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Arsenic ranks first on the EPA's list of environmental toxins

CBR member **Zijuan Liu**, of the **Department of Biological Sciences**, studies how **arsenic** gets inside cells. In the March 2010 issue of the journal **Metalomics**, Liu published "**Trivalent arsenicals and glucose use different translocation pathways in mammalian GLUT1**" (Volume 2, Pages 211-219). **Glucose Transporter** Isoform 1 (GLUT1) is a membrane protein that transports glucose by **facilitated diffusion**. GLUT1 may be the most important pathway for arsenic uptake into heart and brain cells. In this paper, Liu and her team compare the translocation properties of GLUT 1 for trivalent arsenicals such as methylarsenite ($\text{CH}_3\text{As}(\text{OH})_2$) and **glucose**, and conclude that their pathways are quite different. The opening paragraph of the paper explains the rationale for this work:

Arsenic is an environmental toxin that ranks first on the **EPA's list for toxic substances**. It enters the environment primarily from geochemical sources, although it is introduced **anthropogenically** as well. The major source of human arsenic exposure is in the food supply and drinking water. Chronic **arsenic poisoning** via drinking water has been reported in many countries, including Bangladesh, India, China, Chile and the United States. In Bangladesh, over 46 million people drink arsenic-contaminated well water that contains as much as 1000-fold more arsenic than the **World Health Organization (WHO)** limit of 10 **ppb**. Chronic arsenic exposure has been associated with multiple diseases, including neurological disorders, diabetes mellitus, various cancers and cardiovascular diseases such as coronary artery disease, stroke and peripheral arterial disease. However, the mechanisms by which arsenic causes human disease are far from clear.

A coauthor on the study is Joseph McDermott, a graduate student in the **Biomedical Sciences: Biological Communication** PhD program. Liu's research is supported by a grant from the **National Institutes of Health**.

SUMMARY

Arsenic is an environmental toxin that ranks first on the EPA's list for toxic substances. Assistant Prof Zijuan Liu is hard at work trying to understand how it gets into our cells.

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