Intracerebral Microdialysis in Deep Brain Stimulation Surgery for Parkinson’s Disease

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Introduction

- **Deep brain stimulation surgery**
  - STN-DBS for Parkinson’s Disease
  - Expanding applications of DBS


Basal Ganglia

- The Albin-DeLong model
- STN-DBS may create a ‘functional lesion’ in STN
- Recent insights
  - STN-DBS may cause excitatory output from STN
  - Aberrant firing patterns in parkinsonian BG

Image: http://www.nature.com/nature/journal/v400/n6745/fig_tab/400621a0_F1.html
Procedure

- Implant stimulating electrode
- Lower microdialysis catheter to target
- Collect samples at regular intervals for 60min
- Activate stimulating electrode beginning at 40min

OR photography by Dr. M. Kilpatrick and Dr. P. Connelly
Results - Baseline Studies

![Graph showing baseline studies results for DA, Glu, and GABA with time points at 15, 30, 45, and 60 minutes.]
Results - Substantia Nigra

![Graph showing DA (nM) and GABA (μM) levels over time for Patient 5.](image)
Conclusions

- Microdialysis during DBS surgery is a feasible approach for examining EC environment in BG
- Specific changes in NT concentrations with stimulation
  - Studies are ongoing
- Data may aid in understanding DBS mechanisms and BG circuitry
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