

Featured Research Studies

Detection of organophosphate flame retardants in furniture foam and U.S. house dust.

Stapleton HM, Klosterhaus S, Eagle S, Fuh J, Meeker JD, Blum A, Webster TF.

Environ Sci Technol. 2009 Oct 1;43(19):7490-5.

Nicholas School of the Environment, Duke University, Durham, North Carolina, USA.

Restrictions on the use of polybrominated diphenyl ethers (PBDEs) have resulted in the increased use of alternate flame retardant chemicals to meet flammability standards. However, it has been difficult to determine which chemical formulations are currently being used in high volumes to meet flammability standards since the use of flame retardant formulations in consumer products is not transparent (i.e., not provided to customers).

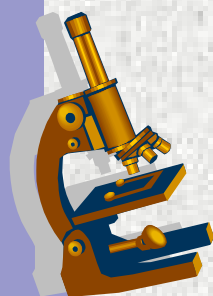
To investigate chemicals being used as replacements for PentaBDE in polyurethane foam, we analyzed foam samples from 26 different pieces of furniture purchased in the United States primarily between 2003 and 2009. Samples included foam from couches, chairs, mattress pads, pillows, and, in one case, foam from a sound-proofing system of a laboratory-grade dust sieve, and were analyzed using gas chromatography mass spectrometry.

Fifteen of the foam samples contained the flame retardant tris(1,3-dichloro-2-propyl) phosphate (TDCPP; 1-5% by weight), four samples contained tris(1-chloro-2-propyl) phosphate (TCPP; 0.5 -22% by weight), one sample contained brominated chemicals found in a new flame retardant mixture called Firemaster 550 (4.2% by weight), and one foam sample collected from a futon likely purchased prior to 2004 contained PentaBDE (0.5% by weight).

Due to the high frequency of detection of the chlorinated phosphate compounds in furniture foam, we analyzed extracts from 50 house dust samples collected between 2002 and 2007 in the Boston, MA area for TDCPP, TCPP, and another high volume use organophosphate-based flame retardant used in foam, triphenylphosphate (TPP). Detection frequencies for TDCPP and TPP in the dust samples were > 96% and were log normally distributed, similar to observations for PBDEs. TCPP was positively detected in dust in only 24% of the samples, but detection was significantly limited by a coelution problem. The geometric mean concentrations for TCPP, TDCPP, and TPP in house dust were 570, 1890, and 7360 ng/g, respectively, and maximum values detected in dust were 5490, 56,080 and 1,798,000 ng/g, respectively.

These data suggest that levels of these organophosphate flame retardants are comparable, or in some cases greater than, levels of PBDEs in house dust. The high prevalence of these chemicals in foam and the high concentrations measured in dust (as high as 1.8 mg/g) warrant further studies to evaluate potential health effects from dust exposure, particularly for children.

PMID: 19848166 [PubMed - indexed for MEDLINE]



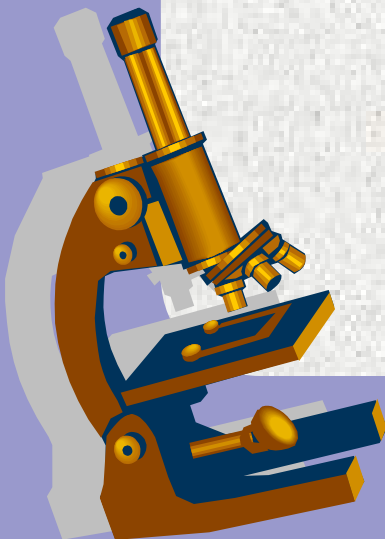
Regulatory T cells (Tregs) monitoring in environmental diseases.

Mićović V, Vojniković B, Bulog A, Coklo M, Malatestinić D, Mrakovčić-Sutić I. Coll Antropol. 2009 Sep;33(3):743-6.

Department of Public Health, School of Medicine, University of Rijeka, Rijeka, Croatia.

The prevalence of environmental diseases is increasing worldwide and these diseases are an onerous burden both to the individual and to the public health. Urban air pollution is a grave problem in majority of metropolises, which contain high levels of traffic congestion generating great amounts of genotoxic substances. The contribution of such environmental exposure to increase prevalence of many allergic, environmental diseases and multiple chemical sensitivity or other related syndromes, as a result of an abnormal immune response based on environmental damage of lymphocyte subsets, is marked. Benzene is one of the most important air pollutants that are emitted by oil industry, since they are involved in almost every refinery process. Volatile organic compounds (VOCs) are a major group of air pollutants and play a crucial role in ecological damages, disturbing the ecosystem and human health. The variability of pollutants is an important factor in determining human exposure to these chemicals. The immune system possess a capacity to distinguish between innocuous and harmful foreign antigens and controls this action by mechanisms of central and peripheral tolerance, where crucial role play regulatory T cells (Tregs). We analyzed the characteristics of human Tregs of inhabitants living near gasoline industry which have assessed moderate spirometric tests and compared them with those situated in rural areas. Our data demonstrate that the chronic inhalation exposure increases the percentage of Tregs cells, but contrary those of inhabitants with decreased spirometry values have shown diminished number of Tregs, which may contribute to the new therapeutic approach of environmental diseases.

PMID: 19860098 [PubMed - in process]



5-Hydroxytryptamine Receptor Stimulation of Mitochondrial Biogenesis.



Rasbach K, Funk JA, Jayavelu T, Green PT, Schnellmann RG.
 J Pharmacol Exp Ther. 2009 Oct 29. [Epub ahead of print]
 Medical University of South Carolina.

Mitochondrial dysfunction is both a cause and target of reactive oxygen species during ischemia-reperfusion, drug and toxicant injury. Following injury renal proximal tubular cells (RPTC) recover mitochondrial function by increasing the expression of the master regulator of mitochondrial biogenesis, PGC-1alpha. The goal of this study was to determine whether 5-hydroxytryptamine (5-HT) receptor agonists increase mitochondrial biogenesis and accelerate the recovery of mitochondrial function. RT-PCR analysis confirmed the presence of 5-HT_{2A}, 5-HT_{2B} and 5-HT_{2C} receptor mRNA in RPTC. The 5-HT₂ receptor agonist 1-(2,5-dimethoxy-4-iodophenyl)-2-aminopropane hydrochloride (DOI) (3-10 muM) increased PGC-1alpha levels, expression of mitochondrial proteins ATP synthase beta and NDUFB8, MitoTracker Red staining intensity, cellular respiration and ATP levels through a 5-HT receptor and PGC-1alpha dependent pathway. Similar effects were observed with the 5-HT₂ agonist m-chlorophenylpiperazine (mCCP) and were blocked by the 5-HT₂ antagonist 8-[3-(4-fluorophenoxy) propyl]-1-phenyl-1,3,8-triazaspiro[4, 5]decan-4-one (AMI-193). Additionally, DOI accelerated the recovery of mitochondrial function following oxidant-induced injury in RPTC. This is the first report to demonstrate 5-HT receptor mediated mitochondrial biogenesis and we suggest that 5-HT-agonists may be effective in the treatment of mitochondrial and cell injury.

PMID: 19875674 [PubMed - as supplied by publisher]

This newsletter is for informational purposes and is not intended to replace the examination, diagnosis and treatment of a licensed physician and no such claims are inferred. Articles are not necessarily the opinion of MCS America and printing of others' opinions does not constitute endorsement. MCS America, Lourdes Salvador, Directors, and associate members of MCS America will not be responsible for misuse of this information. We welcome appropriate submissions for articles, letters-to-the-editor, poetry, artwork, jokes, cartoons, photos, and whatever else is physically printable. Submissions may be sent to publisher@mcs-america.org. We attempt to publish monthly.



Contact Us: admin@mcs-america.org

To subscribe to this free newsletter, send an email to: subscriptions@mcs-america.org