

## Cerebral muscarinic acetylcholinergic receptor measurement in Alzheimer's disease patients on $^{11}\text{C}$ -*N*-methyl-4-piperidyl benzilate —Comparison with cerebral blood flow and cerebral glucose metabolism—

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We studied the cerebral muscarinic acetylcholinergic receptor (mACh-R) by means of  $^{11}\text{C}$ -*N*-methyl-4-piperidyl benzilate ( $^{11}\text{C}$ -NMPB) and positron emission tomography (PET) in Alzheimer's disease (AD) cases, and the findings were compared with the cerebral blood flow (CBF) and the glucose metabolism (CMRGlc) to evaluate the relationship between the mACh-R and the CBF or the CMRGlc. The subjects consisted of 18 patients with AD and 18 age and sex matched normal volunteers. The patients were clinically diagnosed according to the criteria of the NINDS-ADRDA as having "probable AD" and were thus classified into two groups (mild and moderate AD) according to the severity of dementia determined by DSM-III-R. The CBF was measured by  $^{99\text{m}}\text{Tc}$ -HMPAO SPECT, and the CMRGlc was measured by  $^{18}\text{F}$ FDG PET. The  $^{11}\text{C}$ -NMPB uptake was evaluated by the graphical method and the ratio method (ROIs/Cerebellum). A significant mACh-R decrease and more severe CMRGlc decrease in the cortical region was seen in mild and moderate AD. The decrease in the CBF was not as obvious as that in the mACh-R and the CMRGlc.

Our study thus suggested that the mACh-R decreased in patients with AD, and that the  $^{18}\text{F}$ FDG PET was the most sensitive method for detecting the degenerative regions in patients with AD.

**Key words:** cerebral muscarinic acetylcholinergic receptor,  $^{11}\text{C}$ -*N*-methyl-4-piperidyl benzilate, cerebral blood flow, glucose metabolism, Alzheimer's disease