

Yamamoto T<sup>1</sup>, Sakakibara R<sup>1</sup>, Hashimoto K<sup>2</sup>, Nakazawa K<sup>3</sup>, Uchiyama T<sup>1</sup>, Liu Z<sup>1</sup>, Ito T<sup>1</sup>, Hattori T<sup>1</sup>

1. Department of Neurology, Chiba University, 2. Department of Psychiatry, Chiba University, 3. Department of Integrative Neurophysiology, Chiba University

## **STRIATAL DOPAMINE LEVEL INCREASES IN THE URINARY STORAGE PHASE IN CATS**

### Hypothesis / aims of study

In Parkinson's disease, urinary urgency and detrusor hyperactivities are frequently observed<sup>1</sup>.

Some reports revealed that a single dose of levodopa worsened bladder hyperactivity<sup>2</sup>. Then dopamine is expected to be associated with micturitional functions. Therefore we measured striatal dopamine level in the urinary storage/micturition cycle in cats using *in vivo* microdialysis to clarify the role of dopamine on the micturitional reflexes.

### Study design, materials and methods

Experiments were performed on 6 adult male cats under anesthesia with ketamine. A dialysis probe was inserted stereotaxically into the caudate head. Dialysate was collected during the micturition and storage phases, respectively, and stored at -80 degree Celsius. Dopamine level was measured using high-performance liquid chromatography.

### Results

The striatal dopamine level periodically changed in relation to the urinary storage/micturition cycles, and significantly increased in the storage phase as compared to that in the micturition phase(Figure1).

### Interpretation of results

This study revealed that striatal dopamine level increased in urinary storage phase. In addition, previous pharmacological study reported that stimulation of dopamine D1 receptor elicited an inhibitory effect on the micturitional reflexes<sup>3</sup>. Therefore it seems likely that the released striatal dopamine predominantly activate the striatal dopamine D1 receptor, which in turn inhibited the micturition reflexes in the urinary storage phase.

### Concluding message

Striatal dopamine level significantly increases in the urinary storage phase.

It is suggested that striatal dopamine may inhibit the micturition reflexes by activating the striatal dopamine D1 receptor.

### References

- 1) Autonomic disorder in Parkinson's disease. J Neural Transm (Suppl) 1995;45: 11-19
- 2) Short-term effect of a single levodopa dose on micturition disturbance in Parkinson's disease patients with the wearing-off phenomenon. Mov Disord 2003; 18:573-578
- 3) Dopamine D1 receptor mediated inhibition of micturition reflex by central dopamine from the substantia nigra. NeuroUrol Urodyn 1992; 11:535-545

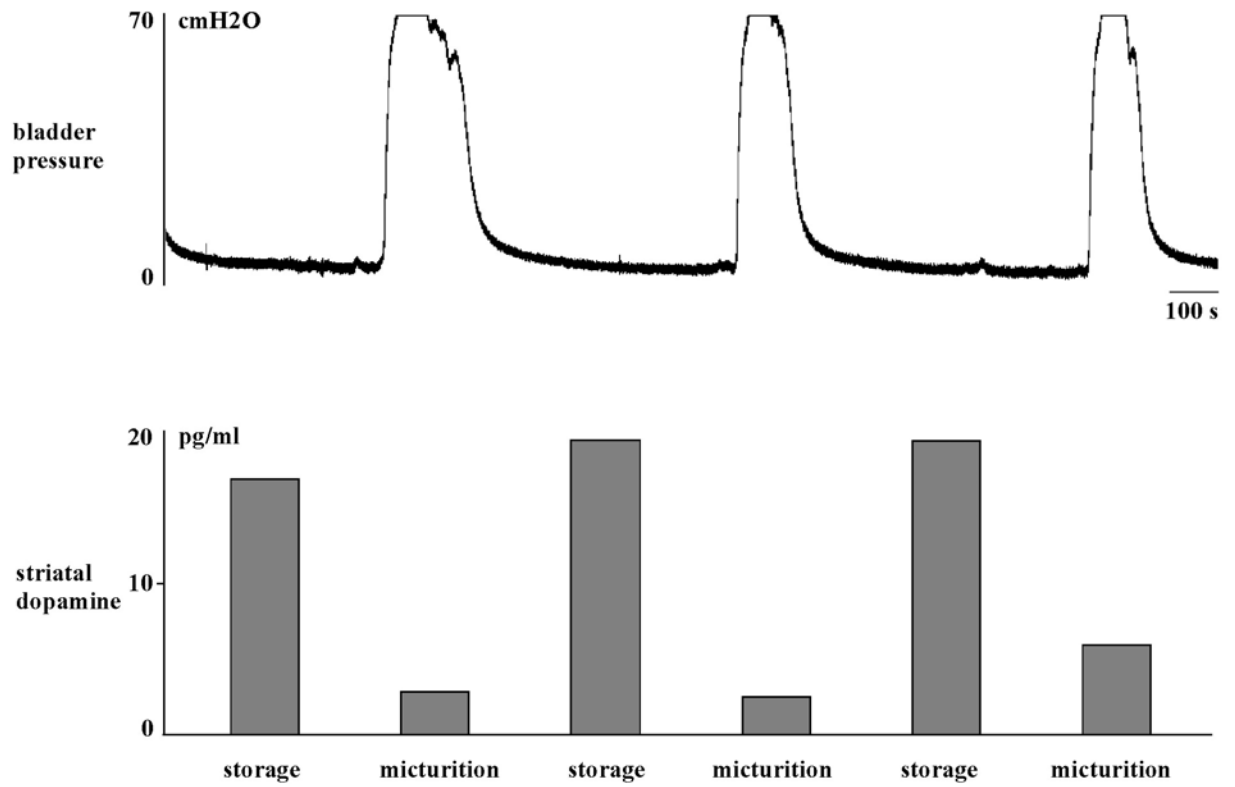


Figure 1 Typical recording of bladder cycles and changes in striatal dopamine level.

The upper trace shows the urinary storage/micturition cycle, and the lower trace shows temporal changes in the striatal dopamine level. The striatal dopamine level periodically changed in relation to urinary cycles, increasing in the storage phase and decreasing in the micturition phase.