

PLASMA HOMOCYSTEINE LEVELS ACCORDING TO TWO METHYLENETETRAHYDROFOLATE GENETIC POLYMORPHISMS AND SERUM FOLATE LEVELS IN A POPULATION-BASED STUDY IN SÃO PAULO, BRAZIL

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Background and Aims: Hyperhomocysteinemia is a risk factor of cardiovascular disease. Homocysteine remethylation requires vitamin B12, folate and methylenetetrahydrofolate reductase (MTHFR) enzyme. The TT homozygosis of the C677T and CC of A1298C in the MTHFR gene are associated with reduced MTHFR activity. This study aims to assess the impact of serum levels of B12 and folate on plasma homocysteine considering C677T and A1298C polymorphism in a Brazilian sample.

Methods: Serum vitamin B12, folate, and plasma homocysteine of 259 participants from a population-based survey in São Paulo were used. The genotypes were done with an *allele-specific* polymerase chain reaction. Two generalized linear models with gamma distribution and link identity were applied to model homocysteine according to sex, age, vitamin B12 as well as folate (cut-off at tercile 7.1 ng/mL) and each polymorphism (C677T: non-TT and TT; A1298C: non-CC and CC) interactions.

Results: Significant effects of males ($p < 0.01$) and age ($p < 0.01$) were found for both models. An increase of 50 pg/mL in vitamin B12 was associated with a reduction of 0.11 ng/mL ($p = 0.01$) and 0.13 ng/mL ($p = 0.01$) in homocysteine levels for C677T and for A1298C model, respectively. Finally, an interaction between C677T and folate was found ($p < 0.01$) whereas between A1298C and folate was not significant. In the C677T model a mean difference of 5.7 ng/mL of homocysteine levels was observed between lower and higher folate among TT genotype ($p < 0.01$) whereas a difference of only 1.1 ng/mL among non-TT ($p < 0.01$). Homocysteine levels among participants with higher folate were similar between non-TT and TT ($p = 0.57$). In the A1298C model a 1.86 ng/mL homocysteine levels difference was observed between higher and lower folate for non-CC and CC genotypes similarly.

Conclusion: Lower levels of folate are associated with higher levels of homocysteine, but in the presence of TT homozygote for C677T genotype homocysteine is even higher.