

Featured Research Studies

Toxicol Lett. 2008 Jul 30;180(1):1-8. Epub 2008 May 16.

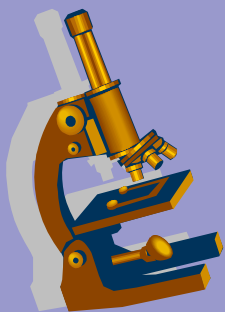
Detection of low-level environmental chemical allergy by a long-term sensitization method.

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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 - indexed for MEDLINE]



Arch Environ Health. 2004 Apr;59(4):172-6.

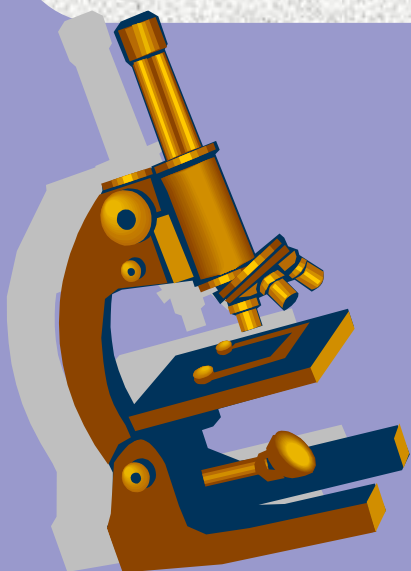
Unexplained cancer clusters: common threads.

Zeliger HI.

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A number of identified cancer clusters have followed exposures to mixtures of chemicals. The causes for these cancers could not be attributed to any of the individual chemicals in the mixtures and up to now have remained unexplained. The author presents case studies showing that these previously unexplained cancer clusters have common characteristics. First, they can be attributed to exposures to mixtures that contain at least one lipophilic and one hydrophilic chemical, with octanol:water partition coefficients, K_{ow} , indicative of lipophilic or hydrophilic character. Second, the specific combinations of lipophiles and hydrophiles act as individual entities and produce cancers not associated with exposure to any of the individual chemicals contained in the mixtures. The cancers that follow these exposures can be in the form of single or multiple cancers per cluster.

PMID: 16189988 [PubMed - indexed for MEDLINE]



Arch Environ Health. 2003 Jan;58(1):23-9.

Toxic effects of chemical mixtures.

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Exposures to chemical mixtures have reportedly produced unexpected effects. Examination of new case studies, as well as those previously reported, shows that when the human body is exposed to mixtures of chemicals that include lipophilic and hydrophilic species, the lipophiles facilitate the absorption of the hydrophiles at enhanced levels and produce effects that are not expected from an individual chemical. These effects include enhanced acute and chronic responses, low-level concentration response, and unexpected target organ attack. Octanol:water partition coefficients are predictive of relative lipophilicity and hydrophilicity. The findings have implications for safe drinking water standards, air quality standards, safe industrial and environmental exposure levels, product formulation, product labeling, and protocols for toxicity testing of chemical products.

PMID: 12747515 [PubMed - indexed for MEDLINE]

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