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Abstract

B-Vitamin Biomarkers in Relation to Immune Function in Older Adults: Preliminary Analysis from the TUDA Study †

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Abstract: Background and objectives: Immune function typically declines with age, increasing susceptibility to disease. Many factors contribute to this decline, including nutritional status. Emerging evidence shows associations of folate and related B-vitamins (B12, B6, and riboflavin) with immune health, but these interactions are complex. The aim of this study was to investigate B-vitamin biomarkers in relation to immune function in ageing. We hypothesised that the higher status of certain B-vitamins will be associated with improved inflammatory markers. Methods: The data were analysed from the Trinity-Ulster-Department of Agriculture (TUDA) study, aimed at investigating health and lifestyle factors in relation to disease, in community-dwelling older adults recruited from the island of Ireland (2008–2012). Of the 5186 TUDA participants, 2724 fulfilled the inclusion criteria for the current investigation. We measured B-vitamin biomarkers, namely, red blood cell folate, serum B12, plasma pyridoxal-5-phosphate (PLP; B6), the erythrocyte glutathione reductase activation coefficient (EGRac; riboflavin), pro-inflammatory markers (interleukin IL-6, tumor necrosis factor-alpha [TNF-α], and c-reactive protein [CRP]), and the anti-inflammatory marker (IL-10). Results: Plasma PLP was negatively associated with CRP (β: −0.066; 95% CI: −0.005–0.000; $p = 0.020$), and plasma homocysteine was positively associated with CRP (β: 0.062; 95% CI: 0.003–0.066; $p = 0.030$) and TNF-α (β: 0.086; 95% CI: 0.023–0.124; $p = 0.004$). No other significant associations between B-vitamins and inflammatory markers were found. As regards general characteristics, the concentrations of IL-6 ($p = 0.040$) and CRP ($p = 0.010$) increased with age; CRP ($p < 0.001$); TNF-α ($p = 0.024$) increased with BMI; higher IL-6 ($p = 0.041$) was associated with living alone; and higher CRP ($p < 0.001$) was associated with smoking. Discussion: These preliminary findings suggest that improving vitamin B6 status and maintaining a healthy weight in older age may support a healthier immune system. Further investigation, particularly in the form of randomised controlled trials, is required to confirm the current findings and investigate the impact of B-vitamins on immune function.

Keywords: B-vitamins; vitamin B6; inflammatory markers; CRP; ageing

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