Association of Micronutrients and Arsenic Methylation in Japanese Women with High Seafood Consumption

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Arsenic is a ubiquitous metalloid in soil and sea sediments, which accumulates in foods with varied concentrations and chemical forms. Exposure to inorganic arsenic is particularly of concern, because it is a proven human carcinogen (IARC, 2004). Ingested inorganic arsenic undergo biomethylation process into monomethylated and dimethylated arsenic (MMA and DMA, respectively) to facilitate its urinary excretion. Among environmental factors influencing arsenic methylation is intake of nutrients involved in one-carbon metabolism and antioxidant defense. This study examined nutrients intake associated with arsenic methylation in 92 Japanese female from coastal area exposed to arsenic predominantly from seafood consumption. We used validated diet history questionnaire (DHQ) method to assess daily nutrient intake and high performance liquid chromatography in tandem with inductively coupled plasma mass spectrophotometry (HPLC-ICP-MS) to determine urinary arsenic species from spot urine samples. Data were log-transformed to approach normal distributions and were analyzed statistically by non-parametric tests. Associations between nutrients and arsenic variables were checked by bivariate analyses, followed by multivariate analyses. Adjusted multiple regression analyses showed that soy protein intake was significantly associated with urinary % MMA (adjusted R^2=0.257; b=-1.38; p=0.031), % DMA (adjusted R^2=0.389; b=2.84; p=0.024), and DMA/MMA (adjusted R^2=0.489; b=12.96; p=0.02). Our results indicate that soy protein intake beneficially influence arsenic methylation in Japanese women with high seafood consumption.