The potential radioiodinated (-)-o-iodovesamicol for diagnosing-Alzhemer's disease.

2001 Fiscal Year Final Research Report Summary

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Research Project

Project/Area Number

11670878

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)

1999 – 2001

Keywords

Iodovesamicol / Cholinergic neurons / Acetylcholine Transporter / Alzheimer's Disease

Research Abstract

We evaluated the potencies of radioiodinated (-)-o-iodovesamicol [(-)-oIV] as a selective vesicular acetylcholine transporter (VAChT) mapping agent. In vitro studies, (-)-enantiomers [(-)-ortho-iodovesamicol ((-)-OIV), (-)-meta-iodovesamicol ((-)-mIV), (-)-vesamicol] displayed a higher affinity for VAChT than (+)-enantiomer [(+)-OIV, (+)mlV, (+)-vesamicol]. (-)-OIV and (-)-mlV showed the same high affinity for VAChT as (-)-vesamicol. For sigma receptors(σ-1, σ-2), (-)-OIV (Ki = 62.2 nM (to σ-1) and 554 nM (to σ-2)) showed a lower affinity than (-)-mlV (Ki = 4.5 nM (to σ-1) and 42.9 nM (to σ-2)). In vivo regional brain distribution study and ex vivo autoradiographic study, the characteristics of (-)-$[^{125}I]$oIV accumulation is very similar to that of $[^3H]$vesamicol in rat brain. Displacement studies in vivo showed that the binding affinity of (-)$[^{125}I]$oIV for VAChT was very high and that for sigma receptors was low. Furthermore, the rate of reduction in (-)-$[^{125}I]$oIV

accumulation (17 %) was significantly higher than that of (-) [^{125}I]mIV (10 %) in the ipsilateral cortex to the lesion ($P < 0.01$) in a unilateral NBM-lesioned rat. These results suggested that (-)-OIV is superior to (-)mIV as a selective vesicular acetylcholine transporter mapping agent. Radioiodinated (-)-oIV may potentially be useful for diagnosis of Alzheimer's disease.

Research Products (8 results)

All Other

All Publications

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

[Publications] Shiba, K.: "The potential of radioiodinated (-)-m-iodovesamicol for diagnosing cholinergic deficit dementia"Nuclear. Medicine and Biology. 28. 261-264 (2001)

[Publications] Ikeda, E.: "Effect of vagal autotransplantation on quantitative [3H]-vesamicol binding image in rats with unilateral lesions of nucleus basalis magnocellularis"NeuroReport. 300. 33-36 (2001)

[Publications] Shiba, K.: "Characterization of radioiodinated (-)-ortho-iodovesamicol binding in rat brain preparations"Life Science. (in press). (2002)

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

[Publications] Shiba, K.: "The potential of radioiodinated (-)-m- iodovesamicol for diagnosing cholinergic deficit dementia"Nuclear. Medicine and Biology. 28. 261-264 (2001)

[Publications] Ikeda, E.: "Effect of vagal autotransplantation on quantitative [3H]-vesamicol binding image in rats with unilateral lesions of nucleus basalis magnocellularis"NeuroReport. 300. 33-36 (2001)

[Publications] Shiba, K.: "Characterization of radioiodinated (-)-ortho iodovesamicol binding in rat brain preparations"Life Sciences. (in press). (2002)

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Published: 2003-09-16