ARSENIC METHYLATION AND SQUAMOUS CELL CARCINOMA IN A US POPULATION BASED CASE-CONTROL STUDY

Diane Gilbert-Diamond, *Dartmouth Medical School, USA*
Jay Gandolfi, *University of Arizona, USA*
Ann Perry, *Dartmouth Medical School, USA*
Steven Spencer*, Dartmouth Medical School, USA*
Jason Moore*, Dartmouth Medical School, USA*
Margaret Karagas, *Dartmouth Medical School, USA*

Background and Aims: Some studies suggest that increased arsenic methylation ability may reduce the risk of skin cancer, though previous studies failed to differentiate between basal cell carcinoma and the less common, but potentially more agressive, squamous cell carcinomas (SCC). Here, we examine whether arsenic methylation ability, measured as the ratio of dimethylarsinic acid/ monomethylarsonic acid (Secondary Methylation Index, SMI) reduces the risk of SCC in a population with moderate exposure via bedrock wells in the state of New Hampshire (NH), US.
Methods: Cases of primary invasive SCC were identified by a collaboration with dermatologists and pathologist serving the NH population. Potential controls were chosen from the NH Department of Transportation driver's license and Medicare enrolment files of state residents. Urine samples from cases and controls were analyzed for arsenic metabolites using HPLC/ICP-MS, and from which total arsenic (sum of inorganic arsenic, MMA and DMA) and DMA:MMA were calculated.
Results: Of the 354 SCC cases and 339 controls, 88 cases and 87 controls had water levels of arsenic above 1 ug/L, and were included in our investigation of urinary arsenic species. Urinary MMA averaged 7.1 µg/L (range: 0.1, 45.8) and SMI averaged 8.3 (range: 0.8, 97.0) Having a urinary MMA concentration above the mean was associated with a higher odds of SCC (adjusted odds ratio = 1.55, 95% CI: 1.04, 2.32). After adjustment for total urinary arsenic, having a 10 unit higher SMI was associated with a decreased odds of SCC (odds ratio = 0.70, 95%CI: 0.49, 1.00).
Conclusions: This study suggests that the ability to methylate MMA to DMA may reduce an individual's risk of SCC in populations with moderate arsenic exposure in the US.