FEATURED ACTIVITIES of DERT
February 2009

MEETINGS

Genes, Environment and Health Initiative – Exposure Biology Program Second Annual Grantees Meeting

January 13-15, 2009
Natcher Building, NIH Campus
Bethesda, Maryland

Introduction: The NIH Genes, Environment and Health Initiative's (GEI) Exposure Biology Program (EBP) sponsored a three day meeting of grantees to focus on topics related to the extension of EBP products into practical applications. The meeting began with a day and a half long symposium including sessions focused on validation of sensors and biomarkers; privacy and IRB concerns related to personal monitoring; data analysis; and feedback from epidemiologists on application of products from the EBP to population studies. In addition, the grantees provided updates on research progress in three poster sessions interspersed between these plenary sessions. Individual Steering Committees for each of the program areas met for the final day and a half of the meeting.

The meeting was organized by a planning committee composed of program leads for the four EBP initiatives (*Drs. David Balshaw and Dan Shaughnessy from NIEHS,* Drs. Jill Reedy and Amy Subar from NCI, Dr. Catherine Loria from NHLBI, Dr. Jeffrey Schulden from NIDA, and Dr. Kay Wanke from OBSSR) and principal investigators from each program area (Dr. Joel Pounds from PNNL, Dr. Charles Rodes from RTI, Dr. Carol Boushey from Purdue University, Dr. Vivek Shetty from UCLA and Dr. Santosh Kumar from the University of Memphis). The meeting was attended by 175 registered participants consisting of principal and co-investigators and students from the funded projects as well as program staff and project scientists from NIEHS, NCI, NHLBI, NIBIB, NINDS, NIAID, NIDA, and NIAAA.

Meeting Highlights: The meeting began with a welcome and introduction by *Dr. Gwen Collman* consisting of highlights and accomplishments in the EBP during the last year, including workshops and presentations by Exposure Biology grantees at national scientific meetings. Following the introductory presentation, the first session covered topics on validating biomarkers, dietary and physical activity assessment tools and validation of data collected from personal monitors of chemical exposure. Speakers included Dr. David Cella (Northwestern University), Dr. John Groopman (Johns Hopkins School of Public Health), Dr. Subar, Patty Freedson (University of Massachusetts at Amherst), and Dr. Rodes. These speakers presented their experiences and words of wisdom of issues faced in the validation of products similar to those being developed in the GEI.

Next, a panel of epidemiologists representing topics from each of the four program areas presented brief overviews of population studies they are conducting and discussed promises and challenges of applying tools for measuring personal exposure and response in these studies. Panelists included Dr. Rob McConnell (University of Southern California), Dr. James Lockey (University of Cincinnati), Dr. Linda Van Horne (Northwestern University), Dr. Charles Matthews (Vanderbilt University), and Dr. Arun Karlamangla (University of California, Los Angeles). A major point of discussion for the panelists was the balance between an 'if you build it they will come' reality and a need for a demonstration that the tool to be used can cost-effectively provide superior information to what is already available.

The first day closed with a session on privacy and IRB considerations and covered numerous issues arising from application of personal monitoring tools and featured talks by Dr. Bradford Hesse (NCI) and Dr. Mani Srivastava (University of California, Los Angeles CENS program). These presentations highlighted the use of technological solutions to ensure the protection of sensitive information while simultaneously allowing scientific use of the information by the investigators.

The second day began with a session on data analysis that included talks by Dr. Gary Fogel (Natural Selection, Inc.) on neural network and machine-learning approaches to analyzing complex data, Dr. Greg Farber (National Center for Research Resources) on the resources and opportunities for data sharing afforded through the Biomedical Informatics Research Network, and Dr. Steven Boker (University of Virginia) on the challenges of capturing and storing data from real-time collection streams.

Dr. Balshaw gave concluding remarks, emphasizing the focus of the Experimental Biology Program and stressing that as the projects mature they need to increasingly focus on the final application of their products in population based studies. He also provided updated information on applying for Opportunity Fund supplements for the current year.

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Outstanding New Environmental Scientist Grantee Forum
December 11, 2008
NIEHS, Research Triangle Park, North Carolina

The Outstanding New Environmental Scientist (ONES) Award is a Grant Program to identify outstanding junior scientists in the University-based community who have a long term career commitment to research in the environmental health sciences. The ONES is a research grant that includes funding for an outstanding research project, equipment, and career enhancement activities to enable awardees to launch an innovative research program focusing on problems of environmental exposures and human biology, human pathobiology and human disease.

The ONES Award has been announced as a request for applications once a year for the past three years. Following the award of the grant, recipients are invited to the NIEHS campus to present their research and to become acquainted with the NIEHS campus and research community. In addition to presenting their research at an NIEHS wide research forum, the awardees had lunch with the Division of Extramural Research Program Officers, visited with members of the NIEHS Postdoctoral Association, and visited laboratories and met with Intramural Scientists.

The ONES Awardees for 2008 were:

PI Name	Title	Institution
Pi, Jingbo	Paradoxical roles of Nrf2 activation in arsenic-induced beta-cell dysfunction	The Hamner Institutes
Slitt, Angela	Effect of nutritional status on MRP2 expression and biliary excretion of bisphenol	University of Rhode Island
Stapleton, Heather	Children's exposure to flame retardants: Effects on thyroid hormone regulation	Duke University
Hollingsworth, John	Ozone primes pulmonary innate immunity	Duke University
Bowman, Aaron	Gene-environment interactions between manganese exposure and Huntington disease	Vanderbilt University
O'Neill, Marie Sylvia	Air pollution, inflammation and preterm birth: A mechanistic study in Mexico City	University of Michigan. Ann Arbor

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NIEHS Superfund Research and Training Program 2008 Annual Meeting:
Innovative Science and Technology for Mitigating Human, Ecological, and Environmental Risks
December 7-9, 2008
Asilomar Conference Center
Pacific Grove, California

Introduction: Over 200 Superfund grantees, researchers, partners, post-doctoral fellows and graduate students gathered for the 11th NIEHS Superfund Research and Training Program annual meeting, held December 7-9, 2008 at the Asilomar Conference Center in Pacific Grove, California.

Highlights: Two keynote speakers were featured at the meeting. On Monday, Dr. Arlene Blum, visiting scholar at the University of California, Berkley, and author of *Annapurna: A Woman's Place* and B*reaking Trail: A Climbing Life,*" described the environmental impacts of fire retardants used in the home in her presentation, entitled "The Fire Retardant Dilemma: Balancing Safety, Human Health, and Environmental Protection." On Tuesday, Dr. Martin Kenney, Professor of Human and Community Development at the University of California, Davis, advocated for individual ownership of the patents and products of intellectual property developed within university systems in his presentation, "Is the Mandatory Invention Ownership University Technology Licensing Office the Best Method of University Technology Transfer?"

Four plenary sessions highlighted student and researcher/post-doc advances in environmental health. Sessions focused on analytical/bioanalytical advances; fate, transport and remediation; and methodologies, toxic effects of superfund chemicals, and exposure, risk, and epidemiology. In addition, a panel discussion was held to discuss real-world applications of Superfund technologies and methodologies

As has come to be a tradition, the winner of the 2008 Karen Wetterhahn Memorial Award was made. This year the recipient of the award was Ms. Laura Senier. Following the award presentation, she delivered a talk on her research, "Public Schools and Contaminated Land in Rhode Island: Using SBRP Research Translation and Community Outreach to Foster Research and Advocacy", to an audience of 200.

Student poster sessions were held on Sunday and Monday evenings. One student from each session was honored for their presentation efforts. Stephen Richardson (University of North Carolina, Chapel Hill) and Courtney Kozul (Dartmouth University) each received a cash prize and an autographed copy of Arlene Blum's book, *Breaking Trail: A Climbing Life*.

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Fourth Annual Early Environmental Exposures Meeting
November 13-14, 2008
Birmingham, Alabama

Background: The Breast Cancer and the Environment Research Centers (BCERC) Network originated in September 2003 in response to a congressional mandate with support from both the breast cancer advocacy and research communities. This seven-year program aims to advance the understanding of environmental factors that influence mammary gland architecture and the entry and progression through female puberty. The studies are conducted by four collaborating centers at Fox Chase Cancer Center (Dr. Jose Russo); University of California, San Francisco Dr. Robert Hiatt), University of Cincinnati (Robert Bornschein), and Michigan State University (Dr. Sandra Haslam).

Objectives: The BCERC Network is pursuing epidemiological and biological studies investigating the influence of Early Environmental Exposures on pubertal maturation, mammary gland development, and the potential of these exposures to alter the risk of breast cancer later in life. The latest scientific findings from the BCERC were presented along with results from investigations in other studies in the field. The content of the meeting included basic biology of breast development, environmental exposures that influence puberty, breast development and future breast cancer risks, and public health communication of the risks associated with these exposures.

Highlights and Recommendations: This year's annual scientific meeting focused on the integration of laboratory-based biology and epidemiology studies in research programs while continuing to assimilate community participation and advocacy concerns through panel discussions, a Mentoring Session, and "Lunch with the Experts", an opportunity for attendees to share their thoughts over lunch with speakers and investigators.

Dr. Gwen Collman, Interim Director, DERT, made opening remarks to the assembled group. *Dr. Les Reinlib, SPHB*, represented NIEHS in the final Panel Discussion with the Audience. *Dr. Elizabeth Maull, SPHB*, helped organize and attended the meeting. Research updates from the members of the BCERC Network, as well as platform presentations from invited speakers, including a keynote address by Dr. Andreas Kortenkamp, University of London, provided thoughtful perspectives to the participants on studies related to mammary gland biology, puberty, and breast cancer as well as the action of environmental chemicals and diet on the developing breast.

The NIEHS, NCI, and Avon Foundation were able to provide partial travel support for a number of advocates and young scholars. The symposium was videotaped and will be made available to the public through the BCERC web-site (http://www.bcerc.org/home.htm) in the near future. Drs. Reinlib and Maull, oversaw the organization of the meeting and contributed to planning the scientific sessions.

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The Central and Eastern European Conference on Health and the Environment: the Environment - A Platform for Health
October 19-22, 2008
Cluj-Napoca, Romania

Background: Based on the concept that the research of the last decades has demonstrated that many diseases are related to the poor quality of the environment, an international conference was convened to analyze and better define the complex links between health and environment. Over 250 participants, mostly from central and eastern Europe, discussed the specific problems of their regions; but presentations incorporated issues related to other parts of the world as the major meeting themes were universal in nature.

This was the third in a series of Central and Eastern European conferences which built on the successes of its predecessors in Prague 2004 and Bratislava 2006.

Highlights: The conference was formatted to encourage collaboration among scientists from various fields, increase interdisciplinarity and multinational participation, and promote integrative research. The major environmental issues of the regions were addressed during the science sessions: sustainable mining, risk assessment and management, environmental health and children's health.

The conference was preceded by workshops on responsible mining, conducting international collaborative research, use of biomarkers, and childhood exposures.

A highlight of the meeting was the strong focus on student participation. There were four breakouts devoted to student presentations, representation of students' research during the poster sessions and a special student discussion session where an international panel of eight students responded to hot topic environment issues. It is anticipated that this discussion will result in a student initiated publication.

Dr. Claudia Thompson, Acting Director of CRIS, presented a keynote, New Tricks for an Old Poison: Use of "-omics" to Study Arsenic Effects. *Ms. Beth Anderson, CRIS*, served on the program committee, was a session chair and presented summary remarks regarding the students sessions during the closing session.

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International Environmental Nanotechnology Conference: Applications and Implications
October 7-9, 2008
Hyatt Regency Hotel
Chicago, Illinois

Background: Nanomaterials present new opportunities to improve our ability to detect, monitor, control and remediate pollutants; however, potential new risks to human health and the environment are a concern that deserves attention. Hence, the U.S. EPA has endeavored to bring together researchers to address the overarching theme of "environmental nanotechnology" beginning with a conference in Washington, DC (October 2005), and another in Chicago, Illinois (September 2006). This past October represented a continuation of these meetings, led by Region 5 EPA and partners at the NIEHS/SBRP, the Agency for Toxic Substance and Disease Registry (ATSDR), the National Science Foundation (NSF), the Department of Energy (DOE), the U.S. Army, the U.S. Navy, and the University of Chicago's Great Lakes Centers for Occupational and Environmental Safety and Health.

Meeting Highlights: EPA Region 5 Deputy Regional Administrator, Mr. Bharat Mathur, opened the conference by welcoming the participants and remarking on the importance of nanotechnology to Region 5 and EPA in general. Mr. Mathur was followed by former EPA Assistant Administrator for Research and Development, Dr. George Gray, who provided perspective on nanotechnology and activity of the Office of Research and Development. EPA National Program Director for Nanotechnology, Mr. Jeff Morris, followed Dr. Gray with commentary on U.S. Federal Interagency activities and international environmental nanotechnology collaborations.

The conference brought together researchers and practitioners from around the world to discuss the nanotechnology applications for remediation of environmental contaminants; the implications of releasing manufactured nanoparticles into the environment; and opportunities for monitoring and sensing. The international character of the meeting was highlighted by nanotechnology experts from Australia, France, Ireland, Japan, Korea, the Netherlands, the United Kingdom, and the United States who provided keynote commentaries on the focus areas of the conference program: remediation, nano-enabled sensing, fate and transport, biological exposure, and toxicity. In addition, lunchtime plenary addresses were given by Dr. Martin Philbert (University of Michigan) and Dr. Igor Linkov (U.S. Army Core of Engineers). The conference agenda included over 100 presentations and 40 posters for the approximately 185 attendees.

Outcomes/Recommendations: Researchers reinforced the benefits of international collaborations in addressing the tremendous potential of nanotechnology. Concerted efforts to standardize minimal information needed in toxicology studies show early indications that there is cross-talk between nations. Furthermore, the development of safe and exciting technologies to make remediation/monitoring efforts more effective will be universally beneficial.

Superfund Basic Research Program staff *Drs. Claudia Thompson and Heather Henry and Ms. Beth Anderson* attended the meeting.

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Environmental Health Sciences (EHS) Core Center Annual Meeting
October 19-21, 2008
Philadelphia, Pennsylvania

Background: *Dr. Les Reinlib and Mr. Liam O'Fallon, SPHB,* worked with University of Pennsylvania Center staff to organize the 2008 EHS Core Center meeting with a key scientific theme on "Omics"

Approaches in Environmental Health Sciences. The meeting was comprised of concurrent and joint sessions of science and outreach staff.

Highlights: *Dr. William Suk* delivered the NIEHS Update to all meeting participants, highlighting scientific and administrative accomplishments over the past year and plans for the future. At the Community Outreach and Education Core (COEC) session, *Dr. Christie Drew, PAB*, gave a well-received presentation on evaluation and logic models. Mr. O'Fallon presented on the Partnerships for Environmental Public Health (PEPH) program.

During the joint session designed to prompt recommendations from Center Directors and COEC staff, Dr. Reinlib presented on the NIEHS Exposure-Biology Program. After Dr. Reinlib's presentation, he and Mr. O'Fallon fielded questions and facilitated discussion on topics of interest. The issue of greatest interest was the development of standard operating procedures for sharing biospecimens.

Recommendations: It was recommended that a working group of Center Directors be created to consider in greater detail the issue of sharing biospecimens.

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Pacific Southwest Residuals Symposium
October 1-2 2008
University of California, Davis; Davis, California

Background: The Third Annual Pacific Southwest Organic Residuals Symposium brought together industry professionals, municipalities, regulators and other stakeholders to identify and realize opportunities that provide the greatest ecological and municipal benefits for using manures, biosolids and other organic residuals. Sponsors were the U.S. EPA (Pacific Southwest Region 9), NIEHS' Superfund Basic Research Program (SBRP), California Integrated Waste Management Board, California State Water Resources Control Board, California Department of Food and Agriculture, Sustainable Conservation, California Association of Sanitation Agencies, Western United Dairymen, and the Association of Compost Producers.

Highlights: The theme of the meeting was Recycling Organic Residuals: Achieving Net Environmental Benefits. In relation to the support by the SBRP under NIEHS, there were two sessions on antimicrobials: (1) Antimicrobial Compounds in Consumer Products and Biosolids: Environmental Occurrence, Fate, and Exposure chaired by: Dr. Rolf Halden, Arizona State University and (2) Antimicrobials: Human Exposure and Health Effects chaired by Dr. Dan Chang, Professor Emeritus, UC Davis. Two antimicrobials, triclosan (TCS) and triclocarban (TCC) that are high volume and in many consumer products (hand soaps, tooth paste, etc), were discussed in terms of their presence in biosolids, persistence in the environment as well as new findings with respect to *in vitro* nerve and *in vitro/in vivo* hormonal activities and data on human exposure.

TCC and TCS bear structural and physico-chemical similarities to Superfund chemicals and were recently tested in biomarker assays developed by the SBRP. Evidence of potential endocrine disruption (ED), effects on enzymatic pathways, as well as neurotoxicity have been observed in mechanistically-derived human cell-based receptor assays, and limited confirmation of endocrine disruption has been presented for TCC in an animal model. Measurements of significant exposure in the U.S. population (75%) to TCS were recently reported by the CDC NHANES program (Calafat Environ Health Perspect, 2008, 116(3): 303–307). Limited tests of exposure to TCC in volunteers indicate exposures can lead to blood levels close to those which resulted in significant effects in the receptor-based assays. Limited data on changes in soil bacterial populations, ED in aquatic species and entry in the food chain have also recently being reported.

These scientific findings were conveyed to manufacturers, affected industries (wastewater treatment) and regulators. Interested parties from diverse fields of research presented and discussed the potential implications of their recent findings.

In attendance from NIEHS/SBRP were Dr. Claudia Thompson, Acting Director SBRP and Ms. Beth Anderson, CRIS Program Analyst.

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Global Variability in Response to Air Pollution: Approaches to Translation of Cardiopulmonary Disease Models
September 4-5, 2008
Chapel Hill, North Carolina

Background: This conference was held as a recommended follow-up to a small workshop held in conjunction with the 2007 International Society of Environmental Epidemiology meeting in Mexico City that explored air pollution studies around the globe. A specific recommendation from the 2007 workshop was to hold a larger conference to bring the animal modelers together with human geneticists and epidemiologists to further advance this field. This conference was intended to foster collaborations between human disease and mouse model researchers so they can expedite identification of genetic susceptibility loci and gene-environment interactions relevant to human diseases associated with air-pollution exposure. This conference also aimed to identify appropriate strategies and approaches for combining and complementing research efforts in human population and animal studies to advance an understanding of the biological pathways involved in air pollution-induced human diseases. The conference began with three overview presentations that presented the state of the science on air pollution and cardiovascular health, pulmonary disease, and genetic susceptibility research. The majority of the remaining conference time focused on three scientific sessions (Genetic Susceptibility of Cardiopulmonary Diseases, Mechanisms of Action/Translation, and Genetics to G x E Interactions and Methods). A final implementation session identified the most important concepts and recommendations.

Numerous themes related to translation of this research field emerged from this conference. The complexity of studying the effects of air pollution was emphasized with the recognition that multiple mechanisms probably account for the impact of air pollution on cardiopulmonary outcomes including: vasoconstriction, clotting/endothelial dysfunction, autonomic nervous system, and inflammation. Many investigators commented on the necessity of bidirectional and interdisciplinary work to allow studies flowing from animal to human and human to animal to validate prior findings and the need for better integration of human-animal data. Multiple issues related to the acute versus chronic effects of air pollution response were discussed with the recognition that the biological pathways involved in acute versus chronic outcomes may be different. Many participants commented on the challenge of extrapolating acute effects seen in challenge or panel studies with the mostly chronic effects studied in epidemiological investigations and the need for biomarkers of chronic effects. The importance of replication of findings, particularly with respect to G x E interaction studies, was stressed. The requirement for more robust analytical and computational tools was recognized for dealing with huge datasets and G x E studies. The many useful mouse resources available today to study G x E and biomarkers of response were described extensively, including: recombinant inbred strains; systems genetics approaches in mice; and the Collaborative Cross, a collection or resource of mouse strains to be used as a tool in mouse genetics.

Recommendations: Specific recommendations to move forward were made throughout the conference and were reiterated at the final implementation session. Many investigators felt that replication studies could be facilitated and streamlined by the establishment of “replication networks” among several institutions. Replication networks should be systematized, standardized, multi-site networks for thoughtful replication of human and laboratory studies, allowing easy access to collaborators for replication. The establishment of centralized infrastructural resources, such as biobanks, genotyping facilities, and computational resources was also stressed. More resources were called for to pool analyses from similar animal model experiments and to facilitate meta-analysis on pooled analysis of human outcomes data. Many scientists recommended that NIEHS put more emphasis on training needs as well. Specific training suggestions included: the use of multiple mechanisms of individual and institutional training, allowing the training of foreign postdoctoral fellows, and the need for computational/toxicology training and other trans-disciplinary training for fellows. Finally, a workshop designed to discuss approaches for standardization of common exposure measures (including what particles, what timing, and dose range) would greatly facilitate collaboration and integration among both American and European institutions and studies.

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Partnerships for Environmental Public Health (PEPH) Workshop
June 30-July 1, 2008
Research Triangle Park, North Carolina

Background: Members of the DERT PEPH Working Group organized the June workshop to engage a diverse set of communities with different perspectives and areas of expertise pertinent to environmental public health. The committee identified certain groups from the responses to the Request For Information (RFI). The organizing committee invited individuals who had familiarity with NIEHS and its mission as well as individuals with little to no familiarity, but who were leaders in a field that could benefit the new PEPH program. The idea was to stimulate new ways of thinking and consider novel approaches to long-standing issues and questions. The organizing committee provided all participants with the RFI Executive Summary and a proposed model for PEPH so that they could ground their feedback and comments on the report and model.

The organizing committee structured the workshop around three key sessions that focused on a specific question (see below). Each session had three components: an introductory panel, break-out discussions and a report-back period. The introductory panel was comprised of five to seven participants each sharing their views. After any clarifying questions, attendees split into four pre-assigned break-out groups. The break-out groups engaged in a discussion related to the designated question for that session. At the end of the break-out discussion, all workshop attendees reconvened to share the most significant concepts discussed in the break-out groups.

Session Questions

1) In the environmental public health field, what issues and un-met needs are faced in the areas of building capacity, evaluation, communication, and research?

What are the most important Tools needed?
What creative new Strategies can be used?
What Resources are needed (beyond money)?
What Partnerships should be fostered?

2) What is NIEHS' unique role in helping identify and foster solutions to the following:

Building capacity
Evaluation
Communication
Research

How would you balance and prioritize the diversity of critical areas/needs in EPH?

Key Recommendations: Workshop participants shared many valuable recommendations to NIEHS staff members. The recommendations were organized into the following categories: Criteria and Concepts for PEPH, Products, and Processes and Activities. Participants emphasized the need for PEPH to be nimble, support gold standards, advance research to action, and, as an umbrella program, it must promote integration across the five proposed areas of PEPH. Recommendations regarding research addressed four key areas: research topics, evaluation of research, communication of research findings, and research capacity building. Capacity building recommendations focused primarily on the needs of community organizations, community residents, and researchers. With regard to Communication, participants recommended that NIEHS establish itself as a top source for science-based materials on environmental public health, develop communication strategies, enhance science literacy, train effective communicators of environmental health science concepts, work with journals and the media field, and promote information sharing and mentoring. Participant recommendations on evaluation addressed the importance of evaluation within all funded projects, as well as the overall PEPH program. Participants identified key challenges, metrics, and resources. Participants recommended that the PEPH program and the NIEHS develop a variety of different products for the purposes of increasing public awareness of EPH and the institute. Such products included factsheets, webinars, curricular materials, standards, evaluation tools, IRB guidelines, and cumulative exposure tools and methods. Participants also enumerated a variety of processes and activities that the NIEHS and the PEPH program could undertake as the Institute begins to re-establish itself in the field of EPH. Recommendations included activities such as social networking, sustained communication with partners, develop a clear PEPH message, define EPH priorities, market PEPH, evaluate past activities, and develop metrics for future activities.

The full Workshop Summary will be posted to the PEPH website in February:
http://www.niehs.nih.gov/research/supported/programs/peph/index.cfm

Questions should be directed to Mr. Liam O'Fallon at ofallon@niehs.nih.gov.

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DERT PAPERS OF NOTE

Selenium May Prevent High-Risk Bladder Cancer

Margaret R. Karagas, Ph.D.
Dartmouth Medical School
P42ES007373

NIEHS-supported grantees at Dartmouth Medical School report in a new study that selenium may help prevent high-risk bladder cancer. The study found that women, moderate smokers, and people p53 positive tumors showed significant reductions in bladder cancer with higher selenium intake.

In the US, bladder cancer is the fourth most common cancer among men and twelfth most common among women with approximately 67,000 cases being diagnosed each year. About 13,000 deaths are expected this year from bladder cancer. Bladder cancer develops through different pathways, but one of the major paths is through alterations in the p53 gene. These cancers are associated with more advanced disease.

The study involved 857 people with newly diagnosed bladder cancer. Selenium intake was measured by analyzing toenail clippings. Cancer risk was reduced between 30 and 50 percent in the three groups as selenium intake increased.

The exact mechanism by which selenium inhibits carcinogenesis is unknown, but it may occur through several mechanisms including reducing oxidative stress and inflammation, enhanced immune responses, activation of DNA repair genes, etc. The results of this study may provide clues on how to prevent tumors from developing and potentially lead to new chemotherapeutic agents.

Citation: Wallace K, Kelsey KT, Schned A, Morris JS, Andrew AS, Karagas MR. Selenium and risk of bladder cancer: a population-based case-control study. Cancer Prev Res (Phila Pa). 2009 Jan;2(1):70-3.

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Gene Packaging is Important in Cancer
Stephen B. Baylin, MD
The Johns Hopkins University Medical Institutions
R01ES011858

New NIEHS-supported research from Johns Hopkins University suggests that the packaging of genes may be as important as the genes themselves when it comes to the development and treatment of cancer. The findings point to the three dimensional chromatin packaging around genes formed by tight loops of polycomb group proteins. Chromatin packaging is a complex combination of DNA and proteins that compress the DNA to fit inside the cell nucleus. The effect of the tight packing and polycomb proteins is to keep genes in a low expression state.

The researchers compared embryonic cells to adult colon cancer cells. The gene studied, GATA-4, is packaged by polycomb group proteins. In the embryonic cells the gene is in a low expression state and had no methylation. When the gene received signals for the cells to mature, the protein structures were disrupted and the gene was highly expressed. However, when the same gene was methylated, as is the case in the colon cancer cells, the polycomb protein packaging loops were tighter and there was no gene expression. When the researchers removed the methylation, the cancer cells behaved similarly to the embryonic cells.

DNA methylation is a normal cellular process, but when the normal processes are disrupted and some genes are improperly methylated, it can shut down important tumor suppressing cell functions. Drugs that removed abnormal DNA methylation from genes have been introduced as potential cancer therapies. This research suggests that for these therapies to be fully effective, researchers may need to search for agents that disrupt the polycomb protein loops.

Citation: Tiwari VK, McGarvey KM, Licchesi JD, Ohm JE, Herman JG, Schübeler D, Baylin SB. PcG proteins, DNA methylation, and gene repression by chromatin looping. PLoS Biol. 2008 Dec 2;6(12):2911-27.

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Dopamine Transmission Impaired by Manganese
Tomás R. Guilarte, Ph.D., Neal C. Burton, Johns Hopkins Bloomberg School of Public Health
NIEHS Grants R01ES010975 and T32ES007141

NIEHS grantees at Johns Hopkins University report that manganese exposure inhibits dopamine neurotransmission from the *substantia nigra* region of the brain leading to motor activity impairments. These results follow on previous studies from this laboratory using cynomologus macaques, also known as crab-eating macaques or long-tailed macaques. Previous research has shown that these monkeys have slight cognitive and fine motor deficits in response to manganese exposure.

The debilitating neurological condition manganism results from chronic high-dose exposure to the essential trace mineral manganese. Movement abnormalities associated with manganism resemble the same condition in Parkinson's disease. Manganese-induced parkinsonism most often results from high exposure in industrial settings related to steel production; however other sources include the impairment of manganese excretion in some liver diseases, patients receiving high doses of manganese from parenteral nutrition, the injection of illicit psychostimulant drugs containing manganese, and possibly exposure to ambient concentrations of manganese generated from gasoline containing the additive methylcyclopentadienyl manganese tricarbonyl.

The monkeys were treated weekly with manganese doses ranging from 3.3-10 milligrams per kilogram body weight from seven up to 59 weeks. They received PET scans prior to the beginning of dosing and at one or two times points during the exposure. The researchers found that amphetamine-induced dopamine release was markedly reduced in the manganese-exposed animals. They conclude that the manganese exposure is responsible for the motor deficits documented in the monkeys. These findings may have implications for the prevention and treatment of symptoms of parkinsonism.

Citation: Guilarte TR, Burton NC, McGlothan JL, Verina T, Zhou Y, Alexander M, Pham L, Griswold M, Wong DF, Syversen T, Schneider JS. Impairment of nigrostriatal dopamine neurotransmission by manganese is mediated by pre-synaptic mechanism(s): implications to manganese-induced parkinsonism. J Neurochem. 2008 Dec;107(5):1236-47.

Note: Neal Burton is a PhD student and was honored at the Society of Toxicology's Annual Meeting in March 2006. Burton brought home first prize in the Neurotoxicology Specialty Section competition for his poster titled "In Vivo Attenuation of the Parkinsonian Phenotype by Induction of the Keap1-Nrf2 Pathway."

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Dioxin Disrupts Prostate Development

Thomas A. Gasiewicz, Ph.D., University of Rochester Medical Center and
Chad M. Vezina, Ph.D, and Richard E. Peterson, Ph.D., University of Wisconsin Madison
R01ES009430, P30001247 (TAG), F32ES014284 (CMV), and R37ES001332 (REP)

Researchers at the University of Wisconsin in Madison have determined the mechanism by which dioxin disrupts prostate gland formation in laboratory mice. They found that when dioxin is administered maternally at between days 15 and 16 of gestation, the chemical inhibits the formation of certain prostate buds in two different regions (ventral and dorsolateral).

Members of this research team have previously shown that dioxin exposure during the fetal and neonatal periods decreases prostate size in mice and later that fetal dioxin exposure inhibited prostate budding thereby reducing the number of prostate ducts and causing the reduction in prostate size. There is also a growing body of scientific evidence that dioxin exposure in humans causes prostate cancer.

Experimental results show that hyperactivation of the aryl hydrocarbon receptor signaling pathway changes the patterning of the fetal urogenital sinus, and disrupting where prostate buds develop and where prostate lobes are formed. The current study presents a new paradigm of how *in utero* dioxin exposure disrupts prostate formation suggesting this same mechanism may in part explain how dioxin impairs the development of other organs and tissues.

Citation: Vezina CM, Allgeier SH, Moore RW, Lin TM, Bemis JC, Hardin HA, Gasiewicz TA, Peterson RE. Dioxin causes ventral prostate agenesis by disrupting dorsoventral patterning in developing mouse prostate. Toxicol Sci. 2008 Dec;106(2):488-96.

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Microglial Cell Enzyme Involved in Neuronal Cell Death

Michael Karin, Ph.D.
University of California at San Diego
R01ES006376

An international research team at the University of California San Diego and the Seoul National University funded by NIEHS report the discovery of the involvement of micoglial cell IκB kinase in excitotoxin-induced neurodegeration. This discovery identifies a target for preventing mass cell death following traumatic brain injury, stroke, or as a result of neurodegenerative diseases.

Excitotoxicity is the process by which nerve cells are damaged and killed by excitotoxins such as glutamate, N-methyl-D-aspartic acid (NMDA), kainic acid, and others. This occurs when neurotransmitter receptors are overstimulated by these and other excitotoxins allowing high levels of calcium ions to enter the nerve cells. The influx of calcium goes on to activate a number of enzymes that lead to damaged cell structures such as the cytoskeleton, the cell membrane, and DNA.

The team employed a special strain of knock out mice that have no gene for the IκB kinase enzyme in specific cells of myeloid lineage including microglia, cells that act as the first and main form of active immune defense in the central nervous system. The gene deletion reduced the IκB kinase activity in cultured microglia by up to 40 percent compared to microglia from normal mice. Kainic acid-induced hippocampal neuronal cell death was reduced by 30 percent in the knock-out microglia. The reduction in neuronal cell death was followed by decreases in kainic acie-induced glial cell activation and expression of proinflammatory genes such as tumor necrosis factor, and interleukin. Additional studies utilizing brain tissue slices in culture showed decreased susceptibility to kainic acid-induced excitotoxicity in knock-out mice brain tissue.

As a result of these studies, the researchers conclude that IκB kinase dependent microglia activation plays a role in kainic acid-induced neuronal cell death by induction of inflammatory agents. The discovery identifies IκB kinase as a possible target for therapeutic interventions to ameliorate or prevent additional cell death following serious brain injuries or as a result of neurodegenerative disease.

Citation: Cho IH, Hong J, Suh EC, Kim JH, Lee H, Lee JE, Lee S, Kim CH, Kim DW, Jo EK, Lee KE, Karin M, Lee SJ. Role of microglial IKKbeta in kainic acid-induced hippocampal neuronal cell death. Brain. 2008 Nov;131(Pt 11):3019-33.

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Discovery of Gene Variant for Cleft Lip

Jeffrey C. Murray, MD, Department of Pediatrics, University of Iowa and
Allen J. Wilcox, MD, Ph.D., NIEHS
P30ES005605

About one-fifth of isolated cleft lip may be due to a single nucleotide difference in the DNA sequence of a gene involved in facial development, according to new research findings from an international research team funded in-part by NIEHS and including an NIEHS intramural scientist. Isolated cleft lip, meaning the child has no other abnormalities, is one of the most common birth defects. The researchers say this discovery could lead to DNA tests to help couples better understand their risk of having a child with a cleft lip.

During fetal development, the lip normally fuses around 35 days of gestation. Since failure of lip fusion can impair the subsequent closure of the palatal shelves, cleft lip is often accompanied with cleft palate. If normally developed parents have a child with an isolated cleft lip, the risk of their second child having a similar cleft increases. Along with other recent gene discoveries, the research team reports they can now account for approximately 30 percent of isolated cleft lip. Just 25 years ago, there had yet to be a single gene identified.

This research finding began six years ago when the team discovered that a gene called IRF-6 is involved with a rare condition called Van der Woude syndrome. About 15 percent of people with the syndrome have malformations that are clinically indistinguishable from isolated cleft lip, which suggested that the gene might be involved in both conditions. Through studying the gene's sequence they discovered a single sequence variant in a section of DNA that is almost identical across twelve different animals.

The team determined that the substitution of a single adenine molecule in place of a guanine in the IRF-6 gene alters the binding site for a protein called AP-2a. The protein is known to be involved in craniofacial development and when altered, causes a syndrome that involves clefts. These findings may not only lead to improvements in predicting clefts, but possibly better interventions to prevent them.

Citation: Rahimov F, Marazita ML, Visel A, Cooper ME, Hitchler MJ, Rubini M, Domann FE, Govil M, Christensen K, Bille C, Melbye M, Jugessur A, Lie RT, Wilcox AJ, Fitzpatrick DR, Green ED, Mossey PA, Little J, Steegers-Theunissen RP, Pennacchio LA, Schutte BC, Murray JC. Disruption of an AP-2alpha binding site in an IRF6 enhancer is associated with cleft lip. Nat Genet. 2008 Nov;40(11):1341-7.

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Antioxidant Administration Reduces Lung Injury from Chlorine Exposure

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U01ES015676

Dosages of vitamin C and other low molecular weight antioxidants may help prevent chlorine-induced lung injury that occurs after railroad tanker spills or might occur as a result of terrorist attacks according to NIEHS-supported research from the University of Alabama Birmingham. The levels of chlorine exposure used in the research study mimic those seen during accidental exposures.

Chlorine is a powerful oxidant that is used in bleaches, disinfectants, and in a wide variety of industrial processes. Under normal conditions, it is a pale green gas that is denser than air. Thousands of tons of chlorine gas are transported by rail in the US each year. Recently chlorine rail cars have been suggested as targets for terrorist attacks. Media reports suggest that as many as 100,000 people could be killed or seriously harmed from the explosion of a single railroad tank car traveling through a major city.

The research team exposed laboratory rats to chlorine gas at either 184 or 400 parts per million for 30 minutes in controlled environmental chambers. These levels are similar to those measured near chlorine tanker spills. Just one hour after exposure, the rats showed evidence of decrease arterial blood oxygen, increased blood carbon dioxide and acidosis, and increased markers of inflammation in respiratory fluid samples. In a subsequent experiment, administration of a mixture of antioxidants, which included ascorbic acid (vitamin C), deferoxamine, and N-acetyl-L-cysteine, prior to exposure to 184 parts per million of chlorine dramatically reduced the respiratory effects seen in the previous experiment.

These experiments suggest that antioxidant administration may be useful for preventing the serious lung injury and death that can occur as a result of chlorine gas exposure. Additional studies will be necessary to confirm these findings, but these results suggest that hazardous materials responders and rescue crews may benefit from prophylactic antioxidant administration prior to responding to a chlorine spill.

Citation: Postlethwait E, Matalon S. Mitigation of chlorine-induced lung injury by low-molecular-weight antioxidants. Am J Physiol Lung Cell Mol Physiol. 2008 Nov;295(5):L733-43.

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Consumption of Foods with High Soy Content is Associated with Lower Sperm Concentrations in Men

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R01ES009718 and P30ES000002

New research from the Harvard School of Public Health reports that men who eat a high amount of soy-based food products have lower total sperm counts. Soy is rich in estrogenic compounds known as isoflavones including genistein, daidzein, and glyciten.

The medical literature is replete with reports of steep drops in sperm count over the last 60 years in the U.S. and Europe. Possible explanations implicate increased exposure to endocrine disruptors and natural and synthetic estrogens.

In the current study, the 99 research subjects were the male partners of couples being evaluated at the Massachusetts General Hospital Fertility Center. They were asked to complete a questionnaire on the foods they eat regularly which included 15 common soy-based foods including tofu, soy milk, tempeh, tofu burgers, miso soup, drinks containing soy protein, etc. Men who were in the highest category of soy intake ate one half of a serving each day of a soy-based food. Their sperm counts were on average 41 million sperm per milliliter of semen lower than men who ate no soy foods. Normal sperm counts range from 80 to 120 million per milliliter.

This study suggests that soy foods could have a deleterious effect on sperm production and might need to be avoided by men who have low sperm counts if they are trying to conceive children. The study findings may also be another explanation for why sperm counts are dropping worldwide.

Citation: Chavarro JE, Toth TL, Sadio SM, Hauser R. Soy food and isoflavone intake in relation to semen quality parameters among men from an infertility clinic. Hum Reprod. 2008 Nov;23(11):2584-90.

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Parkinson's Disease Linked to Vitamin D Deficiency

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U54ES012068

Fifty–five percent of Parkinson's disease (PD) patients are insufficient in vitamin D, according to new research findings from an NIEHS-supported study at the Emory University School of Medicine. The number of Parkinson's patients with vitamin D deficiency was higher than either healthy elderly people in the control group or Alzheimer's disease patients. This finding adds to the evidence that low vitamin D levels are associated with Parkinson's disease.

Most Americans get sufficient amounts of vitamin D through exposure to sunlight or by dietary supplements. Vitamin D fortified milk or cereals are a minor source of the vitamin and few foods, such as fatty fish like salmon or tuna, contain substantial amounts of vitamin D. However, the body's ability to produce vitamin D in response to sun exposure decreases with age making elderly people more at risk for vitamin D deficiency.

Currently it is unclear whether there is a cause and effect relationship between vitamin D and Parkinson's. The connection could be partly related to the decreased mobility of Parkinson's patients, which may result in less sun exposure, or that there is a direct link between vitamin D insufficiency and the onset or progression of the disease.

Previous studies have shown that the region of the brain, the subtantia nigra, that produces dopamine and that is most affected by Parkinson's disease, has high levels of vitamin D receptors, suggesting that vitamin D may be important for the normal function of these cells. Emory doctors are conducting additional research to investigate whether vitamin D insufficiency is a cause or a result of having Parkinson's. A follow-up study is administering standard or larger doses of vitamin D to Parkinson's patients to determine if the vitamin supplementation will reduce the severity of their condition.

Citation: Evatt ML, Delong MR, Khazai N, Rosen A, Triche S, Tangpricha V. Prevalence of vitamin D insufficiency in patients with Parkinson disease and Alzheimer disease. Arch Neurol. 2008 Oct;65(10):1348-52.

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Nanoparticles Kill Blood Vessel Cells in the Human Brain

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University of Kentucky
P42ES007380

A study funded in part by the Superfund Basic Research Program at NIEHS shows that nanoparticles of aluminum oxide can adversely affect and even kill specialized endothelial cells that line blood vessels in the human brain.

The researchers designed this study to determine the effects of nano-scale particles of aluminum oxide on the human blood-brain barrier. In cell culture systems, endothelial cells that line the interior of blood vessels in the brain were treated with nano-alumina, normal sized alumina particles, carbon nanoparticles, or normal sized carbon particles. After exposure, the researchers assessed cell structure, cell death, mitochondrial effects, and tight junction proteins. Laboratory rats were given intravenous doses of nano-alumina.

In 2005, aluminum oxide nanoparticles accounted for 20 percent of the world production of nanoparticles. The particles are used in a variety of applications in the ceramics, electrical, engineering, and biomedical fields. Increases in the production and expansion of the uses of these particles will inevitably lead to greater human exposure.

The nanoscale alumina and carbon particles were much more toxic than their respective compounds of normal particle size. Nano-alumina significantly increase cellular oxidative stress and disrupted the expression of tight junction proteins. The whole animal experiments confirmed the protein alteration with a loss of critical proteins in the cerebral blood vessels.

Citation: Chen L, Yokel RA, Hennig B, Toborek M. Manufactured aluminum oxide nanoparticles decrease expression of tight junction proteins in brain vasculature. J Neuroimmune Pharmacol. 2008 Dec;3(4):286-95.

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Cytosine-DNA Methyltransferase Mediates Carcinogen-Induced Gene Promoter Methylation

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R01ES008801

NIEHS-supported researchers studying the basic cellular and molecular events that occur after exposure to carcinogens report differences in DNA repair capacity in bronchial epithelial cell lines after low-dose treatment with methyl-nitrosourea and benzo(a)pyrene-diolepoxide. They also found that levels of cytosine-DNA methyltransferase 1 (DNMT1) increased significantly during the carcinogen exposure and were linked to promoter-hypermethylation of several genes in each transformed cell line. These finding may have implications for preventing lung cancer in smokers.

When the researchers employed strategies to reduce the production of the DNMT1 protein, cell transformation and gene silencing were reversed. Reduced DNMT1 production prior to carcinogen exposure prevented transformation and gene methylation.

These studies and findings describe a mechanistic link between increased DNMT1, methylation of tumor suppressor genes and reduced DNA repair capacity that together appear to cause cancer-like changes in lung epithelial cells. The study also provides evidence for the use of demethylation strategies to prevent lung cancer in smokers.

Citation: Damiani LA, Yingling CM, Leng S, Romo PE, Nakamura J, Belinsky SA. Carcinogen-induced gene promoter hypermethylation is mediated by DNMT1 and causal for transformation of immortalized bronchial epithelial cells. Cancer Res. 2008 Nov 1;68(21):9005-14.

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Gas Stove Emissions Worsen Asthma Symptoms

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P01ES009606

Johns Hopkins scientists supported by NIEHS report that high levels of nitrogen dioxide gas from cooking and heating stoves in indoor environments aggravate asthma symptoms in inner-city children, especially pre-school aged children. Nitrogen dioxide gas is most prevalent in industrial settings, but it also found at high levels in many poor, inner-city homes that have unvented gas stoves. In a recent report published in Environmental Health Perspectives, the Hopkins researchers report that asthma exacerbations were directly related to high concentrations of nitrogen dioxide in the inner-city homes they studied.

The research team compared the nitrogen dioxide levels in the homes of 150 inner-city Baltimore children aged 2-6 to the frequency and intensity of coughing, wheezing, shortness of breath, and chest tightness. Each 20-point increase in nitrogen dioxide levels led to 10 percent more days of coughing and 15 percent more days of limited speech due to wheezing. Eighty-three percent of the homes had gas cooking stoves and 72 percent were heated with natural gas. Forty-two percent of the households had annual incomes less than $25,000.

Asthma is the most common pediatric chronic disease affecting 6.2 million children in the United States alone. It is widely known that severe asthma is most prevalent in the inner-city environment. This is due in part to poor access to health care and environmental conditions such as the disproportionate exposure to indoor allergens, dust, cigarette smoke, and automobile exhaust. The authors conclude that physicians caring for children with asthma should ask about their home's heating and cooking appliances and recommend using alternatives if possible or at least encourage the parents to have the stoves properly vented.

Citation: Hansel NN, Breysse PN, McCormack MC, Matsui EC, Curtin-Brosnan J, Williams DL, Moore JL, Cuhran JL, Diette GB. A longitudinal study of indoor nitrogen dioxide levels and respiratory symptoms in inner-city children with asthma. Environ Health Perspect. 2008 Oct;116(10):1428-32.

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Particulate Air Pollution Can Alter the Electrical Functioning in the Heart

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Harvard Medical School
P01ES009825 and P30ES000002

New research findings from NIEHS grantees at the Harvard University Department of Environmental Health suggests that exposure to fine particulate air pollution and black carbon particles can adversely effect the heart's ability to conduct electrical signals in people with pre-existing coronary artery disease. The study conducted with 48 Boston-area heart patients, found changes in the ST-segment of the patient's electrocardiograms, possibly indicating inadequate blood flow to the heart or inflamed heart muscle.

The average 24-hour levels for all pollutants measured in the study were below accepted National Air Quality standards indicating the patients were breathing air considered healthy. Fine particulate matter and black carbon are combustion by-products and are generated in areas of heavy traffic. The heart effects were highest within the first month after hospitalization, and for heart attack patients or those with diabetes. Previous studies have shown an association between exposure to road traffic and heart problems.

All the patients had undergone in-hospital procedures to examine or open blocked coronary arteries. The ST-segment changes observed in the study were asymptomatic, but the findings expand the evidence that air pollution can affect heart health, either through inflaming the heart muscle or through reducing blood flow to the heart.

The American Heart Association and the American College of Cardiology recommend that some heart patients, particularly those who have had a heart attack, avoid driving for two to three weeks after leaving the hospital because of the stress heavy traffic can create. This study provides additional rationale to avoid or reduce heavy traffic exposure for people with heart conditions because of the potential exposure to elevated levels of air pollution particles. The study authors suggest additional research is necessary to determine whether the pollution-related ST-segment changes are due to increased heart inflammation, reduced blood flow, oxidative stress, or increased risk of arrhythmias.

Citation: Chuang KJ, Coull BA, Zanobetti A, Suh H, Schwartz J, Stone PH, Litonjua A, Speizer FE, Gold DR. Particulate air pollution as a risk factor for ST-segment depression in patients with coronary artery disease.Circulation. 2008 Sep 23;118(13):1314-20.

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Acetaminophen May Increase the Risk of Developing Asthma

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R01ES011377

There is a growing body of scientific literature suggesting a causal link between the use of the non-steroidal anti-inflammatory drug acetaminophen and the rise in the incidence of asthma in children. A new epidemiologic study, supported by NIEHS, conducted with 345 pregnant women adds to the growing evidence.

There are plausible biological and associative links between acetaminophen and asthma. Acetaminophen became the drug of choice for pain and fever relief in the 1980s after several studies reported a link between Reyes syndrome and aspirin use. In 1986, the FDA placed warning labels regarding the Reyes Syndrome link on acetaminophen bottles. Shortly afterwards, pediatricians nationwide started noticing a rise in asthma incidence. Acetaminophen, unlike aspirin and ibuprofen, decreases the level of the antioxidant glutathione in the lungs and other tissues.

In the NIEHS-funded work, women were recruited during their first trimester of pregnancy. Use of acetaminophen during pregnancy was determined by a questionnaire and related to respiratory outcomes in their newborns during their first year of life. Use of acetaminophen in the second and third trimesters was significantly related to wheezing in the first year. While wheezing is a known symptom of asthma in young children, it alone does not constitute a diagnosis of asthma.

The findings in this report are consistent with previous literature showing increases in asthma symptoms after exposure to acetaminophen. The researchers will continue to follow these children until they reach 5 years of age enabling them to provide more precise estimates of asthma incidence. The researchers point out that this is only the second study suggesting that exposure to acetaminophen late in pregnancy may affect the subsequent development of allergic symptoms in the child. Confirmation of these finding in larger cohorts could have substantial public health implications in defining factors attributable to the development of asthma.

Citation: Persky V, Piorkowski J, Hernandez E, Chavez N, Wagner-Cassanova C, Vergara C, Pelzel D, Enriquez R, Gutierrez S, Busso A. Prenatal exposure to acetaminophen and respiratory symptoms in the first year of life. Ann Allergy Asthma Immunol. 2008 Sep;101(3):271-8.

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Green Tea Polyphenol Combats Health Effects of High Fat Diet
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P30ES005022

Green tea, consumed widely in East Asian countries, contains caffeine and polyphenolic compounds known as catechins. The most common catechin compound in green tea is epigallocatechin-3-gallate (EGCG). EGCG has been suggested as the catechin responsible for the potential health benefits experienced with long-term consumption of green tea.

A team of scientists at the University of Medicine and Dentistry of New Jersey with support from a NIEHS Center Grant has found that long-term treatment with EGCG reverses high-fat diet induced disorders in laboratory mice. In the study mice were fed a diet containing 60% of energy as fat for 16 weeks at which point some mice were given EGCG for another 16 weeks. Mice treated with EGCG had lower body weights, decreased insulin resistance, and lower plasma cholesterol than the untreated mice. EGCG treatment also decreased liver weight and liver triglycerides. Subsequent histological examination of liver tissue revealed decreased lipid accumulation in the liver cells of the treated mice. In another experiment, obese mice were given 4 weeks of EGCG treatment. These mice had decreased body fat and blood glucose as compared to the untreated controls.

These results indicate that physiological relevant doses of EGCG treatment can mitigate the development of obesity, symptoms of metabolic syndrome, and liver fat accumulation. The researchers conclude that these effects could be mediated by decreased fat absorption, decreased inflammation or other mechanisms. Further studies need to be carried out in humans to determine whether green tea or EGCG can be used to prevent the development of obesity and its adverse health outcomes.

Citation: Bose M, Lambert JD, Ju J, Reuhl KR, Shapses SA, Yang CS. The major green tea polyphenol, (-)-epigallocatechin-3-gallate, inhibits obesity, metabolic syndrome, and fatty liver disease in high-fat-fed mice. J Nutr. 2008 Sep;138(9):1677-83.

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A Fruit Fly Model for Amyotrophic Lateral Sclerosis
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University of Oklahoma
R21ES014441

A multi-university research team has developed a new laboratory model for studying the motor neuron disease amyotrophic lateral sclerosis (ALS). The researchers at the University of Oklahoma and the University of Pennsylvania created a transgenic fruit fly that is able to express human superoxide dismutase, an antioxidant enzyme that has been implicated in the hereditary form of ALS.

ALS is a progressive and fatal neurodegenerative disease of the motor nervous system. It is characterized by the loss of muscle function caused by dysfunction and death of motor neurons throughout the body. Ten to fifteen percent of ALS cases are considered to be of genetic origin. About one-fifth of hereditary ALS cases are linked to mutations in the gene encoding for superoxide dismutase. Uncovering how mutations in the enzyme lead to the dysfunction and death of motor neurons could illuminate how ALS develops and progresses in patients with both sporadic and hereditary forms of the disease.

In experiments using the new model, these researchers found that expression of the enzyme in the flies induced neurological damage along with accumulation of the enzyme in motor neurons accompanied by a stress response in the surrounding glial cells. This work suggests that superoxide dismutase can cause cell-autonomous damage to motor neurons. It also highlights the usefulness of the fruit fly model for studying ALS.

Citation: Watson MR, Lagow RD, Xu K, Zhang B, Bonini NM. A drosophila model for amyotrophic lateral sclerosis reveals motor neuron damage by human SOD1. J Biol Chem. 2008 Sep 5;283(36):24972-81.

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Arsenic and Type 2 Diabetes

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Johns Hopikins Bloomberg School of Public Health
P30ES003819

New research findings from the National Health and Nutrition Examination Survey suggest that exposure to levels of arsenic commonly found in drinking water may be a risk factor for type 2 diabetes. The findings suggest that millions of Americans may be at increased risk for type 2 diabetes based on the level of arsenic in their drinking water.

Data on the nearly 800 participants in the study for which urinary arsenic concentrations were available, indicated that urine levels of arsenic were significantly associated with the prevalence of type 2 diabetes. After splitting the subjects into 5 groups based on the level of arsenic in their urine, the researchers determined that those in the highest category were more than three and one-half times more likely to have diabetes. The strength of arsenic as a risk factor for diabetes is similar to other factors such as obesity.

Inorganic arsenic in drinking water at concentrations higher than 100 parts per million has been linked to type 2 diabetes in studies that took place in Taiwan, Mexico, and Bangladesh where drinking water is commonly contaminated with high levels of arsenic. The US drinking water standard is currently 10 parts per million, but most people on private wells have not had their water tested and aren't required to. The researchers estimate that about 13 million Americans live in areas where public water systems exceed the EPA standard for arsenic and this number does not included private wells and water systems.

Animal studies have shown that arsenic affects the production of glucose, insulin secretion and can cause insulin resistance. The current findings reinforce the need to evaluate the role of arsenic in diabetes development in prospective epidemiologic studies conducted in populations exposed to a wide range of arsenic levels.

Citation: Navas-Acien A, Silbergeld EK, Pastor-Barriuso R, Guallar E. Arsenic exposure and prevalence of type 2 diabetes in US adults. JAMA. 2008 Aug 20;300(7):814-22.

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Connection Between Built Environment and Obesity

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R01ES014252

If you are a baby boomer living in a neighborhood with a high density of fast food restaurants, few sidewalks and no parks, you are more likely to be obese according to NIEHS-supported research conducted by the Oregon Research Institute. In contrast, people living in neighborhoods with higher mixed-land use, high street connectivity, better access to public transportation and more green and open spaces were more likely to engage in some form of neighborhood-based walking program.

This study was unique in that it focused on the baby boom population aged 50-75 which will become the major demographic group in healthcare utilization in the next 20 years. By 2030, 36 percent of the total US population will be over 50 as compared to 25 percent currently. Finding and ameliorating built environment limitations on physical activity are an important component in keeping this population healthy and reducing the health care burden.

Current estimates indicate that 34 percent of the US population aged 20 years or more are obese. The research findings point to the access to unhealthy food and lack of accessibility to spaces for exercise as contributing factors for the rise in obesity. The built environment can create barriers to exercise and existing recreational facilities. Simply encouraging people to eat better and get more exercise may not be enough. The researchers point out that zoning and development policies need to be altered to enable people to lead healthier lifestyles.

The researchers examined 120 neighborhoods in Portland, Oregon and more than 1,200 residents in these neighborhoods completed questionnaires providing basic demographic data along with information on exercise and eating habits.

Citation: Li F, Harmer PA, Cardinal BJ, Bosworth M, Acock A, Johnson-Shelton D, Moore JM. Built environment, adiposity, and physical activity in adults aged 50-75. Am J Prev Med. 2008 Jul;35(1):38-46.

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p53 Inhibits Cell Growth as well as Cell Proliferation

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R01ES006376, R37ES004151, and P42ES010337

New research findings by NIEHS grantees at the University of California at San Diego that the tumor suppressor gene p53 is involved in regulating the growth of cells as well as the proliferation of cells. The p53 target genes that inhibit cell proliferation had long been known, but its targets for inhibiting cellular growth were unknown.

Abnormal cell proliferation and growth of cells are characteristics of cancer. The p53 protein acts in the cell nucleus to control the expression of other genes whose products can inhibit cell proliferation and growth. The researchers discovered that two p53 target genes, known as Sestrin1 and Sestrin2, provide an important link between p53 and a protein kinase called mTOR, a central regulator of cell size. Incidentally, mTOR is the target for the immunosuppressive drug rapamycin, which was recently shown to have anti-cancer activity.

The major tumor suppressor p53 can either inhibit cell proliferation and cell growth or induce cell death. Its different functions are mediated through numberous target genes and depend on the extent of damage to the cell. More than half of all human cancers are either missing p53 expression or express a defective version of the protein. Understanding the mechanisms by which p53 suppresses tumors may lead to the development of new cancer preventives and chemotherapeutic agents.

Citation: Budanov AV, Karin M. p53 target genes sestrin1 and sestrin2 connect genotoxic stress and mTOR signaling. Cell. 2008 Aug 8;134(3):451-60.

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The Ah Receptor is Essential for Mediating an Anti-Inflammatory Effect
B. Paige Lawrence, Ph.D. and Michael S. Denison, Ph.D.
University of Rochester and University of California Davis
R01ES0010619, K02ES012409, and R01ES012498

A research team made up of NIEHS grantees from the University of Rochester and the University of California at Davis has discovered a potentially new role for the Ah receptor in treating inflammatory or immunologic disorders. This research adds new information on the diverse functions of the receptor including xenobiotic metabolism, involvement in proper blood vessel formation, and now immune responses.

The team happened upon this discovery while investigating a low-molecular with compound with potent anti-inflammatory activity known as VAF347. The compound is a drug candidate which inhibits allergic lung inflammation. The team demonstrated that VAF347 interacts with the Ah receptor resulting in stimulation of its signaling pathway. Additional experiments in Ah receptor-deficient mice confirmed the connection. These mice are resistant to the compound's ability to block allergic lung inflammation. The data indicate the Ah receptor protein is an important target of VAF347 and its importance in mediating the anti-inflammatory effects of the compound.

Although the importance of the Ah receptor in mediating the toxicity of various organic compounds is well known, this finding suggests that harnessing the biological activity of the receptor for therapeutic purposes is possible and suggests a new tool for the treatment of inflammatory and immunologic disorders.

Citation: Lawrence BP, Denison MS, Novak H, Vorderstrasse BA, Harrer N, Neruda W, Reichel C, Woisetschläger M. Activation of the aryl hydrocarbon receptor is essential for mediating the anti-inflammatory effects of a novel low-molecular-weight compound. Blood. 2008 Aug 15;112(4):1158-65.

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PAPERS by DERT STAFF

Haugen, A.C., Goel, A., Yamada, K., Marra, G., Nguyen, T.P., Nagasaka, T., Kanazawa, S., Koike, Kikuchi, J., Zhong, X., Arita, M., Shibuya, K., Oshimura, M., Hemmi, H., Boland, R.C., Koi, M. Genetic instability caused by loss of MutS homologue 3 in human colorectal cancer. Cancer Research, October, 68, 8465-8472, 2008.

Bredemeyer AL, Helmink BA, Innes CL, Calderon B, McGinnis LM, Mahowald GK, Gapud EJ, Walker LM, *Collins JB*, Weaver BK et al: DNA double-strand breaks activate a multi-functional genetic program in developing lymphocytes. Nature 2008, 456(7223):819-823.

Galliher-Beckley AJ, Williams JG, *Collins JB*, Cidlowski JA: GSK-3{beta}-mediated Serine Phosphorylation of the Human Glucocorticoid Receptor Re-directs Gene Expression Profiles. Molecular and cellular biology 2008.

GRANTEE HONORS and AWARDS

Timothy D. Phillips, Ph.D., a professor of Toxicology in the Department of Veterinary Integrative Biosciences at Texas A&M University, was recently selected for the 2009 Walston Chubb Award for Innovation sponsored by the Sigma Xi Scientific Research Society. Sigma Xi, the international honor society of science and engineering, has nearly 60,000 members who were elected to membership based on their research potential or achievements. Sigma Xi presents the Walston Chubb Award for Innovation to honor and promote creativity in science and engineering. The award carries a $4,000 honorarium and an invitation to give the Walston Chubb Award Lecture at Sigma Xi's annual meeting. Dr. Phillips is the principal investigator on the Chemical Intervention Strategies project of the Texas A&M University Superfund Basic Research Program grant.

Bernhard Hennig, Ph.D., Program Director of the Superfund Basic Research Program at the University of Kentucky, has received a prestigious Fulbright Award to encourage collaborations between the University of Kentucky and the Universidad de Antioquia in Medellin, Colombia. Dr. Hennig will spend four months in Colombia during the spring of 2009, where he will teach a course in nutritional biochemistry and share his research expertise. The Fulbright Program is sponsored by the United States Department of State, Bureau of Educational and Cultural Affairs.

Eric Suuberg, Ph.D., Professor of Engineering and co-director of the Superfund Basic Research Program at Brown University, was awarded an honorary degree on September 17 by the Talliinn University of Technology (TUT) in Estonia. The honor recognized Suuberg's achievements in the fields of chemical engineering, fuel science, and environmental technology. The citation made special mention of Suuberg's "promotion of cultural contacts between Estonia and the United States, in particular scientific contacts between Tallinn University… and Brown University." Suuberg, of Estonian descent, has maintained strong professional ties to TUT for many years. In 2001 he was a Fulbright Scholar in Estonia, and he has served a lengthy term on the board of the Estonian-American National Council, which fosters cultural exchange between the United States and Estonia.

Sadis Matalon, Ph.D., Alice McNeal Professor of Anesthesiology, was named on July 3 as the director of the newly established Pulmonary Injury and Repair Center at the University of Alabama at Birmingham.

STAFF HONORS and AWARDS

Drs. Sally Eckert-Tilotta and Teresa Nesbitt, SRB; Drs. Gwen Collman and J. Patrick Mastin, OD; Drs. Cindy Lawler, Michael Humble and Frederick Tyson, COSPB; Dr. Christina Drew and Mr. Jerry Phelps, PAB; Drs. Kimberly Gray and Caroline Dilworth and Mr. Liam O'Fallon, SPHB; Mr. Joseph (Chip) Hughes and Ms. Sharon Beard, WETB; Ms. Beth Anderson, CRIS; and Ms. Carolyn Mason, GMB, received an NIH Merit Award "For superb teamwork in the conceptualization of the Partnerships for Environmental Public Health program."

Dr. Leroy Worth, Jr., SRB; Drs. Jerrold Heindel, Srikanth Nadadur and Frederick Tyson and Ms. Astrid Haugen, COSPB; Dr. David Balshaw, CRIS; Dr Kimberly McAllister, SPHB; Dr. J. Patrick Mastin, OD; Dr. Christina Drew, PAB; Dr. Bennett Van Houten, PAB/DIR; and Ms. Laurie Johnson and Mr. Michael Loewe, OM received an NIH Merit award "For exception service in the Institutes research efforts in Epigenomics."

Dr. Jerry Heindel, COSPB, and *Dr. Kimberly Gray, SPHB*, both received individual NIEHS Peer Awards at the annual awards ceremony in December "In Recognition for Outstanding Service."

Mr. Hughes, WETP, received an NIH Merit Award as part of the "DHHS Implementation Team for the Pandemic and All-Hazards Preparedness Act (PAHPA). This award was presented at the 2008 OD Honor Awards Ceremony on November 20 in the Natcher Auditorium, NIH in Bethesda, Maryland.

On August 14, EPA announced the 2007 Office of Research and Development awards. *Dr. Srikanth Nadadur, COSPB*, as a member of the Ozone and Lead Assessment Team, received the Bronze Medal for Commendable Service Award, "For outstanding, exceptional contributions in the completion of EPA's Air Quality Criteria for Ozone and Other Photochemical Oxidants and Air Quality Criteria for Lead." The award ceremony was held at the EPA campus in Research Triangle Park, North Carolina on September 17.

STAFF ACTIVITIES

Mr. Remington, WETP, presented on the "Roundtable on Chemical Emergency Preparedness: Key Issues on Safety & Health and Risk Communication" at a Public Health Preparedness Summit in San Diego, California on February 18-20.

Mr. Remington, WETP, presented at CDC's Communication Strategies for Addressing Radiation Emergencies and Other Public Health Crises Conference in Atlanta, Georgia on January 28-29.

Dr. Kirshner, COSPB, helped organize and participated in a workshop on "Drug abuse vulnerability and neurodevelopmental effect of early exposure to secondhand tobacco smoke: Methodological issues and research priorities?" on January 13 in Bethesda, Maryland.

Dr. Heindel, COSPB, was an invited speaker at the American Association of Intellectual and Developmental Disabilities Workshop at the Arlie Center in Warrenton, Virginia, December 11-12. The workshop was on "Toxic Chemicals and Vulnerable Populations: New Opportunities. He spoke on, "The Developmental Origins of Disease/Dysfunction: Environmental Exposures and Epigenetic Mechanisms." He also participated in a breakout session to develop a research agenda for the next five years in this area.

Dr. Henry, CRIS/SBRP, conducted two informational sessions at the SBRP Annual Meeting in Asilomar, California on December 8. "SBRP Training Network" outlined SBRP's efforts in linking student/postdoctoral trainees and tracking student successes; and "Early Career Funding Opportunities" highlighted NIEHS grants for young scientists.

Mr. Outwater, WETP, addressed the Advisory Board of the NIEHS funded University of Cincinnati Midwest Consortium on Jan 7 on the topic "NIEHS WETP Program Accomplishments."

Ms. Beard, WETP, participated in the EPA Brownfields Job Training Review Meeting in Philadelphia, Pennsylvania on December 8-10.

Dr. Henry, CRIS/SBRP, gave a presentation on "Environmental Benefits and Possible Risks of Engineered Nanomaterials" at the International Forum of EcoHealth meeting in Merida, Mexico on December 2nd. The talk featured SBRP and NIEHS research in nanotechnology device development, nanomaterials used for remediation, and toxicity studies.

Dr. Henry, CIRS/SBRP, moderated a session at the "Phytoremediation of Metals" web seminar broadcast through EPA's online training module CLU-IN.org on November 25. Part of a three-part series on phytoremediation, this session featured research by SBRP grantees demonstrating how plants can be used to remove or stabilize arsenic and other metals in soil. The series was sponsored by SBRP and an archive is available at:
http://www.niehs.nih.gov/research/supported/sbrp/events/riskelearning/phytoremediation.cfm.

Mr. Hughes and Mr. Remington, WETP, attended the International Association of Fire Fighters Instructors Development Conference in Charleston, South Carolina on November 12-14.

Drs. Collman, Maull, and Reinlib, SPHB, attended the annual business meetings of Breast Cancer and Environment Research Centers in Birmingham, Alabama, on November 11-12.

Dr. Heindel, COSPB, was an invited speaker at a meeting "Green Chemistry and Environmental Health: Problems Meet Solutions" held in Irvine. California, November 10. He spoke on "Endocrine Disruptors and Human Health."

Dr. Maull, SPHB, participated in the CounterACT-sponsored Sulfur Mustard Symposium in Albuquerque, New Mexico, November 5 – 7.

Mr. O'Fallon, SPHB, was invited to attend and participate in the November meeting of the U.S. EPA CARE grantees which was held in Chicago, Illinois. This year EPA and the CDC/ATSDR hosted a joint meeting of grantees with shared interests in community-based activities addressing environmental public health issues. As part of the three day meeting, the Federal partners had a meeting to discuss opportunities for increased interactions. These agencies have been working together for the past year and have signed an MOU with regard to their environmental public health activities. Mr. O'Fallon was asked to present on the PEPH program and address ways in which NIEHS might be able to coordinate better with EPA and CDC/ATSDR. *Dr. Collman* participated in the meeting via phone. The presentation was well received and generated many questions as there are several shared areas of interest including a better coordinated web presence for environmental public health information. Mr. O'Fallon will arrange a presentation to this group on the NIH funding process.

Dr. Drew and Mr. Phelps, PAB, along with contract staff from the Battelle Centers for Public Health Research and Evaluation made presentations at the November 6-8 meeting of the American Evaluation Association in Denver, Colorado. Their session was entitled "Moving Beyond Bibliometric Analysis: Emerging Evaluation Approaches at the National Institute of Environmental Health Sciences. The presentations focused on the methods and results of a recently conducted evaluation of the NIEHS Asthma Research portfolio. The session was well attended and generated many positive responses among the evaluators in the audience. Note: A manuscript of the evaluation results has been submitted to EHP and is currently being revised after peer review.

Mr. Remington, WETP, presented at the National Response Team's Worker Safety Technical Conference, in Washington, DC on October 28-29

Ms. Beard, WETP, attended the 136th Annual American Public Health Meeting and Exposition in San Diego, California on October 27 and 29 where she presented "Training and Educating the Brownfields Workforce – the NIEHS Model at the session on Environmental Justice and Health Disparities at Brownfields Sites" and facilitated another session entitled "The Occupational Health Disparities Institute: Health and Safety for Latino/Hispanic Workers." She also participated in the session on "Labor Rights, Occupational and Environmental Health" on Saturday, October 25 at the San Diego City College hosted by the Environmental Health Coalition and the CITTAC – Information Center for Working Women and Men.

Dr. Henry, CRIS/SBRP, presented "A Diversity of Research Opportunities: NIEHS and SBRP," an informational session open to faculty, students, and the public given at Clemson University on October 21st. The talk outlined the breadth of research carried out under the SBRP and funding opportunities at NIEHS.

Dr. Humble, COSPB, participated in the Cell Biology and Cancer teacher workshop held at UNC-Chapel Hill on October 16th. The workshop was sponsored by the North Carolina Association for Biomedical Research (NCABR) and was attended by 20 North Carolina middle and high school science teachers. Dr. Humble was the moderator for the morning training session and introduced the cell biology and cancer curriculum and activities developed by NCABR and NIH.

NIEHS WETP hosted an awardee meeting, "Implications for Safety and Health Training in a Green Economy" in Chapel Hill, North Carolina on October 16-17. The meeting defined why and how green job training is important, and how green-collar jobs will be significant in developing the nation's new green economy. The WETP has an opportunity to develop and provide more courses on green concepts to workers, which will allow them to work more safely, productively, efficiently, and effectively in their jobs. To read the complete article on this meeting, please see: http://www.niehs.nih.gov/news/newsletter/2008/november/green-economy.cfm.

Dr. Heindel, COSPB, and Dr. Collman, OD, were invited participants at the Society of Environmental Journalists annual meeting in Roanoke Virginia October 15-19. Dr. Collman served on a panel titled "Does Environment Trump Genetics? Teasing out the Factors Affecting Women's Health." She also participated in a "beat" dinner with about a dozen reporters where she highlighted the NIEHS Partnerships for Environmental Public Health (PEPH) program. Dr. Heindel participated in a panel moderated by a reporter from the Milwaukee Journal Sentinel that focused on endocrine disruptors and toxicology. Heindel also talked to reporters during a lunch session on how to communicate information about epigenetics to the general public.

Mr. Outwater, WETP, addressed the steering committee of the major DOE training facility in Hanford Washington Oct. 8-9, on “NIEHS Program Accomplishments.” In attendance was U.S. Representative Doc Hastings.

Dr. Henry, CRIS/SBRP, chaired the “Nanotechnology-Enabled Sensors” session at the “International Environmental Nanotechnology” meeting in Chicago, Illinois on October 7. In addition to showcasing a variety of novel sensors, many designed for exposure assessment, the session also focused on maximizing positive impacts through green production and thorough life-cycle analyses.

Dr. Heindel, COSPB, was an invited speaker at The Obesity Society Annual Meeting, which was held in Phoenix, Arizona, October 3-7. His talk was “Obesity: Developmental Origins and Environmental Influences.”

Ms. Beard, WETP, attended the North Carolina Central University sponsored conference on Growing a Just, Green Economy in Durham, North Carolina on September 20.

Ms. Beard, WETP, facilitated a panel on workforce development training at the Newark Green Future Summit in Newark, New Jersey, on September 12-13.

Mr. Hughes, Mr. Remington, and Mr. Outwater, WETP, conducted two sessions at the Department of Energy's (DOE) Integrated Safety Management conference in Idaho Falls, Idaho, on August 26. Each session focused on the NIEHS DOE program in relationship to new DOE worker safety regulations (CFR 851).

UPCOMING MEETINGS and WORKSHOPS

The 3nd Annual CounterACT Network Research Symposium will be held at the Omni Shoreham Hotel in Washington, DC, from April 14-16. This is an opportunity for the grantees of the CounterACT Program to share research findings related to the development of therapeutic countermeasures for chemical threats among the Network as well as develop future collaborations. *Dr. Elizabeth Maull, SPHB*, will be chairing the session on Pulmonary Agents. A poster networking session is included in the meeting, as well as a pulmonary pre-meeting workshop focused on chlorine exposures.

Dr. Carol Shreffler, COSPB, has organized an Education-Career Development session entitled, “The Future of Environmental Health Science: Featuring NIEHS funded Early Career Investigators,” for the Society of Toxicology (SOT) Annual Meeting in Baltimore, Maryland, March 15-19. The session is scheduled to take place on Tuesday, March 17.

Drs. Srikanth Nadadur and Jerrold Heindel, COSPB, have organized an Education-Career Development session entitled, “Grantsmanship Forum: Tools and Skills needed to Navigate Toxicology Research Funding,” for the Society of Toxicology (SOT) Annual Meeting in Baltimore, Maryland, March 15-19. The session is scheduled to take place on Monday, March 16.

The NIEHS WETP will cosponsor a grantee meeting and workshop, “Local, State and Federal Partnerships for Chemical Preparedness and Response,” April 29-May 1 in Cincinnati, Ohio. The spring workshop will share knowledge, materials, and resources for chemical and all-hazards preparedness. It will also review a new draft training tool that addresses the health and safety hazards that response and recovery workers will face following a chemical incident.

STAFF CHANGES

Arrivals:
Dr. Lisa Helbling Chadwick joined COSPB as a Health Science Administrator on November 10. She received her B.A. in Biology from Case Western Reserve University. She received her Ph.D. in Genetics from Case Western Reserve University for her work in Dr. Huntington Ward's laboratory identifying genetic and epigenetic modifiers of X chromosome inactivation. Dr. Chadwick's scientific interests are primarily in mammalian genetics, epigenetics and chromatin biology. She came to DERT after completing a postdoctoral fellowship in Dr. Paul Wade's laboratory in the Laboratory of Molecular Carcinogenesis at NIEHS. Her postdoctoral research in Dr. Wade's laboratory focused on investigating a role for the Mi-2/NuRD chromatin remodeling complex in the heterochromatin assembly after DNA replication.

Ms. Jennifer Collins joined SPHB as a Program Analyst on September 28. She has a B.S. in Biological Sciences (2000) and a Master of Functional Genomics degree (2006) from North Carolina State University. Before joining the Division of Extramural Research and Training, Ms. Collins spent ten years in the Division of Intramural Research at NIEHS, primarily in the Microarray Core facility. As a biologist in this group, she was responsible for coordinating the collaborations between the core facility and intramural researchers and for conducting the initial analyses of all gene expression data generated in the lab. Jennifer is currently a program analyst in the Susceptibility and Population Health Branch in the Division of Extramural Research and Training. Her primary function is to assist in coordinating the activities related to the Exposure Biology Program of the Genes, Environment, and Health Initiative.

Ms. Helena Davis joined the Program Analysis Branch as a Program Analyst on February 1. She comes to DERT from The Smithsonian Institute.

Transfers:
Ms. Kathy Ahlmark transferred as a Program Analyst from the Superfund Basic Research Program to the Worker Education and Training Program in December.

Mr. James Williams transferred from his position as the DEAS Supervisor to the Grants Management Branch as a Grants Management Specialist on September 14.

Departures:
Ms. Susan Ricci departed GMB on January 17 to take a position as a budget analyst at Fort Stewart allowing her to join her new husband in Georgia.

Mr. Dwight Dolby retired from GMB on January 2.