

# Abstract

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## **Vitamin B-12, apolipoprotein E genotype, and cognitive performance in community-living older adults: evidence of a gene-micronutrient interaction.**

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**BACKGROUND:** The relation between vitamin B-12 and cognitive function in older adults is unclear. Limited evidence suggests that the relation is modulated by apolipoprotein E epsilon4. Hence, it is important to further examine this gene-nutrient interaction.

**OBJECTIVE:** The aim was to investigate the role of apolipoprotein E (APOE) epsilon4 as a genetic predisposing factor modulating the effect of vitamin B-12 on cognitive function.

**DESIGN:** A battery of neuropsychological tests, including the Mini-Mental State Examination (MMSE) for global cognition, was administered at the baseline assessment to 539 Chinese adults aged  $\geq 55$  y. The MMSE was repeated at a median 18 mo ( $n = 376$ ) and a median of 38 mo ( $n = 247$ ) after baseline. The interaction of vitamin B-12 and APOE epsilon4 on cognitive function was examined in a linear mixed-effects model for MMSE and in a multiple linear regression model for neuropsychological test scores.

**RESULTS:** APOE epsilon4 was associated with a lower MMSE score. Vitamin B-12 (natural log transformed) was positively related to MMSE score, and this association was much stronger in APOE epsilon4 carriers than in APOE epsilon4 noncarriers ( $P$  for interaction = 0.016). Significant interactions between natural log-transformed vitamin B-12 and APOE epsilon4 were also found for the Digit Span Backward Longest Sequence ( $P$  for interaction = 0.013) and Rey Auditory Verbal Learning Test immediate recall ( $P$  for interaction = 0.005). Better performance in these 2 tests was associated with vitamin B-12 in APOE epsilon4 carriers but not in APOE epsilon4 noncarriers.

**CONCLUSIONS:** The association between vitamin B-12 and cognitive function was moderated by APOE epsilon4 status.

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