

# Abstract

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## The combination of exercise training and alpha-lipoic acid treatment has therapeutic effects on the pathogenic phenotypes of Alzheimer's disease in NSE/APPsw-transgenic mice.

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**OBJECTIVE:** Exercise training was suggested as a practical therapeutic strategy for human subjects suffering from Alzheimer's disease (AD) in our previous study. Therefore, the purpose of this study was to investigate the effects of combining exercise training with the administration of antioxidants on the pathological phenotype of AD.

**METHODS:** To accomplish this, non-transgenic mice (Non-Tg) and NSE/APPsw Tg mice were treated with alpha-lipoic acid and treadmill exercised for 16 weeks, after which their brains were evaluated to determine whether any changes in the pathological phenotype-related factors occurred.

**RESULTS:** The results indicated that (i) the combination-applied (COMA) Tg group with exercise training (ET) and alpha-lipoic acid administration (LA) showed ameliorated spatial learning and memory compared to the sedentary (SED)-Tg and single-treatment groups; (ii) there were no differences in the level of Abeta-42 peptides across groups; (iii) the level of glucose transporter-1 and brain-derived neurotrophic factor proteins were highly increased in the COMA group, (iv) ET and LA did not induce a synergistic effect on the expression of heat shock protein-70 and apoptotic proteins including Bax and caspase-3; (v) the levels of SOD-1 and CAT suppressing oxidative stress were extensively higher in the COMA than in the single-treated groups and (vi) there were no significant differences across groups regarding these serum characteristics, although these levels were lower than the SED-Tg group.

**CONCLUSION:** Taken together, these results suggest that the combination with ET and LA may contribute to protect the neuron injury induced by Abeta peptides and may be considered an effective therapeutic strategy for human subjects suffering from AD.

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