

# **Arsenic methylation capacity, body retention, and genotypes of glutathione S-transferase M1 and T1 among current arsenic-exposed residents in Taiwan.**

邱弘毅

Chiou HY;Hsueh YM;Hsieh LL;Hsu LI;Hsu YH;Hsieh FI;Wei ML;Chen HC;Yang HT;Leu LC;Chu TH;Chen-Wu C;Yang MH and Chien CJ

## **Abstract**

Copyright (c) 1997 Elsevier Science B.V. All rights reserved. In order to elucidate the relationships among arsenic methylation capacity, body retention, and genetic polymorphisms of glutathione S-transferase (GST) M1 and T1, a total of 115 study subjects were recruited from Lanyang Basin located on the northeast coast of Taiwan. Specimens of drinking water, blood, urine, hair and toenail were collected from each study subject. Urinary inorganic and methylated arsenic were speciated by high performance liquid chromatography combined with hydride-generation atomic absorption spectrometry. Arsenic concentration in hair and toenail were quantitated by atomic absorption spectrophotometry. The polymerase chain reaction was used to determine genetic polymorphisms of GST M1 and T1. Arsenic concentrations in urine, hair, and toenail of study subjects were positively correlated with arsenic levels in their drinking water. Percentages of various arsenic species in urine (mean±standard error (SE)) were 11.8±1.0, 26.9±1.2 and 61.3±1.4, respectively, for inorganic arsenic, monomethylarsonic acid (MMA) and dimethylarsinic acid (DMA). Men and women had similar arsenic methylation capability. No associations were observed between arsenic methylation capability and arsenic content in either drinking water or urine. Ratios of arsenic contents in hair and toenail to urinary arsenic content (mean±standard error) were 6.2±0.7 and 16.5±1.7, respectively. Genetic polymorphisms of GST M1 and T1 were significantly associated with arsenic methylation. Subjects having the null genotype of GST M1 had an increased percentage of inorganic arsenic in urine, while those with null genotype of GST T1 had an elevated percentage of DMA in urine. Arsenic contents in hair and toenail were significantly correlated with the increase in arsenic concentrations of drinking water and urine, while no significant associations were observed between arsenic contents in hair and toenail and polymorphisms of GST M1 and T1. The relationship between arsenic methylation capability and body retention was

modified by genetic polymorphisms of GST M1 and T1. Arsenic contents in hair and toenail were negatively associated with MMA percentage and positively associated with DMA percentage among subjects having null genotypes of GST M1 and T1, but not among those with non-null genotypes.