Greenlist Bulletin

From the Toxics Use Reduction Institute at the University of Massachusetts Lowell

June 8, 2012

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This is the weekly bulletin of the TURI Library at the University of Massachusetts Lowell. Greenlist Bulletin provides previews of recent publications and websites relevant to reducing the use of toxic chemicals by industries, businesses, communities, individuals and government. You are welcome to send a message to mary@turi.org if you would like more information on any of the articles listed here, or if this email is not displaying properly.

Phthalate Exposure Changes the Metabolic Profile of Cardiac Muscle Cells

Source: Environmental Health Perspectives, June 6, 2012
Authors: Nikki Gillum Posnack, Luther M. Swift, Matthew W. Kay, Norman H. Lee, Narine Sarvazyan

Abstract
Background: Phthalates are common plasticizers present in medical grade plastics and other everyday products. They can also act as endocrine-disrupting chemicals and have been linked to the rise in metabolic disorders. However, the effect of phthalates on cardiac metabolism remains largely unknown.

Objectives: We sought to examine the effect of Di(2-ethylhexyl)phthalate (DEHP) on the metabolic profile of cardiomyocytes, as alterations in metabolic processes can lead to cell dysfunction.

Methods: Neonatal rat cardiomyocytes were treated with DEHP at a concentration and duration comparable to clinical exposure (50-100 µg/mL, 72hrs). The effect of DEHP on gene expression was assessed by microarray analysis. Physiological responses were examined via fatty acid utilization, oxygen consumption, mitochondrial mass and western blot analysis.

Results: Exposure to DEHP led to upregulation of genes associated with fatty acid transport, esterification, mitochondrial import and β-oxidation. The functional outcome was an increase in myocyte fatty acid substrate utilization, oxygen consumption, mitochondrial mass, PPARα protein expression, and extracellular acidosis. Treatment with a PPARα agonist (Wy-14643) only partially mimicked the effects observed in DEHP samples.

Conclusions: The data suggests that DEHP exposure results in metabolic remodeling of cardiomyocytes, whereby cardiac cells increase their dependence on fatty acids for energy production.

This fuel switch may be regulated at both the gene expression and post-transcription levels. Our findings have important clinical implications, as chronic dependence on fatty acids is associated with an accumulation in lipid intermediates, lactate, protons and reactive oxygen species. This dependence can sensitize the heart to ischemic injury and ventricular dysfunction.

Hexabromocyclododecane (HBCD) Stereoisomers in U.S. Food from Dallas, Texas

Source: Environmental Health Perspectives, May 31, 2012
Authors: Arnold Schecter, David T. Szabo, James Miller, Tyra L. Gent, Noor Malik-Bass, Malte Petersen, Olaf Paepke, Justin A. Colacino, Linda S. Hynan, T. Robert Harris, Sunitha Malla, Linda S. Birnbaum

Abstract
Background: Hexabromocyclododecane (HBCD) is a brominated flame retardant used in polystyrene foams in thermal insulation and electrical equipment. The HBCD commercial mixture consists mainly of α, β, and γ stereoisomers. Health concerns of HBCD exposure include alterations in immune and reproductive systems, neurotoxic effects, and endocrine disruption. Previously, stereoisomer specific levels of HBCD have not been measured in U.S. food.

Objectives: HBCD stereoisomer levels were measured in U.S. foods from Dallas, Texas supermarkets.

Methods: Convenience samples of commonly consumed foods were purchased from Dallas, Texas supermarkets in 2009-2010. Food samples included a wide variety of lipid rich foods: peanut butter, poultry, fish and beef. Thirty-six individual food samples were collected in 2010 and analyzed for α, β, and γ-HBCD stereoisomers using liquid chromatography tandem mass spectrometry (LC-MS/MS). Ten pooled food samples previously collected in 2009 for a study of "total HBCD" levels using gas chromatography mass spectrometry (GC-MS), were re-analyzed for α, β, and γ -HBCD stereoisomers using LC-MS/MS.

Results: Of the 36 measured individual foods, fifteen had detectable levels of HBCD (42%). Median (ranges) of α and γ HBCD concentrations were 0.003 (<0.005 - 1.307) and 0.005 (<0.010 - 0.143) ng/g wet weight (ww), respectively; β-HBCD was present in 3 samples with a median (range) of 0.003 (<0.005 - 0.019) ng/g ww. Median levels (range) for α, β, and γ-HBCD, in pooled samples were 0.077 (0.010 - 0.310), 0.008 (<0.002 - 0.070), and 0.024 (0.012 - 0.170) ng/g ww, respectively.

Conclusions: α -HBCD was detected most frequently and at highest concentrations, followed by γ, and then β, in food samples from Dallas, Texas. Food may be a substantial contributor to the elevated α-HBCD levels observed in humans. These data suggest that larger and more representative sampling should be conducted.

New Twist on Old Chemical Process Could Boost Energy Efficiency

Source: University of Washington, June 6, 2012

Newswise - Chemical reactions on the surface of metal oxides, such as titanium dioxide and zinc oxide, are important for applications such as solar cells that convert the sun's energy to electricity. Now University of Washington scientists have found that a previously unappreciated aspect of those reactions could be key in developing more efficient energy systems.

Such systems could include, for example, solar cells that would produce more electricity from the sun's rays, or hydrogen fuel cells efficient enough for use in automobiles, said James Mayer, a UW chemistry professor.

"As we think about building a better energy future, we have to develop more efficient ways to convert chemical energy into electrical energy and vice versa," said Mayer, the corresponding author of a paper about the discovery in the June 8 edition of Science.

Read more ...

Advancing Global Green Chemistry - The Role of Government, Business, and Academia

Source: American Chemical Society, June 2012

On Wednesday, June 20, 2012, The ACS Green Chemistry Institute® (ACS GCI) will host its inaugural hybrid meeting from 9:30 AM - 11:45 AM (EDT) at the 16th Annual GC&E Conference. The topic of this session will be "Advancing Global Green Chemistry - The Role of Government, Business, and Academia."

This FREE event will allow ACS GCI to utilize state-of-the-art technology to further enhance the profile and importance of green chemistry while linking the global green chemistry community. All global green chemistry enthusiasts (including: chemists, engineers, researchers, policy analysts, managers/directors, venture capitalists, chemistry and/or engineering students, chemistry and business school professors, etc.) are encouraged to participate in this dynamic session.

For more information ...

EPA and Partners Announce "My Air, My Health Challenge" / Inventors will compete to develop personal air pollution and health sensors

Source: U.S. EPA, June 6, 2012

WASHINGTON - To help researchers, communities, and doctors better understand the connection between air quality and a person's health, the U.S. Environmental Protection Agency (EPA), the National Institute of Environmental Health Sciences (NIEHS) and the Department of Health and Human Services (HHS) Office of the Coordinator for Health Information Technology announced a nationwide challenge called My Air, My Health (MAMH). The MAMH challenge offers awards for the invention of personal, portable sensors that measure air pollution and a person's physiological response to pollution.

"This challenge provides an opportunity to tap into the ingenuity of Americans to build technology to improve health. In the future, these types of personalized devices will enable people to make better informed choices about their own health and their environment," said Glenn Paulson, EPA Science Advisor.

Men, women, children - we're all different, and our bodies react in different ways to pollution and other harmful toxins in our environment," said Linda Birnbaum, NIEHS Director. "We believe pairing health researchers with technology innovators will help us get the tools we need for a more complete picture of what people are breathing and how it might affect their health."

Read more ...

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