorly understood.
- Recent years have witnessed a paradigm shift in the study of epilepsy, which is increasingly understood as a network-level disorder.
- DBS may potentially provide the opportunity to selectively modulate targeted brain regions and related networks.

**Abstract:** Deep brain stimulation (DBS) has become a well-accepted medical therapy in the treatment of movement disorders such as Parkinson's disease, and is currently under investigation as a treatment for other disorders, including epilepsy. Although DBS is widely used, its therapeutic mechanisms remain poorly understood. Recent research shows that seizures are network-level phenomena, but the incomplete knowledge of neural circuit function has left a gap in our understanding of how disruption at a molecular or cellular level generates epilepsy. In addition, DBS may potentially provide the opportunity to selectively modulate targeted brain regions and related networks. Therefore, a better understanding of the relationship between normal neural networks and epileptogenic networks, as well as the role of DBS in the modulation of neural networks will help us to find the optimal stimulation targets and parameters to achieve a better therapeutic effect. This review will outline the most recent advances in the relationship between normal brain networks and epileptogenic networks, and the modulation of DBS on the excitability of epileptogenic networks. We will then discuss how to optimize DBS stimulation targets and parameters by taking into consideration the concept of network modulation in order to improve treatment of epilepsy in the future.