
Do high blood folate concentrations exacerbate metabolic abnormalities in people with low vitamin B-12 status?

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BACKGROUND: In elderly individuals with low serum vitamin B-12, those who have high serum folate have been reported to have greater abnormalities in the following biomarkers for vitamin B-12 deficiency: low hemoglobin and elevated total homocysteine (tHcy) and methylmalonic acid (MMA). This suggests that folate exacerbates vitamin B-12-related metabolic abnormalities.

OBJECTIVE: We determined whether high serum folate in individuals with low serum vitamin B-12 increases the deleterious effects of low vitamin B-12 on biomarkers of vitamin B-12 cellular function.

DESIGN: In this cross-sectional study, 2507 university students provided data on medical history and exposure to folic acid and vitamin B-12 supplements. Blood was collected to measure serum and red blood cell folate (RCF), hemoglobin, plasma tHcy, and MMA, holotranscobalamin, and ferritin in serum.

RESULTS: In subjects with low vitamin B-12 concentrations (<148 pmol/L), those who had high folate concentrations (>30 nmol/L; group 1) did not show greater abnormalities in vitamin B-12 cellular function in any area than did those with lower folate concentrations (≤30 nmol/L; group 2). Group 1 had significantly higher holotranscobalamin and RCF, significantly lower tHcy, and nonsignificantly lower (P = 0.057) MMA concentrations than did group 2. The groups did not differ significantly in hemoglobin or ferritin. Compared with group 2, group 1 had significantly higher mean intakes of folic acid and vitamin B-12 from supplements and fortified food.

CONCLUSIONS: In this young adult population, high folate concentrations did not exacerbate the biochemical abnormalities related to vitamin B-12 deficiency. These results provide reassurance that folic acid in fortified foods and supplements does not interfere with vitamin B-12 metabolism at the cellular level in a healthy population.

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