FEATURED ACTIVITIES of DERT
February 2011

MEETINGS

Early Environmental Exposures Annual Meeting

November 16 - 19, 2010
Roosevelt Hotel, New York City, New York

Background: This year's Annual Meeting of the Breast Cancer and the Environment Research Program (BCERP) Network served as the orientation point for new awards in 2010. The recompetition of the program was accompanied by a restructuring of the original network, which commenced in September 2003 in response to a congressional mandate with support from both the breast cancer advocacy and research communities. The second phase of the program will continue to advance the understanding of environmental factors that influence mammary gland architecture and the entry and progression through female puberty, but expands the program to other potential windows of susceptibility and has been structured to continue with the original three epidemiological studies of girls passing through puberty (Mount Sinai School of Medicine, Dr. Mary Wolff; Cincinnati Children's Hospital Medical Center, Dr. Frank Biro; and Kaiser Permanente Northern California, Dr. Larry Kushi). Windows of Susceptibility studies are being conducted by eight institutions and their partners: University of California Berkeley (Drs. Barbara Cohn and Mary Beth Terry, Columbia University), University of Wisconsin (Dr. Michael Gould), Michigan State University (Drs. Sandra Haslam and Richard Schwartz), University of Cincinnati (Dr. Shuk-mei Ho), University of Alabama (Drs. Coral Lamartiniere and Jose Russo, Fox Chase Cancer Center, and Tim Huang, Ohio State University), Mount Sinai School of Medicine (Drs. Susan Teitelbaum and Jia Chen), the University of North Carolina, Chapel Hill (Drs. Melissa Troester and Lisa Makowksi), and the University of California, San Francisco (Drs. Zena Werb, Valerie Weaver, and Paul Yaswen). In addition, a Coordinating Center has been established at the University of California, San Francisco, headed by Dr. Robert Hiatt, to assist in coordination of the epidemiology study questionnaires as well as logistics for meetings and conference calls.

Objectives: The BCERP Network is pursuing epidemiological and biological studies investigating the influence of Early Environmental Exposures on various windows of susceptibility, mammary gland development, and the potential of these exposures to alter the risk of breast cancer later in life. An overview of the scientific findings from the first seven years of the program was presented along with plans for the second phase of the research agenda from investigators new to the program as well as those continuing from the first round of applications.

Highlights and Recommendations: This year's annual scientific meeting focused on introducing new members to the program and orienting members of the BCERP to the goals of transdisciplinary research. Opening remarks were provided by Dr. Linda Birnbaum, Director, NIEHS, Dr. Debbie Winn, NCI, *Dr. Les Reinlib, DERT/SPHB*, and Dr. Gary Ellison, NCI. In addition, contractors associated with the NIH-funded Needs Assessment (Cygnus, Inc.) and Key Messaging (PCI Communications) contracts were introduced to the grantees. The COTC and Community Partners had an opportunity to meet separately with the contractors during their subcommittee meetings. In addition, this year's meeting included a half day symposium titled: Precautionary Principle to Public Policy: Building Blocks. Ms. Judith Enck, Regional Administrator, US EPA, Region 2, spoke about Protecting Human Health from a Regional Regulatory Perspective, drawing many questions from the engaged audience. Dr. Shuk-Mei Ho explained the intricacies of epigenetics, as we understand them today, in a very comprehensible fashion. Updates on the most recent BCERP studies were provided by several members of the Network. Dr. Reinlib introduced the subject of Windows of Susceptibility to the audience. The symposium was co-moderated by Ms. Karen Miller, Huntington Breast Cancer Action Coalition, and Ms. Laura Weinberg, Great Neck Breast Cancer Coalition. *Dr. Gwen Collman, DERT/OD*, attended the meeting.

*****

The Superfund Research Program Annual Meeting
November 10 -12, 2010
The Nines Hotel and Conference Center; Portland, Oregon

Background: The annual meeting of the Superfund Research Program (SRP), held in Portland, Oregon (November 10-12) brought together researchers, trainees, and administrators from SRP Research Centers, Research Translation Centers, and Community Engagement Cores from the U.S. and Puerto Rico. Participants shared their latest research on environmental health problems and toxic waste remediation. The breadth of SRP-funded research was fully apparent, with topics ranging from tribal-university collaboration to epigenetics, nanotechnology, and remediation. The variety of experts who came together to share cutting-edge science and problem-solving included toxicologists, chemists, engineers, risk assessors, administrators, and public health officers.

Highlights: The meeting showcased the drive for solution-oriented research that is at the heart of the SRP strategic plan. Researchers are blurring the edges of their disciplines by engaging with experts in other disciplines to develop new ideas and perspectives for tackling the most difficult environmental health problems that exist today. *Dr. William Suk, Director of SRP*, said the emerging trans-disciplinary nature of the research program is a strength that is reflected in the diversity of published papers and in the way that SRP researchers are pushing the limits of their disciplines to develop new ideas for problem-solving. U.S. Representative Earl Blumenauer, D- Oregon, noted that work done by SRP researchers "is gold" for helping develop thoughtful and effective ways to improve our environment and public health in a cost-effective manner.
Environmental health problems associated with arsenic, polyaromatic hydrocarbons (PAHs), bisphenol A (BPA), uranium, persistent organic chemicals, and more are being tackled from the lab bench and the test tube to the community and the Superfund site. Researchers discussed chemicals and chemical mixtures in air, water, soil, and foods. Presentations and posters focused on cleaning up sites, understanding mechanisms of toxicity after exposure, minimizing exposure, and designing sustainable and affordable systems to deal with these problems.

The SRP meeting also featured informal discussions and brain-storming sessions about building more effective partnerships and collaborations between SRP, EPA, ATSDR, communities, and state governmental agencies. They discussed ways to optimize the sharing of information and resources so that more could be accomplished in this climate of limited financial resources. EPA and ATSDR representatives welcomed ideas for collaboration with SRP researchers, and discussion participants enthusiastically took home many pages of notes from discussions to transcribe and later share online. Clearly seeds for new ideas, approaches, partnerships, and collaborations were planted for developing new solutions to complex environmental health problems.

The meeting was also attended by Dr. Gwen Collman, DERT/OD; Drs. Janice Allen and Sally Eckert-Tilotta, SRB; and Ms. Lisa Edwards and Ms. Michelle Victalino, GMB.

NIH Roadmap Epigenomics Program Investigators Meeting and Roadmap Epigenomics Mapping Consortium Steering Committee Meeting
November 8 - 10, 2010
Bethesda Marriott, Bethesda, Maryland

Introduction: The NIH Roadmap Epigenomics Program (REP), which began in 2008, is a trans-NIEHS program (led by NIEHS and NIDA) aimed at understanding both the normal patterns of epigenetic modifications in humans, as well as how changes in these modifications may lead to disease. The annual Investigators Meeting brings together investigators funded under all five sub-initiatives (Reference Epigenome Mapping Centers (REMC), Epigenomics Data Analysis and Coordination Center (EDACC), Technology Development in Epigenetics, Discovery of Novel Epigenetic Marks, and Epigenomics of Human Health and Disease) to encourage collaboration and sharing of ideas. The two day meeting was followed by a smaller meeting of the Roadmap Epigenomics Mapping Consortium Steering Committee, attended by REMC and EDACC Principal Investigators (PIs) and staff, the consortium's external advisory panel, and NIH staff. These meetings were organized by NIEHS and NIDA program staff involved in the program, including *Dr. Lisa Chadwick, COSPB, Dr. Kimberly McAllister, SPHB, and Ms. Astrid Haugen, COSPB.*

Meeting Highlights: Particularly notable talks include one by Dr. David Hawkins of the UCSD REMC, discussing the results of a broad assessment of commercially available histone modification antibodies used for chromatin immunoprecipitation (ChIP). This group, a collaboration between investigators from the REP and the model organism Encyclopedia of DNA elements (modENCODE) consortium, found that over 25% of antibodies tested were either non-specific or failed to generate reproducible ChIP data. As epigenetic analyses depend upon these antibodies, these findings were particularly concerning to the group. The first day also featured a series of talks from investigators funded under the Epigenomics of Human Health and Disease RFA, including NIEHS grantee Dr. M. Daniele Fallin, who gave an engaging talk describing her ongoing study aimed at understanding the relationship between prenatal exposures, epigenetic changes, and the development of autism spectrum disorders. The second day of the meeting provided an update on the efforts of the Reference Epigenome Mapping Consortium and findings from their analyses of the data generated thus far. Additional talks discussed quality control metrics and data standards established by the program and introduced some of the consortium-generated analysis tools available to the public. On November 10, Dr. Chadwick and Dr. John Stamatoyannopoulos (University of Washington REMC), the current chair, led the satellite Steering Committee meeting of the Reference Epigenome Mapping Consortium. This meeting was focused on setting priorities and milestones for the third year of the program, as well as providing an opportunity to receive feedback from the External Advisory Panel. The meeting was also attended by Dr. James Anderson, the new Director of the Division of Program Coordination, Planning, and Strategic Initiatives, which oversees the Common Fund.

Outcomes: We received positive feedback from the grantees, particularly from those outside of the REMC/EDACC group. It was also felt that the Disease RFA PIs would benefit from increased interaction with each other and the REMC/EDACC group, even outside of the annual all-hands meeting. To facilitate this, Dr. Chadwick organized a working group of Disease RFA PIs, beginning in January 2011. This will give the PIs an opportunity to update each other on their work, to discuss any challenges that have arisen, and to get input from investigators funded under different parts of the REP, where appropriate. The Steering Committee meeting resulted in setting milestones for next year, and in focusing the group on delivering a comprehensive community resource.

Training Director's Meeting
November 3, 2011
Research Triangle Park, North Carolina

Meeting Summary: The Directors of the Ruth L. Kirschstein Institutional Training Directors met in the Rodbell Auditorium on the NIEHS Campus on November 3. There are currently 48 funded Institutional Training Programs that support pre- and post-doctoral training and three short term training programs that support summer research experiences for medical students.

The program included updates by the Director, NIEHS, Dr. Linda Birnbaum; the Director of the Division of Extramural Research and Training, *Dr. Gwen Collman*; and the NIH Training Officer, Dr. Rodney Ulane. *Dr. Christie Drew, Chief, PAB,* updated the Directors on the progress being made in the Web-based trainee tracking system, and NIEHS program analysts *Ms. Astrid Haugen, COSPB, and Mr. Liam O'Fallon, SPHB,* provided updates of two initiatives, the Epigenomics Roadmap Program and the Partnerships in Environmental Health.

There were three invited speakers, two scientific and one to inform on new educational initiatives. Dr. Harold Pincus, Co-Director, Irving Institute for Clinical and Translational Research, Columbia University, spoke on the program he developed, "Enhancing Research Mentoring: Institutional and Interpersonal Levers." Dr. Paul B. Watkins, Director, the Hamner – UNC Center for Drug Safety Sciences presented his research on "Novel Translational Approaches to Understand and Predict Drug Induced Liver Injury." Dr. Charles Epstein, Program Manager for Epigenomics discussed the NIH Roadmap Epigenomics Mapping Center at the Broad Institute.

*****

Interagency Breast Cancer and Environmental Research Coordinating Committee Meeting
September 30 - October 1, 2011
Washington, D.C.

Introduction/Background: The Interagency Breast Cancer and Environmental Research Coordinating Committee (IBCERCC) was created in October 2008, when the Breast Cancer and Environmental Research Act was signed into law, amending the Public Health Service Act.

The IBCERCC is charged with reviewing all research efforts within the U.S. Department of Health and Human Services (HHS) concerning the environmental and genomic factors related to the etiology of breast cancer, and developing a comprehensive summary of advances and recommendations regarding research gaps and needs for the Secretary of HHS.

The committee's primary mission is to facilitate the efficient and effective exchange of information on breast cancer research among the member agencies, and to advise the NIH and other federal agencies in the solicitation of proposals for collaborative, multidisciplinary research, including proposals to further evaluate the environmental and genomic factors that may be related to the etiology of breast cancer. It will serve as a forum to assist in increasing public understanding of the member agencies' activities, programs, policies, and research, and bring important matters of interest forward for discussion.

Meeting Highlights: The meeting consisted of presentations from federal members describing their respective agency's breast cancer and environment research portfolio, including scientific advances and perceived research gaps and needs. Dr. Paolo Boffetta, (http://www.mssm.edu/profiles/paolo-null-boffetta) deputy director of the Tisch Cancer Institute at the Mount Sinai School of Medicine also provided the committee with an overview of relevant international research.

In addition to the presentations, committee members led discussions focusing on areas of critical scientific importance, including the current understanding of breast cancer and environment, insights from the study of normal mammary gland development, windows of susceptibility to environmental agents, better models and exposure assessment tools, and research translation and community participation.

Recommendations/Outcomes: The committee developed a draft outline and defined three overarching themes that will guide the development of the IBCERCC Report:

1. State-of-the-Science: Defining "environment," summarizing current knowledge of normal versus abnormal development and the etiology of breast cancer and multiple exposures across the lifespan, reviewing of federal research portfolio, and conceptualizing methods to put scientific opportunities and resources to use.
2. Research Process: Setting research priorities, reducing redundancies, process for soliciting research, developing collaborations, identifying issues with peer review and the most appropriate model systems for breast cancer and environment research.
3. Research Translation, Dissemination, and Policy Implications: Encouraging community participation, determining when research is ready for dissemination to the public, and identifying best practices for research translation.

Dr. Gwen Collman, DERT/OD is the executive secretary and presented on the NIEHS portfolio. Other DERT staff in attendance at the meeting included *Ms. Rachel Gross, DERT/OD, and Drs. Elizabeth Maull and Les Reinlib, SPHB. Dr Caroline Dilworth, and Ms. Jenny Collins, SPHB,* attended via teleconference.

*****

Phytotechnologies in the 21st century: challenges after Copenhagen 2009. Remediation – Energy – Health - Sustainability
September, 26 - 29, 2010
University of Parma, Parma, Italy

Introduction/Background: The International Phytotechnologies Society focuses on ways to use plants to remedy environmental problems. For example, plants can be used to clean or contain contaminants from soil, sediments, or water. Planted systems can degrade organic pollutants and extract heavy metals. Plants can be used to restore impacted ecosystems, provide biofuel, sequester carbon, improve air quality, and beneficially impact our environment. This Society is devoted to bringing together the science, engineering, and applications of phytotechnologies worldwide.

The Superfund Research Program (SRP) has been a longtime supporter of plant-based remediation approaches at numerous universities. Dr. Burken (Missouri University of Science and Technology) and Dr. Schnoor (University of Iowa) were successful in submitting a proposal for supplemental funding to sponsor the travel of students to the meeting as well as to sponsor travel of researchers for an "Environment and Health" session. The rational for having the health effects session was to stimulate interactions between engineering and public health disciplines. The objective is to advance the use of phytotechnologies, a sustainable remediation practice, as a way to achieve primary prevention within the context of public health.

Meeting Highlights: Over 200 academic, government, and industry representatives attended the meeting, representing over 25 countries. The students awarded sponsored travel participated in separate workshops for career training and provided the conference organizers with a summary of their learning experiences.

Advances have been made in research to identify and optimize plant capability to reduce risk and enhance environmental benefits, as was evidenced by the quality of the presentations at the meeting. The research

ranged from mechanistic studies focusing on the enzymatic pathways necessary for the breakdown of exogenous contaminants, to full-scale remediation projects utilizing plants as a mechanism to reduce contamination.

The Environment and Health session featured seven speakers with topics ranging from managing risk reduction in urban gardens, plant sampling techniques that estimate indoor exposure to vapor intrusion, utilization of an aquatic plant to remove arsenic from contaminated drinking water, and plant screens effective in reducing air pollution. The session was well-attended with an average of approximately 100 attendees – standing room only – despite that there were two other concurrent sessions at the time.

Recommendations/Outcomes: The Society would like to continue to build connections within the public health community and propose to hold a session (and/or a presentation) on the summary of the Environment and Health session at the next American Public Health Association meeting. The next phytotechnologies meeting will be held in Portland, Oregon, on September 12.

Of note, SRP trainee Mr. Richard Meggo (University of Iowa) won the best student oral presentation award for his talk "Rhizospheric mineralization of PCB mixtures by hybrid poplar and switchgrass." Richard is a student of Dr. Jerry Schnoor. *Dr. Heather Henry, SRP*, attended the meeting.

*****

5th Aquatic Animal Models for Human Disease
September 20 - 22, 2010
LaSells Stewart Center, Oregon State University, Corvallis, Oregon

Introduction/Background: The 5th Aquatic Animal Models for Human Disease workshop was hosted by Oregon State University, with support from the Department of Environmental and Molecular Toxicology and the Environmental Health Sciences Center at Oregon State Univesity. This meeting, held biannually, was the fifth in a series of meetings that highlight the breadth and depth of research, directed at human health issues and environmental exposures conducted with aquatic models. The conference series is unique in that no one disease or model is the exclusive focus.

The meeting focused on recent advances in the use of aquatic models for human health related research and on how these models may be used for translational research. It provided investigators with a unique opportunity to exchange scientific information, identify research tools and opportunities, and encourage enhancement of the utility of aquatic models for studies of human disease, as well as the introduction and discussion of technologies being developed using aquatic models. The meeting included a range of presentations on recent discoveries from a variety of fields that are not typically covered in more specialized scientific conferences,

The conference brought together researchers, industrial leaders, and funding agency representatives to discuss how the unique advantages of aquatic models are being exploited to accelerate our understanding of the cause of human diseases and for the discovery of novel treatments.

Meeting Highlights: The meeting included over 38 invited speakers in eight scientific sessions, three workshops, a poster session with over 30 presenters, and an optional tour of the Zebrafish Resource Center (ZIRC) at the University of Oregon in Eugene, Oregon. The meeting was structured to allow ample time for networking among the participants.

The scientific sessions included: Environmental Health Sciences in the 21st Century: A Role for Aquatic Animal Models; Mutagenesis and Carcinogeneisis; Transcriptomics and Fish Genomics; Integrative Biology: Bridges Molecular Biology and Pathology; Oceans and Human Health; Tissue Regeneration and Aging; Infectious Disease and Immunity; and Behavior and CNS Disease.

The workshops topics were: Bioinformatics and Computational Biology with Web Based Resources; Aquatic Animal Health and Disease Management in Research Animals; and Cryopreservation of Germ plasm and Management of Genetic Resources.

Recommendations/Outcomes: The talks presented by invited speakers are to be published in a special issue of Comparative Biochemistry and Physiology (Part C: Pharmacology and Toxicology) and is being organized by Dr. Patrick Walsh. The conference was attended by more than 120 researchers from across the U.S. as well as international scientists (Hong Kong, U.K., Brazil, Japan, Germany, Netherlands, Bermuda and Taiwan). SRP encouraged the participation of graduate students and postdoctoral trainees by supplying six travel awards and selecting some abstracts for inclusion in platform session. SRP also provided awards to the top posters and presentations submitted by graduate students and postdoctoral fellows.

The next meeting will be hosted by the University of Wisconsin, Milwaukee (chaired by Dr. Michael Carvan, III).

*****

Next Generation Analytic Tools for Large Scale Genetic Epidemiology Studies of Complex Diseases
September 15 - 16, 2010
Bethesda, Maryland

Introduction/Background: Genome-wide association studies (GWAS) have been highly successful in recent years to identify large numbers of genetic variants associated with multiple common disease outcomes. However these genetic variants identified thus far represent only a small portion of the risk for the complex diseases. Gene-gene and gene-environment interactions have not been explored extensively and these explorations will be needed to identify and account for the multiple genetic and environmental risk factors associated with complex common diseases and to understand the biological pathways implicated in complex disease etiologies. It is broadly recognized in the genetic epidemiology community that more sophisticated analytical and scientific strategies will be necessary to move the field forward. In this context, the workshop "Next Generation Analytic Tools for Large Scale Genetic Epidemiology Studies of Complex Diseases" was developed to examine the state of the science and current challenges surrounding these areas of research.

This workshop, which was sponsored by the Epidemiology and Genetics Research Program (EGRP) and the Surveillance Research Program (SRP) of the Division of Cancer Control and Population Sciences (DCCPS), National Cancer Institute (NCI), National Institutes of Health (NIH), brought together staff from many NIH Institutes and extramural researchers in the fields of biostatistics, human genetics, bioinformatics, epidemiology, and computer science to discuss the analytic and computational challenges and opportunities presently available for large-scale genetic epidemiology studies. The steering committee for this workshop was a large, collaborative group including multiple members from each participating program of NCI (lead by Dr. Elizabeth Gillanders) as well as Dr. Emily Harris from the National Institute of Dental and Craniofacial Research (NIDCR), *Dr. Kim McAllister, SPHB*, Dr. Dina Paltoo from the National Heart, Lung and Blood Institute (NHLBI), and Dr. Erin Ramos from the National Human Genome Research Institute (NHGRI). The goals of the workshop were to (1) identify approaches and methods to identify genetic and environmental risk factors for common complex diseases and (2) identify the development and application of these strategies for the design, analysis, and interpretation of large-scale association studies

Meeting Highlights: A series of presentations on the following topics were given: Gene x Gene and Gene X Environment Interaction, Complex Phenotypes, Rare variants and Next-Generation Sequencing, Simulation models, and Computational Resources/Data Management. These presentations were given by

experts in these particular fields including Dr. Peter Kraft, Harvard; Dr. Nancy Cox, University of Chicago; Dr. John Witte, University of California San Francisco; Dr. Kathryn Roeder, Carnegie Mellon University; Dr. Christopher Amos, The University of Texas M. D. Anderson Cancer Center; Dr. Michael Province, Washington University School of Medicine: and Dr. Jason Moore, Dartmouth Medical School. The keynote address was given by Daniel J. Schaid, Ph.D. from the Mayo Clinic. Attendees also participated in discussions of the challenges surrounding these topics during breakout sessions. Dr. Clare Weinberg from NIEHS chaired the breakout sessions for G x G /G x E interactions. The workshop finished with report backs from the breakout session chairs, who highlighted the most important obstacles in each area and made recommendations for future short and long-term needs in these research disciplines.

Meeting Recommendations/Outcomes: Some of the short-term recommendations for further developing the discovery of G x G and G x E interactions included: the further development of analytical methods and approaches with user-friendly software, a focus on re-analysis of existing GWAS studies for G x E and G x G interactions, comparisons of different study design models and methods for use with different datasets, the harmonization of data types (especially of environmental measures), and a focus on meta-analyses of existing studies when possible for power necessary to do G x G, G x E interactions. Longer-term recommendations and needs identified include: the broader use of functional studies (mouse models, cell lines, etc.) for validation of risk from multiple genetic variants and/or environmental factors; the incorporation of improved environmental measures into planning of long-term cohort studies; the integration of many data types (genomics, metabolomics, gene expression, epigenomics); better exposure assessment; and the incorporation of repeated exposures over time in cohort studies. A meeting report for this workshop is currently being written with plans to submit to the journal "Genetic Epidemiology". In addition, NIEHS is leading a funding initiative with multiple participating Institutes on analytical methods for G x E studies (PAR-11-032 - Methods and Approaches for Detection of Gene-Environment Interactions in Human Disease (R21). This funding announcement is focused on identifying the effectiveness of various types of novel G x E biostatistical and bioinformatics methods and study designs that might increase power to detect G x E interactions. Many of the recommendations from this workshop were incorporated into this funding announcement and into the planning of many follow-up studies for the NIH Genes, Environment and Health Initiative (GEI) as well.

*****

Expert Panel Workshop to Examine the Role of the Environment in the Development of Autoimmune Disease

September 7-8, 2010
Hilton Garden Inn, Durham, North Carolina

Introduction/Background: Over the past 10 years, the NIEHS has participated in trans-NIH committees and sponsored a number of workshops examining the role of the environment and the development of autoimmune disease. Despite the recommendations for research initiatives and the ongoing accumulation of research data, there are still numerous gaps in knowledge in this field. The goal of this new workshop was to bring together experts from the environmental health science and autoimmune research communities to:

- review the findings from their diverse research disciplines concerning the role of the environment and the development of autoimmune disease;
- identify conclusions that can be drawn with confidence from existing data;
- identify critical knowledge gaps and areas of uncertainty; and
- establish key elements of a coherent research agenda to help fill these gaps and resolve uncertainties.

Meeting Highlights: Approximately 40 scientists participated in this 1 ½ day workshop. Prior to the workshop, participants were placed in one of four working groups: animal models, mechanisms,

epi/human studies, and exposure assessment. The working groups were tasked with reviewing the literature in their respective fields prior to the workshop and providing a draft review document examining the published data and reporting:

1. Based on existing evidence we are confident of the following….
2. We consider the following to be likely but require confirmation….
3. Research themes which we believe should be pursued on future investigations.
4. Overall conclusions regarding the role of the environment and the development of autoimmune disease.

Presentations of the draft findings and working group and breakout group discussions constituted the majority of the meeting.

Recommendations/Outcomes: The working groups continue to develop and polish the draft review documents. This workshop will generate publishable reports on the state of the science, and help determine the most appropriate and productive directions for research in the area of environmentally related autoimmune disease via the publication of a workshop consensus statement.

Dr. Michael Humble, COSPB, led the organization of this meeting. *Dr. J. Patrick Mastin, DERT/OD,* was on the planning committee. *Dr. Humble and Dr. Gwen Collman, Director, DERT,* gave presentations. *Drs. Jerry Heindel, COSPB, and Daniel Shaughnessy, SPHB,* attended the meeting.

The NIEHS gratefully acknowledges the generous support of the meeting from the American Autoimmune Related Diseases Associations, Inc.

*****

DERT PAPERS OF NOTE

Freeway Proximity and Autism
Irva Hertz-Picciotto, Ph.D., UC Davis and
Rob McConnell, MD, University of Southern California
R01ES015359 and R21ES019002-01

New research findings from a study sponsored by NIEHS suggest that babies born to mothers who live close to freeways have double the risk of developing autism compared to other children. The study examined almost 600 children ages 2-5 from Los Angeles, San Francisco, and Sacramento. About half the children had autism. Those whose homes were less than 1,000 feet from a freeway were about twice as likely to have autism.

Little is known about environmental contributions to autism, but oxidative stress and inflammation have been linked to the disorder. Previous basic research has demonstrated that traffic-related air pollution causes oxidative damage and increases inflammatory signaling pathways.

In the current study, 304 children had autism and were compared to 259 typically developing children. The study participants were enrolled in the Childhood Autism Risks from Genetics and the Environment (CHARGE) Study. After adjusting for socioeconomic and demographic factors, the mother's address, taken from the birth record, was more likely to be near a freeway (less than 309 meters) for cases as compared to controls. Autism was also associated with residential proximity to a freeway during the third trimester; however, living near other major roads was not associated with autism.

Citation: Volk HE, Hertz-Picciotto I, Delwiche L, Lurmann F, McConnell R. Residential Proximity to Freeways and Autism in the CHARGE study. Environ Health Perspect. 2010. Dec 13.

*****

A Simple Sensor for Explosive Chemicals
Kenneth Suslick, Ph.D.
University of Illinois
U01ES016011

University of Illinois chemists have developed a simple device to detect an explosive like those used in several recent unsuccessful attempts to bring down airliners. The device could lead to an inexpensive and easy to use detector of luggage and passenger screening in airports.

The explosive, triacetone triperoxide (TATP), is easily prepared from products readily available, but it is very difficult to detect with standard detection methods. The researchers developed a colorimetric sensor assay that can detect very low levels of TATP vapor, as low as 2 parts per billion, in a matter of seconds. The sensor array consists of 16 colored dots on an inert plastic film. An acid catalyst breaks down TATP into detectable components that cause the pigments to change color.

The array is uniquely sensitive to TATP and is unaffected by temperature, humidity, or exposure to other chemicals such as those found in detergents or personal care products. The chemists made a hand-held prototype that is just as effective as their laboratory model. The hand-held sensor is now being commercialized by iSense, a sensor manufacturer based in Palo Alto, California..

Citation: Lin H, Suslick KS. A colorimetric sensor array for detection of triacetone triperoxide vapor. J Am Chem Soc. 2010. Nov 10;132(44):15519-21.

*****

Blood DNA Methylation Related to Heart Disease and Stroke
Joel D. Schwartz, Ph.D
Harvard School of Public Health
P30ES000002 and R01ES015172

NIEHS-supported epidemiologists at Harvard University have found that blood DNA methylation is linked to the risk of ischemic heart disease and stroke in a population of 712 elderly subjects in the Boston-Area Normative Aging Study.

The team measured blood cell DNA methylation of Long Interspersed Nucleotide Element-1 (LINE-1) repetitive elements by polymerase chain reaction-pyrosequencing. They estimated relative risks for ischemic heart disease and stroke at baseline and again five years later, and also for mortality from ischemic heart disease.

LINE-1 hypomethylation was associated with baseline heart disease and stroke (relative risk = 2.1 and 2.5 respectively). In participants free of disease, hypomethylation was associated with higher risk for developing ischemic heart disease (relative risk = 4.1) or stroke (relative risk = 5.7). In the entire cohort, subjects with hypomethylation were about three times more likely to die of ischemic heart disease or stroke.

The researchers conclude that as standardized assays become more availably, DNA methylation analysis may contribute to better cardiovascular risk estimation. These results add to the importance of ongoing endeavors in developing interventions and treatments that act through epigenetic mechanisms.

Citation: Baccarelli A, Wright R, Bollati V, Litonjua A, Zanobetti A, Tarantini L,Sparrow D, Vokonas P, Schwartz J. Ischemic heart disease and stroke in relation to blood DNA methylation. Epidemiology. 2010. Nov;21(6):819-28.

*****

BPA Exposure and Oocyte Quality
Frederick S. vom Saal, Ph.D.
University of Missouri
R01ES018764

A small study conducted by NIEHS-supported researchers at the University of California San Francisco has determined that as blood bisphenol A (BPA) levels rise, the quality of oocytes from women undergoing in vitro fertilization declines. As blood levels of BPA doubled, the percentage of eggs that fertilized normally declined by 50 percent.

BPA levels and fertilization rates were analyzed for 26 women undergoing in vitro fertilization during 2007 and 2008. The women were a subgroup of a larger study evaluating the effects of trace exposures to toxic metals on reproductive health.

Though the size of the study is small, the results indicate a negative effect of BPA on reproduction and fertility that may carry over to the general population. Further research on a much larger cohort of participants is necessary to confirm these findings in the general population, but given the widespread nature of BPA exposure in the US, even a modest effect on reproduction demonstrates a substantial concern according the researchers.

Citation: Fujimoto VY, Kim D, Vom Saal FS, Lamb JD, Taylor JA, Bloom MS. Serum unconjugated bisphenol A concentrations in women may adversely influence oocyte quality during in vitro fertilization. Fertil Steril. 2010. Dec 4.

*****

Death Rates Climb During Heat Waves
Michelle L. Bell, Ph.D.
Yale University
R01ES012054

According to research recently published by NIEHS grantees, mortality climbs during summer waves in the United States almost every year. These results have policy implications for addressing the burden of heat waves and for estimating the possible health effects of climate change.

According to the study, the average daily risk of non-accidental death increased 3.75 percent during the heat waves studied in 43 U.S. cities from 1987 to 2005. For each one degree rise above average temperature, the risk of death increased 2.45 percent and 0.38 percent every day the heat wave continued. For the purposes of this study, heat waves were defined as two or more days when the average mean temperature exceeded the 95th percentile of temperatures for May through September for a given city.

Daily risk of mortality was almost double during the first heat wave of the season compared to later heat waves. The authors conclude that people were not acclimated to the heat early and may not have taken appropriate precautions such as using air conditioning or fans and curtailing outside activities. Risk of mortality was greatest in the Northeast and Midwest and the risk of death soared during catastrophic heat waves in 1995 in Chicago and Milwaukee.

Citation: Anderson GB, Bell ML. Heatwaves in the United States: Mortality Risk During Heatwaves and Effect Modification by Heatwave Characteristics in 43 US
Communities. Environ Health Perspect. 2010. Nov 18. [Epub ahead of print]

*****

Sequencing the Exposome

Stephen M. Rappaport, Ph.D. and Martyn Smith, Ph.D.
University of California Berkeley
P42ES004705 and U54ES016115

NIEHS researchers write of the need for the study of the "exposome" in the October 22nd edition of Science. The word exposome was coined in 2005 and is defined as the record of all exposures, both internal and external, individuals receive throughout their lifetime. Martyn Smith and Steve Rappaport advocate for identifying exposures during critical windows of development. They employ the analogy of a movie trailer to explain their idea. A movie represents an individual's life and each frame of the film represents an exposure. Just as a movie trailer condenses all the important parts of the film into about 30 seconds, they believe that having a record of exposures during the important parts of our lives would be beneficial in predicting and preventing disease.

The Berkeley scientists and others advocate a top down approach using various "omics" technologies to gather information needed to understand the exposome. Their approach is to measure gene expression, protein adducts, metals, and metabolites in blood and then use data analysis to determine which exposures are related to disease.

The idea of the exposome is gaining traction in the scientific community and in the chemical industry as well. Industry representatives think that a better understanding of exposures will exonerate many chemicals that are widely feared.

Citation: Rappaport SM, Smith MT. Epidemiology, Environment and disease risks. Science. 2010. Oct 22;330(6003):460-1.

****

Epigenetic Changes and Low-Dose BPA in Breast Epithelial Cells

Tim H.-M. Huang, Ph.D.
Ohio State University
U01ES015986 and R01ES017594

NIEHS-supported scientists at Ohio State University report that low-dose exposure of human breast epithelial cell cultures to bisphenol A causes epigenetic changes suggesting that this model may be widely useful in studying the health effects of bisphenol A and other endocrine disruptors.

There is wide evidence that early exposure to bisphenol A and other estrogen-like compounds may increase breast cancer risk later in life. An epigenetic process has been postulated for this effect, but it is not well understood.

The researchers identified 170 genes with similar gene expression changes after the low-dose bisphenol A exposure. Further analysis revealed that the expression of the gene for lysosomal-associated membrane protein 3 was epigenetically silenced. Additional studies found the same effect in estrogen receptor alpha-positive breast tumors. The authors conclude that the combination of their exposure model, epigenetic analysis, and other assays can lead to a better understanding of the heritable effects of low-dose bisphenol A exposure in human cells.

Citation: Weng YI, Hsu PY, Liyanarachchi S, Liu J, Deatherage DE, Huang YW, Zuo T, Rodriguez B, Lin CH, Cheng AL, Huang TH. Epigenetic influences of low-dose bisphenol A in primary human breast epithelial cells. Toxicol Appl Pharmacol. 2010 Oct 15;248(2):111-21.

*****

Genetic Driver of Severe Allergic Asthma
Marsha Wills-Karp, Ph.D.
Cincinnati Children's Hospital Medical Center
P50ES015903

NIEHS-supported investigators at the Cincinnati Children's Hospital Medical Center have discovered a genetic basis for determining the severity of asthma. The work, carried out in laboratory mice, could form the basis for future therapeutic strategies to treat asthma.

Asthma cases have been increasing in the past few decades. The disease is triggered in susceptible people by components of air pollution, allergens, tobacco smoke, and other environmental agents.

The research team identified a pro-inflammatory protein called interleukin-17A as the chief cause of severe asthma-like symptoms in their laboratory animals. They found that exposure to allergens causes incorrect regulation of a gene called complement factor 3 which is part of the innate immune system. This results in over-production of interleukin-17A, which in turn contributes to ever increasing inflammatory responses and hyper airway responsiveness and airflow obstruction.

The research team will continue to study the interaction of complement factor 3 and interleukin-17A in severe asthmatics with the hope of targeting one or both of the pathways for the treatment of severe asthma.

Citation: Lajoie S, Lewkowich IP, Suzuki Y, Clark JR, Sproles AA, Dienger K, Budelsky AL, Wills-Karp M. Complement-mediated regulation of the IL-17A axis is a central genetic determinant of the severity of experimental allergic asthma. Nat Immunol. 2010. Oct;11(10):928-35.

*****

Amplifying Stem Cells
Gary Perdew Ph.D., Pennsylvania State University
Michael S. Denison Ph.D and Bruce Hammock Ph.D., University of California Davis
R01ES004869, ES007685, and P42ES004699

The success of hematopoietic stem cell transplantation into human patients for treating blood diseases depends on the number of stem cells in the graft. Culturing stem cells with a cocktail of growth factors before transplantation can induce proliferation, but the increase in cell number is rapidly followed by differentiation, which is accompanied by loss of the cell surface markers CD34 and CD133.

NIEHS grantees recently identified the purine derivative StemRegenin 1 (SR1) in a screen for small molecules that could stimulate stem cell growth without hastening differentiation. Culturing human stem cells collected from peripheral blood with the cytokine cocktail plus SR1 increased the number of $CD34^+$ and $CD133^+$ cell populations as compared to control cells treated with the growth factors alone. SR1 treatment had no effect in the absence of the growth factors, and removing SR1 from the culture medium induced differentiation of the cells. Addition of SR1 did not increase proliferation of stem cells but instead increased the proportion of cells that were $CD34^+$ by suppressing differentiation. The number of multilineage colonies formed by stem cells also increased with SR1 treatment as compared to controls, further supporting the idea that SR1 maintained stem cells in a multipotent state. SR1treatment increased

both short- and long-term engraftment of human umbilical cord blood $CD34^+$ cells into mice as compared to uncultured or control stem cells cultured with cytokines alone.

SR1 inhibited the aryl hydrocarbon (Ah) receptor, a nuclear receptor that has been implicated in pathways that regulate hematopoiesis. Two agents that bind to the Ah receptor mimicked the effects of SR1 on cultured stem cells, and SR1 blocked the transcriptional response to the AhR agonist dioxin. The authors conclude that modulating Ah receptor activity may be a useful strategy for improving clinical outcome of stem cell transplantation.

Citation: Boitano AE, Wang J, Romeo R, Bouchez LC, Parker AE, Sutton SE, Walker JR,Flaveny CA, Perdew GH, Denison MS, Schultz PG, Cooke MP. Aryl hydrocarbon receptor antagonists promote the expansion of human hematopoietic stem cells. Science. 2010 Sep 10;329(5997):1345-8.

*****

Cause of Vioxx-Induced Cardiovascular Events Determined
Bruce Hammock, Ph.D., University of California Davis
R01ES002710 and P42ES004699

An international research team with funding from NIEHS has discovered a novel mechanism which may explain the heart attacks and strokes suffered by some long-term, high-dosage users of the arthritis drug Vioxx. This groundbreaking discovery may lead to safer drugs for millions of people who suffer chronic pain.

The team employed metabolomic profiling to analyze the plasma of laboratory mice given Vioxx. They found dramatic accumulations of an arachidonic acid metabolite known as 20-HETE. The metabolite is known to be a potent vasoconstrictor and high levels of it could cause increases in the risk of heart attack and stroke. The research team believes that similar increases might be seen with other non-steroidal anti-inflammatory drugs.

Vioxx was pulled from the marketplace in 2004 after reports of heart attacks and stroke in patients taking the drug. It had been used by millions of people worldwide and showed great promise for disease and conditions marked by chronic pain and inflammation such as arthritis. The UC Davis scientists believe that their findings will open new paths for developing safer COX2 inhibitors. Agents that reduce the circulating levels of 20-HETE while providing the same pain relief may reduce the risk of adverse cardiovascular events.

Citation: Liu JY, Li N, Yang J, Li N, Qiu H, Ai D, Chiamvimonvat N, Zhu Y, Hammock BD. Metabolic profiling of murine plasma reveals an unexpected biomarker in rofecoxib-mediated cardiovascular events. Proc Natl Acad Sci U S A. 2010. Sep 28;107(39):17017-22.

Promising Target for Parkinson's Disease Treatment
Kathleen Maguire-Zeiss, Ph.D.
Georgetown University
R01ES014470

New research from Johns Hopkins University with support from NIEHS demonstrates that certain commercially available drugs protect nerve cells from the lethal effects of Parkinson's disease in a mouse model. These drugs were shown to be an effective treatment in inhibiting the production of a protein known as LRRK2. This protein is known to be overactive in some Parkinson's patients and causes nerve cells to die.

The researchers monitored LRRK2 autophosphorylation and LRRK2-mediated phosphorylation of myelin basic protein with and without treatment with 70 kinase and phosphorylase inhibitors. Of the 70 tested,

eight were found to block the effects of LRRK2 and two of those are known to cross the blood-brain barrier.
These two compounds, known as GW5074 and indirubin-3'-monooxine, were tested in a mouse model of LRRK2 neurotoxicity. Injections of these two drugs twice a day substantially prevented nerve cell death—one was almost completely effective and the other prevented cell loss by about 80 per cent. The two drugs have similar structures leading the researchers to envision developing additional compounds around their core structure. The researchers are currently working to design more specific inhibitors of LRRK2 and the group plans to license the technology they develop.

Citation: Lee BD, Shin JH, VanKampen J, Petrucelli L, West AB, Ko HS, Lee YI, Maguire-Zeiss KA, Bowers WJ, Federoff HJ, Dawson VL, Dawson TM. Inhibitors of leucine-rich repeat kinase-2 protect against models of Parkinson's disease. Nat Med. 2010. Sep;16(9):998-1000.

*****

Prenatal PAH Exposure Lowers IQ

Frederica Perera, Ph.D.
Columbia University
R01ES010165

New findings from a Columbia University study conducted in Krakow, Poland show that prenatal exposure to polycyclic aromatic hydrocarbons reduces IQ in children at five years of age. The study results recapitulate an epidemiologic study done by the same researchers on a population of women and children from New York City.

Healthy, pregnant non-smoking women were recruited into the study from 2001 to 2006. While pregnant, the women completed a questionnaire and carried a personal air monitor for 48 hours to estimate their babies' exposure to air pollutants. They also provided a blood sample or cord blood sample at delivery. A total of 214 children were followed through 5 years of age. At that time the children were given a standardized intelligence exam called the Raven Coloured Progressive Matrices (RCPM) test.

The median prenatal exposure to PAHs was 17.96 nanograms per cubic meter of air. Children exposed to levels higher than this had an average decrease in IQ by 3.8 points. Adjusting for maternal intelligence, lead exposure or dietary intake of PAH did not alter the results. These finding cause concern because RCPM scores measured during the preschool period correlate with academic achievement later in life. The research team is continuing to follow these children to determine longer-term effects of PAH exposure.

Citation: Edwards SC, Jedrychowski W, Butscher M, Camann D, Kieltyka A, Mroz E, Flak E, Li Z, Wang S, Rauh V, Perera F. Prenatal exposure to airborne polycyclic aromatic hydrocarbons and children's intelligence at 5 years of age in a prospective cohort study in Poland. Environ Health Perspect. 2010. Sep;118(9):1326-31.

****

Low Dose BPA Alters Gene Expression in the Fetal Mouse Ovary

Patricia Hunt, Ph.D.
Washington State University
R01ES013527

NIEHS grantee Dr. Patricia Hunt at Washington State University reports that gene expression changes in fetal mouse ovaries occur as soon as 12 hours after the mother has been exposed to bisphenol A. These changes may produce adverse reproductive outcomes as the mice grow and develop.

Bisphenol A is a ubiquitous chemical found in many forms of plastic that humans come in contact with daily. It is used in water and baby bottles, in the plastic linings of food and beverage cans, and in other consumer products. A growing body of evidence demonstrates that it is an endocrine disruptor at all stages of life.

The research shows that bisphenol A affects the earliest stages of egg production in the ovaries of developing mice fetuses suggesting that their offspring may suffer genetic defects in biological processes such as mitosis and DNA replication. This is an example of a "transgenerational" effect in that the grandchildren of the exposed animals are still at risk for adverse health effects.

The research team also reports finding down-regulation of mitotic or cell cycle genes raising the possibility that bisphenol A exposure might act to shorten the reproductive lifespan by reducing the pool of fetal oocytes that later mature into eggs. If this effect is true in humans, it could result in premature menopause in women.

Citation: Lawson C, Gieske M, Murdoch B, Ye P, Li Y, Hassold T, Hunt PA. Gene Expression in the Fetal Mouse Ovary Is Altered by Exposure to Low Doses of Bisphenol A. Biol Reprod. 2010. Aug 25.

*****

Common Genetic Variants Associated with Blood Lipids

James Swenburg, DVM, Ph.D.
University of North Carolina
P30ES010126

A genome-wide association study published in the August 5 issue of *Nature*, and partially supported by NIEHS reports genetic variants associated with levels of four blood lipids: total cholesterol; low-density lipoprotein cholesterol; high-density lipoprotein cholesterol; and triglycerides. The paper is a world-wide multi-institute collaborative effort based on data from more than 100,000 individuals of European descent.

The study identified 95 loci associated with at least one of the four traits tested. These included the 36 previously reported and 59 newly identified loci. Of the new loci, 39 were associated with total cholesterol, 31 with high-density lipoprotein, 22 with low-density lipoprotein, and 16 with triglycerides. Interestingly, 21 of the 36 known loci showed association with another lipid phenotype in addition to that previously reported.

Additional analyses were undertaken in populations with East Asian, South Asian, and African American ancestry using a different cohort of Europeans as a control group. The single nucleotide polymorphisms found in this control European cohort were largely replicated in the non-European populations, albeit to a lesser extent in the African American population.

In order to assess the clinical relevance of these loci, associations with coronary artery disease were assessed in 25,000 cases and 66,000 controls of European descent. Thirteen loci showed association, with most of them also being associated with low density lipoprotein showing a causal risk factor. A second clinical phenotype, hyperlipidaemia, was also assessed in a smaller study, where individuals with greater numbers of risk loci showed higher lipid levels.

The study identifies a large number of loci associated with blood lipids in both European and non-European populations, as well as provides clinical and biological evidence that increases the strength of these associations.

Citation: Teslovich TM, et. al. Biological, clinical and population relevance of 95 loci for blood lipids. Nature. 2010. Aug 5;466(7307):707-13.

*****

Charlotte, NC Light Rail Transit Use Reduces Obesity Risk
D.J. Peterson, Ph.D.
Rand Corporation
R21ES014167

New research finding supported solely by NIEHS demonstrate that increasing the availability of light-rail systems and improving neighborhood environments is associated with a reduction in body mass index.

Researchers conducted two surveys in Charlotte, NC before and after the completion of a light-rail system serving downtown locations. The surveys assessed levels of physical activity, body mass index, perception of neighborhood environments, and the use of public transit systems. They found that construction of the light rail system led to increases in walking and subsequent weight loss. These findings were also associated with having a positive impression of one's neighborhood. The use of the light-rail system to commute to work resulted in an average reduction in body mass index of 1.18 kg/m^2 and an 81 percent decreased risk of becoming obese.

Citation: MacDonald JM, Stokes RJ, Cohen DA, Kofner A, Ridgeway GK. The effect of light rail transit on body mass index and physical activity. Am J Prev Med. 2010. Aug;39(2):105-12.

*****

Circadian Clock in Pancreas Linked to Diabetes
Christopher A. Bradfield, Ph.D.
University of Wisconsin Madison
R37ES005703

New research by NIEHS grantees at Northwestern University published in the prestigious journal *Nature,* reports that the circadian clock in pancreatic islet cells regulates the production of insulin. If the clock or more specifically the genes that regulate it, are faulty, the result is diabetes.

The researchers report the insulin-secreting beta cells have their own dedicated clock, which regulates the behavior of genes and proteins involved in insulin production and secretion on a 24-hour cycle. The researchers created transgenic mice with the clock genes knocked out. The animals developed impaired glucose tolerance, abnormally low levels of insulin, and went on to develop diabetes.

The team concludes that the variation seen in insulin secretion in humans and susceptibility to diabetes is likely related to the clock mechanism. They report an association in the changes of the cycling of the clock within the pancreas itself and disease. They plan to continue research in this area to determine if the clock can be modulated which may lead to a better understanding or better treatments for diabetes.

Citation: Marcheva B, Ramsey KM, Buhr ED, Kobayashi Y, Su H, Ko CH, Ivanova G, Omura C, Mo S, Vitaterna MH, Lopez JP, Philipson LH, Bradfield CA, Crosby SD, JeBailey L, Wang X, Takahashi JS, Bass J. Disruption of the clock components CLOCK and BMAL1 leads to hypoinsulinaemia and diabetes. Nature. 2010. Jul 29; 466(7306):627-31.

*****

***In Utero* BPA Exposure Leads to Epigenetic Alterations**
Hugh S. Taylor, M.D.
Yale University School of Medicine

R01ES010610

Researchers at the Yale University School of Medicine report that *in utero* exposure to bisphenol-A (BPA) causes diminished methylation of the estrogen response element of the *Hoxa10* gene. This finding suggests that permanent epigenetic alteration of estrogen response element sensitivity to estrogen may be a general mechanism by which endocrine disrupting chemicals exert their actions.

BPA is a known endocrine disrupting chemical. It binds to the estrogen receptor tricking the cells' machinery into thinking they are being signaled by estrogen to act in a prescribed manner. The *Hoxa10* gene is a homeobox gene which controls uterine growth and development. A homeobox is a DNA sequence found in genes that are involved in the regulation of patterns of development. They are found in animals and plants.

In this study, pregnant mice were treated with BPA. *Hoxa10* and protein expression were increased by 25 percent in the reproductive tracts of mice exposed *in utero.* DNA methylation of *Hoxa10* was significantly reduced in both the promoter and intron regions of the gene after BPA exposure. The decrease in methylation led to an increase in binding of the estrogren receptor alpha to the estrogen response element of the gene.

Citation: Bromer JG, Zhou Y, Taylor MB, Doherty L, Taylor HS. Bisphenol-A exposure in utero leads to epigenetic alterations in the developmental programming of uterine estrogen response. FASEB J. 2010. Jul; 24(7):2273-80.

*****

Vitamin A Treatment and Lung Disease in Pre-Term Lambs
Dallas M. Hyde, Ph.D.
University of California Davis
P01ES000628

Neonatal Chronic Lung Disease (CLD) often occurs in premature babies who are chronically maintained on mechanical ventilation until their lungs have developed enough to breath normally. The disease is characterized by incomplete development of the lungs and a thickening of lung tissues. Even with improved procedures for ventilation, neonatal CLD continues to be a major cause of mortality and long-term morbidity in premature infants. Administration of vitamin A has improved the respiratory outcome of premature infants, but there is little information to suggest the mechanisms by which this occurs.

A multi-disciplinary team of researchers from Utah, California, Pennsylvania and Texas reports that a variety of growth factors and cellular components are modulated by vitamin A administration in premature lambs managed with mechanical ventilation. Gene expression of tropoelasatin and deposition of elastin was decreased in treated lambs while vascular endothelial and other growth factors were increased.

The researchers conclude that vitamin A treatment partially improves lung development in chronically ventilated pre-term neonates by modulating these factors. They speculate that treatment approaches that could potentially enhance these effects may lead to more complete alveolar development and capillary growth such that gas exchange will be in improved in premature infants.

Citation: Albertine KH, Dahl MJ, Gonzales LW, Wang ZM, Metcalfe D, Hyde DM, Plopper CG, Starcher BC, Carlton DP, Bland RD. Chronic lung disease in preterm lambs: effect of daily vitamin A treatment on alveolarization. Am J Physiol Lung Cell Mol Physiol. 2010 Jul;299(1):L59-72.

*****

Polyfluoroalkyl Chemicals Linked to ADHD

David M. Ozonoff, Ph.D.
Boston University School of Public Health
P42ES007381

Researchers at the Boston University School of Public Health report a link between exposure to polyfluoroalkyl chemicals (PFCs) and attention deficit hyperactivity disorder (ADHD) in children. This research was supported by NIEHS.

PFCs are highly stable compounds used in a variety of industrial and commercial applications such as stain resistant coatings, food packaging, fire-fighting foams, and non-stick surfaces for cookware. The research team used data from the National Health and Nutrition Examination Survey (NHANES) to compare PFCs levels in blood samples taken from 571 children ranging in age from 12 to 15. Forty-eight of the children were reported to have ADHD. An earlier report of NHANES data suggests that more than 98% of the US population has measureable amounts of PFCs. Because of the compounds' stability, it can take years for PFCs to be eliminated from the body.

Other research suggests that PFCs may be developmental neurotoxicants. *In vitro* studies show the compounds affect nervous cell differentiation. And *in utero* rodent studies linked PFCs to reductions in thyroid hormone which is known to regulate brain development.

The Boston University team is careful to point out that at the present time, there is no evidence that PFCs cause ADHD—they have only discovered the link. But given the persistence and prevalence of these compounds in the environment further investigations into whether PFCs cause ADHD and other behavioral disorders is merited.

Citation: Hoffman K, Webster TF, Weisskopf MG, Weinberg J, Vieira VM. Exposure to Polyfluoroalkyl Chemicals and Attention Deficit Hyperactivity Disorder in U.S. Children Aged 12-15 Years. Environ Health Perspect. 2010. Jun 15.

Link Discovered Between Particulate Matter Air Pollution and Sleep-Disordered Breathing
Antonella Zanobetti, Ph.D., Joel Schwartz, Ph.D., Brent Coull, Ph.D., and Diane Gold, M.D.
Harvard School of Public Health
P01ES009825

In a study co-funded by NIEHS, the National Heart Lung and Blood Institute and the U.S. EPA, researchers at the Harvard School of Public Health report for the first time a link between particulate matter air pollution and sleep-disordered breathing, a known contributor to cardiovascular diseases.

Sleep-disordered breathing includes conditions such as apnea and hypopnea and affects approximately 17 percent of U.S. adults, many of whom are not aware that they have a problem. The current studies included over 3,000 subjects and found novel evidence for temperature and pollution effects on sleep-disordered breathing. Increases in apnea and hypopnea were associated with short-term temperature increases in all seasons and with increases in particulate matter air pollution in the summer months.

Specifically, increases in particulate matter of less than ten micrometers in size were associated with about a 13 percent increase in the Respiratory Disturbance Index and with a 20 percent increase in the amount of time the blood oxygen saturation fell below 90 percent.

There is known overlap in factors that contribute to sudden infant death syndrome (SIDS) and sleep-disordered breathing. Previous research has shown a similar association between increases in air pollution and increased risk of SIDS.

These findings are of even greater significance as researchers demonstrate the importance of sleep to overall health and well-being. Air pollution and sleep-disordered breathing are independently associated with increased risk for cardiovascular diseases, strokes, and other major health conditions. Further research is necessary to determine whether particulate matter air pollution produces it negative effects, at least in part, by promoting sleep-disordered breathing.

Citation: Zanobetti A, Redline S, Schwartz J, Rosen D, Patel S, O'Connor GT, Lebowitz M, Coull BA, Gold DR. Associations of PM10 with Sleep and Sleep-disordered Breathing in Adults from Seven U.S. Urban Areas. Am J Respir Crit Care Med. 2010. Jun 10.

*****

Living, Breathing Lung-on-a-Chip
Donald E. Ingber, MD, Ph.D.
Wyss Institute for Biologically Inspired Engineering
R01ES016665

NIEHS-supported researchers have developed a device that mimics a living and breathing human lung on a microchip roughly the size of a quarter. This device was developed in response to the Nanoscience and Nanotechnology in Biology and Medicine Program. The research team is located at the Wyss Institute for Biologically Inspired Engineering at Harvard University.

The device has the potential to be a valuable research tool for testing the effects of environmental agents, and the absorption, safety and efficacy of drug candidates. The device may help accelerate and reduce the expense of drug development by reducing the reliance on current models, in which testing of a single substance can cost more than $2 million.

The lung-on-a-chip device uses a new approach to tissue engineering which places tissue from the lining of the alveoli and the blood vessels that surround them across a porous membrane. Air flows across the

lung cells while culture medium, mimicking blood, is pumped through the capillaries. Mechanical stretching of the device mimics the expansion and contraction of the lungs during breathing.

The researchers tested the device by introducing *E. coli* bacteria on the lung cell side of the device while allowing white blood cells to flow through the capillaries. The lung cells detected the bacteria, and through the porous membrane, activated the blood vessel cells, which caused an immune response resulting in the white blood cells movement to the air chamber where they killed the bacteria. They conducted additional tests with nanoparticles found in commercial products and air and water pollutants. The results show that the nanoparticles passed through the lung tissue and into the capillary system. Mechanical stretching greatly enhanced the nanoparticle absorption. The investigators are following up these studies with others to test the gas exchange capacity of the device. The team is also working to build other model systems to mimic the intestinal system, bone marrow, and cancer models.

Citation: Huh D, Matthews BD, Mammoto A, Montoya-Zavala M, Hsin HY, Ingber DE. Reconstituting organ-level lung functions on a chip. Science. 2010. Jun 25;328(5986):1662-8.

*****

Transcription Termination Flips Out
Miguel Garcia-Diaz, Ph.D.
Stony Brook University
R00ES015421

An NIEHS recipient of a Pathway to Independence Award (K99/R00) reports the determination of the structure of a mitochondrial termination factor called MTERF1. Mitochondrial termination factors are a family of proteins implicated in mitochondrial transcription, the coordination between transcription and replication and the regulation of mitochondrial protein synthesis. Human MTERF1 is responsible for transcription termination in the mitochondria.

Combined with functional studies, the structure reveals that upon binding MTERF1 unwinds the DNA double helix and promotes base flipping, the rotation of a single base to the outside of the helix, and that this reorganization is essential for termination. The analyses show how MTERF1 recognizes specific DNA sequences and provides a context for understanding the mechanistic consequences of two pathogenic mitochondrial DNA mutations.

Further experiments are planned to address whether the two mutations, G3249A and G3242A, result in transcriptional differences if these alterations fully explain the clinical phenotype.

Citation: Yakubovskaya E, Mejia E, Byrnes J, Hambardjieva E, Garcia-Diaz M. Helix unwinding and base flipping enable human MTERF1 to terminate mitochondrial transcription. Cell. 2010. Jun 11; 141(6):982-93.

*****

Fetal Leydig Cell Protein Regulates Sertoli Cell Proliferation
Denise R. Archambeault, Ph.D.
University of Illinois
T32ES007326

An NIEHS-supported trainee reports a newly discovered function for a fetal Leydig cell produced protein called Activin A. The protein, which is a member of the transforming growth factor β (TGF-β) protein superfamily, acts directly on Sertoli cells to promote proliferation during late embryogenesis.

Prior to this discovery, it was thought that fetal Leydig cells, which produce testosterone, only served to masculinize the embryo and not function in testis morphogenesis. In additional experiments that genetically disrupted the gene that encodes for Activin A specifically in fetal Leydig cells, testis cord elongation and expansion due to decreased Sertoili cell proliferation failed to occur. Disruption of TGF-β signaling in Sertoli cells led to testis cord dysgenesis and proliferative deficits similar to those in the Leydig cell-specific Activin A knockout mice. These results indicated that Activin A is the major TGF-β protein that acts directly on Sertoli cells. These effects last into adulthood resulting in low sperm production abnormal testicular development. These findings challenge the existing paradigm that fetal testis development is solely under the control of the Sertoli cells.

Citation: Archambeault DR, Yao HH. Activin A, a product of fetal Leydig cells, is a unique paracrine regulator of Sertoli cell proliferation and fetal testis cord expansion. Proc Natl Acad Sci U S A. 2010. Jun 8; 107(23):10526-31.

*****

PAPERS by DERT STAFF

Wendell P. Ela, David L. Sedlak, Morton A. Barlaz, *Heather F. Henry*, Derek C.G. Muir, Deborah L. Swackhamer, Eric J. Weber, Robert G. Arnold, P. Lee Ferguson, Jennifer A. Field, Edward T. Furlong, John P. Giesy, Rolf U. Halden, Tala Henry, Ronald A. Hites, Keri C. Hornbuckle, Philip H. Howard, Richard G. Luthy, Anita K. Meyer, A. Eduardo Sáez, Frederick S. vom Saal, Chris D. Vulpe, Mark R. Wiesne. Toward Identifying the Next Generation of Superfund and Hazardous Waste Site Contaminants. Environmental Health Perspectives 119(1) Jan 2011. http://ehp03.niehs.nih.gov/article/fetchArticle.action?articleURI=info%3Adoi%2F10.1289%2Fehp.1002497.

Duma D, *Collins JB*, Chou JW, Cidlowski JA: Sexually dimorphic actions of glucocorticoids provide a link to inflammatory diseases with gender differences in prevalence. Sci Signal 2010, 3(143):ra74.

Lahousse SA, Hoenerhoff M, *Collins J*, Ton TV, Masinde T, Olson D, Rebolloso Y, Koujitani T, Tomer KB, Hong HH, Bucher J, Sills RC: Gene Expression and Mutation Assessment Provide Clues of Genetic and Epigenetic Mechanisms in Liver Tumors of Oxazepam-Exposed Mice. Vet Pathol. 2010. [Epub ahead of print]

GRANTEE HONORS and AWARDS

At the Superfund Research Program (SRP) annual meeting, which was held in Portland Oregon on November 11-12, it was announced the U.S. – Mexico Bi-national Center would be renamed in honor of *Dr. Dean Carter*, a former SRP Director and investigator at the University of Arizona. Dr. Carter was an innovator who understood that environmental contamination in border areas results in complex science and culture issues, and also that realistic solutions require input from diverse disciplines. Dr. Carter's work on U.S.-Mexico border health issues was groundbreaking and productive in the areas of education, scientific meetings and research. Perhaps his greatest and most lasting accomplishment has been that he was able to stimulate Mexicans, in both government and non-government positions, to recognize that they have the same needs in the area of environmental health as we do in the United States and that working as partners we will accomplish more than working alone.

Martin Philbert, Ph.D., has been named the Dean of the School of Public Health at the University of Michigan at Ann Arbor. Dr. Philbert is an NIEHS grantee and former member of the National Advisory

Environmental Health Sciences Council. His research is focused on the role of astrocyte injury in neuroprotection and the modulation of immune-GI function by silver nanoparticles .

A paper by SRP grantee *Dr. Kun Lu*, University of North Carolina-Chapel Hill, was selected as the Board of Publications Best Paper in Toxicological Sciences Award for 2010. This award is given annually to the authors of the best paper published in a 12-month period in an official Society of Toxicology publication. The paper, Distribution of DNA Adducts Caused by Inhaled Formaledhyde is Consistent with Induction of Nasal Carcinoma but not Leukemia, can be accessed at the Toxicological Sciences website http://pubs.acs.org/doi/abs/10.1021/tx1003886 .

This year's recipient of the Karen Wetterhahn Memorial Award is *Dr. Courtney Kozul-Horvath* of Dartmouth University. The award was presented at the SRP annual meeting in Portland, Oregon on November 11. The SRP established this annual award to recognize an outstanding graduate student or post-doctoral researcher that best demonstrates the qualities of scientific excellence exhibited by Dr. Wetterhahn. The SRP acknowledged Dr. Horvath for her contributions to research on effects of low-dose arsenic exposure on the immune system. *Dr. Collman, DERT/OD*, presented the award.

Dr. Peter Thorne, University of Iowa, received the John Doull Award at the 2010 Annual Meeting of the Central States Chapter of the Society of Toxicology in Iowa City, Iowa on November 4-5. The award is granted each year by the CS-SOT to honor the contributions of an outstanding member of the discipline of toxicology. The award is named after Dr. John Doull, who is the author of the landmark text Cassarett & Doull's Toxicology.

SRP grantee *Dr. Martyn Smith*, Director of the UC-Berkeley SRP, received a Child Health Advocate Award from the Children's Environmental Health Network (CEHN). The award was presented during their annual reception, held October 27th in Washington, DC. The event's purpose was to raise awareness on the effects of environmental hazards to children's health, acknowledge effective children's environmental health advocates, and fundraise for CEHN programs. The award acknowledges Dr. Smith's support during the CEHN's formative years in the 1990's and his research on childhood leukemia.

On October 21st, *Dr. Jennifer Bomberger* received the Young Investigator Basic Science Award at the North American Cystic Fibrosis Conference in Baltimore, MD. Jennifer is a fellow in Dr. Bruce Stanton's lab at Dartmouth University and studies how arsenic reduces the innate immune response to bacterial and viral infections.

Marin Cohn, Ph.D., Professor, Department of Molecular Genetics and Microbiology at the University of Florida Gainesville, has been awarded a Howard Hughes Medical Institute Early Career Scientist Award. This award will cover his salary for 5 years plus $150,000 lab support for one year. Dr. Marin is an NIEHS grantee who is studying Targets of Endocrine Disruptors in External Genetalia. His focus is on the role of hormones and endocrine disruptors in the development of male and female external genitalia using both a fish and rodent model.

STAFF HONORS AND AWARDS

The following DERT staff received an NIH Merit Award at the NIH Director's Award Ceremony, December 16 in the Rodbell Auditorium on the Campus of NIEHS in Research Triangle Park, North Carolina. The NIH Merit Award is the highest level honor award an Institute Director can approve. This award recognizes contributions in the areas of leadership, significant scientific research or administrative support, creativity, and notable competence and resourcefulness in improving the scientific or administrative management of the Institute.

Drs. Leroy Worth, Sally Eckert-Tilotta, Terry Nesbitt and Janice Allen, SRB; Dr. David Balshaw, CRIS; Drs. Kimberly Gray, Les Reinlib and Claudia Thompson, SPHB; Dr. Annette Kirshner, COSPB; Mr. James Remington, WETB; and Ms. Martha Barnes, PAB, "For extraordinary efforts to develop the Mechanism for Time-Sensitive Research Opportunities in EHS (R03/R21 Program)."

Drs. Danielle Carlin, Heather Henry, Janet Cakir, William Suk and Ms. Beth Anderson, CRIS; and Dr. Claudia Thompson, CRIS/SPHB, "For exemplary leadership and performance in the initiation, establishment, and management of the Strategic Plan to support the scientific and programmatic direction of the Superfund Research Program (SRP)."

Drs. Les Reinlib and Claudia Thompson and Mr. Liam O'Fallon, SPHB; Dr. Jerry Heindel, COSPB; Dr. Linda Bass, SRB; Dr. Christie Drew, Mr. Jerry Phelps and Ms. Helena Davis, PAB; and Ms. Pam Clark and Mr. Aaron Nicholas, GMB, "In recognition of exemplary leadership in developing, implementing and reporting the results of the Environmental Health Sciences Core Centers (EHS CC) assessment."

Drs. William Suk and David Balshaw, CRIS, and Drs. Daniel Shaughnessy, Kimberly McAllister, Claudia Thompson and Ms. Jennifer Collins, SPHB, "For leadership, direction, and accomplishments resulting in the continued successes of the NIH Genes, Environment and Health Initiative (GEI)."

Messrs. Ted Outwater, James Remington and Joseph "Chip" Hughes and Ms. Kathy Ahlmark and Mrs. Sharon Beard, WEPB; Dr. Gwen Collman, DERT/OD; Dr. Claudia Thompson, SPHB/CRIS; Dr. William Suk, CRIS; Ms. Carolyn Mason, GMB; and Ms. Margarita Roque, OM for DERT, were part of a cross-divisional NIH Merit Award, "For exceptional performance during the NIEHS oil spill response, developing the GuLF Study protocol and establishing the Gulf oil spill research program."

STAFF ACTIVITIES

Dr. Shreffler, COSPB, participated in the solicitation and review of applications from graduate level scientists to attend the Nobel Lindau meeting. From June 26 - July 1, 2011, about 20 Nobel Laureates in Physiology or Medicine and 550 young researchers from around the world will meet at Lindau (Germany) to exchange ideas, discuss projects and build international networks. NIH can nominate 40 predoctoral students to the selection committee. NIH received approximately 120 applications for these slots, and a committee of NIH Program Officers participated in the ranking of the applications using a secret Study Section style ratings ballot of applications randomly assigned. Each application was rated by three NIH staff from across the NIH Institutes.

Dr. Humble, COSPB, helped host and organize a meeting between NIEHS and FIC discussing the future of the International Training and Research in Environmental and Occupational Health (ITREOH) training program. Three representatives from FIC visited NIEHS on December 17 for these discussions.

SRP held a "Funding Opportunities Web Seminar" on December 15th through the EPA's Clu-In.org online training module. Presenters included: *Dr. Janice Allen, SRB, Ms. Lisa Archer-Edwards, GMS, and Drs. Henry and Suk and Ms. Anderson, CRIS*. The seminar provided an overview of the three funding opportunities offered by SRP, with particular attention given to the nuances of the multi-project Center grants (P42s). Approximately 50 individuals registered and attended the web seminar.

Mr. Hughes and Mrs. Beard, NIEHS WETP, are currently working along with *Mr. O'Fallon, SPHB* and Dr. John Balbus, OD, on the HHS EJ Working Group Meeting to revise and develop a new HHS Environmental Justice Strategy that encompasses all of the salient EJ activities across the HHS, as well as participate in the Interagency Working Group on Environmental Justice. Mr. Hughes and *Dr. Collman, DERT/OD,* also attended the White House Environmental Justice Forum on December 15.

Dr. Humble, COSPB, gave a presentation at the December 10 meeting of the NIH Autoimmune Diseases Coordinating Committee at the NIH. Mike presented a workshop report to the group on the workshop he organized in September 2010 examining the role of the environment and the development of autoimmune disease.

A technical information meeting was held in Mobile, Alabama, on Dec 8 for groups interested in applying to the Deepwater Horizon Request for Application. Over 70 people attended the meeting representing both academic institutions and community organizations. Topics included programmatic issues, peer-review, grantsmanship, fiscal and administrative management. In addition the same information was presented as a webinar on Dec 14. *Drs. Thompson, SPHB, Collman, DERT/OD, and Worth, SRB,* and Dr. Dearry presented overviews at the Mobile meeting. Drs. Thompson and Worth, along with *Ms. Duke, GMB*, presented during the webinar.

Dr. Heindel, COSPB, presented an invited and sponsored presentation, "Developmental Basis of Disease: Role of Environmental Exposures and Epigenetics," at the Canadian SOT annual meeting in Montreal December 6.

Dr. Humble, COSPB, attended the NIGMS-sponsored meeting of the Minority Biomedical Research Support (MBRS)-Support of Competitive Research (SCORE) Program SC1 and SC2 Principal Investigator meeting at NIH December 2-3. Dr. Humble manned the NIEHS information table during this meeting, speaking with the SC1 and SC2 grantees about their research interests and the mission of the NIEHS.

For the past 18 months, the *Program Analysis Branch* (PAB) in collaboration with staff throughout the division has been working on the development of an evaluation metrics manual for the Partnerships for Environmental Public Health Program. On October 18 the draft document was posted to the website for comments. Based on the comments received, the document will be revised this spring/summer and a final document will be ready in the fall.

Dr. Cakir, SRP, collaborated with Dr. Norbert Kaminski of Michigan State University to host a conference entitled the Health Consequences from Xenobiotic-Gut Microbiome – Host Interactions, November 17-18 at the NIEHS Main Campus in Research Triangle Park, North Carolina. The conference drew close to 100 scientists from across the U.S. to listen to seminars on the state of the knowledge of the gut microbiome and participate in breakout sessions to discuss questions designed to draw from the scientific community priorities and new directions in research. The results of the workshop will be used to propose new areas of funding for NIEHS.

Mr. Phelps, PAB, presented a poster entitled "Analysis of NIEHS Small Grants Programs (R03/R21)" at the American Evaluation Association's Annual Meeting in San Antonio Texas on November 10. The goal of the analysis was to see if the PI's were successful in obtaining subsequent funding through regular study sections or other mechanisms. *Dr. Drew, PAB*, chaired a session and *Ms. Davis, PAB*, presented on "Metrics for the National Institute of Environmental Health Sciences: Measuring Outcomes to Advance Partnerships…"which introduced newly proposed metrics for measuring outcomes in public environmental health programs. In addition, Dr. Drew has or will be presenting the proposed metrics at the annual P30 EHS Core Centers meeting COEC forum, the WETP annual meeting , the Breast Cancer and Environment Research Program annual meeting, an ad hoc meeting with WE Act, the NY Department of Health and evaluators from Columbia University and Mt Sinai Hospital, the Society for Risk Analysis, the NIEHS/EPA/Public Launch January 10, the Association of State and Territorial Health Officials Monthly Environmental Health Director's call, the NCI Evaluation Special Interest Group , the NIAID Evaluation Forum, the PEPH Grantee Webinar , the National Environmental Health Association Webinar, NIH Evaluation Special Interest Group and the CDC Evaluation Workgroup.

Dr. Helbling Chadwick and Ms. Haugen, COSPB, along with program staff from NIDA, organized the NIH Roadmap Epigenomics Program Investigators Meeting, which was held on November 8-9 in Bethesda, Marland. The first day of the meeting featured talks from investigators funded under the Novel Marks, Technology Development, and Epigenomics of Human Health and Disease RFAs. The second day of the meeting provided an update on the progress made by the NIEHS-funded Reference Epigenome Mapping Consortium. In the first two years, a total of 337 unique data sets (i.e. one epigenetic feature in one cell or tissue type) have been submitted, with 64 unique cell or tissue types represented. The PIs gave several presentations that discussed how a comprehensive analysis of epigenetic marks in a given cell type can point towards functional genomic elements (i.e. enhancers) that may be important for tissue-specific processes, shared some of the initial comparisons of epigenetic profiles in different tissues, and provided some interesting preliminary data about epigenetic variation observed between individuals.

Dr. Henry and Ms. Anderson, SRP, co-chaired a session at the Society for Environmental Toxicology and Chemistry annual meeting in Portland, Oregon on November 8, titled: "Communities, Ecology, and Health – Making the Connection." The session featured successes in working with communities to communicate risks of fish consumption, food-chain transfer of contaminants, and community based cumulative risk assessment (CBCRA). The session included work by Superfund Research Program Community Engagement and Research Translation Cores, EPA grantees and activities, and included research activities abroad. Chuck Maurice (EPA-ORD) and Maureen Avakian (MDB) also co-chaired the session.

Dr. Shreffler, COSPB, participated in the annual meeting of the Building Interdisciplinary Research Careers in Women's Health (BIRCWH) Directors in Bethesda on November 8. The Annual Program was organized by Office for Research on Women's Health. BIRCWH is a program of Institutional Career Development Awards (K12) that promotes the career development of junior scientists who plan to engage in research careers in problems related to women's health. NIEHS has one funded BIRCH grant at the University of Rochester.

Mr. O'Fallon, SPHB, organized and moderated two sessions at the 2010 annual APHA Conference in Denver, Colorado, November 6-10. The first session, "Partnering with communities to address environmental and occupational justice concerns," featured various federally-funded projects that brought together community and university partners to address environmental health concerns of community residents. Projects highlighted were funded by NIEHS, CDC, and the EPA. The second session, "Partners in research: Strengthening and evaluating models for equitable participation in environmental public health research and action," focused on the four NIEHS-funded projects that were a part of the larger NIH Partners in Research program. The presenters highlighted their projects and accomplishments over the two year grant period. *Mrs. Beard, WETP*, presented a talk on "Building a green jobs alliance where safety and training comes first" on November 8 for the Blue/Green Track #1: "Producing green and working safe." This was a special intersectional track on environmental and occupational justice.

Mr. O'Fallon, SPHB, based on discussions throughout the year, organized a Funders' Summit and convened it at the annual APHA meeting on November 6. The purpose of the meeting was to begin developing information channels between public and private funders to enhance the work we do to address environmental public health concerns of community groups. The goal at the end of the meeting was for participants to have a better appreciation for funding priorities across groups; recognize similarities/differences in funding strategies; identify program areas of shared interest; and highlight technical/fiscal issues of concern to applicants. A broader goal was for the group to identify a strategy to move forward in a coordinated, sustainable fashion when the meeting concluded. The following individuals from NIEHS participated: Drs. Birnbaum, Jung, Balbus, Dearry, *Collman, DERT/OD*, and *Mr. Hughes and Mrs. Beard, WETP*. Representatives from other Federal agencies and Foundations in attendance included: HHS (Office of the Assistant Secretary of Health); EPA; the Kresge Foundation; the PEW Charitable Trusts; the Northwest Health Foundation; and Health and Environmental Funders

Network. Other groups were invited to participate. The participants agreed that this meeting was valuable and identified next steps to improve coordination.

Dr. Gwen Collman, Director/DERT, was one of 20 NIH staff graduating from the 2010 NIH Executive Leadership Program. This was the first year the program was offered. The program integrates the academic experience of NIH's educational partners—Brookings Executive Education and Washington University in St. Louis—and the hands-on involvement of senior NIH executives to provide a rewarding leadership experience for participants.

The Worker Education and Training Program's (WETP) fall 2010 awardee meeting and workshop were held October 25-26 on the NIEHS Main Campus, in Research Triangle Park, North Carolina. This workshop reviewed the current issues relating to the various components of the newly awarded cooperative agreements. Issues relating to basic hazmat training and how the programs have grown and developed since their inception were covered. Other items included a hazmat and disaster response update to discuss lessons learned from the Gulf oil spill and how they relate to what has been learned about training from previous disasters; environmental remediation and green jobs issues; Environmental training and Environmental Justice; and the direction of the DOE program given the series of collaboration training meetings that have been held around the complex.

Mr. O'Fallon, SPHB, was invited to participate in a workshop on Community-based Participatory Research (CBPR) at the "Moving Forward Together" goods movement conference, held October 22-23 and hosted by the COEC at the University of Southern California (USC) and their partners. The conference was held at the Carson Community Center in Carson, California. The conference had more than 600 attendees from around the country and around the globe. Participants came from 18 states and 5 countries, and from many backgrounds and experiences. Approximately 25 people attended the CBPR workshop in which Mr. O'Fallon participated along with Andrea Hricko (USC, COEC) and John Sullivan (University of Texas Medical Branch, COEC).

Dr. Gray, SPHB, participated October 21-22, as part of a Government Perspective panel on Early Life exposure: the search for cause and effect, from laboratory to surveillance at the Children's Environmental Health Institute's Sixth Biennial Scientific Symposium: Prenatal and Early life Exposures: How Environmental Toxins affect the course of Childhood.

The Environmental Health Sciences (EHS) Core Centers held their annual meeting October 19-21 at the University of Louisville EHS Center. *Dr. Reinlib, SPHB*, is the program Director for the EHS Centers program and *Mr. O'Fallon* directs the Community Outreach and Education Cores (COECs). Mr. O'Fallon organized a half day meeting with the COEC Directors for October 19. Discussion focused on Community Engagement and Information Dissemination. *Dr. Drew, PAB*, presented the PEPH Evaluation Metrics Document; discussion of the new PEPH resource Center was also presented and discussed. October 20-21 focused on plenary session topics that included Environmental Genomics; Biomarkers and Translational Research; and Community Engagement and Implications. In addition, working groups were organized on Inter-Center, Interdisciplinary Work Groups to advance goals of the Centers program and a working session on the Gulf Oil Response was led by *Dr. Thompson, SPHB*. The highlight of the meeting was the Rubbertown Community Tour. *Dr. Gwen Collman, DERT/OD*, attended the meeting.

Dr. Humble, COSPB, attended the Millennium Promise/ITREOH Network Meeting sponsored by Fogarty International Center, October 21-22 at the NIH, Bethesda. Dr. Humble gave a presentation to the attendees on upcoming initiatives and funding opportunities at NIEHS.

Mrs. Beard and Mr. Outwater, WETP, conducted a collaborative safety training workshop in conjunction with the U.S. Department of Energy's (DOE) Office of Health, Safety and Security October 19-20, for the

Idaho Site Office in order to identify opportunities for efficiencies in the safety training programs across Idaho National Laboratory. The overall objective of these collaborative workshops was to identify areas and topics where HSS, the NIEHS, and grantees under the NIEHS WETP's DOE Nuclear Weapons Cleanup Training Program could work collaboratively with the DOE site programs to enhance the safety of site operations through training.

There was a joint meeting organized by NIEHS, EPA and ATSDR, October 19-20, that brought together the Children's Centers supported by NIEHS and EPA and Pediatric Environmental Health Specialty Units (PESHUs) Meeting. This meeting was valuable on sharing expertise. Topics for sessions included: prenatal exposures; neurodevelopmental effects; socioeconomic status, health disparities; role of children's health science to inform chemical management; and children's health in a global context.

Dr. Gray, SPHB, was instrumental in organizing this year's Children's Environmental Health Conference, held October 18-20. Discussion topics presented by the program investigators included: novel approaches for identifying early developmental perturbations; determinants of exposure; and small group discussions on air pollution exposures/ modeling/ estimates and health outcomes; challenges in research translation; and alternatives for sample analysis. *Dr. Collman, DERT/OD*, provided opening remarks.

Mr. O'Fallon, SPHB, helped organize, lead, and moderate sessions at the annual meeting of the Community Outreach and Education Cores (COECs) that is a part of the Environmental Health Sciences Core Centers (EHS CC) Program. In particular, Mr. O'Fallon worked with Lynn Albert and Maureen Avakian (MDB, Inc) to promote the newly re-established PEPH Resource Center. The EHS Core Center at the University of Louisville hosted the annual event on October 18-19. As a result of the meeting and encouragement by Dr. Linda Birnbaum, the name of COEC has been changed to "Community Outreach and Engagement Core."

Dr. McAllister, SPHB, helped organize, as part of the education committee of the International Genetic Epidemiology Society (IGES), an educational workshop at the IGES meeting in Boston on October 10-12. This workshop was held on October 10th and was entitled "Next Generation Sequencing in Genetic Epidemiological Studies." This session focused on next generation sequencing methods, applications, and strategies for genetic epidemiology studies.

Mrs. Beard, WETP, participated in a Department of Labor (DOL) Green Building Demonstration Workshop on October 5, and presented at the session on Youth Safety RULES and provided information on the health and safety training programs and activities of the NIEHS WETP at the DOL Youth Build Federal Learning Exchange Conference Octobet 6-7 in Washington, DC.

Mr. Outwater, WETP, presented program updates and represented the NIEHS WETP at the DOE HAMMER Steering Committee meeting in Hanford Washington, October 5-6.

In October, the PAB starting working with the Battelle Centers for Public Health Research and Evaluation to evaluate the two ARRA signature Projects focused on BPA and Nanotechnology. *Dr. Pettibone* and *Mr. Phelps* are working with program officers to define the portfolios and with Battelle to begin portfolio analyses.

Dr. Henry, SRP, presented "Public Health Problems, Phytotechnology Solutions – Potential for Growth," at the International Society for Phytotechnologies, Parma, Italy, on September 29. *Dr. Suk, SRP*, is a co-author on the presentation.

The PAB has been working with a contractor to develop an application to automate the Administrative Supplement receipt and review process. "SOS" was launched on September 14 and all administrative supplement applications funded in 2011 and going forward will be included in the system.

Mr. Outwater, WETP, participated in the review of session proposals for the national EPA Brownfields Conference, September 13-14 in Washington, DC.

Dr. Henry, SRP, presented "National Institute of Environmental Health Sciences – Superfund Research Program Remediation Effectiveness," at the U.S. EPA – GLNPO, Remedy Effectiveness & Operational Management Summit, "Moving Remedy Effectiveness Research Forward with our Partners." The meeting was held in Toledo, Ohio on August 31.

UPCOMING MEETINGS and WORKSHOPS

WETP will host a spring grantee meeting and "The Gulf Coast Lessons Learned Workshop: Improving Training for Disaster Cleanup Workers" on May 3-5 in Mobile, Alabama.

STAFF CHANGES

Arrivals:
Dr. Kristianna G. Pettibone joined PAB as a Health Science Administrator on September 27. She holds a Ph.D. in Policy Sciences (health policy concentration) from the University of Maryland, Baltimore County; an M.S. in Corporate and Professional Communication from Radford University; and a B.A. in Communications from Virginia Tech. Dr. Pettibone has over 10 years experience managing, directing, and guiding public health policy research and evaluation projects. She served as a Research Scientist at The MayaTech Corporation from 2001 through 2010 and was Director of MayaTech's Center for Community Prevention and Treatment Research from 2007-2010. In these positions she gained extensive experience conducting and moderating focus groups, developing qualitative and quantitative survey instruments, conducting qualitative research and analysis, and documenting and disseminating evaluation findings. Prior to joining The MayaTech Corporation in 2001, Dr. Pettibone served as Director of Development for several community-based organizations.

Departures:
Mr. Wes Brinson, is leaving DEAS in mid-February to take a position as the youth pastor with his church in Raleigh.

Ms. Rachel Gross left DERT/OD on January 18 to take a position as the Director of Volunteers and Community Service at her church in Raleigh.