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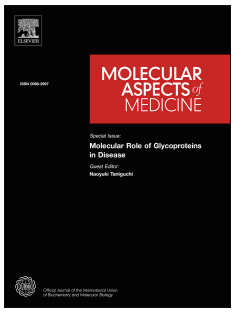

Homocysteine and disease: Causal associations or epiphenomenons?

Luciana Hannibal, Henk J. Blom

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Review

Homocysteine and disease: causal associations or epiphenomenons?

Luciana Hannibal* and Henk J. Blom*

Laboratory of Clinical Biochemistry and Metabolism, Department of General Pediatrics, Adolescent Medicine and Neonatology, University Medical Centre Freiburg. Mathildenstrasse 1, 79106 Freiburg, Germany

* Correspondence to: Dr. Luciana Hannibal, luciana.hannibal@uniklinik-freiburg.de or Prof. Dr. Henk Blom, henk.blom@uniklinik-freiburg.de

Abstract

Nutritional and genetic deficiencies of folate and vitamin B_{12} lead to elevation of cellular homocysteine (Hcy), which translates in increased plasma Hcy. The sources and role of elevated plasma Hcy in pathology continues to be a subject of intense scientific debate. Whether a cause, mediator or marker, little is known about the molecular mechanisms and interactions of Hcy with cellular processes that lead to disease. The use of folic acid reduces the incidence of neural tube defects, but the effect of Hcy-lowering interventions with folic acid in cardiovascular disease and cognitive impairment remains controversial. The fact that levels of Hcy in plasma do not always reflect cellular status of this amino acid may account for the substantial gaps that exist between epidemiological, intervention and basic research studies. Understanding whether plasma Hcy is a mechanistic player or an epiphenomenon in pathogenesis requires further investigation, and this research is essential to improve the assessment and potential treatment of hyperhomocysteinemias.

Keywords:

Homocysteine

One-carbon metabolism

Cardiovascular disease

Neural tube defects

Cognitive decline