

1999 Fiscal Year Final Research Report Summary

Central muscarinic mechanisms of bladder overactivity associated with Alzheimer type senile dementia.

Research Project

Project/Area Number

10470334

Research Category

Grant-in-Aid for Scientific Research (B)

Allocation Type

Single-year Grants

Section

一般

Research Field

Urology

Research Institution

Kanazawa University

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Project Period (FY)

1998 - 1999

Keywords

Alzheimer dementia / neurogenic bladder / bladder overactivity / muscarine / brain / bladder / urinary incontinence / ibotenic acid

Research Abstract

OBJECTS : To investigate the mechanisms of neurogenic bladder overactivity in Alzheimer type senile dementia in a conscious rat model.

METHODS : Male Wistar rats were placed in a stereotaxic apparatus, and subjected to bilateral lesion of the basal forebrain by means of ibotenic acid (IA) injection (7.5 μg/rat on each side)(BF rats). Phosphate buffered saline (PBS) was injected to control rats (sham operated rats ; SO rats). Cystometrograms (CMG) were obtained 7 to 10 days after IA/PBS injection. After CMG recording, choline-acetyltransferase (CAT) activities in the frontal cortices were assayed to assess the damage to cholinergic

neuronal projections from basal forebrain to frontal cortices. The influences of intracerebroventricular administration of Oxotremorine M, muscarinic receptor agonist, or pirenzepine, M1 muscarinic receptor antagonist were investigated in conscious BF or SO rats. Antagonized effects of pirenzepine were also examined in BF rats. The effects of oxotremorine M or pirenzepine directly injected into the PMC (pontine micturition center) were examined under urethane anesthesia.

RESULTS : Bladder capacity become significantly smaller than before IA injection. Seven to 10 days after IA injection, bladder capacity was approximately 43% of SO rats. CAT activity in the frontal cortices was reduced in BF rats. Oxotremorine M increased bladder capacity in BF rats, while decreased in SO rats. Pirenzepine significantly increased bladder capacity both in BF and SO rats, and antagonised the effect of oxotremorine M. Direct injection of oxotremorine M into the PMC decreased bladder capacity in BF and SO rats, while injection of pirenzepine had no effects on CMG.

CONCLUSIONS : These results indicate that M1 muscarinic system in the cerebral cortex has inhibitory influence to micturition reflex pathway. Down-regulation of this inhibitory mechanism plays an important role on overactive bladder in Alzheimer type dementia. M2 muscarinic system in the brainstem is likely to have excitatory influence on micturition reflex pathway.▲ Less

Research Products (13 results)

All Other

All Publications

[Publications] Yokoyama, O, Kamatsu K et al.: "Change in bladder contractility associated with bladder overactivity in rats with cerebral infarction"J. Urol. 159. 577-580 (1998) ▼

[Publications] Yokoyama O, Ishiura Y, et al.: "Effects of MK-801 on bladder overactivity in rats with cerebral infarction"J. Urol. 159. 571-576 (1998) ▼

[Publications] Yokoyama O, Yoshiyama M, et al.: "Glutamatergic and dopaminergic contributions to rat bladder hyperactivity after cerebral artery occlusion"Am. J. Physiol. 276. R935-R942 (1999) ▼

[Publications] Ishimura Y, Yokoyama O, et al.: "Central muscarinic mechanisms regulating voiding in rats"NeuroUrol Urodyn. 18. 351-352 (1999) ▼

[Publications] Nakamura Y, Yokoyama O, et al.: "Effects of nifedipine on bladder overactivity in rats with cerebral infarction"J. Urol. 162. 1502-1507 (1999) ▼

[Publications] Nakada Y, Yokoyama O, et al.: "Effects of aniracetam on bladder overactivity in rats with cerebral infarction"J. Pharmacol. Exp Ther. (in press). (2000) ▼

[Publications] 横山 修: "尿失禁に対する経膈的手術のコツ.臨床泌尿器科のコツと落とし穴"中山書店. 165 (1999) ▼

[Publications] 児玉浩一、横山 修: "脳梗塞ラットモデルを用いた研究法. 神経泌尿器科学研究法"日本医学館. 172 (2000) ▼

[Publications] Yokoyama O, Komatsu K, et al: "Change in bladder contractility associated with bladder overactivity in rats with cerebral infarction"J. Urol. 159. 577-580 (1998) ▼

[Publications] Yokoyama O, Ishiura Y, et al: "Effects of MK-801 on bladder overactivity in rats with cerebral infarction"J. Urol. 159. 571-576 (1998) ▼

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[Publications] Ishiura Y, Yokoyama O, Namiki M, et al: "Central muscarinic mechanisms regulating voiding in rats"NeuroUrol Urodyn. 18. 351-352 (1999) ▼

[Publications] Nakamura Y, Yokoyama O, et al: "Effects of nifedipine on bladder overactivity in rats with cerebral infarction."J Urol. 162. 1502-1507 (1999) ▼

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