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ORIGINAL RESEARCH COMMUNICATION

Plasma vitamin B-6 forms and their relation to transsulfuration metabolites in a large, population-based study[1,2,3]

Øivind Midttun, Steinar Hustad, Jørn Schneede, Stein E Vollset and Per M Ueland

[1] From Bevital A/S, Armauer Hansens Hus, Bergen, Norway (ØM and PMU); LOCUS for Homocysteine and Related Vitamins, University of Bergen, Bergen, Norway (ØM, SH, JS, SEV, and PMU); the Hormone Laboratory, Haukeland University Hospital, Bergen, Norway (SH); the Section for Pharmacology, Institute of Medicine, University of Bergen, and Haukeland University Hospital, Bergen, Norway (SH); and the Department of Biomedical Sciences, Clinical Chemistry, Umeå University, Umeå, Sweden (JS)

Background: Vitamin B-6 exists in different forms; one of those forms, pyridoxal 5'-phosphate (PLP), serves a cofactor in many enzyme reactions, including the transsulfuration pathway, in which homocysteine is converted to cystathionine and then to cysteine. Data on the relations between indexes of vitamin B-6 status and transsulfuration metabolites in plasma are sparse and conflicting.

Objective: We investigated the distribution and associations of various vitamin B-6 species in plasma and their relation to plasma concentrations of transsulfuration metabolites.

Design: Nonfasting blood samples from 10 601 healthy subjects with a mean age of 56.4 y were analyzed for all known vitamin B-6 vitamers, folate, cobalamin, riboflavin, total homocysteine, cystathionine, total cysteine, methionine, and creatinine. All subjects were genotyped for the methylenetetrahydrofolate reductase (*MTHFR*) 677C→T polymorphism.

Results: Plasma concentrations of the main vitamin B-6 vitamers—PLP, pyridoxal, and 4-pyridoxic acid—were strongly correlated. Among the vitamin B-6 vitamers, PLP showed the strongest and most consistent inverse relation to total homocysteine and cystathionine, but the dose response was different for the 2 metabolites. The PLP–total homocysteine relation was significant only in the lowest quartile of the vitamin B-6 distribution and was strongest in subjects with the *MTHFR* 677TT genotype, whereas cystathionine showed a graded response throughout the range of vitamin B-6 vitamer concentrations, and the effect was not modified by the *MTHFR* 677C→T genotype.

Conclusion: This large population-based study provided precise estimates of the relation between plasma concentrations of vitamin B-6 forms and transsulfuration metabolites as modified by the *MTHFR* 677C→T genotype.

Key Words: Vitamin B-6 • homocysteine • cystathionine • cysteine • methylenetetrahydrofolate reductase • transsulfuration

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