

Associations between B vitamin and amino acid intake, *MTHFR* genotype, atherogenic indices, and homocysteine levels in postmenopausal women

Agata Muzsik,¹ Agata Chmurzynska¹

¹Institute of Human Nutrition and Dietetics, Poznań University of Life Sciences, Poznań, Poland

INTRODUCTION

It has been hypothesized that insufficiency of one-carbon metabolism may aggravate lipid metabolism disturbances.

Lipid metabolism abnormalities and metabolic syndrome (MetS)—which is associated with abnormally high levels of triglycerides and low levels of high-density lipoproteins—often occur in postmenopausal women.

The purpose of this study was thus to determine the relationships between amino acid and B vitamin intake, *MTHFR* genotype, lipid profile, and atherogenic indices in postmenopausal women.

MATERIAL AND METHODS



N = 131

postmenopausal women

age—61.48 ± 5.62 y

waist circumference—96.27 ± 12.44 cm

- ▶ The mean macronutrient, amino acid, and B vitamin intake was evaluated using dietary records.
- ▶ Lipid profile and concentrations of apolipoprotein A1 and B in serum were measured using the colorimetric method.
- ▶ The total homocysteine (tHcy) and glutathione (GSH) level in plasma were measured using high-performance liquid chromatography.
- ▶ *MTHFR* genotype (rs1801133) was determined using a single tube TaqMan SNP Genotyping Assay.
- ▶ Castelli's risk index I and II, the atherogenic coefficient, and the TG/HDL ratio were calculated.

RESULTS

MetS

No association was found between MetS and tHcy or GSH concentrations.

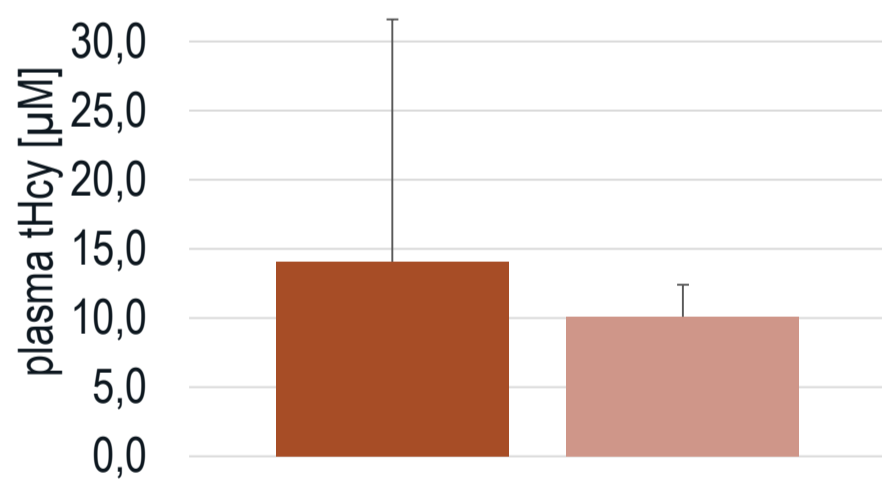
MTHFR genotype and folate intake

MTHFR genotype and folate intake also did not affect tHcy, GSH, lipid profile, or atherogenic indices. tHcy level in plasma.

Table 1 Associations between plasma tHcy concentrations and daily intake of protein, amino acids and dietary indexes in postmenopausal women.

Daily intakes	Low plasma tHcy N = 58	High plasma tHcy N = 63	p-value
Protein, total [g]	75.99 ± 3.16	73.08 ± 4.51	< 0.001
Animal protein/plant protein ratio	2.13 ± 0.17	1.56 ± 0.08	< 0.01
Protein/carbohydrates ratio	0.33 ± 0.02	0.27 ± 0.01	< 0.001
Methionine, total [g]	1.74 ± 0.07	1.51 ± 0.06	< 0.01
Lysine, total [g]	4.96 ± 0.22	4.28 ± 0.16	< 0.01
Arginine, total [g]	3.62 ± 0.18	3.30 ± 0.13	< 0.05
Glycine, total [g]	3.02 ± 0.14	2.75 ± 0.11	< 0.05
Tryptophan, total [g]	0.94 ± 0.04	0.82 ± 0.03	< 0.01

Subjects with tHcy levels over the median had lower total protein intake, animal protein/plant protein ratio, and protein/carbohydrates ratio, higher amino acid intake (methionine, lysine, arginine, glycine, and tryptophan) than did subjects with lower tHcy levels.



- B12 intake below 2.4 µg/day (N = 43)
- B12 intake above 2.4 µg/day (N = 76)

Figure 1 Plasma tHcy level stratified by intakes below or above B₁₂ intake recommendations

Women who failed to meet their vitamin B₁₂ intake needs had almost **40% higher levels of tHcy** than women who did meet those needs.

CONCLUSIONS

MTHFR genotype, folate intake, and tHcy levels in plasma are not associated with lipid metabolism in postmenopausal women.

tHcy levels may depend on the intake of vitamin B₁₂, and of protein or particular amino acids.