[Behav. Brain Res., **72**, 49-55 (1996)] [Lab. of Molecular Biology]

Age-Related Changes in Learning and Memory and Cholinergic Neuronal Function in Senescence Accelerated Mice (SAM).

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The senescence-accelerated mouse (SAM) has been established as a murine model of accelerated aging. We investigated learning ability and memory in various tasks in a SAM strain, SAMP1A, and in a control strain of SAMR1TA at the ages of 20, 30 and 40 weeks. We also measured choline acetyltransferase (ChAT) and cholinesterase (ChE) activity in the brain of these mice at the same ages. These results suggest that SAMP1TA has a deficit, with cholinergic neuronal dysfunction, in learning ability and momory, as shown by impairment of performance in latent learning and long-term memory, but not in short-term memory.

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Propentofylline Prevents Neuronal Dysfunction Induced by Infusion of Anti-Nerve Growth Factor Antibody into the Rat Septum.

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Propentofylline has potent stimulatory effects on NGF synthesis/secretion in mouse astrocytes *in vitro*. To investigate the pharmacological effects of propentofylline, we used an animal model of dementia in which anti-NGF antibody was infused into the septum for 16 days via a mini-osmotic pump. The administration of propentofylline prevented the decreased learning capacity and the deficit in cholinergic marker enzyme activities. The results suggest that the use of NGF stimultors may provide a new approach to the treatment of dementia.

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Dysfunction of Cholinergic and Dopaminergic Neuronal System in β-Amyloid Protein- Infused Rats.

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Accumulations of β-amyloid protein are characteristic and diagnostic features of the brain of Alzheimer's disease patients. In this study, the effects of β-amyloid protein infusion on the release of neurotransmitters in cholinergic and dopaminergic neuronal systems were investigated by using an in vivo brain microdialysis method. Dopamine release induced by high-K^+ stimulation was decreased in amyloid protein-infused rasts compared with vehicle-infused rats. These results suggest that the release of the two transmitters, acetylcholine and dopamine, was decreaseed by β-amyloid protein and that learning deficits observed in the β-amyloid protein-infused rats are partly due to the impairment of neurotransmitter release.