Hypothesis / aims of study
In Parkinson’s disease, urinary urgency and detrusor hyperactivities are frequently observed. Some reports revealed that a single dose of levodopa worsened bladder hyperactivity. 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 (Figure 1).

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. 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
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.