Marta Calatayud et al., Occup Med Health Aff 2016, 4:5 (Suppl)
http://dx.doi.org/10.4172/2329-6879.C1.028

IN VITRO ASSESSMENT OF ARSENIC AND GUT MICROBIOME INTERPLAY

Marta Calatayud[a] and **Tom Van de Wiele**[a]
[a]Center for Microbial Ecology and Technology, Ghent University, Belgium

Microbe-host cross-talk is a key factor in human health and while the gut barrier controls (micro-) nutrient absorption, it also fends off antigens or xenobiotics. One of the contaminants of highest health concern is arsenic, which affects more than 100 million people worldwide, causing cancer, cardiovascular and metabolic diseases. Human exposure to inorganic and organic arsenic is largely caused by the ingestion of contaminated drinking water and foodstuffs, mainly rice and seafood. Although most of the arsenic is absorbed in the small intestine, significant amounts could reach distal segments of the gut. Specifically, at the colon, a mucus layer is covering the epithelial surface, protecting the colonocytes from the luminal milieu. This specific niche, due to its close contact with epithelial cells, is gaining more attention in host-microbe interaction studies. From our results, gut microbiome was affected by arsenic in the simulator of the human intestinal microbial ecosystem (SHIME®). 7 human fecal samples were stabilized in the SHIME reactor and exposed to environmentally relevant levels of arsenic (0.01 or 0.1 mg/L) for 7 days. Gut microbiome and specifically mucus associated microbiota reduced its metabolic activity, represented by a decrease in short chain fatty acids and ammonium production (48-89% of reduction compared to the control). In addition, the microbial structure in the mucus niche was specifically affected, increasing the richness and reducing the evenness in the community. These results support the hypothesis of considering the mucus ecosystem in the gut as sensitive "target organ" of arsenic toxicity.

Biography

Marta Calatayud has a Veterinary degree and obtained her Ph.D. from Valencia University and the Institute of Agrochemistry and Food Technology - Spanish National Research Council. After being an assistant professor of Toxicology at the Technical University of Ambato (Ecuador), she started a doctor assistant position at the Center for Microbial Ecology and Technology, Ghent University (Belgium) where she is currently performing her research. Her primary interest is the understanding of environmental pollutants behavior at intestinal level, including the host-associated microbiome. Recently, she has been granted by the FWO to develop an in vitro biomimetic model of the intestine.

marta.calatayudarroyo@ugent.be

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