

# Featured Research Studies

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## **A cohort study of the association between secondary sex ratio and parental exposure to polybrominated biphenyl (PBB) and polychlorinated biphenyl (PCB).**

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### ABSTRACT:

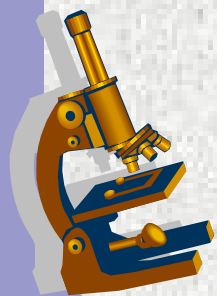
**BACKGROUND:** Polybrominated biphenyl (PBB), a brominated flame retardant, was accidentally mixed into animal feed in Michigan (1973-1974) resulting in human exposure through consumption of contaminated meat, milk and eggs. Beginning in 1976 individuals who consumed contaminated products were enrolled in the Michigan Long-Term PBB Study. This cohort presents a unique opportunity to study the association between parental exposures to PBB and offspring sex ratio.

**METHODS:** We identified offspring of female PBB cohort participants (born 1975-1988) and obtained electronic birth records for those born in the state of Michigan. We linked this information to parental serum PBB and PCB concentrations collected at enrollment into the cohort. We modeled the odds of a male birth with generalized estimating equations accounting for the non-independence of siblings born to the same parents. We explored potential confounders: parental age and education at offspring's birth, parental body mass index at cohort enrollment, birth order, gestational age and year of offspring's birth.

**RESULTS:** The overall proportion of male offspring among 865 live births to cohort mothers was 0.542. This was higher than the national male proportion of 0.514 (binomial test:  $p=0.10$ ). When both parents were in the cohort ( $n=300$ ), we found increased odds of a male birth with combined parents' enrollment PBB exposure [greater than or equal to] the median concentrations (3 ug/L for mothers; 6 ug/L for fathers) compared to combined parents' PBB exposure < the median concentrations (AOR=1.43, 95% CI: 0.89-2.29), although this did not reach statistical significance. In addition, there was a suggestion of increased odds of a male birth for combined parents' enrollment PCB exposure [greater than or equal to] the median concentrations (6 ug/L for mothers; 8 ug/L for fathers) compared to combined parents' enrollment PCB exposure < the median concentrations (AOR=1.53, 95% CI: 0.93-2.52).

**CONCLUSIONS:** This study adds to the body of literature on secondary sex ratio and exposure to environmental contaminants. In this population, combined parental exposure to PBBs or PCBs increased the odds of a male birth. Further research is needed to corroborate these findings and shed light on the biological mechanisms by which these types of chemicals may influence the secondary sex ratio.

PMID: 19682390 [PubMed - as supplied by publisher]



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**Chronic exposure to arsenic in the drinking water alters the expression of immune response genes in mouse lung.**

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**BACKGROUND:** Chronic exposure to drinking water arsenic is a significant worldwide environmental health concern. Exposure to As is associated with an increased risk of lung disease, which may make it a unique toxicant, because lung toxicity is usually associated with inhalation rather than ingestion.

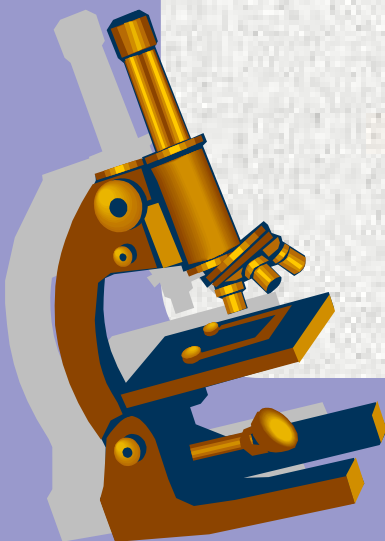
**OBJECTIVES:** The goal of this study was to examine mRNA and protein expression changes in the lungs of mice exposed chronically to environmentally relevant concentrations of As in the food or drinking water, specifically examining the hypothesis that As may preferentially affect gene and protein expression related to immune function as part of its mechanism of toxicant action.

**METHODS:** C57BL/6J mice fed a casein-based AIN-76A defined diet were exposed to 10 or 100 ppb As in drinking water or food for 5-6 weeks.

**RESULTS:** Whole genome transcriptome profiling of animal lungs revealed significant alterations in the expression of many genes with functions in cell adhesion and migration, channels, receptors, differentiation and proliferation, and, most strikingly, aspects of the innate immune response. Confirmation of mRNA and protein expression changes in key genes of this response revealed that genes for interleukin 1 beta, interleukin 1 receptor, a number of toll-like receptors, and several cytokines and cytokine receptors were significantly altered in the lungs of As-exposed mice.

**CONCLUSIONS:** These findings indicate that chronic low-dose As exposure at the current U.S. drinking-water standard can elicit effects on the regulation of innate immunity, which may contribute to altered disease risk, particularly in lung.

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### **Complex adaptive systems allostasis in fibromyalgia.**

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Fibromyalgia (FM) can be conceptualized as a failed attempt of our main complex adaptive system (the autonomic nervous system) to adjust to a hostile environment.

FM cannot be fully understood through the prevailing linear-reductionist medical model. Conversely, FM can be explained using the new complexity theory paradigms. Relentless sympathetic hyperactivity in FM may be a sign of allostasis. Similarly sympathetic hyporeactivity to stress may indicate allostatic load.

Dorsal root ganglia have been suggested as important sympathetic-nociceptive short-circuit sites. Autonomic dysfunction also explains non-pain-related FM features.

Preliminary genetic evidence supports FM's dysautonomic nature. A scientific holistic therapy is proposed to harmonize rigid complex systems and, in doing so, to help to improve FM symptoms.

PMID: 19647143 [PubMed - in process]

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