

December 2012

NIEHS Spotlight



[Birnbaum receives prominent EPA award](#)

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[NIEHS/NTP celebrates 20-year partnership with FDA](#)

The Interagency Agreement between NIEHS and the FDA has resulted in dozens of critical, complex studies that have helped protect public health.



[NIEHS knocks it out of the park at APHA](#)

NIEHS enjoyed a high profile at the 140th annual meeting of the American Public Health Association Oct. 27-31 in San Francisco.



[Leping Li awarded tenure](#)

The National Institutes of Health Central Tenure Committee recently granted tenure to Leping Li, Ph.D., a bioinformaticist in the NIEHS Biostatistics Branch.



[Stokes selected as a fellow of ATS](#)

NTP center director Rear Adm. William Stokes, D.V.M., was notified Oct. 25 of his induction as a fellow of the Academy of Toxicological Sciences.

Science Notebook



[Science Day celebrates Institute achievements](#)

The 10th annual NIEHS Science Day showcased breakthroughs in environmental health and recognized research and mentorship achievements by NIEHS scientists.



[Understanding individual susceptibility to environmental toxicants](#)

Aaron Bowman, Ph.D., discussed how he uses induced pluripotent stem cells (iPSCs) to study environmental health and neurodegenerative disease risk.



[Research on PCBs and obesity earns Wetterhahn award](#)

Nicki Baker, a doctoral student at the University of Kentucky, is the 15th recipient of the annual Karen Wetterhahn Memorial Award.



[SRP patents licensed for water applications](#)

University of Kentucky researchers used non-toxic nanoparticles and green chemistry approaches to remediate water polluted by hazardous waste.



[Wing discusses poverty, health, and industrial hog production](#)

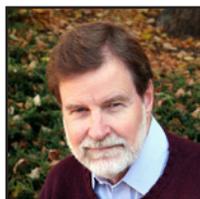
At the very hour the embargo on his latest paper lifted Oct. 28, NIEHS grantee Steve Wing, Ph.D., addressed a capacity audience of science writers in Raleigh, N.C.

NIEHS Spotlight



[Postdoc Brant Hamel moves into clinical research at Duke](#)

NIEHS fellow Brant Hamel, Ph.D., transitioned from the bench Nov. 1 into clinical research as a regulatory coordinator for gastrointestinal oncology clinical trials.



[Wilson named editor-in-chief of DNA Repair](#)

NIEHS researcher Samuel Wilson, M.D., will become the first National Institutes of Health scientist to serve as editor-in-chief of the journal DNA Repair.



[Varmus recognizes NIEHS leadership on GEI](#)

Several NIEHS staff members received merit awards from the National Cancer Institute for their contributions to the Genes, Environment, and Health Initiative (GEI).



[Former NIEHS/NTP pharmacologist Larry Hart remembered](#)

His many friends and colleagues at NIEHS and NTP remembered, with fondness, colleague Larry Hart, Ph.D., who died Oct. 22 in Chapel Hill, N.C.



[Postdoctoral fellow recruitments aim for a more diverse NIEHS](#)

The goal of the NIEHS Intramural Research Training Award (IRTA) diversity program is to increase the participation of fellows and faculty from underrepresented groups.

Science Notebook



[Guerinot discusses metal uptake, transport, and accumulation in plants](#)

Dartmouth College professor and SRP grantee Mary Lou Guerinot, Ph.D., discussed how plants take up and distribute metals at a recent NIEHS seminar.



[Antimicrobial compound associated with allergies](#)

A research team led by NIEHS scientists found that Norwegian children exposed to high levels of the antimicrobial compound triclosan display allergic sensitization.



[Fall NICEATM activities focus on international collaborations](#)

NICEATM scientists worked with international colleagues on new methods and decision strategies for chemical safety and vaccine testing.



[LMG speaker discusses replication beyond DNA damage](#)

A research team led by NIEHS scientists found that Norwegian children exposed to high levels of the antimicrobial compound triclosan display allergic sensitization.



[This month in EHP](#)

The December issue of Environmental Health Perspectives highlights human health impacts of increased imports and green building techniques in tribal housing.

NIEHS Spotlight



[NIEHS Epidemiology Branch receives grant from Avon Foundation](#)

NIEHS epidemiologist Hazel Nichols, Ph.D., was in Charlotte, N.C., to receive an oversized mock check for \$270,000 from the Avon Foundation.



[NIEHS connects with students and scientists at ABRCMS conference](#)

Ericka Reid, Ph.D., and Anshul Pandya, Ph.D., represented NIEHS at the 2012 Annual Biomedical Research Conference for Minority Students (ABRCMS) in San Jose, Calif.



[Science writers storm Raleigh](#)

NIEHS was well represented at ScienceWriters2012, a joint meeting of the National Association of Science Writers and the Council for the Advancement of Science Writing.



[Live from NIEHS: Experts field obesity questions](#)

NIEHS convened a panel of experts Nov. 29 to tackle questions from the public on childhood obesity and related environmental factors.



[USPHS officers join Veterans Day parade](#)

U.S. Public Health Service (USPHS) Commissioned Corps officers, from various divisions in North Carolina, participated in the Veterans Day parade in Raleigh.

Science Notebook



[GEMS reflects on 30 years](#)

The Genetics and Environmental Mutagenesis Society celebrated its 30th anniversary at the William and Ida Friday Center for Continuing Education in Chapel Hill, N.C.

Extramural Research

[Extramural papers of the month](#)

- [BPA exposure linked to thyroid level changes for pregnant women and newborns](#)
- [PCBs impair glucose homeostasis in mice](#)
- [Childhood air pollution exposure and adult heart health](#)
- [Dioxin induces disease and reproductive problems in later generations](#)

Intramural Research

[Intramural papers of the month](#)

- [RAP80 reduces cancer risk and maintains genome stability](#)
- [DNA sequence context influences human 8-oxoguanine DNA glycosylase activity](#)
- [Glucocorticoid signaling could lead to better therapeutics](#)
- [Bacteria in house dust worsens asthma](#)

Inside the Institute



[CFC enters the home stretch](#)

With two more special events building the pledge coffer in November, the Combined Federal Campaign at NIEHS has its Dec. 15 deadline clearly in sight.



[Celebrating Halloween in style](#)

Members of the NIEHS Laboratory of Signal Transduction were in a festive mood for their Halloween international potluck lunch.



[NIEHS celebrates Native American Heritage Month](#)

This year's featured speaker, Wilbur Woodis, is a Native American who focuses on health, social, and educational issues for American Indians and Alaska Natives.

Calendar of Upcoming Events

- **Dec 10**, Rodbell ABC 10:00 a.m.-11:00 a.m. — Seminar on “The environmental health atlas: A portal to discovering the promise of environmental health,” by Bruce Lanphear, Ph.D.
- **Dec 11**, Rodbell Auditorium, 8:00 a.m.-5:00 p.m. — NTP Board of Scientific Counselors Meeting
- **Dec 17**, Rodbell A, 11:00 a.m.-12:00 p.m. — Biostatistics Branch Seminar Series with Andrew Allen, Ph.D.
- View More Events: [NIEHS Public Calendar](#)

NIEHS Spotlight

Birnbaum receives prominent EPA award

By Robin Arnette

The U.S. Environmental Protection Agency (EPA) has awarded NIEHS/NTP Director Linda Birnbaum, Ph.D., the [2011 Level III Scientific and Technological Achievement Award \(STAA\)](#), for examining the public health impacts of asbestos-containing vermiculite in Libby, Mont. According to the EPA website, STAA is one of the EPA's most prestigious scientific award programs and Level III awards are for those who have accomplished an unusually notable research or technological effort.

Birnbaum and three EPA colleagues won their award in the category of health effects research and human health risk assessment, for studying the prevalence of respiratory symptoms among Libby residents in 2000-2001. They determined that residents who were children when the Libby vermiculite mine closed in 1990 showed some respiratory symptoms as a result of asbestos-contaminated vermiculite exposure. Their findings appeared in a 2010 issue of the journal *Environmental Health Perspectives* and they submitted their paper, "Evaluation of associations between respiratory symptoms and asbestos-contaminated vermiculite exposure among children," to the EPA Science Advisory Board later that year.

"The work we did in Libby was very important, because no other previous studies had demonstrated a connection between asbestos-containing vermiculite and respiratory problems in children under 18," Birnbaum said.

The EPA Office of Research and Development sponsors the STAA program as a way to recognize exceptional scientific and technological papers published by EPA employees. The nominated research must initiate or revise a scientific principle or procedure, be recognized as a major achievement within its field of study, and be published in a peer-reviewed journal.

Citation: [Vinikoor LC](#), [Larson TC](#), [Bateson TF](#), [Birnbaum L](#). 2010. Exposure to asbestos-containing vermiculite ore and respiratory symptoms among individuals who were children while the mine was active in Libby, Montana. *Environ Health Perspect* 118(7):1033-1038.

[Return to Table of Contents](#)



*Birnbaum spent several years at the EPA, before becoming the NIEHS/NTP director in 2009.
(Photo courtesy of Steve McCaw)*

NIEHS/NTP celebrates 20-year partnership with FDA

By Cindy Loose

A unique partnership between NIEHS and the U.S. Food and Drug Administration (FDA) has been so successful at protecting public health that countries around the world are seeking advice on how to implement a similar program, said NIEHS/NTP Director Linda Birnbaum, Ph.D., at a recent gathering celebrating the 20th anniversary of the collaboration.

Birnbaum was referring to the formal interagency agreement that was signed by both agencies in December 1992. The agreement makes it possible for NIEHS to provide support for toxicological studies on agents of public health concern that are conducted at the FDA [National Center for Toxicological Research \(NCTR\)](#). Dozens of critical, complex studies carried out through this agreement have helped protect public health.

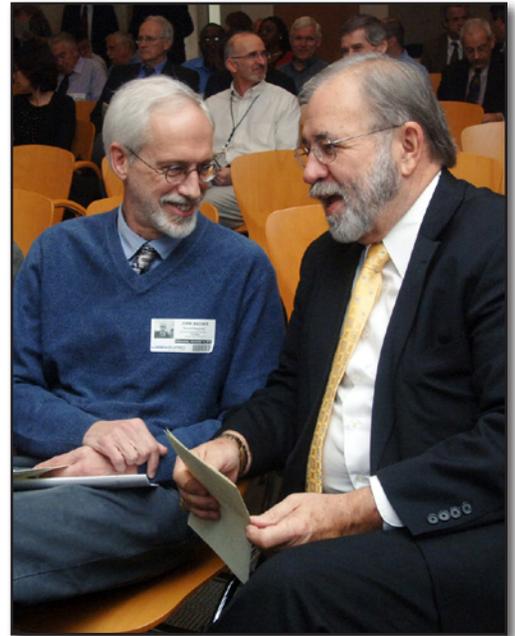
The National Toxicology Program (NTP) is an interagency program, headquartered at NIEHS, that coordinates and manages the efforts of the U.S. Department of Health and Human Services to understand the hazardous nature of chemicals to which the U.S. public is exposed. The interagency agreement between NIEHS and FDA is a critical mechanism by which these federal partners cooperatively work together to achieve these goals.

Milestones accomplished

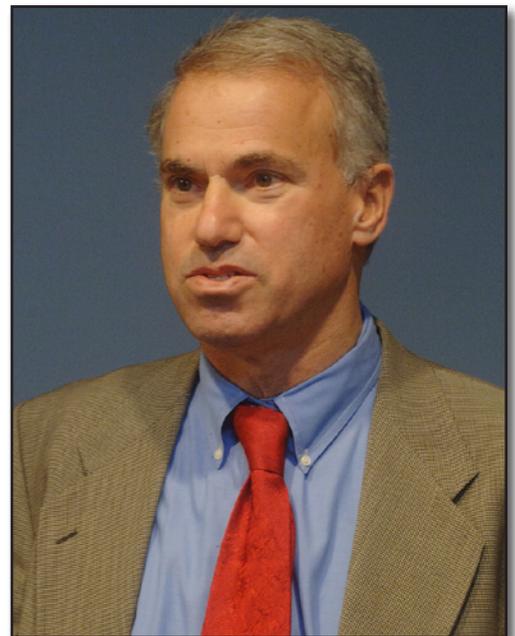
At the anniversary ceremony Nov. 14 at FDA headquarters in Silver Spring, Md., NTP Associate Director John Bucher, Ph.D., provided some key examples of how the collaboration between the agencies has impacted public health. He mentioned one study, in particular, that has helped improve the safety and quality of seafood imported from overseas.

“The work we’ve done together has really made a difference,” said Jesse Goodman, M.D., FDA’s chief scientist. He noted that one of the earliest studies looked at fumonisin B1, a toxin produced by fungi that grow on many types of corn and other grains. Considered the definitive study on the carcinogenicity of the fungi, the data were used around the world to set allowable contaminant levels in grains used in both animal and human food products.

Coordinating through a committee of diverse partners can pose some challenges but, as Birnbaum noted, “The interagency agreement allows us to work together to develop common approaches to solve real public health questions.”



Bucher and Allaben enjoy a light moment during one of the breaks. (Photo courtesy of Cathy Brown)



Goodman talked about the carcinogenicity of Fumonisin B1 in his remarks. (Photo courtesy of Cathy Brown)

Immediate practical applications

NTP Deputy Division Director for Science Nigel Walker, Ph.D., said studies take on a special dimension when you work with the people who need the data to make important regulatory decisions that can help protect lives.

“The public wants us to do the right thing, and this agreement allows us to work and spend wisely for public health,” Walker said.

“Enormous efforts on the part of many people were needed to make the interagency agreement a success,” said William Allaben, Ph.D., an early leader of NCTR. He singled out Connie Weis, who has worked at NCTR since 1997, and has been a program manager there since 2003.

Weis, who is retiring from the FDA, was honored at the ceremony with a plaque. “I don’t know what I would have done without her in my corner,” said Allaben, who also thanked Birnbaum for “embracing us.”

NTP toxicological studies carried out at NCTR have led to regulations of a number of ingredients in dietary supplements, animal feed, cosmetics, and in both human and veterinary pharmaceuticals. Potential health effects from exposure to bisphenol A, or BPA, is among the many studies currently ongoing.

The collaboration has advanced science and taken advantage of new scientific tools in state-of-the-art labs, to take on new challenges posed by emerging sciences. For example, in 2010, the FDA/NCTR and NIEHS/NTP, among others, collaborated to develop a Nanotechnology Core Facility to study potential health effects from rapidly developing nano-related products.

As Birnbaum concluded in her remarks, “The interagency agreement has produced 20 years of productive collaboration in science and research, and let’s hope for many more.”

(Cindy Loose is a contract writer with the NIEHS office in Bethesda, Md.)

[Return to Table of Contents](#)



Weis, center, accepts her plaque for many years of dedicated service to the FDA and NTP from Goodman, left, and Birnbaum. (Photo courtesy of Cathy Brown)



NIEHS and FDA leadership prepare to dig into a tasty-looking cake prepared for the celebration. From left to right are Walker, Allaben, Birnbaum, Goodman, Bucher, and Paul Howard, Ph.D., director of the Office of Scientific Coordination at NCTR and FDA project officer on the NCTR/NIEHS interagency agreement. (Photo courtesy of Cathy Brown)



NCTR Director William Slikker Jr., Ph.D., center with folder, and Birnbaum, right, chat with attendees. (Photo courtesy of Cathy Brown)

NIEHS knocks it out of the park at APHA

By Robin Mackar

San Francisco had plenty going for it during the last week of October. Its home baseball team won the World Series, and the city played host Oct. 27-31 to the 140th annual meeting of the [American Public Health Association \(APHA\)](#).

This year's APHA theme, "Prevention and Wellness Across the Lifespan," is especially applicable to NIEHS, whose new [strategic plan](#) places heavy emphasis on improving public health by preventing disease and disability. "NIEHS is all about prevention," said NIEHS/NTP Director Linda Birnbaum, Ph.D., and other NIEHS attendees at the numerous sessions they attended or participated in.

Session on responding to environmental disasters

One of the key program areas that NIEHS highlighted at the conference, which was attended by more than 14,000 people, was the Institute's ability to mobilize support activities and expertise across all the divisions, to rapidly and effectively respond to the 2010 Deepwater Horizon oil spill.

The Monday morning special session, "[More Than Oil: Health and Environmental Disasters](#)," was organized by NIEHS Senior Advisor Allen Dearry, Ph.D., and moderated by Senior Medical Advisor Aubrey Miller, M.D. The panel discussion featured Birnbaum, NIEHS Worker Education and Training Program Director Chip Hughes, Chief of the NIEHS Epidemiology Branch Dale Sandler, Ph.D., and two additional panelists who have worked closely with NIEHS in the Gulf region.

David Abramson, Ph.D., of the National Center for Disaster Preparedness at Columbia University, presented new findings from two projects examining the vulnerabilities and resilience of coastal residents impacted by both Katrina and the oil spill. He showed a short video of his team's efforts that underscored how children and youth are particularly vulnerable to the effects of disasters. "Children's mental health recovery in a post-disaster setting can serve as a bellwether indicator of successful recovery, or as a lagging indicator of system dysfunction and failed recovery," Abramson concluded.

Maureen Lichtveld, M.D. a professor and chair of the Department of Global Environmental Health Sciences at the Tulane University School of Public Health and Tropical Medicine, focused her talk on health disparities, disaster, and environmental health research in the Gulf region. Lichtveld plays an integral part in the Gulf Academic-Community Consortium Network, which includes about 15 different community groups.



There was always something happening at the popular NIEHS booth. Miller, left, and preventive medicine physician Bernard "Bernie" Birnbaum, M.D., of University of Colorado Health, discussed the health care challenges in helping underserved populations. Birnbaum also had an opportunity to visit with his mother, NIEHS/NTP Director Linda Birnbaum, Ph.D. (Photo by Robin Mackar)

Birnbaum refreshed everyone's memories about the timeline of events dating back to April 20, 2010, when the Deepwater Horizon oil rig exploded, up to the present day. In his comments, Hughes highlighted the activities of his program, which provided safety training to more than 100,000 workers involved in cleaning up the oil spill. Sandler then discussed the challenges and progress of the [GuLF STUDY](#) she is leading.

NIEHS outreach at APHA

Other NIEHS staff from across the Institute presented at APHA, moderated sessions, and helped organize events led by the APHA Environment Section, including NIEHS Senior Advisor for Public Health John Balbus, M.D., who participated in several sessions related to climate change. "Public health professionals are so enthusiastic about being on the frontlines of guiding public health interventions related to climate change," he said. "They are the ones who can really make a difference in protecting vulnerable populations."

Kimberly Thigpen Tart, J.D., a program analyst in the Office of Policy, Planning, and Evaluation, and a member of the APHA Environment Section Program Planning Committee, moderated a session on community perception of public health risks that included compelling presentations on community attitudes toward hydrofracking and health effects of living near America's freight gateways. Division of Extramural Research and Training staff members Liam O'Fallon, Sharon Beard, Beth Anderson, and others were on hand to share news from NIEHS.

Hundreds of attendees were also drawn to the NIEHS exhibit, which was staffed by members of the NIEHS Office of Communications and Public Liaison, and Environmental Health Perspectives. NIEHS won a second place ribbon for creating an exciting, visually appealing, and informative display.

(Robin Mackar is the news director in the NIEHS Office of Communications and Public Liaison, and a frequent contributor to the Environmental Factor.)

[Return to Table of Contents](#)

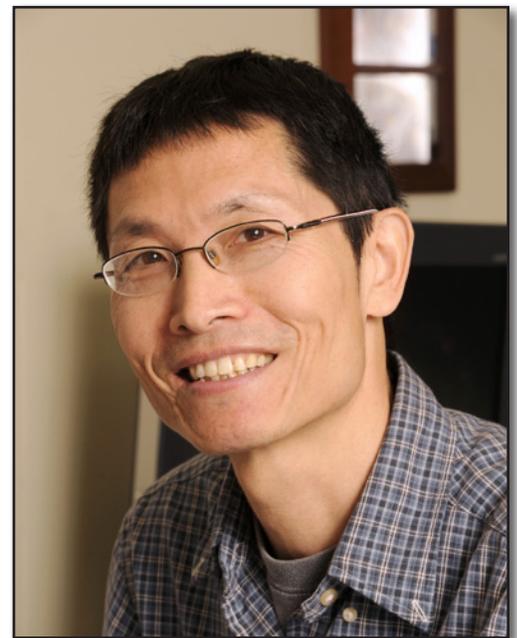
Leping Li awarded tenure

By Robin Arnette

The National Institutes of Health Central Tenure Committee unanimously granted tenure Nov. 19 to [Leping Li, Ph.D.](#), a leading researcher in the NIEHS Biostatistics Branch. Clarice Weinberg, Ph.D., Li's branch chief, was pleased with the news.

"Leping is an outstanding bioinformaticist, and NIEHS and my branch are really fortunate to have among us an investigator with his talents and enthusiasm for science," Weinberg said.

Li has a wide range of expertise, but he mainly focuses on genomic analyses, developing methods for analysis of NextGen data and using ChipSeq data to detect transcription factor binding sites in DNA sequences. To this end, he develops software programs that scientists around the world can download and use for free.



In addition to developing computer software and mentoring his staff, Li also finds the time to organize scientific symposia. (Photo courtesy of Steve McCaw)

“Bioinformatics is an integral part of environmental health science research at NIEHS,” Li said, when asked about the importance of his work. “New technologies have enabled investigators to generate huge amounts of data, but drawing reliable and insightful inferences from those data remains a challenge. I believe that I am in an excellent position to play a pivotal role in integrated studies of the effects of the environment on human health.”

Li came to NIEHS in 2000 as a research fellow, moving on to lead his own research group in 2003. He received a B.S. in medicinal chemistry from Fudan University in 1987, and a Ph.D., also in medicinal chemistry, from the University of North Carolina at Chapel Hill in 1994.

[Return to Table of Contents](#)

Stokes selected as a fellow of ATS

By Eddy Ball

National Toxicology Program (NTP) center director Rear Adm. William Stokes, D.V.M., was notified Oct. 25 of his induction as a fellow of the [Academy of Toxicological Sciences \(ATS\)](#).

In his letter announcing the fellowship, ATS President James Lamb, Ph.D., wrote, “This honor represents a significant milestone in the development of your career in toxicology. You have earned this recognition following a thorough review of your scientific credentials by your peers.”

According to its online [history](#), ATS was established in 1981, to assure the objective and unbiased understanding and interpretation of toxicity data developed for the protection of public health. With its emphasis on peer review and regulatory toxicology, certification by ATS is complementary to, but distinct from, certification as a Diplomate of the American Board of Toxicology (DABT).

NIEHS/NTP Director Linda Birnbaum, Ph.D., a DABT since 1982, and a fellow of ATS since 2006, welcomed Stokes to the academy. “This is an impressive addition to Bill’s other certifications and honors,” she said, “and a credit to NTP’s alternative testing programs. I offer Bill my sincere congratulations on this honor.”

A leader in alternative testing and animal welfare

Stokes serves as director of the NTP Interagency Center for the Evaluation of Alternative Toxicological Methods (NICEATM) and executive director of the Interagency Coordinating Committee on the Validation of Alternative Methods (ICCVAM). NICEATM and ICCVAM provide scientific support and coordinate interagency initiatives for advancing new and alternative safety testing methods, including those designed to replace, reduce, and refine the use of animals in toxicity testing. Stokes has 33 years of experience in biomedical and toxicological research and has served the NTP since 1992.



Stokes joins a [select group](#) of scientists who are ATS fellows. Because of his leadership in the review and advancement of alternative testing for regulatory agencies, Stokes said he felt the recognition is especially gratifying. (Photo courtesy of Steve McCaw)

In addition to his fellowship with ATS, and new certifications from the American Academy of Environmental Engineers ([see story](#)) and American College of Animal Welfare ([see story](#)), Stokes is a diplomate of the American College of Laboratory Animal Medicine. He studied environmental and biomedical engineering at the University of Louisville's J.B. Speed Scientific School, before attending the College of Veterinary Medicine at Ohio State University. Stokes is a career officer and assistant surgeon general in the U. S. Public Health Service (USPHS) Commissioned Corps, and served as the 8th chief veterinary officer for the USPHS from 2003-2007. Stokes has authored or co-authored more than 300 scientific publications, reports, book chapters, test guidelines, and abstracts.

[Return to Table of Contents](#)

Postdoc Brant Hamel moves into clinical research at Duke

By Nisha Cavanaugh

NIEHS postdoctoral fellow, Brant Hamel, Ph.D., transitioned from the bench to clinical research as a regulatory coordinator for gastrointestinal oncology clinical trials at the [Duke Cancer Institute](#).

Hamel's new position, which began Nov. 1, will focus on the policies and practices involved in clinical trials. He will prepare submissions and amendments to the Institutional Review Board and the U.S. Food and Drug Administration, write informed consent forms, and track projects to ensure all documentation is current and complete. Hamel describes the work as being responsible for ensuring that all regulatory and ethical requirements are met, in order to ensure the safety of patients enrolling in clinical trials.

As an Intramural Research and Training Award fellow in the Molecular Endocrinology Group headed by [John Cidlowski, Ph.D.](#), Hamel examined the role of the N-terminus of the glucocorticoid receptor (GR) in affecting the nucleocytoplasmic localization of the receptor. He discovered a novel motif that, when mutated, results in constitutive nuclear localization of GR in the absence of hormone.

Key to success: getting involved

Hamel credits his success in acquiring a job to a few important experiences at NIEHS. He served on the 15th Annual NIEHS/EPA Biomedical Career Fair committee earlier this year ([see story](#)) and was responsible for organizing and leading a panel on careers in regulatory affairs. He used this opportunity to network with experts in the field.

Hamel was also a frequent writer for the Environmental Factor, composing noteworthy stories and research summaries. He found his experience covering community-engaged research at the South Atlantic National Research Conference ([see story](#)) particularly relevant for his new position. Editor Eddy Ball, Ph.D., said of Hamel's experience as a guest writer, "Brant understood that writing for the newsletter could also be a way of networking. He let me know about his interests in clinical research, so I could offer him assignments that would be relevant to his job search, helping him learn more about clinical research, and meet people in the field."



At the same time he was building the network that helped him land his new job, Hamel used his expertise at the bench and his writing skills to submit an abstract earlier this year that won him a Fellows' Award for Research Excellence ([see story](#)).

Joining local or national societies to build your network

On his own time, Hamel pursued other mechanisms of training, including completion of a class through the North Carolina Regulatory Affairs Forum (NCRAF) and a short internship in the regulatory affairs department at the Duke Translational Medicine Institute.

NCRAF is an association of regulatory affairs professionals in the Research Triangle, N.C., area. “If you are interested in regulatory positions, one of the best things you can do is get involved with a local group like NCRAF,” advises Hamel. NCRAF gave him the opportunity to make connections, as well as learn how people got their jobs, and it was through these connections that he initially heard about the job opening.

(Nisha Cavanaugh, Ph.D., is a postdoctoral fellow in the NIEHS DNA Repair and Nucleic Enzymology Group.)

[Return to Table of Contents](#)

Wilson named editor-in-chief of DNA Repair

By Shannon Duncan

NIEHS researcher Samuel Wilson, M.D., will take on the role of editor-in-chief of the journal DNA Repair Jan. 1, 2013. This is the first time a National Institutes of Health (NIH) researcher has held the position. When asked how he felt about his latest role, Wilson said, “I am looking forward to working with the publisher, editors, and advisors toward enhancing the impact and utility of the journal.”

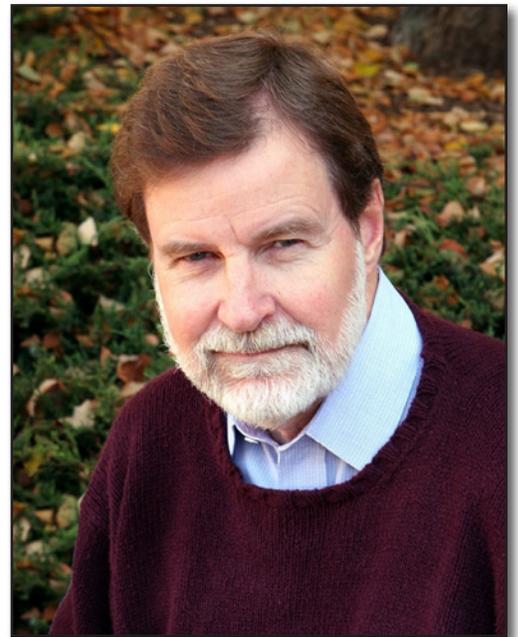
A leading journal in its field

DNA Repair, established in 2001, grew out of the journal Mutation Research/DNA Repair, under the leadership of Errol Friedberg, M.D. Friedberg, who has served as editor-in-chief of the journal since its inception, announced his plans to retire at the end of this year.

[DNA Repair](#) is a leading scientific journal that publishes research on cellular responses to DNA damage. Over the years, DNA Repair has maintained a close working relationship with publisher Elsevier to promote high quality publications through the peer-review process.

The journal’s mission is to provide an alternative forum, by publishing original observations of cellular responses to DNA damage. The journal also accepts submissions that include letters to the editor, book reviews, and hot topics in DNA repair.

Looking to the future, Wilson said that one of his main objectives for DNA Repair is to see the journal expand its scope and facilitate DNA repair research internationally.



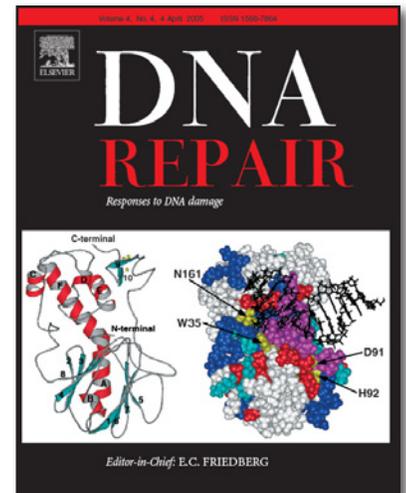
Wilson is head of the DNA Repair and Nucleic Acid Enzymology Group in the NIEHS Laboratory of Structural Biology. (Photo courtesy of Steve McCaw)

Expanding service to science

Wilson's current research explores mechanisms of base excision DNA repair, with an emphasis on DNA polymerase beta. In four decades, as an NIH researcher, Wilson has published more than 400 research articles, been a member of numerous committees, and served as deputy director and acting director of NIEHS. Wilson said that he considers the editor-in-chief position a way to continue serving the field of science, while increasing the relevance of research in DNA repair.

(Shannon Duncan is an administrative technician in the NIEHS Laboratory of Structural Biology.)

[Return to Table of Contents](#)



The current impact factor for DNA Repair is 4.135, which is considered quite impressive for a specialized journal.

Varmus recognizes NIEHS leadership on GEI

By Ed Kang

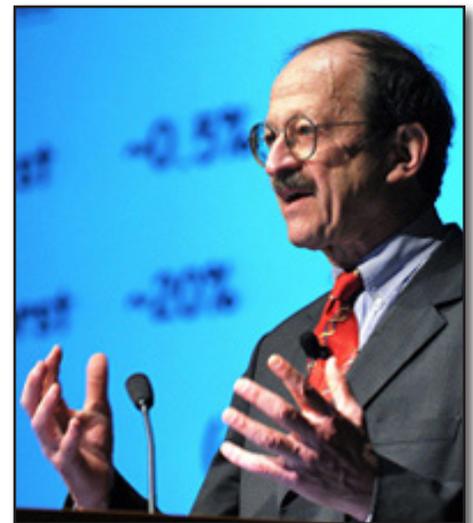
Each year, the National Cancer Institute (NCI) recognizes the outstanding contributions of people who aid in the continued advancement of cancer research. NCI staff gathered Nov. 15, not only to recognize their own, but also to acknowledge several NIEHS Division of Extramural Research and Training (DERT) members who helped coordinate and lead the successful Genes, Environment, and Health Initiative (GEI).

From 2007 to 2010, NIEHS and other National Institutes of Health (NIH) institutes coordinated research on exposure biology and genetics through GEI. The award recognizes the efforts made to accelerate progress in the field of exposure biology, which focuses on unraveling how the toxicants a person is exposed to during life can interact with each other, with lifestyle factors, and with a person's genes, to cause disease.

The group was nominated by Susan Krebs-Smith, Ph.D., chief of the NCI Risk Factor Monitoring and Methods Branch. Awards were presented to 28 scientists and staff from the participating institutes.

NIEHS awardees included:

- Gwen Collman, Ph.D., DERT director
- William Suk, Ph.D., Superfund Research Program director
- David Balshaw, Ph.D., program administrator
- Daniel Shaughnessy, Ph.D., health scientist administrator
- Kimberly McAllister, Ph.D., health scientist administrator
- Jennifer Collins, program analyst
- Claudia Thompson, Ph.D., Susceptibility and Population Health Branch chief



"[NIH] is an organization that represents, in my view, the best in what the government can do for the public," said NCI Director Harold Varmus, M.D., at the awards ceremony held at the NIH Masur Auditorium. "All of you should feel proud of the fact that you're doing such great work to advance the public good." (Photo courtesy of NCI)

Although the GEI program has ended, NIEHS remains committed to advancing exposure biology and supports many promising research efforts in this area.

(Ed Kang is a public affairs specialist in the NIEHS Office of Communications and Public Liaison and a frequent contributor to the Environmental Factor.)

[Return to Table of Contents](#)

Former NIEHS/NTP pharmacologist Larry Hart remembered

By Eddy Ball

His many friends and colleagues at NIEHS and NTP remembered, with fondness, colleague Larry Hart, Ph.D., who died Oct. 22 at the Carol Woods Retirement Community in Chapel Hill, N.C., following complications from a fall. Hart, who was 79, retired in 1999 after 30 years of service with NIH, NIEHS, and NTP.

A number of current and former employees of NIEHS and NTP shared their memories of Hart, in the days following news of his death and at his memorial service Nov. 2 at The Chapel of the Cross in Chapel Hill ([see text box](#)). Toxicologist James Huff, Ph.D., was the first at NIEHS to hear of Hart's death and set the tone for a long list of glowing praise. "He was one of the very best," Huff wrote, "a wonderful caring friend, an all-round decent person who joined NTP in the beginning and was clearly instrumental in its early and continued success."

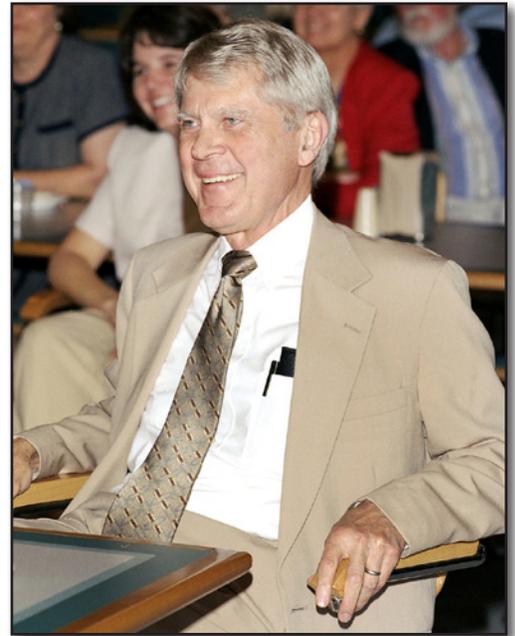
NIEHS/NTP Director Linda Birnbaum, Ph.D., recalled, "I often saw Larry after I left NIEHS [in 1989] at cultural events in Chapel Hill — always the big smile and how are you. He'll be missed." In a similar vein, former policy analyst Tom Hawkins reflected on Hart's engaging presence. "Larry Hart was a wise and gentle soul, and one fine scientist as well — incisive, deliberative, and disciplined," Hawkins said.

Many others mentioned his optimism, engaging ever-present smile, insightfulness, willingness to help, and uncompromising advocacy of public health.

From a small town in Iowa to the Research Triangle in North Carolina

Although he was born in Los Angeles, Hart moved with his family to Le Mars, Iowa at a young age and lived there until he entered the United States Army in 1954, after completing his first year of college. Following discharge, he attended the University of Iowa in Iowa City, earning a B.S. in pharmacy in 1960 and a Ph.D. in pharmacology in 1964.

Hart held a postdoctoral fellowship at the National Heart, Lung, and Blood Institute and continued his work as a research scientist at the National Cancer Institute in Bethesda, Md., prior to a short interval of work in the private sector as a pharmacology section chief at Imperial Chemical Industries in Wilmington, Del.



Hart flashed his characteristic smile during his retirement party in 1999. (Photo courtesy of Steve McCaw)

Hart returned to federal government research in 1972 with NIEHS and later NTP, where he was serving, among other scientific efforts, as executive secretary of the NTP Board of Scientific Counselors at the time of his retirement. He also lectured as an adjunct assistant professor in the department of pharmacology at the University of North Carolina at Chapel Hill.

Hart is survived by his wife of 55 years, Martha; son David Hart and wife Anne Yoder; son Thomas Hart; former daughter-in-law Amy Hart; and son-in-law Donald Tomlinson. Also surviving are grandchildren Maggie Hart, Seth Hart, Callie Hart, Alexandra Tomlinson, and Jessica Tomlinson; and step grandson, Dylan Blankenship.

In lieu of flowers, the family has asked that memorial contributions be sent to the Ronald McDonald House of Chapel Hill, 101 Old Mason Farm Road, Chapel Hill, N.C. 27517; The Chapel of the Cross, 304 East Franklin Street, Chapel Hill, N.C. 27514; or to the Resident Assistance Fund, Carol Woods Retirement Community, 750 Weaver Dairy Road, Chapel Hill, N.C. 27514.

Comments on a life well-lived from friends at NIEHS and NTP

- “Larry was one the most decent human beings I had interactions with here at NIEHS, both at the time when he was in Laboratory of Pharmacology and later with NTP.” — *Raj Chhabra, Ph.D.*
- “Larry Hart was an integral part of many NIEHS and NTP programs, particularly NTP Report of Carcinogens. We were lucky to have such a great man as our colleague.” — *June Dunnick, Ph.D.*
- “I was thinking of Larry and Jim Fouts the other day when I had a question that I wished that I could have asked them. I have good memories [of them both].” — *Jef French, Ph.D.*
- “That is indeed very sad news. I remember Larry being in an office next to mine when I was still in my early years at NIEHS. He was always willing to talk or help with any problems I came across, even though he didn’t work in the same group as I did. Larry had a wonderful smile and welcoming personality that was greatly appreciated not only by me, but also by many others who would often stop by to see him.” — *Bill Jirles*
- “Larry was a terrific person and always settled and enjoyable with that big smile.” — *Ken Korach, Ph.D.*
- “I agree with you all, there was no finer man than Larry Hart.” — *Sandy Lange*
- “When I think of Larry, it is hard to remember a time when he wasn’t smiling. He certainly made the culture of NIEHS more inclusive and friendly.” — *John McLachlan, Ph.D.*
- “He was so dear to me and had been a friend ever since I came to NIEHS. He was so helpful to me and always available when needed.” — *Betty Mills*
- “I was fortunate to work closely with Larry, David Rall, and others for the first ten years of the NTP. Larry was looking forward to celebrating his 80th. Betty Mills and I met with him for lunch 3-4 times a year. Luckily for us, we had lunch with him a few weeks ago, and he was his usual self, full of energy, telling us about his children and grandchildren, and clearly excited about turning 80 in December.” — *James Huff*

Postdoctoral fellow recruitments aim for a more diverse NIEHS

By Robin Arnette

The NIEHS scientific diversity program began six years ago, with the goal of increasing the participation of fellows and faculty from underrepresented groups at the Institute. When diversity IRTA program leader [Trevor Archer, Ph.D.](#), chief of the NIEHS Laboratory of Molecular Carcinogenesis, and co-leader, past NIEHS Director Emeritus Kenneth Olden, Ph.D., started looking for young scientists of color, they took a targeted approach to recruitment.

“It was an expansion of something that had been going on before, which was we’d go to various society meetings and encourage fellows to look at the science that was going on at NIEHS and have them think about it as a place to go,” Archer said. “Now, we’re also encouraging scientific faculty here to go out and make a real effort to recruit talented young scientists.”

Doubling the numbers

Archer said that, until this year, NIEHS had three participants at any one time in the program, but because of the support of Scientific Director Darryl Zeldin, M.D., the program has increased to seven slots, with five currently filled. Zeldin said he expanded the program because enhancing diversity in the NIEHS Division of Intramural Research (DIR) is a high priority and improves the division.

“Zeldin’s willingness to find funds and grow the program, at a time when we all know budgets are tight, speaks to his commitment to making NIEHS more diverse,” Archer added.

Current diversity IRTA fellows include:

- Georgette Charles, Ph.D.
Advisor: Guang Hu, Ph.D., LMC
- Christine Ekenga, Ph.D.
Advisor: Dale Sandler, Ph.D., Epidemiology Branch
- Jose Colon Saez, Ph.D.
Advisor: Jerrel Yakel, Ph.D., Laboratory of Neurobiology
- Danielle Watt, Ph.D.
Advisor: Thomas Kunkel, Ph.D., Laboratory of Structural Biology
- Kimberly Wiggins, Ph.D.
Advisor: Archer, LMC



Archer said one of the goals of the NIEHS diversity IRTA program is to provide the fellows with the best fellowship experience possible. (Photo courtesy of Steve McCaw)



Charles is a stem cell biologist studying pluripotency, or the ability of a stem cell to differentiate into different cell types. (Photo courtesy of Steve McCaw)

Former diversity IRTA fellows Omari Bandele, Ph.D., and David Cavazos, Ph.D., have left the Institute. Bandele, who performed research with Michael Resnick, Ph.D., and Douglas Bell, Ph.D., in the Laboratory of Molecular Genetics, now has a permanent position with the U. S. Food and Drug Administration in Washington, D.C. Cavazos, who used his expertise while with Richard Paules, Ph.D., in the Laboratory of Toxicology and Pharmacology, is now at the University of Texas at Austin.



Colon Saez studies the role of neuronal nicotinic acetylcholine receptor channels in neurological disorders. (Photo courtesy of Steve McCaw)



Wiggins is interested in nuclear receptor transcriptional activation. (Photo courtesy of Steve McCaw)

According to Archer, the diversity IRTA program is really about identifying talent, giving them the opportunity, and supporting them as they work with their mentors.

“One of the things we do is to make sure that the mentors in the program have a good track record and history of mentoring, which really maximizes our fellows’ opportunity for success,” Archer said.”

[Return to Table of Contents](#)

NIEHS Epidemiology Branch receives grant from Avon Foundation

By Bhargavi Rao

NIEHS epidemiologist [Hazel Nichols, Ph.D.](#), was in Charlotte, N.C., to receive an oversized mock check for \$270,000 from the Avon Foundation, to support the Institute’s breast cancer research efforts.

The money is part of proceeds from the 8th annual [Avon Walk for Breast Cancer](#) held Oct. 27-28 in Charlotte — the last of nine Avon Walks this year. The event, which attracted more than 900 participants from 36 states and Washington, D.C., raised more than \$1.75 million for breast cancer research and awareness. NIEHS received the largest research grant awarded at the event.

Nichols and her colleagues in the NIEHS Epidemiology Branch, led by Dale Sandler, Ph.D., will use the grant to better understand the role that factors, such as reproductive hormones, central adiposity, and oxidative stress, play in breast health in premenopausal women. The study will involve a



Linked video:
[Watch a video of participants in What It's Like to Walk: 2012 Avon Walk for Breast Cancer \(04:05\).](#)

(Launches in new window)

Download Media Player:  Flash 

cohort of 1,500 participants from the larger NIEHS-led [Sister Study](#), and will examine the use of biomarkers in serum and urine to predict cancer development and progression.

When asked about the goals of the project, Nichols said, “The focus is really on indicators of risk that can be measured in premenopausal women.”

(Bhargavi Rao, Ph.D., is an Intramural Research Training Award fellow in the NIEHS Laboratory of Molecular Carcinogenesis.)



Nichols, left, holds the mock check presented to NIEHS by Avon Foundation Breast Cancer Crusade Executive Director Marc Hurlbert, Ph.D. (Photo courtesy of the Avon Foundation)



It was still dark on the morning of Oct. 27 when participants began their fund raising trek through downtown Charlotte. (Photo courtesy of the Avon Foundation)

[Return to Table of Contents](#)

NIEHS connects with students and scientists at ABRCMS conference

By Anshul Pandya

NIEHS, along with other National Institutes of Health institutes and agencies, academia, and private sector companies, encouraged African-American and other minority students to pursue higher education at the [Annual Biomedical Research Conference for Minority Students \(ABRCMS\)](#). This year’s conference, held Nov. 7-10 in San Jose, Calif., the heart of Silicon Valley, attracted more than 3,600 talented students from around the country.

Ericka Reid, Ph.D., from the NIEHS Science Education and Diversity Office, and postdoctoral fellow Anshul Pandya, Ph.D., from the NIEHS Laboratory of Neurobiology, represented the Institute.

ABRCMS 2012
Annual Biomedical Research Conference for Minority Students



CALIFORNIA • NOVEMBER 7–10, 2012

The ABRCMS is sponsored by the National Institute of General Medical Sciences Division of Training, Workforce Development, and Diversity, and managed by the American Society for Microbiology.

Connecting with young scientists

Reid and Pandya staffed the exhibit booth and focused on making sure that students were aware of the exciting research opportunities, including internships and fellowships that are available at NIEHS.

“It is always a rewarding experience for me to talk with young scientists, of various backgrounds, about training opportunities and career possibilities,” said Reid. “The [NIH] Summer Internship Program was a popular topic, and I’m hopeful that interest among students for this program will translate into an increase in the number of diverse applicants next year.”



As director of the NIEHS Office of Science Education and Diversity, one of Reid’s duties is to raise awareness about the Institute, through local, state, and national outreach efforts. (Photo courtesy of Steve McCaw)



Pandya is a member of the Ion Channel Physiology Group led by Jerrel Yakel, Ph.D. (Photo courtesy of Steve McCaw)

Graduate students and doctoral candidates also inquired about the career opportunities available at NIEHS. Pandya, who was attending his first

ABRCMS, was happy to give his own account of what it’s like to work at NIEHS and to explain the plethora of research that goes on at the Institute.

“There was a misconception among a lot of students that, as its name suggests, NIEHS was involved only in environmental research,” Pandya said. “Events like ABRCMS enable us to convey our Institute’s robust health and biomedical science research program.”

(Anshul Pandya, Ph.D., is an Intramural Research Training Award (IRTA) fellow in the NIEHS Laboratory of Neurobiology.)

[Return to Table of Contents](#)

Science writers storm Raleigh

By Ernie Hood

The country’s leading science journalists, bloggers, and freelance writers gathered in Raleigh, N.C., Oct. 26-30 for ScienceWriters2012, the annual joint meeting of the National Association of Science Writers and the Council for the Advancement of Science Writing. Though Hurricane Sandy’s untimely arrival forced some to miss the conference, more than 500 gathered in the Raleigh Convention Center to hear nationally recognized authorities in biomedicine, genetics, astrophysics, and other areas of study.

Among the featured speakers was [Kimberly Gray, Ph.D.](#), NIEHS program lead for the Centers for Children’s Environmental Health and Disease Prevention Research. Her keynote talk, “Air Pollution, Brain Development, and Behavior,” highlighted significant NIEHS-funded research in recent years, which points to an association between high prenatal exposure to air pollutants and subsequent delayed development, lower IQ, and behavioral problems in children.

Gray also spoke of the successful multidisciplinary approach within the centers to better understand the environmental factors affecting children’s health, and to promote translation of research findings into intervention and prevention methods designed to reduce health risks.

In addition to grant-funded research, science writers also heard the latest in intramural studies from [John \(Jef\) French, Ph.D.](#), head of the NTP Host Susceptibility Group. As part of the conference’s Lunch with a Scientist sessions, French’s talk focused on his group’s work on mouse model genetics.

Although the meeting was anchored at the Raleigh Convention Center, the lunchtime discussions were held at North Carolina State University’s Centennial Campus, giving visitors a chance to see the considerable science and engineering educational facilities and resources located on campus.

NIEHS staff from the Office of Communications and Public Liaison, including Director Christine Flowers, Robin Mackar, and Ed Kang, supported the yearlong planning efforts for the event, as well as the development of a Tip Book, a colorful resource of profiles and story ideas about researchers from across North Carolina, including 10 NIEHS scientists and several grantees. The book was distributed to attendees of ScienceWriters2012.

Karl Leif Bates, director of research communications at Duke University, who spearheaded efforts to bring the conference to North Carolina, said, “Thanks to contributions from NIEHS and countless other members of the Triangle science community, North Carolina’s world-class scientific achievements and activities will once again be in the national spotlight.”

(Ernie Hood is a contract writer for the NIEHS Office of Communications and Public Liaison.)

[Return to Table of Contents](#)



Sir Walter Raleigh donned the familiar white lab coat, in honor of the scientific-themed proceedings. (Photo courtesy of Ashley Yeager, Duke University)



President and CEO of the Research Triangle Foundation of North Carolina, Robert Geolas, welcomed attendees to the Triangle. (Photo courtesy of Megan Morr, Duke University)



NIEHS created and produced a booklet for the conference, showcasing North Carolina’s robust scientific endeavors.

Live from NIEHS: Experts field obesity questions

By Ed Kang

NIEHS convened a panel of experts Nov. 29 to tackle questions from the public on childhood obesity and related environmental factors. The unique, virtual event — the first of its kind at NIEHS to mix social media and Web broadcasting to reach a diverse national audience — attracted more than 600 viewers and sparked tweets to 1.5 million twitter users.

Are chemicals making our kids fat?

Over the last two decades, the obesity rates have significantly increased in the United States and around the world. In the U.S., about a third of adults and a growing number of children are obese, which puts them at greater risk for conditions such as heart disease, stroke, type 2 diabetes, and certain types of cancer.

Although many factors are involved, NIEHS in-house and grantee-funded research is providing mounting evidence that early life environmental exposures are associated with obesity and related conditions.

“We are seeing that there’s more to this problem than diet and lifestyle,” remarked NIEHS/NTP Director Linda Birnbaum, Ph.D., who led the panel of prominent researchers. “The better we can understand the effects of early-life exposures, the more effectively we can reduce the prevalence of many diseases and conditions, including obesity.”

Twitter and Web drive new engagement opportunities

During the forum, audience members, including students, advocacy organizations, and local, state, and federal agencies, took advantage of the capability to ask the panel questions via email, Web, and Twitter.

“Getting in front of people to listen to their concerns has been a long-standing commitment of leadership at NIEHS,” said John Schelp, special assistant in the Office of Science Education and Diversity, who organized the event, along with the Office of Communications and Public Liaison. “This event shows we can continue these conversations in a virtual way that’s meaningful.”

NIEHS sponsors community forums, in cities throughout the U.S., on the general theme of environmental impacts on human health. The purpose is to bring together members of the public, who are interested in public health and the environment, with NIEHS and other federal, state, and local government health officials; environmental health professionals; and disease and environmental advocacy groups. The forums provide a platform for an open dialogue, to establish better coordination among the public and health professionals working on community exposures, industrial exposures, and other environmental issues.

Birnbaum will travel next to Seattle on April 18 to discuss safe seafood, then to Detroit on June 18 to meet with the community on air pollution.



Schelp, along with the NIEHS Office of Communications and Public Liaison, organized the Institute’s first virtual forum. (Photo courtesy of Steve McCaw)



The forum panel included, left to right, Gregory Diette, M.D., Johns Hopkins University; Lawrence Kushi, Sc.D., Kaiser Permanente; Birnbaum; Kristina Thayer, Ph.D., NTP; moderator Kimberly Gray, Ph.D., NIEHS; Andrew Rundle, Ph.D., Columbia University; and Karen Peterson, Sc.D., University of Michigan. Peterson, Kushi, and Rundle also took advantage of their visit to present research highlights and future directions to NIEHS staff at the ongoing Keystone Science Lecture Seminar Series sponsored by the Division of Extramural Research and Training. (Photo courtesy of Steve McCaw)

(Ed Kang is a public affairs specialist in the Office of Communications and Public Liaison, and a regular contributor to the Environmental Factor.)

[Return to Table of Contents](#)

USPHS officers join Veterans Day parade

By Josef Rivero, Alnissa Carter, and Christine Fallon

The state of North Carolina held its annual Veterans Day parade Nov. 10 in Raleigh. This year’s theme, “Welcome Home Iraqi War Veterans,” brought together a wide range of veterans, from active-duty service members of the Fort Bragg 50th Signal Battalion to Veterans of Foreign Wars.

For the first time in the history of the parade, U.S. Public Health Service (USPHS) Commissioned Corps officers, from various operating divisions in North Carolina, were invited to participate. USPHS officers from the Federal Bureau of Prisons, Butner Federal Correctional Complex, Womack Army Medical Center, and NIEHS joined the celebration. The distinguished USPHS Honor Guard led the contingent through the parade route.



Stokes, center, and other USPHS Commissioned Corps Officers at the N.C. Veterans Day parade. (Photo courtesy of Josef Rivero)

Parade attendees were greeted by a host of service organizations and youth programs, including the American Red Cross, Boy Scouts of America, Capital City Young Marines, Military Order of the Purple Heart, U.S. Naval Sea Cadet Corps, and numerous local high school Reserve Officers’ Training Corps (ROTC) units. The officials

of the parade included N.C. Gov. Bev Perdue, U.S. Rep. David Price, U.S. Rep. Brad Miller, and Raleigh Mayor Nancy McFarlane.

Assistant U.S. Surgeon General Rear Adm. William Stokes, D.V.M., from NIEHS, joined parade officials on the reviewing stand and participated as a guest speaker during the ceremony. In his remarks, Stokes thanked and honored all veterans and their families, including the hundreds of veterans who now serve on active duty in the USPHS Commissioned Corps. Immediately following the parade, the wreath-laying ceremony commenced with the presentation of colors by the Sanderson High School Air Force Junior ROTC, followed by the singing of the national anthem.

[Return to Table of Contents](#)



Speakers at the event included, right to left, Stokes; Master of Ceremonies Larry Stogner, News Anchor for ABC11 Eyewitness News in Raleigh; Veterans Day Parade Chair Patricia Harris from the Wake County Council of Veterans Organizations Inc.; and Brig. Gen. Ferdinand Irizarry II, deputy commander of the U.S. Army John F. Kennedy Special Warfare Center and School based at Fort Bragg. (Photo courtesy of Josef Rivero)

Science Notebook

Science Day celebrates Institute achievements

By Jeffrey Stumpf

Continuing the early November tradition, the 10th annual NIEHS Science Day took place Nov. 1-2, bringing together scientists from intramural and extramural research and the National Toxicology Program. Science Day recognizes research and mentorship achievements by NIEHS scientists, and showcases breakthroughs in environmental health.

Traditionally, the Institute celebrates Science Day with dozens of poster presentations, several talks by NIEHS staff and fellows, and handing out of awards.

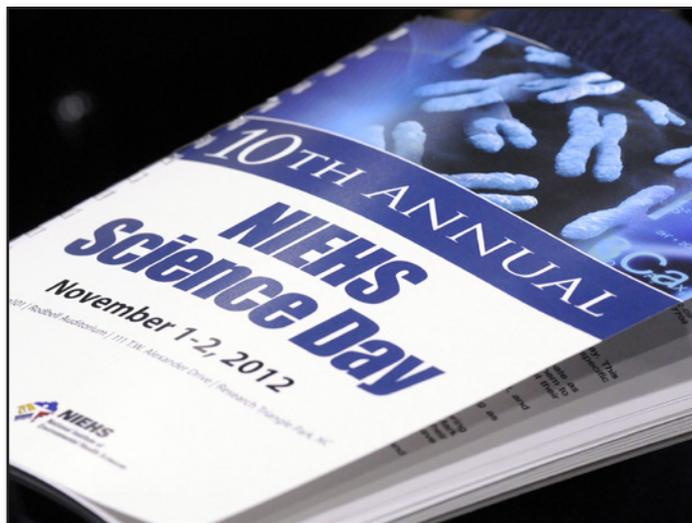
In addition to the extra day, this year's Science Day added more talks by fellows and investigators, a presentation by a former NIEHS trainee, the first Fellow of the Year Award and, more importantly, as NIEHS Director Linda Birnbaum, Ph.D., noted, more participation across the Institute.

“This is the first year that we really have opened up Science Day and engaged in the process of one NIEHS,” Birnbaum remarked. “We now have many presentations, not only from DIR [Division of Intramural Research], but also from the Division of the National Toxicology Program (DNTP), and from the Division of Extramural Research and Training (DERT).”

Science day highlights achievements in stem cell research

In organizing the 2012 Science Day, Joel Abramowitz, Ph.D., and his committee unified NIEHS researchers around a common theme — the impact of stem cell research on environmental health. Representatives from all three divisions gave talks on the topic.

Michael Waalkes, Ph.D., represented DNTP with his talk describing the effects of arsenic exposure in mice. After limited arsenic dosing during embryogenesis, Waalkes showed that the mice are more likely to develop tumors by altering stem cell numbers and response, thereby increasing cancer stem cells. Also, arsenic could transform cell lines into cancerous cells that quickly induced tumors when transplanted into the animal.



NIEHS Science Day presented research from all three divisions, through 101 posters, 12 abstract talks, three mini-symposium talks, and a presentation by a former NIEHS trainee. (Photo courtesy of Steve McCaw)



Abramowitz led the committee that organized and directed the expanded and more inclusive 2012 Science Day. (Photo courtesy of Steve McCaw)

DIR advances in stem cell research were described by Guang Hu, Ph.D., a principal investigator in the Laboratory of Molecular Carcinogenesis. Hu explained that CNOT proteins, in particular CNOT3, are important for cardiomyocyte differentiation. Using his methods, Hu envisions that he may be able to develop toxicity screens that would allow them to ask important questions about environmental health.

Les Reinlib, Ph.D., speaking on behalf of DERT, focused on building a field of stem cell research in environmental health. Reinlib stated that NIEHS wants to seed stem cell research by focusing on subjects such as the effects of early exposures on stem cell development, the window of time during development where stem cells are most susceptible to environmental hazards, and the role of stem cell reprogramming in environmental diseases.

And the winner is ...

The NIEHS Trainees Assembly (NTA) selected Mitch Eddy, Ph.D., as the 2012 Mentor of the Year, based on recommendations by his present and past trainees. Numerous heartfelt letters of support described how Eddy impacted their lives scientifically, professionally, and personally.

Intramural Research Training Award (IRTA) fellow Tracy Clement, Ph.D., nominated Eddy, describing him as enthusiastic, respected, open, selfless, thoughtful, and never dismissive. “It was not long after I started collecting letters of support from mentees that I realized how profound of an impact he really has had on his trainees,” Clement noted. “Mitch’s loyalty to his trainees and willingness to do all he can for them, during and after their training period, was recognized across the board and with deep appreciation.”

Bonnie Joubert, Ph.D., won the new Fellow of the Year Award, which recognizes extraordinary qualities in trainees that will prepare them for a well-rounded research career, such as passion for research, excellence in science communications, and leadership. Upon hearing of the new award category, investigator Stephanie London, M.D., Dr.P.H., immediately nominated the award winner.

London stated that Joubert has “a perfect storm of qualities that make her outstanding.” Trained as an epidemiologist, London mentioned that Joubert is well-trained in biology and programming, making her a valuable asset to the lab.

“There aren’t many people on the street that have Bonnie’s level of skill,” London said. “Not only that, she has a blazing work ethic — her computer is always about to melt.”

(Jeffrey Stumpf, Ph.D., is a research fellow in the NIEHS Laboratory of Molecular Genetics Mitochondrial DNA Replication Group.)

Past Mentors of the Year

Jau-Shyong Hong, Ph.D. (2003)
John Pritchard, Ph.D. (2004)
William Copeland, Ph.D. (2005)
David Miller, Ph.D. (2006)
David Armstrong, Ph.D. (2007)
Ronald Mason, Ph.D. (2008)
Serena Dudek, Ph.D. (2009)
Matthew Longley, Ph.D. (2010)
Donna Baird, Ph.D. (2011)



Kenneth Korach, Ph.D., chief of the NIEHS Laboratory of Reproductive and Developmental Toxicology, takes note of Waalkes’ research on arsenic exposure. Korach leads research in estrogenic responses in the Receptor Biology Group. (Photo courtesy of Steve McCaw)



Science day allows researchers the opportunity to present their work to colleagues across the Institute. From left to right, Douglas Bell, Ph.D., Harriet Kinyamu, Ph.D., and Joyce Goldstein, Ph.D., listen to Laboratory of Molecular Carcinogenesis visiting fellow Ruifang Li, Ph.D., as she explained her research. (Photo courtesy of Steve McCaw)



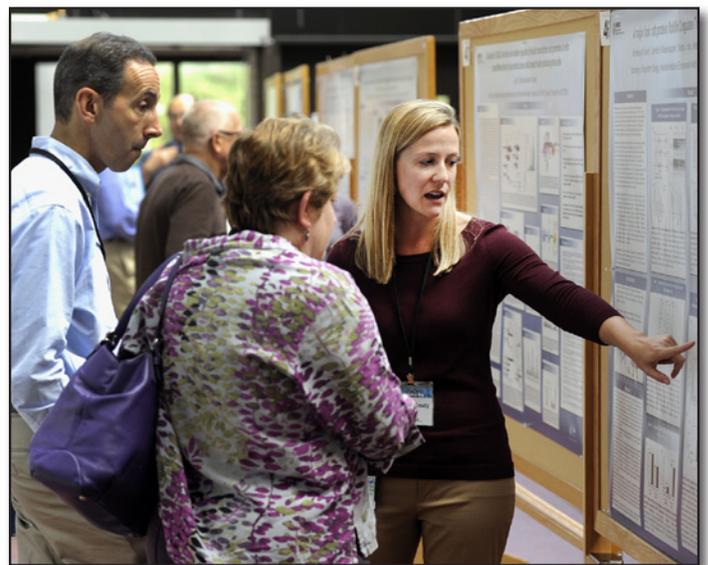
Sherine Chan, Ph.D., delivered the inaugural Science Day former NIEHS trainee presentation about her work studying mitochondrial fusion in zebrafish. As an assistant professor at the Medical University of South Carolina, Chan is building upon her NIEHS research on diseases associated with defects in mitochondrial DNA replication. (Photo courtesy of Steve McCaw)



Jessica Williams, Ph.D., left, a research fellow in the Laboratory of Structural Biology, explains her research on responding to ribonucleotide incorporation into DNA to University of North Carolina at Chapel Hill Professor Jack Griffin, Ph.D. (Photo courtesy of Steve McCaw)



George Fromm, Ph.D., left, from the Laboratory of Molecular Carcinogenesis, accepts the Best Oral Presentation Award from Abramowitz, for his talk on the regulation of Mapk/ERK signaling and stem cell pluripotency by NELF-mediated pausing of RNA polymerase II. (Photo courtesy of Steve McCaw)



Kymberly Gowdy, Ph.D., right, from the Laboratory of Respiratory Biology, impresses Dori Germolec, Ph.D., center, and Scientific Director Darryl Zeldin, M.D., with her award-winning poster titled, "A major lipid raft protein flotillin-2 regulates T cell function and allergic asthma." (Photo courtesy of Steve McCaw)



Margaret Adgent, Ph.D., left, from the Epidemiology Branch, describes her research that earned her the Best Poster of the Year Award. The poster was titled, "Cytological assessment of urethral and vaginal epithelium in 1 and 12-week old infants: evidence for postnatal estrogen withdrawal using swab and urine cell collection methods." (Photo courtesy of Steve McCaw)



Laboratory of Respiratory Biology's Seddon Thomas, Ph.D., left, accepted the Best Poster Presentation Award from Abramowitz for her poster titled, "A strategy for fate mapping of IL-17-producing cells in vivo." (Photo courtesy of Steve McCaw)



While presenting the Fellow of the Year Award, London, right, had high praise for Joubert, concluding with the question, "How did I deserve to get someone as good as her?" (Photo courtesy of Steve McCaw)



On behalf of so many of Eddy's trainees before her, Clement simply stated, "Thanks for everything," before presenting Eddy with the prestigious Mentor of the Year Award. (Photo courtesy of Steve McCaw)

[Return to Table of Contents](#)

Understanding individual susceptibility to environmental toxicants

By Carol Kelly

The genetic blueprint that makes each of us unique also influences our susceptibility to environmental toxicants. Deciphering the complexities of this interaction is what motivates Aaron Bowman, Ph.D., an assistant professor in the Department of Neurology at Vanderbilt University. During his Keystone Science Lecture Seminar Series presentation Nov. 14 at NIEHS, Bowman described how his lab uses induced pluripotent stem cells (iPSCs) to take a personalized approach to investigating environmental health and neurodegenerative disease risk.

“We are actively seeking to understand how individuals at risk for certain neurodegenerative diseases, such as Parkinson’s disease and Huntington’s disease, may exhibit altered susceptibility to metals in the environment,” said [Bowman](#).

His lab is pioneering a patient-specific approach to test differential neurotoxicity and gene-environment interactions, using differentiated neural progenitors and neurons from patient-specific iPSCs.

A type of undifferentiated cell, iPSC is a useful tool for modeling diseases. These cells are generated by injecting specific gene control agents into an adult cell, which can then be taken back to its early developmental, or stem cell, form. Although difficult to create, iPSCs do not provoke the ethical considerations associated with using human embryonic stem cells. In recognition of this breakthrough technology, the method’s inventor, Shinya Yamanaka, M.D., Ph.D., won the 2012 Nobel Prize in Physiology or Medicine.

“Working with human iPSCs is costly in both dollars and time, but the technology potential makes it worthwhile,” said Bowman. “My lab has been applying iPSC technology to neurotoxicity research for more than three years. We have established protocols to generate iPSC lines and differentiate them down neural forebrain and midbrain lineages.”

Bowman’s lab is investigating the influence of manganese exposure in Huntington’s disease and Parkinson’s disease. He and his colleagues hope to define mechanisms of neuronal dysfunction and learn the basis of selective neuropathology, by characterizing the molecular function of disease genes and their interaction with environmental toxicants under both normal and pathological conditions.



In addition to his research work, in 2012, Bowman was chosen vice president-elect of the Neurotoxicology Specialty Section of the Society of Toxicology (SOT), as well as senior councilor of the SOT Stem Cells Specialty Section. (Photo courtesy of Steve McCaw)



“Aaron is a real success story, who demonstrates the need to bring in new talent to the field of environmental health science,” said Cindy Lawler, Ph.D., in her introductory remarks. Lawler hosted the lecture. (Photo courtesy of Steve McCaw)

Bowman is a ONES Awardee

Bowman won an NIEHS Outstanding New Environmental Scientist (ONES) award in 2008 for examining the mechanisms behind the interaction between manganese and Huntington's disease. The support from NIEHS enabled him to develop an approach to use patient-derived stem cell models to better understand the connections between genetic and environmental risk factors.

“My interest in the role of environmental factors in disease began with a discovery of a unique interaction between exposure to the metal manganese and the gene associated with Huntington's disease,” said Bowman. “In the discovery of an unexpected environmental risk factor, I became intrigued by connections between disease and our environment.”

He received his Ph.D. in biomedical sciences in 2000 from the University of California, San Diego, and did his postdoctoral fellowship training at Princeton University and Baylor College of Medicine.

(Carol Kelly is a research and communication specialist with MDB Inc., a contractor for the NIEHS Division of Extramural Research and Training.)

[Return to Table of Contents](#)

Research on PCBs and obesity earns Wetterhahn award

By Sara Mishamandani and Carol Kelly

Research about environmental toxins and their impact on obesity and type 2 diabetes is the basis for Nicki Baker's receipt of the 2012 Karen Wetterhahn Memorial Award. Baker, a trainee in the NIEHS-funded University of Kentucky (UK) Superfund Research Program (SRP), accepted the prestigious award Oct. 23 at the NIEHS SRP annual meeting.

Exposure to PCB's and weight loss

Baker's work, which was recently published in the journal [Environmental Health Perspectives](#), brings novel insight into how environmental toxins, namely coplanar polychlorinated biphenyls (PCBs), affect human health. In the study, Baker found that when obese mice experienced weight loss, those exposed previously to PCBs lost the benefit of glucose homeostasis, or stability, reducing the influence of weight loss in preventing type 2 diabetes.



Baker presented her research at the SRP annual meeting Oct. 23 in Raleigh, N.C. The very next day, Environmental Health Perspectives accepted and published her paper, online, on coplanar PCBs and weight loss in obese mice. (Photo courtesy of Steve McCaw)

PCBs are a class of hazardous chemicals that were banned in the 1970s. However, these toxic compounds linger in groundwater and soil. Because they are lipophilic, or have an attraction to fat, PCBs also accumulate in fat tissue.

In her study, Baker investigated the effects of coplanar PCBs on the expression of tumor necrosis factor alpha (TNF-alpha), a known contributor to insulin resistance, and the levels of glucose and insulin in lean and obese mice.

Results of the study are described in “[PCBs impair glucose homeostasis in mice](#),” one of the Environmental Factor’s extramural papers of the month for December.

2012 Wetterhahn Award Winner

Baker, the 15th recipient of the annual Karen Wetterhahn Memorial Award, is a doctoral student under the guidance of Lisa Cassis, Ph.D., in the Graduate Center for Nutritional Sciences at UK. The SRP acknowledged Baker for her contributions to research, as well as her contributions to the community.

In addition to her doctoral work, Baker is an adjunct instructor at the Bluegrass Community and Technical College in Lexington, Ky., teaching human nutrition and human ecology. Through her lectures, she strives to increase interest in nutrition and its ability to influence health and disease. She is also a mentor to undergraduates studying the effects of Superfund chemicals on adipocytes, also known as fat cells.



*Bill Suk, Ph.D., director of the NIEHS SRP, talks with Baker during a break.
(Photo courtesy of Steve McCaw)*

Karen Wetterhahn Memorial Award

Karen Wetterhahn, an expert in the mechanisms of metal toxicity, was best known for her research on chromium. A professor of chemistry at Dartmouth College, she founded Dartmouth’s Toxic Metals Research Program in 1995.

In addition to research, Wetterhahn was passionate about teaching. Concerned about the higher rate of dropout of women from the sciences compared to men, she worked with a colleague to develop the Women in Science Project at Dartmouth. This successful program provides a learning environment where first-year women engage in experiences designed to further their interest in science, math, or engineering.

Tragically, Wetterhan died in 1997, as a result of dimethylmercury poisoning, caused by the accidental spill of a few drops of the chemical on her latex glove-covered hand.

Wetterhahn’s death shocked the scientific community, including regulatory agencies, because she had taken all required safety measures known at the time. Safety guidelines by the Occupational Safety and Health Administration were soon changed to reflect the high risk associated with the use of dimethylmercury.

As a tribute to her legacy, NIEHS created the annual Karen Wetterhahn Memorial Award, shortly after her death. The award recognizes outstanding young scientists who are conducting research relevant to Superfund or the cleanup of hazardous waste sites. The awardee receives support to attend one major scientific conference, in addition to travel funds to attend the NIEHS SRP annual meeting, where they present their research.

“Nicki knows what she wants to achieve and, as a result, works diligently and responsibly in all aspects of her project,” said Cassis. “On her own initiative, she is serving as a role model for future scientists studying environmental chemicals.”

Citation: Baker NA, Karounos M, English V, Fang J, Wei Y, Stromberg A, Sunkara M, Morris AJ, Swanson HI, Cassis LA. 2012. Coplanar polychlorinated biphenyls impair glucose homeostasis in lean C57BL/6 mice and mitigate beneficial effects of weight loss on glucose homeostasis in obese mice. *Environ Health Perspect*; doi:10.1289/ehp.1205421 [Online 24 October 2012].

(Sara Mishamandani, a research and communication specialist for MDB, Inc., is a contractor for the NIEHS SRP and Division of Extramural Research and Training (DERT). Carol Kelly, a research and communication specialist with MDB, Inc., is a contractor for DERT.)

[Return to Table of Contents](#)

SRP patents licensed for water applications

By Sara Mishamandani

Patents from the NIEHS-funded University of Kentucky (UK) Superfund Research Program (SRP) center have been licensed by Sepro Membranes Inc. in Oceanside, Calif. The functional membrane technology, described in three patents, degrades waterborne contaminants, including toxic organic compounds; sequesters heavy metals at very high capacity; and uses synthesized nanoparticles, all within the membrane pore structure.

Dibakar Bhattacharyya, Ph.D., university alumni professor of chemical and materials engineering at UK, serves as principal investigator on the projects. Bhattacharyya and his SRP team developed the dual membrane system to remove chlorinated organic contaminants from water, including polychlorinated biphenyls (PCBs) and trichloroethylene (TCE).

PCBs and TCE are present at Superfund sites in Kentucky and nationwide. TCE, a degreasing agent, is the most frequently reported organic contaminant in groundwater. PCBs are a class of hazardous chemicals used in coatings for electronics, sealants, adhesives, paint, and flame retardants that were banned in the 1970s, but still linger in groundwater and soil.



Bhattacharyya leads the NIEHS-funded UK SRP project that focuses on the degradation of chlorinated organic contaminants in water. (Photo courtesy of The University of Kentucky)

Innovative water detoxification technology

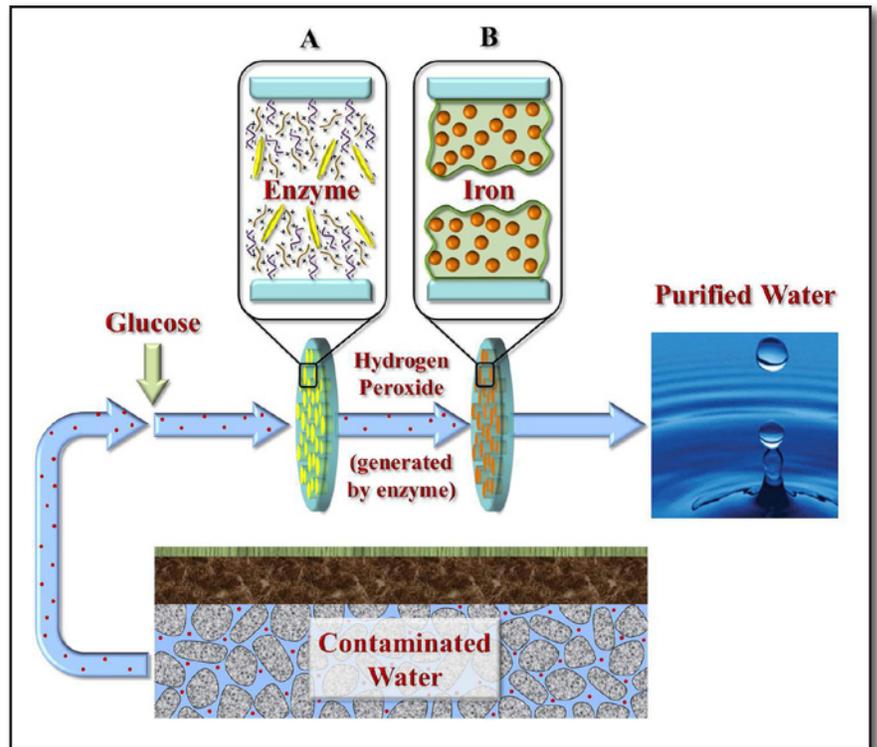
Bhattacharyya’s membrane system uses enzymes to generate hydrogen peroxide, which are needed for free radical production. The system uses the free radicals, along with iron-based nanoparticles, synthesized by Bhattacharyya’s group, for the oxidative dechlorination of the contaminants.

Bhattacharyya’s group pioneered the synthesis of iron-based nanoparticles for toxic organic dechlorination, providing a green method for the remediation of groundwater. The device may offer an inexpensive way to provide clean drinking water in areas of the world where chemical contamination is prevalent.

“The integration of nanotechnology and membrane provides a novel approach for water detoxification technologies, through the use of non-toxic nanoparticles and green chemistry approaches,” said Bhattacharyya. “Sepro manufactures large-scale systems. Their goal will be to integrate our membrane functionalization approaches, through the licensing of three new patents and five previous patents, for new and untapped water technology markets.”

(Sara Mishamandani is a research and communication specialist for MDB Inc., a contractor for the NIEHS Superfund Research Program, Worker Education and Training Program, and Division of Extramural Research and Training.)

[Return to Table of Contents](#)



This illustration depicts an example of the method used by Bhattacharyya for water purification, using stacked functionalized synthetic membranes. (Photo courtesy of The University of Kentucky)

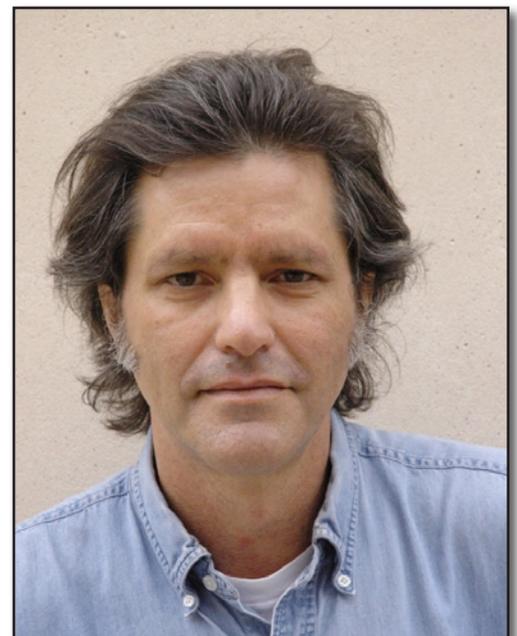
Wing discusses poverty, health, and industrial hog production

By Eddy Ball

At the very hour the embargo on his latest paper lifted Oct. 28, NIEHS grantee Steve Wing, Ph.D., addressed a capacity audience gathered in Raleigh, N.C., for the annual meeting of the National Association of Science Writers ([see story](#)).

Wing’s presentation examined the environmental injustices and adverse health effects posed by concentrated or confined animal feeding operation (CAFO) practices in economically disadvantaged rural areas of eastern North Carolina. Low income communities of color, he explained, have ten times more CAFOs than wealthier, white communities, even after adjusting for how rural they are.

Wing is an associate professor at the University of North Carolina at Chapel Hill (UNC) and advocate for social justice who was honored in 2009 with the International Society for Environmental Epidemiology Research Integrity Award ([see story](#)). Literacy is an important part of Wing’s quest for environmental justice. His research combines community engagement with novel and sophisticated epidemiology, to empower people in their efforts to improve public health for themselves and their neighbors.



Wing opened his talk with a comment about his audience. “I think science writers are really important, because lack of understanding of science in the general public is a huge problem,” he told the audience. “I do not believe we can have a sustainable democracy, unless people understand more about science.” (Photo courtesy of UNC-CH)

Defining public health in a global context

According to Wing, public health is not just the inoculation and individual hygienic practices that preoccupy most public health offices. Instead, it should deal with such global issues as energy, transportation, water, waste disposal, housing, and agriculture, to support public policy for promoting well-being, in addition to combating disease.

CAFO practices, he said, are the outgrowth of a radical transformation in agriculture, as family farming gave way to corporate industrial production in the last half of the 20th century. Unlike earlier ways of producing meat from hogs, cattle, and poultry, today's industrial farming centralizes production in CAFOs, where animals are fattened for slaughter, as quickly and economically as possible, with imported factory-farm grain laced with hormones and antibiotics delivered to animals by automated feeders.

"The factory farms are profitable," Wing argued, "because they don't pay for the damage they do."

Nutrients become toxic waste and a threat to health

Animals in CAFO operations live within a closed system, Wing explained. Feeding takes place in the same cage where animals defecate and urinate through slats in the floor. Typically, waste is then piped to lagoons, where it mixes with water that is then sprayed on open fields adjacent to the places community members live and breathe, play and work, eat and drink.

In such close confinement next to animal waste, disease is a constant threat. Wing touched briefly on the issues of animal welfare and biosecurity — the development of antibiotic-resistant bacteria that thrive in such facilities and the hazards posed by the carcasses of animals killed by disease — before moving on to the effects of poor air quality on the health of residents.

Human health effects in communities impacted by CAFO operations

Beginning in 2008 with one of his first papers on the community health effects of industrial hog operations in eastern North Carolina, Wing, along with community advocates and fellow epidemiologists as co-authors, published a series of publications. These papers explored people's perception of the impact of odor from



Animals in CAFOs spend their entire lives in close quarters. According to a 2010 press release by [Food and Water Watch](#), factory farms in North Carolina house 79.7 million broiler chickens, 10 million hogs, 3.9 million egg-laying hens, 13,700 dairy cows, and 3,800 beef cattle that produce as much untreated waste as 207 million people. (Photo courtesy of the book "CAFO")



Permitted by the North Carolina Department of Environment and Natural Resources, a large factory farm may produce more waste than a small town. Urine and feces are piped to lagoons before being sprayed on adjacent fields. (Photo courtesy of Steve Wing)

these industries on daily living activities, as they relate to the beneficial use of property and enjoyment of life. They also addressed the associations between air pollution measures, including particulate matter and the toxic gas hydrogen sulfide (H₂S), and health outcomes. Their findings provided evidence that hog pollution plumes from CAFOs limited several leisure time activities, impacted social interactions, and coincided with adverse mental and physical health outcomes.

The UNC team's most recent [paper](#) used a repeated measures design to evaluate within-person effects of exposure to CAFO emissions, most tellingly in regard to diastolic blood pressure (see text box). It also measured air pollution levels in central locations with mobile instrumentation. Even though the study group was small, its comparison of people's blood pressures during exposed and unexposed time periods helped eliminate bias from confounding factors. Exposures were assessed by a self-reported measure of the hog odor, together with instrument measures of H₂S and particulates.

Striving to overcome the limitations of self report

In his latest paper on the health effects of industrial hog production, Wing and colleagues followed up their findings, from a 2011 study on symptomatic and functional respiratory responses to specific, well-recognized environmental exposures arising from the industrial production of swine, with a study of blood pressure and stress. The team studied the same cohort of 101 non-smoking adult volunteers living near industrial swine operations in 16 neighborhoods in eastern North Carolina, residents who had been recruited through the engagement of community leaders.

Following two daily exposures to swine CAFO emissions, participants reported levels of hog odor on a 9-point scale and measured their blood pressure using an oscillometric, automated device. Simultaneously, the team measured ambient levels of H₂S and particulate matter equal to or smaller than 10 micrometers in aerodynamic diameter, at central locations in each neighborhood. The researchers then compared each participant's blood pressure during times of both more and less exposure to swine CAFO air pollution, with each participant serving as her or his own control for acute response.

Because swine CAFOs are the primary source of H₂S in the study communities, the authors considered it a specific marker of hog malodor.

The team found that, on average, blood pressure of swine CAFO neighbors increased in association with increases in markers of transient plumes of odorant air pollution on the 9-scale rating and with concentrations of H₂S greater than 10 parts per billion.

"Repeated acute physical environmental stressors, such as malodor and noise, may be aspects of the built environment that contribute to racial and economic disparities in high blood pressure and its sequelae," they concluded. Wing pointed out, that even small increases in blood pressure could be important in the so-called stroke belt that includes communities in the study.

"I couldn't have done this study without the support of community members," Wing said of the need for building trust among participants. Because of CAFO operator sensitivity to the ongoing study and possible evasive efforts on their part, Wing thinks the results may actually underrepresent the health effects of exposure to CAFO air pollution.

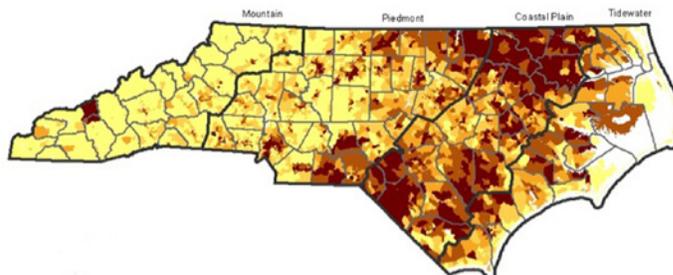
Citation: [Wing S, Horton RA, Rose KM](#). 2012. Air Pollution from Industrial Swine Operations and Blood Pressure of Neighboring Residents. *Environ Health Perspect*; doi:10.1289/ehp.1205109 [Online 28 October 2012].



As this photo from a neighboring resident shows, hog spraying doesn't always respect property lines. This family covers its lawn tractor when the factory sprays its fields, and some residents report that the smell of hog waste seeps indoors, even with windows and doors shut. (Photo courtesy of Steve Wing)



Industrial hog production has tended to concentrate in rural communities of the eastern coastal plain region of North Carolina. (Image courtesy of Steve Wing)



The same communities, shown in brown on this U.S. Census Bureau map, are places where the population is predominately made up of people of color. (Image courtesy of Steve Wing)

[Return to Table of Contents](#)

Guerinot discusses metal uptake, transport, and accumulation in plants

By Sara Mishamandani

Understanding the way plants absorb and distribute metals, such as iron and arsenic, may help to improve environmental and human health, said Dartmouth College professor and Superfund Research Program (SRP) grantee Mary Lou Guerinot, Ph.D., during her Oct. 25 lecture at NIEHS. Her talk was part of the Keystone Science Lecture Seminar Series, sponsored by the NIEHS Division of Extramural Research and Training (DERT).

In her lecture, “Ionome to Genome: Gene Discovery in Aid of Plant Nutrition, Human Health, and Environmental Remediation,” [Guerinot](#) discussed techniques to better understand the genes and mechanisms involved in metal uptake and distribution in plants. She introduced and described ionomics, or the study of the complete set of mineral nutrients and trace elements found within a living organism.

Guerinot’s group measures metal ion abundance in plants, using inductively coupled plasma mass spectroscopy (ICP-MS). ICP-MS uses high temperature to both ionize and atomize metals present in a sample, to prepare them for detection in a spectrometer, providing accurate measurements of overall metal content.

Her group also investigates where the metal ions are localized within the plant, using synchrotron X-ray fluorescence microspectroscopy. This method takes advantage of the fluorescent light released when X-rays interact with the outer electrons of a metal atom. The wavelength of the emitted light determines the type and location of the metals within a sample.

Iron accumulation in plants and nutrition

Guerinot's group analyzes plant iron content to search for mutants that can more readily absorb iron, and to determine the genes associated with iron uptake. The group identified several promising plant lines that accumulate more iron in their seeds than other plants, and are using them to better understand the genes responsible for the uptake.

"Because extreme poverty limits access to food for much of the world's population, it is important that affordable food be as nutritious as possible," said Guerinot.

Iron deficiency is the most common human nutritional disorder. She explained that understanding the genetic propensity of a plant to absorb iron will help develop ways to fortify foods with iron, improving nutrient content.

Understanding arsenic in rice

Guerinot also discussed her research on harmful metal uptake in edible plants, such as arsenic and cadmium in rice. This work is being done at the Dartmouth SRP center, which focuses on the fate and transport of arsenic, as well as arsenic exposure and associated health effects.

Previous research at the Dartmouth SRP, led by Brian Jackson, Ph.D., uncovered high levels of inorganic arsenic in organic brown rice syrup. Another Dartmouth SRP grantee, Margaret Karagas, Ph.D., discovered that consumption of around a half cup per day of cooked rice had levels of arsenic comparable to drinking 1 liter per day of water containing 10 micrograms of arsenic, the current U.S. maximum contaminant limit. This research revealed the need to monitor arsenic in foods and develop guidelines for arsenic concentrations.

Guerinot uses the same laboratory techniques she uses to investigate iron in plants to determine abundance and localization of arsenic in rice.

Finding rice cultivars that don't take up arsenic

Guerinot's research group evaluated more than 300 rice cultivars grown in multiple locations, and performed field trials, in varied arsenic soils, to see how much of the arsenic concentration was due to the environment and how much was due to genotype. The results showed a genetic basis for arsenic accumulation.

"We are trying to find rice cultivars that restrict arsenic accumulation in the grain," said Guerinot. "We think it is the simplest, fastest, and most cost effective approach to solve the problem of arsenic contamination of rice and rice-based products."



Guerinot is the Ronald and Deborah Harris Professor of the Sciences at Dartmouth College. She has served as chair of the Department of Biological Sciences, as Associate Dean of the Faculty for the Sciences, and as Vice Provost. (Photo courtesy of Steve McCaw)



DEPT Program Administrator Danielle Carlin, Ph.D., left, hosted Guerinot's lecture at NIEHS. (Photo courtesy of Steve McCaw)

Discovering this genetic variation may help breed cultivars low in grain arsenic, leading to reduced human exposure to arsenic from rice.

(Sara Mishamandani is a research and communication specialist for MDB, Inc., a contractor for the NIEHS Superfund Research Program, Worker Education and Training Program, and Division of Extramural Research and Training.)

[Return to Table of Contents](#)

Antimicrobial compound associated with allergies

By Robin Arnette

Your typical morning routine may include bathing with soap, cleaning your teeth with toothpaste and mouthwash, and topping off your hygiene regimen with deodorant. According to a recent study, though, an active ingredient in some of these products may impact your respiratory health, by promoting the development of allergies and causing inflammation in the mucous lining of the nose, also known as rhinitis.

Researchers from NIEHS, Norway, and the Centers for Disease Control and Prevention found the link, after measuring levels of triclosan, a synthetic antimicrobial chemical, in urine samples from Norwegian children. The authors published their [paper](#) online Nov. 12 in the journal *Allergy*, and say their findings replicate those of another [study](#) that used American children participating in the National Health and Nutrition Examination Survey (NHANES). Since these reports found an association between triclosan and the occurrence of allergic sensitization in two different populations, the researchers feel confident the relationship is genuine.

“Our work and the NHANES research found no association with asthma, but we have data suggesting that triclosan is connected to upper respiratory symptoms,” said Randi Bertelsen, Ph.D., lead author and visiting fellow in the NIEHS [Genetics, Environment, and Respiratory Disease Group](#) led by Stephanie London, M.D., Dr.P.H. Bertelsen took a two-year sabbatical from her post at the Norwegian Institute of Public Health to do research at NIEHS. She said this paper is the first to measure levels of triclosan exposure in any population or age group in Norway.



Bertelsen noted that the children who were allergically sensitized as a result of high triclosan levels had a specific antibody that caused the symptoms of allergy. (Photo courtesy of Steve McCaw)

Allergic sensitization

London is a co-author on the article and emphasized the importance of this work by pointing out that triclosan doesn't just show up in personal products.

“It also appears in many other consumer goods, such as toys, plastic kitchen utensils, clothing, and some hand sanitizers,” London said. “Because of its prevalence in everyday items, we have to understand how it affects us.”

Bertelsen explained that the 623 Norwegian children used in the cohort have been followed since birth. At age 10, the youngsters received two days of extensive clinical evaluation at Oslo University Hospital, undergoing allergy skin prick tests and lung function assessments on a treadmill, and providing urine and blood samples. The research team sent the urine samples to the Centers for Disease Control and Prevention to measure the amounts of triclosan.

The results determined that children with allergic sensitization and rhinitis had the highest levels of triclosan in their urine. Since triclosan doesn't stay in the body very long, 1-2 days according to Bertelsen, she and others think the elevated levels come from continued use of certain products.

“It's believed that very little actually goes through the skin, and that the mucosa in your mouth is where everything is absorbed,” Bertelsen said. “If you like one kind of toothpaste, you're more likely to consistently use the same brand.”



London's group studies the interaction between genetics and the environment in respiratory diseases. (Photo courtesy of Steve McCaw)

Changing the flora and fauna

The exact mechanism of how triclosan leads to allergy is unknown, but Bertelsen offered a possibility. She said triclosan kills some bacterial strains, but not all. As a result, it changes the bacterial composition in the intestine, skin, and mouth. The ratio between good and bad bacteria in the gut may be especially important. She said other studies have examined the intestinal biota in children with and without allergies and found that the microbial composition differs between the two groups.

Bertelsen plans to continue examining the triclosan-allergy connection. She said other research groups have measured triclosan in breast milk from Swedish mothers and, since Norwegian mothers tend to breastfeed their babies during the first 4-6 months of life, she and her colleagues plan to follow up the Swedish findings with a study of triclosan and allergy development in Norwegian infants. The research team has already collected urine from the newborns and will follow up as they age.

Citation: Bertelsen RJ, Longnecker MP, Lovik M, Calafat AM, Carlsen KH, London SJ, Lodrup Carlsen KC. 2012. Triclosan exposure and allergic sensitization in Norwegian children. *Allergy*; doi:10.1111/all.12058 [Online 12 November 2012].

[Return to Table of Contents](#)

Fall NICEATM activities focus on international collaborations

By Debbie McCarley and Cathy Sprankle

Scientists in the National Toxicology Program (NTP) Interagency Center for the Evaluation of Alternative Toxicological Methods (NICEATM) worked with international colleagues this fall to advance innovative new test methods and integrated testing and decision strategies for chemical safety and vaccine testing.

Stokes coordinates test method development activities with Japanese counterparts

Regulatory authorities, worldwide, require testing of chemicals and products for skin allergy hazard potential. NICEATM Director Rear Adm. William Stokes, D.V.M., joined scientists in Japan for a September workshop on “Adverse Outcome Pathways for Skin Sensitization Testing.” He also participated in a meeting of the management team for a Japanese-led study of a new test method proposed to identify whether substances have the potential to cause skin allergies.

“Our work at NICEATM has shown that it is now possible to accurately identify many allergy hazards without using animals,” explains Stokes. “Any animal testing that is still required can be accomplished using a recently adopted procedure that uses only a small number of mice. Based on recent progress, we expect that most, if not all, chemical skin allergy hazards will soon be identified without using animals.”

The Japan workshop focused on using methods to identify skin allergy hazards, based on key events that occur in the adverse outcome pathway leading to skin allergy reactions. Stokes spoke about the NICEATM development of an integrated testing and decision strategy, and said the testing strategy, presented at the 2012 meeting of the Society of Toxicology, can identify most chemical allergens without animals, and reduces overall animal use by 72 percent.

NICEATM workshop reviews new *Leptospira* vaccine testing approaches

Later in September, over 80 scientists from around the world gathered in Ames, Iowa, at the NICEATM-sponsored “International Workshop on Alternative Methods for *Leptospira* Vaccine Potency Testing: State of the Science and the Way Forward.” Workshop participants reviewed available improved methods for *Leptospira* vaccine potency testing, which currently uses many laboratory animals and causes significant pain and distress to the animals used.



The organizing committee for the Leptospira workshop, gathered for a photo after the workshop. From left to right, Marta Guerra, D.V.M., Ph.D., Centers for Disease Control and Prevention; Eric Klaasen, D.V.M, Ph.D., MSD Animal Health, The Netherlands; Jeffrey Galvin, Ph.D., Pfizer Animal Health; Brett Webster, Boehringer Ingelheim Vetmedica, Inc.; David Alt, D.V.M., Ph.D., USDA; Karen Brown, Ph.D., Pair O Docs Consultants; Hans Draayer, Gourneck View Consulting, LLC; Catrina Stirling, Ph.D., Pfizer; Warren Casey, Ph.D., NICEATM; Geetha Srinivas, D.V.M, Ph.D., USDA; Angela Walker, D.V.M, Ph.D., USDA; Stokes; Kevin Ruby, Ph.D., USDA; Randal Sebring, D.V.M., Colorado Serum Company; Richard McFarland, M.D., Ph.D., FDA. (Photo courtesy of James Fosse, Animal and Plant Health Inspection Service, USDA)

Participants in the workshop, including vaccine manufacturers and regulators, discussed steps that could be taken to achieve wider use of *in vitro* replacement methods for *Leptospira* vaccine potency testing developed by the U.S. Department of Agriculture (USDA) Center for Veterinary Biologics. These suggestions included exploration of new approaches to validation, and sharing of data, reagents, and best practices.

Workshop participants also proposed the development and application of serological methods, which measure the levels of specific antibodies in the blood of immunized test animals. These methods use fewer animals, and reduce or eliminate animal pain and distress compared to traditional methods. Participants agreed on specific characteristics that serological methods must have and which regulatory agencies would require these methods.

“Action on the proposals from this workshop can immediately reduce, and eventually replace, animal use for *Leptospira* vaccine potency testing, while still protecting human and animal health,” said Stokes.

Slides presented by speakers are available on the [NICEATM website](#). A workshop report will be published next year as a special issue of the journal *Biologicals*.

(Debbie McCarley is a special assistant to Stokes. Cathy Sprankle is a communications specialist with ILS, Inc., support contractor for NICEATM.)

[Return to Table of Contents](#)

LMG speaker discusses replication beyond DNA damage

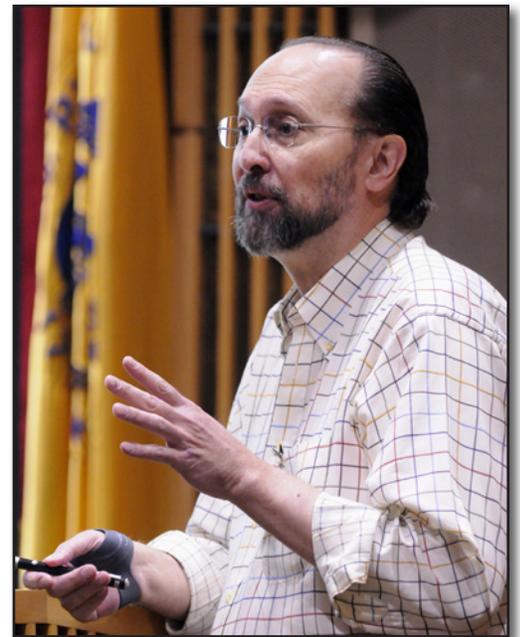
By Jeffrey Stumpf

After low levels of DNA damage, cells may not need a large gene expression response to complete DNA replication, according to research presented Nov. 19 at NIEHS by Kenneth Marians, Ph.D.

Marians, dean of the Gerstner Sloan-Kettering Graduate School of Biomedical Sciences, described clear evidence that DNA replication, by itself, can restart beyond a replication blocking DNA lesion. His research suggests that DNA replication is more tolerant of DNA damage than previously thought.

Many environmental agents, such as ultraviolet (UV) light, damage DNA by causing roadblocks that stall DNA polymerases. All forms of life have evolved methods of dealing with DNA damaging agents, including removing the damaged base; recruiting a more tolerant polymerase that bypasses the lesion; providing a detour for the polymerase using recombination or switching the template; and signaling for cell death via apoptosis.

Disruption to these pathways are directly linked to genetic or environmentally-induced predisposition to cancer. Inducing the proteins that promote the DNA damage response pathways is costly to the cell. Marians argues that the replication complex, or replisome, may be able to deal with small amounts of DNA damage by skipping past the damage.



While Marians noted his interest in separate replication restart proteins, he mentioned that his focus for the last five years has been on how the replisome itself restarts replication. (Photo courtesy of Steve McCaw)

“I think that replisome skipping is a housekeeping function that is there to take care of background levels of damage and not induce DNA damage responses,” Marians postulated. “There’s no reason to induce the response if there is only a couple of lesions in the DNA.”

***E. coli* proteins mind the gap to finish what they started**

The well-accepted dogma of nuclear and bacterial DNA replication states that continuous leading strand DNA replication is coupled to discontinuous lagging strand replication. While the lagging strand restarts with every Okazaki fragment, Marians asked whether leading strand replication could also replicate discontinuously past a DNA lesion.

His research took advantage of the ability to reconstitute the *E. coli* replisome, to demonstrate replication past a carefully made DNA template containing a cyclobutane pyrimidine dimer, a common lesion caused by exposure to UV light. Using this system, Marians showed that the replisome restarts replication several hundred nucleotides past a lesion, or consecutive lesions, creating a small gap that would be repaired by special gap filling proteins *in vivo*. Interestingly, Marians demonstrated that restarted replication occurred with the same kinetics as replication prior to the lesion.

Switching polymerases in mid-replication

Though discontinuous leading strand synthesis by the replisome leaves a small gap at a DNA lesion, synthesizing DNA without a gap requires translesion synthesis (TLS) by a specialized polymerase. In *E. coli*, DNA polymerase IV (Pol IV) performs TLS by gaining access to the replication fork and inserting a nucleotide opposite the DNA lesion.

Marians used his replication system to understand how the normal replisome hands off the replication fork to Pol IV. He showed that TLS by Pol IV requires the same DNA tethering protein complex, called the beta clamp, as the normal replisome. Thus, the beta clamp may function as a tool belt that provides an adequate polymerase to the replication fork quickly.

Humans contain many TLS polymerases and a similar DNA tethering protein, suggesting that a similar mechanism may be important for human DNA replication. Mutations in the gene that encodes the TLS DNA polymerase eta cause a variant of xeroderma pigmentosum, which leads to an extreme sensitivity to light and a high risk of skin cancer. By understanding TLS mechanisms, Marians’ work will lead to a better understanding for how polymerase switching is important to resisting UV damage and preventing cancer.

(Jeffrey Stumpf, Ph.D., is a research fellow in the NIEHS Laboratory of Molecular Genetics Mitochondrial DNA Replication Group and a frequent contributor to the Environmental Factor.)



Postdoctoral fellow, Deepa Singh, Ph.D., from the NIEHS Mechanisms of Mutation Group, invited Marians to present his research to the Institute. Singh noted, “Marians has also taken a great deal of interest in the training of graduate students.” (Photo courtesy of Steve McCaw)



Steven Roberts, Ph.D., right, and Daniel Menendez, Ph.D., work in the NIEHS Chromosome Stability Group and share Marians’ interest in learning how cells tolerate DNA damage. (Photo courtesy of Steve McCaw)

This month in EHP

The December issue of [Environmental Health Perspectives](#) highlights human health impacts of increased imports and green building techniques in tribal housing.

Progress and Pollution: Port Cities Prepare for the Panama Canal Expansion

The Panama Canal expansion, slated for completion by 2015, has sparked the competitive imagination of East Coast and Gulf Coast port authorities, who hope to capture some of the 70 percent of U.S. imports currently controlled by West Coast ports. Experts at the U.S. Army Corps of Engineers call the Panama Canal expansion a likely game changer for U.S. trade, and container volumes at East Coast and Gulf Coast ports could more than double within the next two decades. However, with this growth come questions about what major initiatives to expand cargo capacity could mean for public health in these port cities.

Healthier Tribal Housing: Combining the Best of Old and New

A convergence of housing-related factors may be partly to blame for increased disease risks among Native Americans and Alaska Natives, such as climate change, poverty, overcrowding, poorly constructed homes, insufficient indoor ventilation, and use of wood-burning stoves. If housing is a problem, it may also be a solution. Tribes across the country are now building healthier homes that combine traditional indigenous building methods and designs with modern green building techniques.

Podcast — Leaded Aviation Gasoline with Marie Lynn Miranda

Removing lead from gasoline used in cars and trucks reduced atmospheric lead emissions by 98 percent between 1970 and 1995, but some airplanes still use leaded fuel. The Federal Aviation Administration is working to eliminate leaded aviation gasoline by 2018 but, for now, aircraft contribute a large percentage of annual atmospheric lead emissions. In this [podcast](#), Marie Lynn Miranda, Ph.D., talks about her research on blood lead levels in children living near airports.

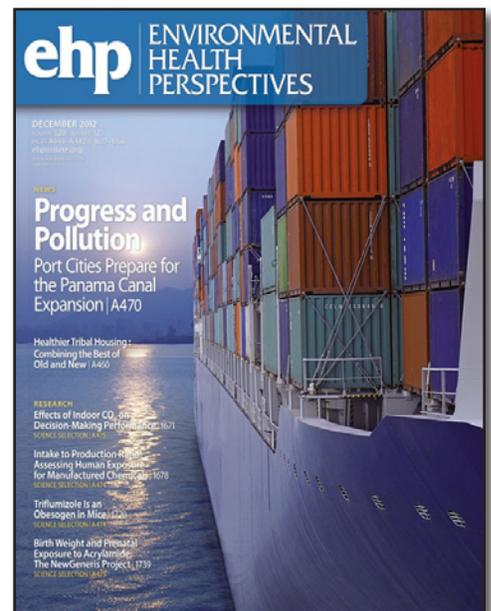
Featured commentaries, reviews, and research this month include:

- Don't Hold Your Breath: Indoor CO₂ Exposure May Impair Decision Making
- Exposure Intimacy: A New Metric for Assessing Chemical Intake
- Potential Obesogen Identified: Fungicide Triflumizole Is Associated with Increased Adipogenesis in Mice
- Crispy Cravings May Affect Baby's Health: Prenatal Acrylamide Exposure Is Associated with Reduced Birth Weight

[Return to Table of Contents](#)



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GEMS reflects on 30 years

By Ernie Hood

The Genetics and Environmental Mutagenesis Society (GEMS) celebrated its 30th anniversary Nov. 8, by recognizing the contributions of its 27 past presidents and showcasing the research of several students and postdocs. At the fall 2012 meeting, held at the William and Ida Friday Center for Continuing Education in Chapel Hill, N.C., GEMS members looked back on three decades of success in developing a thriving, local forum for genetics and environmental mutagenesis students, postdocs, and senior researchers.

The meeting and slate of speakers were organized by GEMS President Nagu Keshava, Ph.D., of the U.S. Environmental Protection Agency (EPA), around the theme of “Air Quality and Health Impacts.”

“We were trying to have a transdisciplinary theme this time, incorporating the environmental aspect,” said Keshava.

She also noted that when the society was founded in 1982, many of its members could not afford to attend large national meetings and, due to the current economic climate and federal government budget tightening, the same impediment remains. Keshava said that GEMS has allowed local students and postdocs to attend a meeting in their discipline, with excellent speakers and the opportunity to establish connections and potential collaborations.

Three main speakers were featured over the course of the daylong meeting. The first speaker, David Balshaw, Ph.D., program administrator in the NIEHS Division of Extramural Research and Training, addressed the approximately 60 attendees on “Emerging Technologies for Exposure Assessment: Making the Exposome a Reality” ([see text box](#)).

GEMS members were also treated to presentations by EPA health scientist Lucas Neas, Ph.D., who spoke about “Air Pollution Epidemiology in a Multipollutant World,” and Jason West, Ph.D., of the Department of Environmental Sciences and Engineering at the University of North Carolina at Chapel Hill (UNC), whose talk addressed “Connecting Climate, Air Quality, and Human Health: Applications Using Global Atmospheric Models.”



GEMS held its fall 2012 meeting at the William and Ida Friday Center for Continuing Education in Chapel Hill, N.C. (Photo courtesy of Steve McCaw)



GEMS President Keshava presided over the day's activities at the society's 30th annual meeting, which included several scientific presentations, student and postdoc posters, the awarding of certificates of appreciation to GEMS past presidents, and election of new officers. (Photo courtesy of Steve McCaw)

EPA and UNC School of Medicine postdoctoral fellow Esra Mutlu, Ph.D., shared the results of her group's research on the "Comparative Mutagenicity of Diesel and Biodiesel Emissions," which found that, under the study's conditions, emissions from biodiesel combustion were less mutagenic than those from petroleum diesel.

Student awards for posters went to Ryan Thys of the Wake Forest School of Medicine and Jennifer Nichols, a predoctoral IRTA fellow in the NIEHS Laboratory of Respiratory Biology. Nichols won the society's GEMS Award for her abstract, "Chrm2 Is a Candidate Susceptibility Gene for Hyperoxic Lung Injury in a Murine Model of Bronchopulmonary Dysplasia."

GEMS also conducted its annual business meeting, marked by the election of new officers, including President-elect William Kauffman, Ph.D., of the UNC Department of Pathology and Laboratory Medicine.

(Ernie Hood is a contract writer for the NIEHS Office of Communications and Public Liaison.)



Balshaw stressed the interdisciplinary nature of emerging exposure science, saying "Everything from engineering sciences, such as electrical engineering and environmental engineering, to computational sciences to handle the data, to environmental epidemiology and toxicology, are critically involved, as well as the clinical side to understand the health relevance of the data." (Photo courtesy of Steve McCaw)



NIEHS predoctoral IRTA fellow Jennifer Nichols discussed her GEMS award-winning poster. (Photo courtesy of Steve McCaw)



NIEHS/NTP health scientist Diane Spencer was one of the society's past presidents who received a certificate of appreciation from current GEMS President Keshava. Spencer led the group 2002-2003. (Photo courtesy of Steve McCaw)

New tools for analyzing the exposome

In his presentation at the GEMS meeting, Balshaw provided an overview of the new tools and emerging approaches that promise fresh insights into the exposome — the measure of all the exposures of an individual in a lifetime and how those exposures relate to health.

Among the many innovative methods developed through NIEHS funding, several new devices for monitoring exposures to airborne pollutants are poised to provide valuable information about exposure risks. Balshaw observed that after years of development, some are close to full deployment, but significant challenges remain.

“The data is very different from what we’re getting from existing technologies,” he said. “It’s both a much larger data volume, and much more complex type of exposure data than what the epidemiologists are used to working with.”

Balshaw told the GEMS attendees that, eventually, the goal is to determine untargeted associations between environment and disease. “The ultimate future is to look at global changes in both genetic factors and environmental factors, so that you can truly begin to understand individual risk of developing diseases and the factors that contribute to susceptibility.”

[Return to Table of Contents](#)

Extramural papers of the month

By Nancy Lamontagne

- [BPA exposure linked to thyroid level changes for pregnant women and newborns](#)
- [PCBs impair glucose homeostasis in mice](#)
- [Childhood air pollution exposure and adult heart health](#)
- [Dioxin induces disease and reproductive problems in later generations](#)



Read the current Superfund Research Program [Research Brief](#). New issues are published on the first Wednesday of each month.

BPA exposure linked to thyroid level changes for pregnant women and newborns

A new study from NIEHS grantees links levels of urine bisphenol A (BPA) in pregnant women to changes in thyroid hormone levels for the women and their newborn boys. Thyroid hormone is necessary for healthy brain development, and the new findings add to growing health concerns about BPA.

The researchers studied 476 women participating in the Center for the Health Assessment of Mothers and Children of Salinas (CHAMACOS) longitudinal study, which is examining environmental exposures and health

among pregnant women and children. They measured BPA concentration in urine samples collected from the women during the first and second half of pregnancy, as well as free and total levels of thyroxine hormone and thyroid-stimulating hormone. The investigators also measured thyroid-stimulating hormone in the newborns.

The average maternal BPA concentration was associated with reduced thyroid-stimulating hormone in boys, but not in girls. Among boys, the link was stronger for BPA measurements taken in the third trimester of pregnancy and decreased with time between BPA and thyroid hormone measurements.

The researchers say their results suggest that maternal BPA either has a transient effect on thyroid-stimulating hormone in the newborn, or that there is a developmental window of susceptibility. Further studies are needed to better understand the relationship.

Citation: [Chevrier J, Gunier RB, Bradman A, Holland NT, Calafat AM, Eskenazi B, Harley KG. 2012. Maternal Urinary Bisphenol A During Pregnancy and Maternal and Neonatal Thyroid Function in the CHAMACOS Study. Environ Health Perspect; doi:10.1289/ehp.1205092 \[Online 4 Oct. 2012\].](#)

[Return to Table of Contents](#)

PCBs impair glucose homeostasis in mice

There is growing evidence that PCB exposure is linked to increased risk for type 2 diabetes. A new mouse study from NIEHS grantees provides insight into how coplanar PCBs affect gene expression and accumulate in body fat in a way that leads to problems with regulating glucose.

Because studies suggest that PCB exposure levels are associated with diabetes even in lean individuals, the researchers initiated studies in mice fed a low-fat diet. They also conducted studies in mice made obese from consumption of a high-fat diet, and in a group of obese mice made to lose weight by switching to the low-fat diet. Some mice from all the diet groups received PCB-77, and others served as controls.

The researchers measured glucose and insulin tolerance, as well as levels of tumor necrosis factor alpha (TNF-alpha) in adipose (body fat), liver, and muscle tissue. TNF-alpha is known to contribute to insulin resistance. *In vivo* and *in vitro* experiments revealed that interfering with aryl hydrocarbon receptors (AhR) stopped the effects of PCB-77, indicating that an AhR-dependent mechanism was involved. The researchers concluded that adipose-specific elevations in TNF-alpha expression may contribute to impaired glucose homeostasis, or stability.

Citation: [Baker NA, Karounos M, English V, Fang J, Wei Y, Stromberg A, Sunkara M, Morris AJ, Swanson HI, Cassis LA. 2012. Coplanar Polychlorinated Biphenyls Impair Glucose Homeostasis in Lean C57BL/6 Mice and Mitigate Beneficial Effects of Weight Loss on Glucose Homeostasis in Obese Mice. Environ Health Perspect; doi:10.1289/ehp.1205421 \[Online 24 October 2012\].](#)

[Return to Table of Contents](#)

Childhood air pollution exposure and adult heart health

Childhood exposure to ozone can increase risk for higher carotid artery intima-media thickness (CIMT) in healthy young adults, according to a study from NIEHS grantees. Increased CIMT thickness marks plaque buildup in artery walls, which increases risk for later cardiovascular disease.

To study the effects of childhood exposure to air pollution, the researchers estimated childhood and lifetime exposures to particulate matter (PM), nitrogen dioxide, and ozone for 861 University of Southern California college students, using their home addresses and the U.S. Environmental Protection Agency's Air Quality System database. The investigators also collected health and sociodemographic information, and analyzed lipids and biomarkers in blood samples.

As a whole, study participants had an average CIMT of 603 micrometers. However, individuals exposed to ozone from birth to age 5, had an average CIMT 7.8 micrometers higher as young adults, and those exposed from ages 6 to 12 had an average 10.1 micrometers higher. Lifetime exposure to ozone showed similar, but not significant associations. The researchers say their findings point to the importance of regulating air pollutants and limiting childhood exposures to ozone.

Citation: Breton CV, Wang X, Mack WJ, Berhane K, Lopez M, Islam TS, Feng M, Lurmann F, McConnell R, Hodis HN, Kunzli N, Avol E. 2012. Childhood Air Pollutant Exposure and Carotid Artery Intima-media Thickness in Young Adults. *Circulation* 126(13):1614-1620.

[Return to Table of Contents](#)

Dioxin induces disease and reproductive problems in later generations

NIEHS grantees report that dioxin, specifically TCDD, administered to pregnant rats, created epigenetic changes that led to a variety of reproductive problems and adult-onset disease in subsequent generations.

Pregnant rats received TCDD during fetal days eight to 14. The first generation of rats showed increased incidences of total disease and multiple diseases, including prostate and polycystic ovarian disease, and fewer ovarian follicles. Third generation males had kidney disease, and females had pubertal abnormalities, ovarian primordial follicle loss, and polycystic ovary disease.

Investigators also analyzed epigenetic changes in the third generation sperm, finding 50 differentially DNA methylated regions in gene promoters. These regions offer potential epigenetic biomarkers for transgenerational disease and ancestral environmental exposures.

Citation: Manikkam M, Tracey R, Guerrero-Bosagna C, Skinner MK. 2012. Dioxin (TCDD) Induces Epigenetic Transgenerational Inheritance of Adult Onset Disease and Sperm Epimutations. *PLoS One* 7(9):e46249.

(Nancy Lamontagne is a science writer with MDB, Inc., a contractor for the NIEHS Division of Extramural Research and Training, Superfund Research Program, and Worker Education and Training Program.)

[Return to Table of Contents](#)

Intramural papers of the month

By Nisha Cavanaugh, Melissa Kerr, Anshul Pandya, and Bhargavi Rao

- [RAP80 reduces cancer risk and maintains genome stability](#)
- [DNA sequence context influences human 8-oxoguanine DNA glycosylase activity](#)
- [Glucocorticoid signaling could lead to better therapeutics](#)
- [Bacteria in house dust worsens asthma](#)

RAP80 reduces cancer risk and maintains genome stability

In a study published in the journal *Cancer Research*, NIEHS scientists reported that RAP80, a ubiquitin interaction motif-containing protein and member of the BRCA1 complex, was important in maintaining genomic stability and reducing cancer risk. Since mutations in BRCA1 and BRCA2 account for 5 to 7 percent of familial breast cancers, this study has significant implications in understanding how disruption of this complex may exacerbate the risk of developing cancer.

Using a RAP80-null mouse model developed in the NIEHS Cell Biology Group led by Anton Jetten, Ph.D., the scientists demonstrated that in the absence of RAP80, mice exposed to ionizing radiation and the carcinogen 7,12-dimethylbenz(a)anthracene had a greater tendency to develop lymphomas and mammary cancer, in addition to breast cancer. The mice lacking RAP80 also exhibited greater genomic instability, due to a reduced ability of the cells to repair genetic lesions caused by the DNA-damaging agents.

Since RAP80 has not been convincingly implicated in playing a major role in human cancers thus far, this study is critical in delineating RAP80 as a molecular marker, mutations in which can increase the risk of cancer. In addition, these mice might provide an additional model to analyze the tumorigenicity of environmental chemicals. **(BR)**

Citation: [Yin Z, Menendez D, Resnick MA, French JE, Janardhan KS, Jetten AM](#). 2012. RAP80 is critical in maintaining genomic stability and suppressing tumor development. *Cancer Res* 72(19):5080-5090.

[Return to Table of Contents](#)

DNA sequence context influences human 8-oxoguanine DNA glycosylase activity

NIEHS researchers have examined to what extent DNA sequence context affects the glycosylase activity of human 8-oxoguanine (8-oxoG) DNA glycosylase (OGG1), a part of the base excision DNA repair (BER) pathway. They discovered that mispairs positioned 5' to the 8-oxoG lesion deter its repair and could increase 8-oxoG mutagenicity.

The research addressed a potential cause of the G to T mutational hotspot found in the human p53 gene, corresponding to a CpG dinucleotide. The G to T mutation is characteristic of oxidative stress-induced 8-oxoG lesions and their error-prone replicative bypass. Cells protect against this mutation by several processes, one of

which is BER initiated by OGG1. The aim of the research was to understand the significance of methylated C adjacent to the 8-oxoG lesion on OGG1 activity.

The researchers found that OGG1 had comparable activity on DNA with 5-methyl C and normal C located 5' to 8-oxoG. However, a mismatch placed 5', not 3', to the 8-oxoG lesion dramatically decreased OGG1 activity. Since methylation of C in the CpG dinucleotide leads to the T:G mispair, the results have interesting biological implications. A methylation-induced T:G mispair 5' to the lesion can lower the opportunity for 8-oxoG removal resulting in more mutations. (NC)

Citation: Sassa A, Beard WA, Prasad R, Wilson SH. 2012. DNA sequence context effects on the glycosylase activity of human 8-oxoguanine DNA glycosylase. *J Biol Chem* 287(44):36702-36710.

[Return to Table of Contents](#)

Glucocorticoid signaling could lead to better therapeutics

NIEHS scientists have determined that glucocorticoids modulate the signaling profile of G protein-coupled receptors (GPCRs) through alterations in arrestin gene expression. Since GPCRs are targeted by nearly half of all prescription drugs, the work could result in the development of specific treatments that will reduce side effects and boost efficacy.

The activity of GPCRs is governed by a group of adaptor proteins called arrestins. Using several different cell types, the research team discovered that glucocorticoids directly regulate arrestin gene expression. The signaling protein beta-arrestin-1 is upregulated, while beta-arrestin-2 is downregulated. Both of these deviations occur at the transcriptional level by the binding of glucocorticoid receptors to intragenic glucocorticoid response elements. The fluctuation in arrestin expression can modify the effect GPCRs can have on human cells by biasing their signaling profile to favor G protein-dependent or beta-arrestin-dependent responses.

This discovery shows a deeper understanding of how glucocorticoids adjust responses within a cell through the regulation of the beta-arrestin gene expression, and suggest that coadministration of glucocorticoids may help or hinder the efficacy of GPCR-based treatments. (MK)

Citation: Oakley RH, Revollo J, Cidlowski JA. 2012. Glucocorticoids regulate arrestin gene expression and redirect the signaling profile of G protein-coupled receptors. *Proc Natl Acad Sci U S A* 109(43):17591-17596.

[Return to Table of Contents](#)

Bacteria in house dust worsens asthma

A recent study published by NIEHS scientists found that flagellin (FLA), a bacterial protein found in house dust, exacerbates asthma by inducing allergic responses to allergens. The findings reinforce the connection between asthma and the environment.

Previous studies have implicated the exposure to indoor allergens as a risk factor for asthma, so the researchers allowed mice to inhale proteins of bacterial origin or extracts of house dust, together with innocuous chicken ovalbumin (OVA). Control mice receiving either OVA alone or microbial products alone did not become

sensitized and failed to develop airway inflammation after subsequent challenge with OVA. However, inhalation of FLA or house dust extracts containing FLA together with OVA caused the mice to develop allergic pulmonary inflammation following OVA challenge.

The research team also found that the mammalian receptor for FLA, toll-like receptor 5 (TLR5), was required for priming of strong allergic responses in mice by some house dust extracts. This finding was confirmed in a human study, which detected higher serum levels of FLA-specific antibodies in asthma patients compared to non-asthmatics.

The study concluded that household FLA promotes the development of allergic asthma by TLR5-dependent priming of allergic responses to indoor allergens. **(AP)**

Citation: [Wilson RH, Maruoka S, Whitehead GS, Foley JF, Flake GP, Sever ML, Zeldin DC, Kraft M, Garantziotis S, Nakano H, Cook DN. 2012. The Toll-like receptor 5 ligand flagellin promotes asthma by priming allergic responses to indoor allergens. Nat Med 18\(11\):1705-1710.](#)

(Nisha Cavanaugh, Ph.D., is a postdoctoral fellow in the NIEHS Laboratory of Structural Biology. Melissa Kerr studies chemistry at North Carolina Central University and is an intern in the NIEHS Office of Communications and Public Liaison. Anshul Pandya, Ph.D., is an Intramural Research Training Award (IRTA) fellow in the NIEHS Laboratory of Neurobiology. Bhargavi Rao, Ph.D., is an IRTA fellow in the NIEHS Laboratory of Molecular Carcinogenesis.)

[Return to Table of Contents](#)

Inside the Institute

CFC enters the home stretch

By Eddy Ball

With two more special events building the pledge coffer in November, the Combined Federal Campaign (CFC) at NIEHS has its Dec. 15 deadline clearly in sight. Co-chair Claire Long reported the drive had raised \$86,022 as of Nov. 29, or about 75 percent of its ambitious 2012 goal of \$115,000.



“Over the next two weeks,” she said, “we need to raise \$28,978 to reach our goal for this year. We’re asking you all to reach a little deeper to help the many people who need our support.”

CFC held its annual Halloween Fun Run and Walk Oct. 31, along with employees of the U.S. Environmental Protection Agency (EPA). Despite unseasonably cold weather, participants from NIEHS and EPA assumed a holiday attitude and dressed in Halloween costumes for the event, and some even pretended to be competitive.

Three weeks later, the annual CFC Ice Cream Social drew scores of NIEHS employees to the cafeteria for dairy delights and fellowship, during a welcome break from their daily routines. With free treats, the turnout was better than ever.

Enthusiastic CFC supporter, NIEHS/NTP Director Linda Birnbaum, Ph.D., encouraged employees to do better than they did last year. “I’m proud of the NIEHS tradition of generosity,” she said, “and I think, with a little extra stretch, we can meet or exceed our goal by the end of the pledge drive this month.”



Shown, left to right, are Elizabeth Ruben from the Division of Extramural Research and Training, who coordinated the Halloween Fun Run in collaboration with the EPA; Claire Long of the Office of Management; and Scott Redman of the Financial Management Branch. Long and Redman are the 2012 CFC coordinators. (Photo courtesy of Steve McCaw)

Pledging is easy

Online — Visit the official website of the [Greater North Carolina Area CFC](#) to pledge, authorize payroll deductions, and find out more about participating charities.

Contact NIEHS division chairs — More information about CFC, pledging, and participating charities is available just an email or phone call away by contacting these volunteers:

[Elizabeth Ruben](#), Division of Extramural Research and Training

[Bob Petrovich](#), Division of Intramural Research

[Eli Ney](#) and [Pat Stockton](#), Division of the National Toxicology Program

[Debbie Wales](#), Office of the Director

[Dona McNeill](#), Office of Management

[Leigh Voldness](#), Office of Research Facilities

[Delise Mahoney](#), Office of Human Resources



Researchers have very busy schedules, but there's always time for ice cream. Shown, left to right, are Viji Panduri and Michelle Campbell from the Laboratory of Molecular Genetics, and Alexandria Mara from the Laboratory of Respiratory Biology. (Photo courtesy of Steve McCaw)



Birnbaum, right, was dressed appropriately for an unexpectedly cold morning of fun, as she waited for the walk to begin. Shown with her, left to right, are Administrative Officer Katy Fine, Chief of Staff Paul Jung, M.D., and Deputy Director Rick Woychik, Ph.D. (Photo courtesy of Steve McCaw)



In addition to tasty goodies, the tree in the background certainly makes it feel like the holidays. From left to right, are Redman, Cynthia Innes from the Laboratory of Toxicology and Pharmacology, and Deputy Associate Director for Management Chris Long. (Photo courtesy of Steve McCaw)



Members of the NIEHS Office of the Director lend their support for a good cause. From left to right are Kay Tierney, Debbie Wales, Birnbaum, and Associate Director for Management Joellen Austin. (Photo courtesy of Steve McCaw)



Runners left from the main building at EPA. (Photo courtesy of Steve McCaw)

[Return to Table of Contents](#)

Celebrating Halloween in style

By Sheila Yong

The F module hallway was abuzz with activity the morning of Oct. 30, as members of the NIEHS Laboratory of Signal Transduction (LST) prepared for its Halloween international potluck. The party kicked off promptly at lunch time with a brief pronouncement of “Let’s eat!” from LST Chief John Cidlowksi, Ph.D.

Laboratory members from different parts of the U.S. and several countries around the world brought dishes from their hometowns, ranging from Carolina-style barbecue ribs and Brunswick stew, to delicacies from China and India. While enjoying their meals, attendees got to vote for their favorite entree. LST Administrative Specialist Pinkney Wilder prepared the winning dish — succulent Carolina barbecue ribs in a sweet and tangy sauce. Although Wilder’s ribs were voted the best, all of the recipes were delicious.

“The food is outstanding,” exclaimed NIEHS Scientific Director Darryl Zeldin, Ph.D., who was the guest of honor for this year’s festivities.

Dressing the part

Members of each group tapped into their imaginations to create unique costume and pumpkin designs. Zeldin served as judge.

For best costume, Zeldin was torn between the dragon dance costume, from the Calcium Regulation Group led by James Putney, Ph.D.; the 1970s disco dancers, from the Polypeptide Hormone Action Group led by Perry Blackshear, M.D., Ph.D.; and the fisherman and his fish costumes from Cidlowksi’s Molecular Endocrinology Group. Ultimately, he pronounced the Cidlowksi group the winner.

“Although the outcome might seem fishy to some, since John is the LST chief, no pun intended, my decision was completely objective,” Zeldin maintained.

The NIEHS pumpkin patch

Unlike the dilemma in the best costume contest, deciding the best pumpkin winner was less stressful for Zeldin.

“The Shears pumpkin is definitely the most creative,” Zeldin said, referring to the pumpkin decorated by members of the Inositol Signaling Group headed by Stephen Shears, Ph.D. They started with a standing lamp, added poster tubes, old jeans, and sneakers, and topped it off with a pumpkin head. “Dr. Hello Win,” as the pumpkin was affectionately called, had a huge grin and sported a pair of black-rimmed glasses.

Jeremy Weaver, Ph.D., a postdoctoral fellow in the Shears group, quipped, “Have you talked to our new postdoc yet?” As everyone looked around for an unfamiliar face, Weaver jokingly pointed to Dr. Win.

Other pumpkins were just as amusing, with the armadillo pumpkin from the Cidlowksi group coming in second, and the disco ball pumpkin from the Blackshear group placing third.



Wilder shows what’s left, after hungry partygoers devoured his prize-winning barbecue ribs. (Photo courtesy of Steve McCaw)

Competition aside, it was all good fun. The party concluded with a group photo of smiling faces.

“This is the first time I have seen a lab put together a party of this scale,” Zeldin said. “It is a great team-building idea for other branches to consider, and could be organized as an institute-wide event. It is definitely something to look forward to.”

(Sheila Yong, Ph.D., is a visiting fellow in the NIEHS Laboratory of Signal Transduction.)



Cidlowski does a great impression of the Gorton's fisherman, as he poses with his catch of the day. (Photo courtesy of Steve McCaw)



Members of the Putney group entertain their colleagues with a traditional dragon dance. (Photo courtesy of Steve McCaw)



Looking groovy in their '70s-inspired disco garb, members of the Blackshear group can't wait to dance the night away under the disco pumpkin. Can you dig it? (Photo courtesy of Steve McCaw)



Meet Dr. Hello Win, the newest member of the Shears group. Actually, he is just the best pumpkin at the party. (Photo courtesy of Steve McCaw)



The LST gang poses in all its gaudy glory, after a fun-filled afternoon. (Photo courtesy of Steve McCaw)

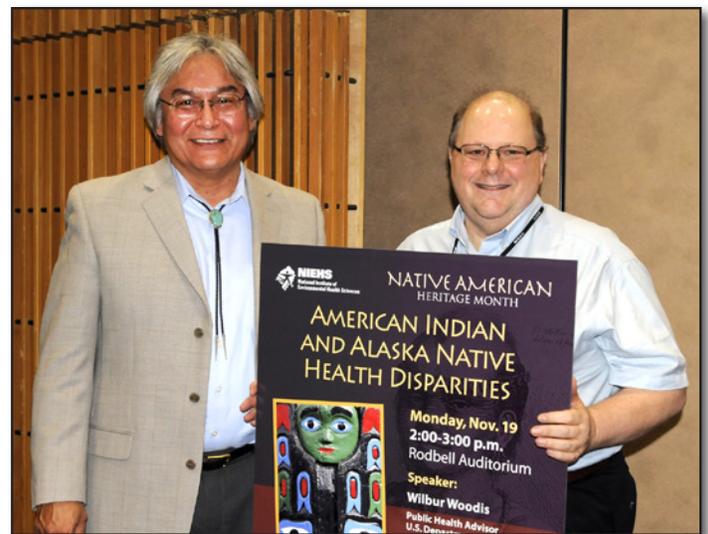
[Return to Table of Contents](#)

NIEHS celebrates Native American Heritage Month

By Dona McNeill

The NIEHS 2012 Native American Heritage Month celebration Nov. 19 highlighted a topic that the Institute and the Indian Health Service share — concern for individuals and communities that are socioeconomically disadvantaged, and who suffer inequalities in both health and environmental burdens.

This year's featured speaker, Wilbur Woodis, is a Native American who focuses on health, social, and educational issues for the American Indian and Alaska Native communities. He is currently on a yearlong assignment in the Office of Minority Health at the Indian Health Service, where he provides expert advice on the formulation of program strategies related to the implementation of departmental policies and procedures for improving the health of disadvantaged and underserved populations.



NIEHS Diversity Council chair Brad Collins, right, thanked Woodis for an informative seminar. (Photo courtesy of Steve McCaw)

Woodis began with an overview of the Indian Health Service's mission and some of the statistics about the 2 million American Indian and Alaska Natives whose tribes they partner with. He spoke with great enthusiasm about partnerships that are being developed between native tribes and the Mayo Clinic, U.S. Department of Veterans Affairs, and Dartmouth College, to address health issues such as heart disease, diabetes, alcohol-related accidents, and suicide.

The program was sponsored by the National Institutes of Health Office of Equal Opportunity and Diversity Management (OEODM) and the NIEHS Diversity Council. Chris Long, NIEHS deputy associate director for management, welcomed the speaker and the new OEODM director, Debra Chew, and her staff to the program. Long read from President Obama's proclamation on [National Native American Heritage Month](#), where he renewed the federal government's commitment to address injustices and build new avenues of opportunity for American Indians and Alaska Natives.

(Dona McNeill is Employee Services Manager in the NIEHS Office of Management.)

[Return to Table of Contents](#)



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