

# Study about changes in serotonin nerve system in nerve transplantation model with dementia

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# 2002 Fiscal Year Final Research Report Summary

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## Study about changes in serotonin nerve system in nerve transplantation model with dementia

Research Project

### Project/Area Number

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13670924

### Research Category

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Grant-in-Aid for Scientific Research (C)

### Allocation Type

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Single-year Grants

### Section

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一般

### Research Field

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Radiation science

### Research Institution

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Kanazawa University

### Principal Investigator

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### Project Period (FY)

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2001 – 2002

### Keywords

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dementia / Alzheimer / autoradiography / acetylcholine / receptor / transporter / vesamicol

### Research Abstract

In order to establish the nuclear medicine evaluation method of a nerve transplant in rats, vagal nodosal ganglion was autotransplanted in nucleus basalis magnocellularis lesioned rat as dementia model, and quantitative autoradiography was performed to evaluate the cerebral blood flow and the acetylcholine system. Nucleus basalis magno-cellularis lesioned rats were made with ibotenic acid. According to the method of Ikeda, the nerve transplant model was made by transplanting vagal nodosal ganglion in the back side of a carotid artery near the destructive lesion by ibotenic acid. Cerebral blood flow, muscarinic acetylcholine receptor and acetylcholine transporter were evaluated with <sup>99m</sup>Tc-HMPAO, 3H-QNB, and 3H-vesamicol respectively with quantitative autoradiography 1, 2, and 4 weeks after the transplantation. A lesioned rat and transplant model did not accept a significant change, but it turns out that a cerebral blood flow is almost uninfluent in the acetylcholine system. Although the acetylcholine receptor showed the downward tendency in the destructive model and showed the improvement tendency in the transplant model, there was no significant difference in the lesion-to-normal ratio in both groups. Acetylcholine transporter was significantly decreased in the lesion side of the lesioned rat, especially in the parietal lobe which is a projection area from the nucleus basalis magnocellularis. In the transplant model, the improvement tendency was shown with time and the significant improvement was obtained four weeks after the transplantation. It was suggested that acetylcholine transporter imaging with 3H-vesamicol in a nerve transplant is most suitable as a nuclear medicine evaluation in a dementia model.

## Research Products (4 results)

All Other

All Publications (4 results)

[Publications] Shiba K, Mori H, Ikeda E, Sumiya H, Tonami N.: "The potential of radioiodinated (-)-m-iodovesamicol for diagnosing cholinergic deficit dementia"Nucl Med Biol. 28. 261-264 (2001) ▼

[Publications] Ikeda E, Ichikawa A, Mori H, Shiba K, Kuji I, Sumiya H, et al.: "Effect of vagal autotransplantation on quantitative [<sup>3</sup>H]-vesamicol binding image in rats with unilateral lesions of nucleus basalis magnocellularis"Neurosci Lett. 300. 33-36 (2001) ▼

[Publications] Shiba K, Mori H, Ikeda E, Sumiya H, Tonami N.: "The potential of radioiodinated (-)-m-iodovesamicol for diagnosing cholinergic deficit dementia"Nucl Med Biol.. 28. 261-264 (2001) ▼

[Publications] Iteda E, Ichikawa A, Mori H, Shiba K, Kuji I, Sumiya H, et al.: "Effect of vagal autotransplantation on quantitative [<sup>3</sup>H]-vesamicol binding image in rats with unilateral lesions of nucleus basalis magnocellularis"Neurosci Lett.. 300. 33-36 (2001) ▼

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