

Cognitive Performance In Vitamin B12 Deficient Vegan Men With Intermediate Hyperhomocysteinaemia

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Background: Previous studies examining cognitive function in relation to vitamin B12 status have shown mixed results. The strongest evidence for a link appears in two sub-groups of the population: the healthy elderly and people with dementia. However, the lack of research on younger participants makes the relationship between B12 and cognitive function difficult to gauge in the general population. One population of interest are vegans, who can be subject to deprivation of vitamin B12 through their elimination of animal products.

Aim: To assess the effect of vitamin B12 supplementation on cognitive performance in a sample of healthy vegan men (n=138, mean age 48, range 18 - 80) using robust neuropsychological tasks with the necessary sensitivity to detect sub-clinical effects.

Methods: Vegan participants (n=39) with serum vitamin B12 levels < 120 ng/L were given the active supplement, 18 of this subgroup undertook structural MRI scans before supplementation. Vegan participants with serum levels of 120 – 200 ng/L (n = 35), were given either active or placebo treatment. A subgroup of vegan participants with serum vitamin B12 > 200 ng/L (n=64) were used as controls. Homocysteine (tHcy) and methylmalonic acid (MMA) were measured using isotope dilution GCMS with SIM. Holotranscobalamin (holoTC) was measured by ELISA, folate and serum vitamin B12 by a competitive protein binding immunoassay.

Results: There were no significant differences in cognition between controls and other participants. Despite intermediate hyperhomocysteinaemia, reversed by vitamin B12 supplementation, there were virtually no significant effects of supplementation on the cognitive tests. Adequate power was present to accept the null hypothesis. Structural MRI showed no detectable neuropathology.

Conclusion: Supplementation of this population with long term vitamin B12 deficiency, did not improve cognitive performance; this was attributed to protective effects of high folate and reduced saturated fat intake of vegans.

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