The association of dietary folate with serum and red cell folate is modulated by the G80A reduced folate carrier single nucleotide polymorphism in an elderly population sample

PD Roach¹,², L Dufficy¹, N Naumovski¹, X Ng¹, B Blades¹,², C Travers², P Lewis², J Sturm², M Veysey², MD Lucock¹,²

¹Environmental and Life Sciences, University of Newcastle, Ourimbah, NSW 2258
²Central Coast Centre for Vascular Health, Northern Sydney Central Coast Health, Gosford, NSW 2250

Background – There are various polymorphisms in the genes coding for enzymes and carriers involved in folate metabolism which are known to affect folate distribution and disposition. Recently, a single nucleotide polymorphism (SNP) in the reduced folate carrier (RFC) has been found to modulate the uptake of folate by cells. The SNP, a change from guanine to adenine at position 80 of exon 2 of the gene (G80A RFC) leads to an arginine replacing a histidine in the expressed RFC protein.

Objectives – As the G80A RFC SNP may affect the absorption of dietary folate and its uptake by cells, the aim was to determine whether it impacted on the associations between dietary folate and serum and red cell folate.

Design – Subjects (119, 52 males, 67 females) were recruited from a retirement village. Dietary folate intake was assessed by food frequency questionnaire, serum and red cell folates were measured by immunoassay and Pearson correlation coefficients (r) and their significance (P < 0.05) were determined using SPSS.

Outcomes – Dietary folate intake was significantly associated with serum folate in the elderly having the GG (r = 0.524; P = 0.002) and GA (r = 0.408; P = 0.002) genotypes but not in those with the AA (r = 0.347; P = 0.060) genotype. Similarly, dietary folate was significantly associated with red cell folate in the GG (r = 0.399; P = 0.022) and GA (r = 0.564; P < 0.0001) but not in the AA genotypes (r = 0.223; P = 0.236).

Conclusions – The G80A RFC SNP modulated the association of dietary folate intake with serum and red cell folate in this elderly population with the GG and GA genotypes but not the AA genotype showing significant associations.