

# Featured Research Studies

[Toxicol Lett.](#) 2008 May 16.

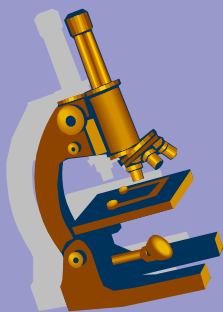
## **Detection of low-level environmental chemical allergy by a long-term sensitization method.**

Fukuyama T, Ueda H, Hayashi K, Tajima Y, Shuto Y, Saito TR, Harada T, Kosaka T

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Multiple chemical sensitivity (MCS) is characterized by various signs, including neurological disorders and allergy. Exposure may occur through a major event, such as a chemical spill, or from long-term contact with chemicals at low levels. We are interested in the allergenicity of MCS and the detection of low-level chemical-related hypersensitivity. We used long-term sensitization followed by low-dose challenge to evaluate sensitization by well-known Th2 type sensitizers (trimellitic anhydride (TMA) and toluene diisocyanate (TDI)) and a Th1 type sensitizer (2,4-dinitrochlorobenzene (DNCB)). After topically sensitizing BALB/c mice (9 times in 3 weeks) and challenging them with TMA, TDI or DNCB, we assayed their auricular lymph nodes (LNs) for number of lymphocytes, surface antigen expression of B cells, and local cytokine production, and measured antigen-specific serum IgE levels. TMA and TDI induced marked increases in levels of antigen-specific serum IgE and of Th2 cytokines (IL-4, IL-5, IL-10, and IL-13) produced by ex vivo restimulated lymph node cells. DNCB induced a marked increase in Th1 cytokine (IL-2, IFN-gamma, and TNF-alpha) levels, but antigen-specific serum IgE levels were not elevated. All chemicals induced significant increases in number of lymphocytes and surface antigen expression of B cells. Our mouse model enabled the identification and characterization of chemical-related allergic reactions at low levels. This long-term sensitization method would be useful for detecting environmental chemical-related hypersensitivity.

PMID: 18571882 [PubMed - as supplied by publisher]



Brain Cogn. 2008 Jun 10. [Epub ahead of print]

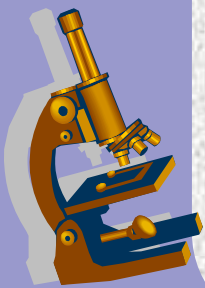
## **Air pollution, cognitive deficits and brain abnormalities: A pilot study with children and dogs.**

Calderón-Garcidueñas L, Mora-Tiscareño A, Ontiveros E, Gómez-Garza G, Baragán-Mejía G, Broadway J, Chapman S, Valencia-Salazar G, Jewells V, Maronpot RR, Henríquez-Roldán C, Pérez-Guillé B, Torres-Jardón R, Herrit L, Brooks D, Os-naya-Brizuela N, Monroy ME, González-Maciel A, Reynoso-Robles R, Villarreal-Calderon R, Solt AC, Engle RW.

Instituto Nacional de Pediatría, Mexico City, Mexico; Department of Biomedical and Pharmaceutical Sciences, The Center for Structural and Functional Neurosciences, College of Health Professions and Biomedical Sciences, The University of Montana, 32 Campus Drive, 287 Skaggs Building, Missoula, MT 59812, USA.

Exposure to air pollution is associated with neuroinflammation in healthy children and dogs in Mexico City. Comparative studies were carried out in healthy children and young dogs similarly exposed to ambient pollution in Mexico City. Children from Mexico City (n: 55) and a low polluted city (n:18) underwent psychometric testing and brain magnetic resonance imaging MRI. Seven healthy young dogs with similar exposure to Mexico City air pollution had brain MRI, measurement of mRNA abundance of two inflammatory genes cyclooxygenase-2, and interleukin 1 beta in target brain areas, and histopathological evaluation of brain tissue. Children with no known risk factors for neurological or cognitive disorders residing in a polluted urban environment exhibited significant deficits in a combination of fluid and crystallized cognition tasks. Fifty-six percent of Mexico City children tested showed prefrontal white matter hyperintense lesions and similar lesions were observed in dogs (57%). Exposed dogs had frontal lesions with vascular subcortical pathology associated with neuroinflammation, enlarged Virchow-Robin spaces, gliosis, and ultrafine particulate matter deposition. Based on the MRI findings, the prefrontal cortex was a target anatomical region in Mexico City children and its damage could have contributed to their cognitive dysfunction. The present work presents a groundbreaking, interdisciplinary methodology for addressing relationships between environmental pollution, structural brain alterations by MRI, and cognitive deficits/delays in healthy children.

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## **The challenge of multiple chemical sensitivity.**

Spencer TR, Schur PM.

Environmental health professionals frequently come across a health-related problem with no clear cause-and-effect relationship. A typical case occurs when a person complains of experiencing symptoms, often in an indoor setting, that may vary from vague to severe. Multiple Chemical Sensitivity (MCS) may be a factor at play in some of these situations. The condition is characterized by persistent symptoms that follow exposure to chemically unrelated compounds at doses well below those that have been established individually to cause harmful effects. An understanding of MCS among environmental health and medical professionals is encouraged. The following article provides a review of the current literature about MCS and discusses the difficulties, from various sources, in resolving health complaints that may be caused by exposure to low doses of multiple chemicals

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