Dietary Thiocyanate and N-Nitrosation in vivo in the Wistar Rat

Maduagwu E.N. · Umoh I.B.
Department of Biochemistry, College of Medicine, University of Ibadan, Ibadan, Nigeria

Abstract

The influence of dietary thiocyanate (SCN⁻) on N-nitrosation in vivo was investigated over 14 min following the administration, by stomach tube, of single doses of sodium nitrite and dimethylamine hydrochloride to male albino Wistar rats whose diet contained appreciable quantities of bound cyanide (cyanogenic glycosides) and free (nonglycosidic) cyanide. The rate of disappearance of the nitrosating agent (NO₂⁻) from the stomach in control animals showed a high linear correlation (r = -0.84) with gastric N-nitrosation, as measured by metabolism (N-demethylation) of ‘formed’ nitrosamine in liver tissue isolated from these animals. This statistical relationship was significantly increased (r = 0.98), as well as the rate of NO₂⁻ utilization and the activity of the N-demethylase enzyme, in animals fed the test diet. Stomach SCN⁻ content was well correlated with both stomach NO₂⁻ concentration (r = -0.95) and liver N-demethylase activity (r = +0.93). Interactions, in vivo, between thiocyanate ion and nitrosamine precursors ingested in food may enhance nitrosamine carcinogenesis.
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E.N. Maduagwu, I.B. Umoh

Department of Biochemistry, College of Medicine, University of Ibadan, Ibadan

Key Words. Cassava cyanide · Thiocyanate · N-nitrosation

Abstract. The influence of dietary thiocyanate (SCN⁻) on N-nitrosation was investigated over 14 min following the administration, by stomach tube, of sodium nitrite and dimethylamine hydrochloride to male albino Wistar rats. Apprecciable quantities of bound cyanide (cyanogenic glycosides) and free cyanide. The rate of disappearance of the nitrosating agent (NO₂⁻) in control animals showed a high linear correlation (r = −0.84) with gas measured by metabolism (N-demethylation) of ‘formed’ nitrosamine in from these animals. This statistical relationship was significantly increased as the rate of NO₂⁻ utilization and the activity of the N-demethylase enzyme in the test diet. Stomach SCN⁻ content was well correlated with both storatin (r = −0.95) and liver N-demethylase activity (r = +0.93). Interaction thiocyanate ion and nitrosamine precursors ingested in food may enhance carcinogenesis.

Introduction

The fact that N-nitrosamines are toxic and carcinogenic is well known, reaching implications in human carcinogenesis [4, 5].

Spontaneous, nitrosation...