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## **Reduced thyroid hormones with increased hippocampal SNAP-25 and Munc18-1 might involve cognitive impairment during aging**

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### **Abstract**

The mechanism underlying the decline of age-related learning and memory remains unclear. Brain-region-specific changes of synaptic proteins and decreased thyroid hormones (THs) have been implied involving this decline. During normal aging, however, the relationships among synaptic proteins, THs and abilities of learning and memory remain to be elucidated. In this study, the age-related spatial learning and memory ability of 41 Kunming mice (KM) (14 mice aged 6 months, 13 mice aged 11 months, 14 mice aged 22 months) was measured with radial six-arm water maze. The levels of SNAP-25 and Munc18-1 in brain regions were semi-quantified by Western blotting and the serum THs were detected by radioimmunoassay. Our results showed the old Kunming mice had marked impairment of spatial learning and memory, with decreased serum free triiodothyronine (FT3) and increased SNAP-25 and Munc18-1 in dorsal hippocampus (DH), ventral hippocampus (VH) and frontal lobe (F). The Pearson's correlation test showed the impairment of spatial learning ability positively correlated with SNAP-25 in DH and Munc18-1 in DH and VH. While, the levels of SNAP-25 (DH, VH and F) and Munc18-1 (DH) negatively correlated with the serum FT3 level, and the spatial memory decline marginal negatively correlate with serum THs. These results suggested that increased hippocampal SNAP-25 and Munc18-1 which seemingly result from decreased serum THs might involve the age-related impairment of spatial learning and memory.

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