

ARSENICALS, WATER TREATMENT, AND WATER QUALITY: CAN WE LEAVE OUT ONE?

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Background and aims: Metals are considered very important and highly toxic pollutants in the various environmental departments. Arsenic-associated human health complications are reported worldwide. Although inorganic arsenic has long been known to be toxic to humans, little is known about its metabolite, dimethylarsinic acid, and its toxicity. The risk of outbreaks of waterborne diseases increases where standards of water, sanitation and personal hygiene are low. Water may be contaminated with naturally occurring inorganic elements such as arsenic and cause disease. The risk for developing a human disease derived from environmental exposure is not based solely on the environmental exposure, but is modified by mitigating conditions, such as other environmental or genetic factors. Therefore, we investigated the hepatic toxicity of dimethylarsinic acid and its interaction with iron and lipopolysaccharide in drinking water.

Methods: Rats were given drinking water with dimethylarsinic acid with or without iron for 3 weeks. A single dose of lipopolysaccharide was given with dimethylarsinic acid-plus-iron treatment.

Results: Dimethylarsinic acid alone, iron alone, and dimethylarsinic acid-plus-iron treatment did not cause hepatic damage. A single dose of lipopolysaccharide increased hepatic damage in dimethylarsinic acid-plus-iron-treated rats.

Conclusions: Our study indicates an important ecological and environmental related public health issue: the arsenic removal system may cause liver damage via arsenic metabolites as well as poor water quality. We conclude that exposure to lipopolysaccharide increases hepatic damage in dimethylarsinic-acid-plus-iron-treated rats.