Fundamental Study on Assessment of Neurotransplantation and Drug Treatment in Alzheimers Disease Using Nuclear Medicine Imaging

2000 Fiscal Year Final Research Report Summary

Fundamental Study on Assessment of Neurotransplantation and Drug Treatment in Alzheimers Disease Using Nuclear Medicine Imaging

Research Project

Project/Area Number

10670832

Research Category

Grant-in-Aid for Scientific Research (C)

Allocation Type

Single-year Grants

Section

一般

Research Field

Radiation science

Research Institution

KANAZAWA UNIVERSITY

Principal Investigator

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Project Period (FY)

1998 – 2000

Keywords

Alzheimer's disease / Lesion of Nucleus Basalis Magnocellularis / Acetylcholine / Receptor / Neurotransplantation / Transporter / β-amyloid

Research Abstract

(1) In this study, β-amyloid protein was infused into the cerebral ventricle of rats for 14 days ; the eight-arm radial maze was used to evaluate memorial ability. In the same animals, vesicular acetylcholine transporter and muscarinic acetylcholine receptor density was measured. The performance of the eight-arm radial maze task was impaired in β-amyloid protein treated rats. In neocortex, the vesicular acetylcholine transporter density was lower in β-amyloid protein-treated rats than vehicle treated rats ; there was no difference in muscarinic acetylcholine receptor density between the two groups. These results suggest that the reduction in vesicular acetylcholine transporter density is related to memory impairment induced by β-amyloid protein.
(2) It is considered that the nodosal ganglion grafting improves the learning and memory disorder in the nucleus basalis magnocellularis lesioned rat, and that [^3H]-vesamicol is one of the mapping agents for presynaptic cholinergic neurons. Quantitative autoradiography was performed using high sensitive imaging plate system to evaluate the effect of neurotransplantation on [^3H]-vesamicol binding. The affected-side to unaffected-side ratio of [^3H]-vesamicol in the nucleus basalis magnocellularis lesioned group was significantly lower than that in the sham-operated group at I , 2 and 4 weeks ($p< 0.01$). In the transplanted group, the ratio was significantly higher than that in the untreated group at 4 weeks ($p<0.05$). [^3H]-vesamicol binding is one of the most sensitive indicators of nucleus basalis magnocellularis lesions and the effect of the nodosal ganglion grafting.

Research Products (6 results)

All | Other

All | Publications (6 results)

[Publications] Ikeda E: "Reduction of vesicular acetylcholine transporter in β-amyloid protein-infused Rats with memory impairment"Nuclear Medicine Communications. 21. 933-937 (2000)

[Publications] Shiba K: "The potential of radioiodinated(-)-m-iodovesamikol for diagnosing cholinergic deficit dementia"Nuclear Medicine & Biology. (in press).

[Publications] Ikeda E: "Effect of vagal autotransplantation on quantitative [^3H] -vesamicol bindingimage in rats with unilateral lesions of nucleus basalis magnocellularis"Neuroscience Letters. (in press).

[Publications] Ikeda E: "Reduction of vesicular acetylcholine transporter in β-amyloid protein-infused rats with memory impairment"Nuclear Medicine Communications. 21. 933-937 (2000)

[Publications] Shiba K: "The Potential of radioiodinated(-)-m-iodovesamikol for diagnosing cholinergic deficit dementia"Nuclear Medicine & Biology. (in press).

[Publications] Ikeda E: "Effect of vagal autotransplantation on quantitative [^3H]-vesamicol bindingimage in rats with unilateral lesions of nucleus basalis binding image"Neuroscience Letters. (in press).

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