UPDATE
National Toxicology Program
U.S. Department of Health and Human Services

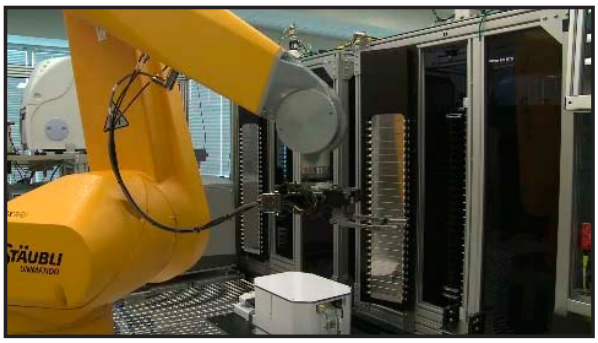
January 2012

Headquartered at the National Institute of Environmental Health Sciences • NIH-HHS

What's Inside:

Tox21 begins screening 10,000 chemicals

By Robin Mackar reprinted from *eFACTOR*, January 2012



In December, a high-speed robotic screening system, aimed at protecting human health by improving how chemicals are tested in the U.S., began testing 10,000 compounds for potential toxicity. The compounds cover a wide variety of classifications, and include consumer products, food additives, chemicals found in industrial processes, and human and veterinary drugs.

Testing this 10,000 compound library begins a new phase of an ongoing collaboration between the National Institutes of Health, the U.S. Environmental Protection Agency, and the U.S. Food and Drug Administration, referred to as Tox21. NIH partners include NIEHS/NTP and the NIH Chemical Genomics Center (NCGC), part of the NIH Center for Translational Therapeutics (NCTT), housed at the National Human Genome Research Institute (NHGRI).

"There has never been a compound library like this before," said NIEHS/NTP Director Linda Birnbaum, Ph.D.

Birnbaum is especially excited that some of the compounds the NTP has brought forward for testing are mixtures of chemicals. "All of us are exposed to many different chemicals at the same time, not just one chemical at a time," she said. "These new technologies allow us to more rapidly advance our understanding of not only individual chemicals, but mixtures of chemicals as well."

A subset of the NTP portion of the 10,000 compound library will focus on pilot testing several formulations or mixtures of compounds, a priority area for NIEHS/NTP. The library constituents were selected after a thorough analysis of existing scientific studies, more than 200 public chemical databases, and chemical nominations received from internal and external partners. Each test compound will undergo a thorough chemical analysis to verify its identity and determine its purity, concentration, and stability.

The goal of the testing is to provide results that will be useful for evaluating whether these chemicals have the potential to disrupt processes in the human body to an extent that leads to adverse health effects.

The compounds will be tested in the Tox21 robotic screening system at the NCGC in Rockville, MD. The Tox21 robot, unveiled earlier this year, was purchased with funds provided by the NTP as part of its contribution to the Tox21 partnership.

"The robot has undergone rigorous testing since it was installed and unveiled earlier this year. It's ready to start testing this large compound library," said NHGRI Director Eric Green, M.D., Ph.D. "This is a milestone for Tox21, because it will allow us to test chemicals at a rate previously impossible for anyone to do by hand."

Next page

The development of methods for evaluating chemical toxicity has the potential to revolutionize the assessment of new environmental chemicals and the development of new drugs for therapeutic use.

"We are happy to contribute NCGC's pharmaceutical collection of approximately 3,500 compounds of approved and investigational drugs as part of the Tox21 program," said NCTT Scientific Director Christopher Austin, M.D.. "Drug toxicity is one of the primary reasons that the development of new drugs fails and approved drugs are removed from the market, and the ability to better predict toxicity would improve the efficiency of drug development enormously."

All testing results will be available to the public through NIH and EPA chemical toxicity databases.

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

Return to table of contents

Speakers discuss hydraulic fracturing

By Robin Mackar reprinted from *eFACTOR*, December 2011

Workers conduct drilling operations.
(Photo courtesy of Eric Esswein)

The term fracking, or the hydraulic fracturing method of extracting gas and oil from underground deposits, is a subject frequently being discussed by a wide variety of audiences across the country, including the public, media, scientists, industry, and politicians. Two distinguished speakers brought their expertise on this topic Nov. 21 to the staff and leadership at NIEHS, as well as agencies affiliated with the National Toxicology Program (NTP).

John Bucher, Ph.D., director of the Division of the NTP at NIEHS, hosted the two lecturers, as the Institute begins to determine its role in this emerging field.

NIEHS/NTP Director Linda Birnbaum, Ph.D., who attended and participated in the lively discussions that followed each talk, said, "This is one of those emerging areas that we need to do our best to get ahead of the curve, so we can more fully understand any potential health impacts related to the development of this resource."

Next page

Upcoming Events

February 8-9, 2012

NTP Technical Reports
Peer Review Panel

NIEHS
111 TW Alexander Drive
Research Triangle Park, NC

June 21-22, 2012

NTP Board of Scientific Counselors

NIEHS
111 TW Alexander Drive
Research Triangle Park, NC

September 5-6, 2012

Scientific Advisory Committee on Alternative Toxicological Methods

NIEHS
111 TW Alexander Drive
Research Triangle Park, NC

September 18-20, 2012

NICEATM-ICCVAM

Alternatives to the Pertussis Test

Natcher Conference Center, NIH
Bethesda, MD

http://ntp.niehs.nih.gov/go/calendar

Assessing the impact on oil and gas workers

The first speaker, Eric Esswein, a senior industrial hygienist at the National Institute for Occupational Safety and Health and a Commissioned Officer in the U.S. Public Health Service, presented an excellent overview on hydraulic fracturing and discussed his agency's efforts to assess chemical exposures in oil and gas workers.

"What we're really trying to do is develop partnerships with the oil and gas extraction industry to identify, characterize, and, if needed, control

workplace chemical exposures," said Esswein as he walked agency representatives through the photo-heavy presentation from his field office in Denver. "There is very little exposure assessment information available to determine if occupational health risks exist for workers in this industry."

Esswein explained that hydraulic fracturing involves high-pressure injection of water, sand, and chemicals, to release shale-gas trapped in deep underground formations. He provided the audience with an overview of what goes on in the industrial setting related to drilling and hydraulic fracturing.

"There's a lot more going on at well sites than just the hydraulic fracturing. There's also site preparation and different types of drilling that occurs well before the hydrofracking can begin. A wide variety of services occur throughout the entire process, including transporting chemicals, water, and supplies to and from the sites," Esswein said.

Esswein talked about some potential risks to workers, including exposure to volatile organic compounds, dust particles, lead, oil mists, benzene, diesel particulate matter, and silica, among others. He pointed out more research needs to be done, and any new knowledge has to be communicated to the field, so they can put that knowledge into practice to ensure safety and health for the betterment of workers. A link to the NIOSH Fact Sheet describing the study is available at www.cdc.gov/niosh/docs/2010-130/pdfs/2010-130.pdf.

Impact of fracking on surrounding communities

Robert B. Jackson, Ph.D., director of the Duke University Center on Global Change at the Nicholas School of the Environment in Durham, N.C., focused his talk on shale-gas, the environment, and human health.

The majority of Jackson's presentation focused on research he and his colleagues are conducting on several hundred private wells in northeastern Pennsylvania and upstate New York that are near shale formations.

Jackson and colleagues' first paper, appearing in the May 17 issue of the Proceedings of the National Academy of Sciences, found evidence that methane contamination, in well water near the shale-gas extraction sites, appears to be related to natural gas extraction. He pointed out, however, that there was no evidence that the drinking-water samples were contaminated with fracturing fluids or brines from the hydraulic fracturing.

Jackson discussed some of the possible mechanisms by which the methane may have gotten into the wells, including the most likely possibility of leaky gas-well casings, and less likely mechanisms of physical displacement of gas through natural and fracturing-induced fissures from the target formation. Jackson also said that more research needs to be conducted to determine the health effects of methane.

In the PNAS paper and in the seminar, Jackson called for more environmental stewardship, and possibly more federal research and regulations, to ensure the sustainable future of shale-gas extraction. "We need systematic, independent data on groundwater quality, before and after drilling operations begin in a region. Having this baseline will go a long way toward preventing environmental impacts, and improving scientific knowledge and public confidence," Jackson said. ●

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

Return to table of contents *Next page*

Panel peer reviews NTP low-level lead draft

By Robin Mackar reprinted from *eFACTOR*, December 2011

Some of the world's most notable lead researchers, including Bruce Lanphear, M.D., senior scientist at the Child and Family Research Institute, and Pam Factor-Litvak, Ph.D., associate professor of clinical epidemiology at Columbia University Mailman School of Public Health, were members of the peer review panel who met at NIEHS to review the draft NTP monograph on health effects of low-level lead. *(Photo courtesy of Michael Garske)*

A nine-member independent peer review panel, convened by the National Toxicology Program (NTP), reviewed the Draft NTP Monograph on Health Effects of Low-level Lead on November 17-18 at NIEHS.

The panel concurred with the overall NTP conclusion that "there is sufficient evidence for adverse health effects in children and adults at blood Pb [lead] levels below 10µg/dL [micrograms per deciliter] and below 5 µg/dL as well."

The monograph is the result of an extensive review of the current scientific literature by the NTP Office of Health Assessment and Translation (OHAT), formerly the Center for the Evaluation of Risks to Human Reproduction, in response to a nomination by the National Institute for Occupational Safety and Health (NIOSH) for an NTP evaluation to assess the reproductive and developmental effects of lead exposures. OHAT expanded the scope of the evaluation to include a wider range of health effects, including cardiovascular, renal, immune, and neurological effects in children and adults, to maximize the utility of the evaluation and reflect OHAT's more broad-based focus on health assessment.

The draft monograph was released for public comment on Oct. 14. Public commenters were given time to present at the meeting, before OHAT health scientists gave brief presentations on the basis for the NTP conclusions for specific health effects of lead, and summary conclusions for each health area.

The panel accepted and agreed with the NTP summary conclusions for associations of cardiovascular, renal, and immune health outcomes with lead exposures resulting in blood lead levels below 10µg/dL. To reflect the evidence for effects at lower blood lead levels, the reviewers suggested changing the draft summary conclusions of sufficient evidence for associations with neurological effects in children, and reproductive effects in adult women, including reduced fetal growth and lower birth weight, from 10µg/dL to 5µg/dL.

Regulatory and public health implications

Next, the NTP will carefully consider the peer review panel and public comments, revise the document as needed, and move forward on finalizing the monograph. The process should be completed in early 2012, when the finished monograph will be posted to the NTP website.

There will likely be public health implications, in addition to the regulatory impacts of the monograph's conclusions. For example, NIEHS/NTP Director Linda Birnbaum, Ph.D., speculated that the science emerging on the potential danger of prenatal lead exposures could result in public health action similar to advisories to women of childbearing age to avoid eating fish laden with high levels of mercury. "What I've heard today leads in the same direction for discussion about lead," she said. "I certainly know that most young women who are pregnant are not being measured for their lead levels. I think that's a message we might want to try to get out."

Panel member Eliseo Guallar, M.D., Dr.P.H., of the Johns Hopkins University Bloomberg School of Public Health, noted that although the monograph's conclusions set the lead exposure levels at which associated health effects are seen lower than ever, "we're still finding that the lower we go, we still find effects of lead, and I think we still haven't seen the end of it. This is not an area where we're done yet," Guallar predicted.

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

Return to table of contents

Next page

Workshop confronts challenges of mixtures research

By Robin Mackar reprinted from *eFACTOR*, November 2011

Rider, left, and Carlin brought the expertise of their divisions, DNTP and DERT, to successfully organize the NIEHS Workshop "Advancing Research on Mixtures: New Perspectives and Approaches for Predicting Adverse Human Health Effects" at the Sheraton Chapel Hill Hotel. *(Photo courtesy of Steve McCaw)*

Improving how research on mixtures of chemicals is conducted is a theme being discussed at meetings across several continents, but the Sept. 26-27 NIEHS "Advancing Research on Mixtures" workshop in Chapel Hill, N.C. really brought the issue front and center by marshalling leading experts to address this enormous challenge.

During welcoming remarks, John Bucher, Ph.D., director of the NIEHS Division of the National Toxicology Program (DNTP), emphasized that research on mixtures has to be attacked with a new path and pace. Bucher said, from a toxicology perspective, "[It is the] bravest of the brave of us who were trying to tackle mixtures research, but it's time to tap into our new understanding of this problem, take advantage of new technologies, and really ask ourselves what we can do to advance this field" — a sentiment echoed throughout the meeting.

Broad-based perspectives

"This workshop is designed to help not only the NIEHS intramural and extramural divisions develop a mixtures research strategy, but other scientific communities, as well," said workshop co-chair Cynthia Rider, Ph.D., of the DNTP, as she kicked off the meeting.

The first morning was filled with insightful talks that brought everyone up to speed on the current approaches and some of the major challenges in a variety of disciplines (see text box).

Co-chair Danielle Carlin, Ph.D., from the NIEHS Division of Extramural Research and Training (DERT), thanked the speakers and led the charge for the five breakout sessions aimed at developing and ranking a comprehensive, discipline-based list of knowledge gaps in mixtures research. Representatives from DERT, NTP, and the NIEHS Division of Intramural Research (DIR) participated in each of the workgroups.

Multidisciplinary focus

Linda Birnbaum, Ph.D., NIEHS/NTP director, opened the second day with some inspirational words. "We live in a world of mixtures. We can't keep looking at one chemical at a time," said Birnbaum. "We have so many great minds gathered here. Let's try to think outside the box. Let's use our interdisciplinary expertise to get this field moving forward."

Plenary sessions the second day focused on innovative approaches for studying mixtures (see text box).

Claudia Thompson, Ph.D., of DERT, provided the charge for multidisciplinary breakout sessions that were each given a key topic in mixtures research. Topics included modeling mixture toxicity, making better use of exposure data, integrating ideas from toxicology and epidemiology, using high-throughput approaches to assess chemical interactions, and consideration of mixtures across time.

Birnbaum, left, and Nigel Walker, Ph.D., DNTP deputy division director for science, listened intently as speakers offered their perspectives on how to advance research on mixtures. *(Photo courtesy of Steve McCaw)*

Next page

Woychik not only provided input throughout the workshop, but also gave closing remarks, which summarized some of the major themes emerging across the breakout sessions. He stressed that NIEHS would incorporate the information gained at the meeting in the future NIEHS mixtures research agenda. *(Photo courtesy of Steve McCaw)*

Next steps

NIEHS Deputy Director Rick Woychik, Ph.D., closed the meeting by talking about next steps. He provided an update on the NIEHS strategic planning process and showcased how the themes heard throughout the mixtures meeting dovetail with many themes emerging in the strategic planning process.

Better technologies for characterizing mixtures, such as furthering the development of subdermal chips and iPhone apps, developing innovative strategies for analyzing and modeling the biological effects of mixtures from both a bottom-up and top-down approach, and looking at total exposure, including all routes, sources, and chemicals, both inside and outside the body, are some of the themes Woychik mentioned coming out across sessions.

"Now is the prime time to be working your research recommendations into our strategic planning process," Woychik said. He also mentioned that a workshop report will be prepared. ●

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

Return to table of contents *Next page*

Workshop speakers

Day one:

- **Glenn Rice, Ph.D.**, a risk assessment expert at the U.S. Environmental Protection Agency (EPA), described whole mixture and component-based risk assessment approaches, and highlighted data needs, including increased chemical analysis of complex mixtures and more work at environmentally relevant dose levels.
- **Paul Price**, from The Dow Chemical Company, provided an overview of mixtures issues from the exposure science perspective. He emphasized the need to use exposure data in the design of toxicological and epidemiological studies and the use of new modeling tools to prioritize mixtures for study.
- **Earl Gray, Ph.D.**, a reproductive biologist and toxicologist at EPA, encouraged researchers to start shifting away from looking at mechanisms of individual chemicals, to focusing more on target pathways and tissues affected by multiple chemicals.
- **David Christiani, M.D.**, of Harvard University, provided the epidemiological perspective, by showcasing examples where epidemiologists are already contributing to mixtures research, including papers about the Tar Creek Superfund Site, and research on air pollutants and mortality, where the exposures are known, but the effects on populations are not fully understood.
- **Chris Gennings, Ph.D.**, of Virginia Commonwealth University, discussed the role that statistical approaches can play in predicting the toxicity of chemical mixtures. She described some of her recent work to assess sufficient similarity of complex mixtures.

Day two:

- **Paige Tolbert, Ph.D.**, of Emory University, discussed the use of multipollutant models in epidemiological studies of air pollution.
- **Andreas Kortenkamp, Ph.D.**, of the University of London, emphasized the need for toxicologists and epidemiologists to work together to solve mixtures challenges.
- **Chirag Patel, Ph.D.**, of Stanford University, presented a novel approach for linking exposure to disease through the use of environment-wide association studies.

NTP board moves initiatives forward

By Ernie Hood reprinted from *eFACTOR*, January 2012

Nagarkatti gave a report on the NTP technical reports peer review. *(Photo courtesy of Steve McCaw)*

The NTP Board of Scientific Counselors (BSC) accomplished quite a bit in its Dec. 15, 2011, session at NIEHS. Highlights of the meeting included updates by the NTP director and associate director, three chemical nominations, a hair dye workshop proposal, a report on the NTP diabetes and obesity workshop, and presentation of a proposed review process for the Report on Carcinogens (see text box).

Before moving into its packed agenda of reports and proposals, the BSC heard from NIEHS/NTP Director Linda Birnbaum, Ph.D., who thanked three departing members for their contributions. Birnbaum presented certificates and letters of appreciation to Mitzi Nagarkatti, Ph.D., Ruthann Rudel, and Gina Solomon, M.D., whose terms expired Dec. 27, 2011.

Chemical nominations evaluated

The BSC approved NTP research and testing concepts for three chemicals, moving each of them to the next step in the process of being developed into an NTP research program. Two are high production volume (HPV) compounds, while the third is used mainly in laboratory settings and has been implicated in the deaths of two workers.

Sulfolane is a solvent used mainly in natural gas and petroleum refining, with U.S. production in 2006 estimated at 10-50 million pounds. Nominated to the NTP by several agencies and officials from the state of Alaska and the Agency for Toxic Substances and Disease Registry, sulfolane has been detected in nearly 300 drinking water wells within the town of North Pole, Alaska, possibly as a result of activities at a nearby petroleum refinery. It is also present at other sites within Canada. Sulfolane has not been tested for chronic toxicity or carcinogenic activity, and BSC member Elaine Faustman, Ph.D., from the University of Washington, expressed a high level of support for going forward with further evaluation by NTP. Fellow concept reviewer Melissa McDiarmid, M.D., of the University of Maryland School of Medicine, agreed, noting, "This is precisely the situation that the NTP is supposed to serve."

The HPV class of chemicals called phenolic benzotriazoles (PBZTs) was nominated to the NTP by NIEHS. Used as UV stabilizers within products to increase stability to light, there are 10 HPV PBZTs among the 29 compounds in the class, some of which are used in food contact polymers and adhesives, cosmetics, sunscreens, and fragrances. With high production and high potential for human exposure, the challenge will be to prioritize which of the chemicals to evaluate for potential health hazards, and which tests will eventually yield a class evaluation. BSC concept reviewers recommended that the NTP start its program on PBZTs with ADME (absorption, distribution, metabolism, excretion) and toxicokinetics tests to determine whether the active agent is a parent compound or a metabolite, and then move on with a testing funnel strategy similar to that used in the pharmaceutical industry for drug discovery.

NIEHS/NTP toxicologist Chad Blystone, Ph.D., presented the research and testing concepts on sulfolane and PBZTs considered by the BSC. *(Photo courtesy of Steve McCaw)*

The third proposed compound, trimethylsilyldiazomethane (TMSD), was nominated by the Occupational Safety and Health Administration (OSHA), due largely to the recent deaths of two chemists exposed to the agent in the laboratory workplace. TMSD is a synthetic methylating reagent used for organic synthesis and in analytical methods, such as gas

Next page

chromatography. Originally developed as a less toxic and more stable substitute for the highly explosive compound diazomethane, there is currently very little toxicity data on TMSD, but dermal and inhalation exposures are likely in occupational settings. The BSC recommended moving forward with the proposed NTP testing program, but urged that extreme caution be exercised, including the use of appropriate personal protective equipment by testing personnel, due to the presumed acute toxicity of the compound.

Hair dye workshop supported

The BSC favored a proposed workshop on permanent hair dyes. According to NTP presenter Ruth Lunn, Dr.P.H., the conference would advance the state of the science related to potential human health hazards associated with the widely used products, by focusing discussions on data gaps, research strategies, and testing methods. Potential carcinogenicity is a major concern, but studies to date have been unclear. Because there are so many different chemicals involved, and the dyes are all mixtures, determining safety of the products presents quite a challenge. Several BSC members noted that there are many scientific questions to be addressed, and the needed studies will be complex. Despite that cautionary note, the BSC supported moving forward with organizing the workshop. A representative from the Personal Care Products Council, in attendance, commended the NTP for tackling this issue, and said the industry looks forward to working with NTP to address this important subject.

The next BSC meeting is scheduled for June 21-22.

Proposed RoC review process

The BSC also spent time listening to comments from the public and receiving an update from the NTP on proposed changes on how the congressionally mandated Report on Carcinogens (RoC) would be developed.

The proposed changes to the RoC are intended to increase the transparency and openness of how the NTP reviews substances. Numerous opportunities for public input are built into the process.

NTP Associate Director John Bucher, Ph.D., walked the BSC through a number of changes that the NTP has made since the original proposed review process was released for public comment Oct. 31, 2011. Since then, the NTP has held a public listening session, which brought 19 speakers, and a public comment period, allowing the NTP an opportunity to revise the process to accommodate some of the issues raised by the public.

As he thanked everyone for input, Bucher said all input has been considered and some revisions have been made. Bucher illustrated changes to the process, which is comprised of four parts: nomination and selection of candidate substances; scientific evaluation of candidate substances; public release of the draft RoC monograph and peer review; and HHS approval and release of the latest edition of the RoC.

BSC chair David Eastmond, Ph.D., from the University of California, Riverside, told the NTP, "The BSC supports what you are trying to do, and supports you going forward."

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

Return to table of contents

Next page

NIEHS grantees collaborate with NTP, FDA on BPA studies

By Robin Mackar reprinted from *eFACTOR*, November 2011

Twelve researchers received NIEHS funding this fall to work in collaboration with NTP and the U.S. Food and Drug Administration (FDA) to help develop state-of-the art rodent studies on the chemical bisphenol A (BPA). The information generated from these studies is expected to help regulatory agencies faced with the responsibility of determining the safety of products being used by consumers.

The selected grantees (see text box), known for their expertise in conducting research on the health effects of BPA, will have an opportunity to work with a multidisciplinary team of scientists from the NTP and FDA to suggest disease endpoints to be looked at, and also provide input on the overall design of the BPA studies.

The long-term BPA rodent studies will be conducted at the National Center for Toxicological Research (NCTR), in Arkansas, FDA's internationally recognized research center that has worked with NIEHS for over 30 years in carrying out studies in support of the NTP mission. These BPA studies are being designed in accordance with established good laboratory practices (GLP).

"Having our grantees involved in this seminal experiment, that integrates a GLP-compliant study with additional disease endpoints, will provide the data needed to build consensus on the health effects of BPA," said Jerrold Heindel, Ph.D., program administrator in the NIEHS Division of Extramural Research and Training (DERT). The 12 grantees were selected from an NIEHS funding announcement. DERT will invest approximately $2 million per year over the next four years for these efforts, according to Heindel. NTP is investing about $3 million per year through an interagency agreement with NCTR.

The studies at NCTR are expected to start before the end of the year. Currently, the researchers are working on establishing the dose levels for the multigenerational studies.

In addition to looking at traditional toxicological endpoints, such as cancer, the grantees are working with NTP to look at disease or dysfunction endpoints not typically measured in GLP guideline studies.

"We're hopeful that this unprecedented integrated research project, that we're about to embark upon, will reduce some of the uncertainties and research gaps in the BPA arena, and provide us with better information on this chemical," said John Bucher, Ph.D., associate director of NTP and director of the NIEHS Division of the National Toxicology Program.

The program provides an opportunity to leverage resources and ideas between NIEHS-funded researchers studying BPA, the NTP, and the FDA. The backbone of the new studies is that they will follow good laboratory practices, which will add utility to regulatory agencies.

"This collaborative research effort exemplifies how different parts of the federal government and academia are working together to address a public health problem," said Linda Birnbaum, Ph.D., NIEHS/NTP director.

Recipients of the NIEHS funding and their research areas

- Nira Ben-Jonathan, Ph.D., University of Cincinnati — Metabolism and heart disease
- Kim Boekelheide, M.D., Ph.D., Brown University — Male reproduction
- Jodi Flaws, Ph.D., University of Illinois at Urbana-Champaign — Female reproduction and fertility
- Nestor Gonzalez-Cadavid, Ph.D., Los Angeles Biomedical Research Institute at Harbor-UCLA Medical Center — Male reproduction
- Andrew Greenberg, Ph.D., Tufts University — Metabolic disease and diabetes
- Shuk-Mei Ho, Ph.D., University of Cincinnati — Cancer
- Norbert Kaminski, Ph.D., Michigan State University — Immunity
- Heater Patisaul, Ph.D., North Carolina State University — Neurobehavior
- Gail Prins, Ph.D., University of Illinois at Chicago — Prostate cancer
- Ana Soto, M.D., Tufts University — Mammary cancer
- Frederick vom Saal, Ph.D., University of Missouri — Reproductive development
- Robert Zoeller, Ph.D., University of Massachusetts, Amherst — Brain and thyroid function

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

Return to table of contents

Next page

Foster named fellow of Academy of Toxicological Sciences

By Mamta Behl reprinted from *eFACTOR*, November 2011

ATS Fellow Paul Foster
(Photo courtesy of Steve McCaw)

Paul Foster, Ph.D., chief of the NTP Toxicology Branch, was notified Oct. 13 of his selection as a fellow of the Academy of Toxicological Sciences (ATS).

This honor represents a significant milestone in the course of a career in toxicology. Since 1981, ATS has awarded the title of fellow to certified toxicologists who are recognized by their peers for their expertise and sound scientific judgment. The purpose of this recognition and certification is to ensure the competence and experience of professionals whose work affects public welfare.

Foster is a member of a number of leading societies dealing with toxicology and reproduction, and has served on several continuing education and science program committees. He was also an officer of the Reproductive and Developmental Toxicology specialty section of the Society of Toxicology from 1997 to 2001 and president 1999-2000.

Foster has served on the editorial boards of the journal Reproductive Toxicology, and the publication Birth Defects Research Part B: Developmental and Reproductive Toxicology, and as an associate editor of the journal Toxicological Sciences. He is the author or co-author of more than 100 peer-reviewed publications and book chapters, as well as numerous NTP and other study reports.

Foster's research interests include understanding the potential human health effects of environmental endocrine disruptors, the mechanisms of testicular toxicity, the study of early testicular Leydig cell dysfunction induced by chemicals as a prelude to hyperplasia and tumors, and the toxicokinetic and dynamic parameters affecting the induction of reproductive and developmental toxicity. He also has a broad interest in risk assessment issues in these areas, and currently serves as the NTP's senior discipline expert in reproductive and developmental toxicology.

Prior to joining NIEHS in 2002, Foster was the director of the research program in endocrine, reproductive, and developmental toxicology at the CIIT Centers for Health Research, now known as The Hamner Institutes for Health Sciences. ●

(Mamta Behl, Ph.D., is a contractor in the NTP Toxicology Branch.)

Return to table of contents

NTP advisor named as fellow of the Collegium Ramazzini

By Eddy Ball reprinted from *eFACTOR*, January 2012

Collegium Ramazzini fellow David Eastmond
(Photo courtesy of UCR)

NTP Board of Scientific Counselors chair David Eastmond, Ph.D., is among the latest group of fellows selected by the Collegium Ramazzini, an organization of international scholars who work towards solutions of occupational and environmental health problems around the world.

Eastmond is a professor of cell biology at the University of California, Riverside (UCR) and chair of the university's Department of Cell Biology and Neuroscience. He is actively involved in research and teaching in the areas of toxicology and risk assessment. Along with his service on the NTP Board of Scientific Counselors, Eastmond has contributed to a number of U.S. and international panels on genotoxicity and carcinogens.

In a UCR press release issued Nov. 28, 2011, Eastmond was quoted as saying, "I am very pleased and honored to be selected as a fellow of the Collegium Ramazzini, and look forward to working with this esteemed group."

Next page

Recognition for international distinction in environmental health

With 190 fellows from countries around the world, the Collegium Ramazzini is an international scientific society that examines critical issues in occupational and environmental health, with a view towards action to prevent disease and promote health. The fellows are professionals of clear personal distinction and integrity, distinguished by their contributions to occupational and environmental health.

Eastmond joins the select group of Collegium Ramazzini fellows, which includes several current and former NIEHS scientists, advisors, and grantees. NIEHS/NTP Director Linda Birnbaum, Ph.D., former NIEHS Director Kenneth Olden, Ph.D., NTP Associate Director John Bucher, Ph.D., and Superfund Research Program Director William Suk, Ph.D., are fellows, along with other outstanding past and present NIEHS scientists, including Carl Barrett, Ph.D., David Hoel, Ph.D., James Huff, Ph.D., George Lucier, Ph.D., Ronald Melnick, Ph.D., and Walter Rogan, M.D.

Former NIEHS Director David Rall, M.D., Ph.D., was the recipient of the annual Ramazzini Award in 1989. One of Eastmond's colleagues on the NTP Board of Scientific Counselors, Melissa McDiarmid, M.D., of the University of Maryland, is also a Collegium Ramazzini fellow.

The Collegium Ramazzini carries on the legacy of the father of occupational medicine

Founded in 1982, the Collegium derives its name from Italian physician and University of Modena Professor Bernardino Ramazzini (1633–1714), who authored one of the founding and seminal works of occupational medicine and played a substantial role in its development. His book, De Morbis Artificum Diatriba (Diseases of Workers), outlined the health hazards of chemicals, dust, metals, repetitive or violent motions, odd postures, and other disease-causative agents encountered by workers in 52 occupations.

Return to table of contents

New toxicology lab is joint effort of NCI and NIEHS

By Ian Thomas reprinted from *eFACTOR*, November 2011

After giving leadership her undivided attention for nearly three years, Birnbaum is ready to spend some time on her own research with flame retardant chemicals. *(Photo courtesy of Steve McCaw)*

Like Birnbaum, Mike Sanders holds a Diplomate of the American Board of Toxicology (D.A.B.T.) certification. *(Photo courtesy of Steve McCaw)*

In an announcement to Institute leadership Oct. 19, NIEHS/NTP Director Linda Birnbaum, Ph.D., unveiled her plans for the Laboratory of Toxicology and Toxicokinetics (LTT), a joint research endeavor of the National Cancer Institute (NCI) and the NIEHS Division of Intramural Research. Administered by NCI and operated out of the NIEHS main campus in Research Triangle Park, N.C., this newest addition to the NIH research family will focus predominantly on toxicity of xenobiotics – chemicals that are foreign to a living organism, such as a drug, pesticide, or carcinogen – with an emphasis on environmental pollutants.

"We're extremely excited for the future of this lab," said Birnbaum of the project, which she herself will spearhead. "We've assembled a wonderful staff of talented scientists, each of whom brings a highly unique set of skills to the team and all of whom are eager to get started."

All in the family

Boasting a small staff of 4-6 members, LTT will be led by Mike Sanders, Ph.D., a former researcher with NTP and a longtime colleague of Birnbaum.

"I've known Linda since 1981, when we worked together in the Chemical Disposition and Metabolism Group here at NIEHS," recalled Sanders, a career toxicologist who earned his doctorate from North Carolina State University. "In many respects, much of the work we'll be doing here is a carryover from those early days."

Next page

According to Sanders, LTT's initial focus will be the further examination of brominated flame retardants, chemicals used in many flame resistant materials that have come under scrutiny in recent years for their potentially harmful effects to the environment and human health. While this is presently a hot button issue within the scientific community, Sanders notes that it's of particular importance to Birnbaum.

"Linda is extremely passionate about protecting human health, especially with regard to the toxic effects of chemicals on the environment," said Sanders. "That makes both this lab and its mission very near and dear to her because, in many ways, they're an extension of the work she's done throughout her career as a scientist."

Back to the future

Sanders admits that while the manners and methodologies of scientific research have evolved significantly since the early 1980s, both he and Birnbaum agree that LTT will always remember where it came from.

"As it pertains to characterizing mechanisms of toxicity, this lab will employ some newer, cutting-edge technologies, which are designed to investigate chemical effects at the molecular level," Sanders explained. "Still, when it comes to chemical metabolism and disposition, we'll always have room for the tried and true techniques that we used in the old NIEHS group in 1981."

Help from the masses

Sanders says that LTT will soon be up and running with the first of its experiments, an impressive achievement given its otherwise empty-shell status upon his arrival in mid-July.

"Anytime you're trying to get a program like this off the ground, there are always administrative and logistical hoops to jump through," he noted. "Since the start of this process this past summer, we've built this entire lab completely from scratch and that simply could not have been done without the incredible hard work of everyone involved from both NCI and NIEHS."

For more information about LTT, or to schedule a tour, contact Mike Sanders at 919-541-1872 or by email at sander10@niehs.nih.gov.

(Ian Thomas is a public affairs specialist with the NIEHS Office of Communications and Public Liaison.)

Return to table of contents

NICEATM convenes international workshop on rabies vaccine testing

By NICEATM reprinted from *eFACTOR*, November 2011

Stokes introduced breakout group co-moderators as they reported on findings of breakout session 1: Antibody Quantification (Serologic) Methods for Rabies Vaccine Potency Testing: Validation Status, Data Gaps, and Implementation Strategies. *(Photo courtesy of NICEATM)*

Lukas Bruckner, D.V.M., Institute of Virology and Immunoprophylaxis (IVI), Switzerland, led discussions on breakout session 2: *In Vitro* Antigen Quantification Methods for Rabies Vaccine Potency Testing: Validation Status, Data Gaps, and Implementation Strategies. *(Photo courtesy of NICEATM)*

More than 70 scientists from 14 different countries, representing government, industry, and academia, attended the workshop Oct. 11-13 in Ames, Iowa.

NIEHS scientists Rear Adm. William Stokes, D.V.M., and Warren Casey, Ph.D., joined other scientists from around the world Oct. 11-13 at the "International Workshop on Alternative Methods for Human and Veterinary Rabies Vaccine Testing: State of the Science and Planning the Way Forward." More than 70 scientists from 14 different countries, representing government, industry, and academia, attended the workshop.

Workshop participants reviewed new testing methods that may provide improved accuracy and efficiency, and developed recommendations to validate and implement their use. The new methods are also expected to further reduce, refine, by lessening or eliminating pain and distress, and eventually replace the use of animals for potency testing of human and veterinary rabies vaccines.

Next page

Combating a major public health problem

Rabies is a deadly disease that kills more than 70,000 people worldwide each year, and rabies vaccines are the most important resources available for prevention of rabies infections. In the U.S. and other developed countries, widespread use of veterinary rabies vaccines protects pets and wildlife from disease. This practice significantly reduces the risk to humans in these countries from exposure to infected wildlife and domestic animals. For those estimated 15 million people each year exposed to the rabies virus, post-exposure human rabies vaccination prevents disease and saves lives.

The current methods used to evaluate the effectiveness of each production lot of veterinary and human rabies vaccine involves vaccinating animals and then challenging them with the live rabies virus. This approach requires large numbers of laboratory animals and causes significant animal pain and distress. A workshop organized last year by the NTP Interagency Center for the Evaluation of Alternative Toxicological Methods (NICEATM) and the Interagency Coordinating Committee on the Validation of Alternative Methods (ICCVAM) identified rabies vaccines as one of the highest priorities for research, development, and validation of alternative test methods for potency and safety testing.

New approaches for testing vaccines

"Promising new approaches to rabies vaccine testing are now available that are more humane and use fewer or no animals. The technology exists to put those approaches into practice now or in the near future," explained Stokes, who is director of NICEATM. "These approaches are more humane, faster, cheaper, and more accurate. They're also safer for laboratory workers, as they don't require handling of live rabies virus."

The goals of last month's workshop were to review the current state of the science of these methods, and to define efforts necessary to achieve global acceptance and implementation. The workshop was organized by NICEATM and ICCVAM, in partnership with the European Centre for the Validation of Alternative Methods, the Japanese Center for the Validation of Alternative Methods, and Health Canada. The workshop was hosted by the U.S. Department of Agriculture (USDA) Center for Veterinary Biologics at the recently established National Centers for Animal Health in Ames, Iowa. Having the workshop at this state-of-the-art research facility encouraged participation by scientists from USDA and the numerous vaccine manufacturers in the Midwest.

The workshop was co-sponsored by the International Alliance for Biological Standardization.

Workshop participants reviewed a recent international study on a method that measures protective antibodies from vaccinated animals, to assess rabies vaccine potency. This method eliminates the need for challenge testing with live virus, thereby avoiding severe pain and distress to the test animals and providing for improved worker safety. An action plan was formulated to achieve global implementation of this alternative method. Workshop participants also reviewed the state of the science for methods that measure the specific protective protein in vaccines, as a way to evaluate potency without animal testing. Finally, workshop participants recommended steps that can be taken immediately to relieve animal pain and distress, including routine use of anesthetics and analgesics, and ways to reduce the number of animals required in the current potency test.

Presentations and a summary of recommendations from the workshop are available on the NICEATM-ICCVAM website. A workshop report will be published early next year in the journal Biologicals.

Biologics Working Group

NICEATM and the ICCVAM interagency Biologics Working Group (BWG) were primarily responsible for organizing the workshop. The BWG is co-chaired by Jodie Kulpa-Eddy, D.V.M., of the USDA, and Richard McFarland, M.D., Ph.D., of the U.S. Food and Drug Administration (FDA). Kulpa-Eddy is also currently chair of ICCVAM and the USDA's principal ICCVAM representative. In addition to the FDA and USDA, the BWG includes scientists from the Centers for Disease Control and Prevention, U.S Department of Defense, U.S. Department of the Interior, NIEHS, and the National Institute of Allergy and Infectious Diseases. Stokes and Casey are the NIEHS representatives on the BWG.

Stokes builds international partnerships for advancing alternative testing

By Debbie McCarley and Cathy Sprankle reprinted from *eFACTOR*, January 2012

Rear Adm. William Stokes, D.V.M., director of the NTP Interagency Center for the Evaluation of Alternative Toxicological Methods (NICEATM), represented NIEHS and NICEATM at international scientific meetings in November. Stokes joined other scientists from around the world at meetings of the Japanese Society for Alternatives to Animal Experiments (JSAAE) and the advisory council of the Japanese Center for the Validation of Alternative Methods (JaCVAM). These meetings were part of a continuing effort to build global partnerships to advance alternatives to animal testing.

At the 24th annual meeting of the JSAAE Nov. 10–11 in Sendai, Japan, Stokes provided an update on recent progress and future planned activities of NICEATM and the Interagency Coordinating Committee on the Validation of Alternative Methods (ICCVAM), which NICEATM administers. Stokes' presentation summarized NICEATM and ICCVAM contributions towards reducing, refining (enhancing animal welfare and eliminating or decreasing pain and distress), and replacing animal use for safety testing. The presentation also noted U.S. interagency efforts to accelerate development and use of more efficient safety testing approaches with the potential to better protect human health.

While at the JSAAE conference, Stokes attended a management team meeting for an ongoing study to evaluate a test method that uses human cells to identify substances with the potential to cause allergic contact dermatitis. Stokes and other meeting attendees received an update and provided feedback on current progress. Results of the study could support the use of this method to reduce or replace animal use. "Participation in validation studies to evaluate new test methods is an important aspect of our international interactions," Stokes commented. "Collaboration in the earlier stages of test method development greatly increases the chances that we'll later agree on recommendations on the appropriate uses of a new test method."

A cornerstone of NICEATM's international interactions

Stokes also provided JSAAE attendees with an overview of the International Cooperation on Alternative Test Methods (ICATM). ICATM is an international partnership among national validation organizations that promote the advancement of refinement, reduction, and replacement alternatives for animal testing. The European Union, U.S., Japan, Canada, and South Korea are currently members of the cooperation agreement. The ICATM partners cooperate and collaborate on test method validation studies, peer review of new test methods, and development of harmonized recommendations for how new test methods can be used.

ICATM coordination meetings take place several times a year and provide an opportunity for the five ICATM organizations to discuss activities in the three major areas of cooperation. The meetings are planned to coincide with meetings of the Society of Toxicology and other gatherings of mutual interest to the participant organizations. "These regular interactions allow the ICATM partners to develop good communications and working relationships, which support our collaborations on test method development," noted Stokes.

Stokes participates in Japanese advisory council meeting

Another important interaction activity for the ICATM partners is liaison membership on one another's advisory committees. Following the ICATM meeting, Stokes attended a meeting of the advisory council of JaCVAM, NICEATM's counterpart organization in Japan. The meeting took place at the Japanese Ministry of Health, Labour, and Welfare in Tokyo. The JaCVAM advisory council serves a similar role as the Scientific Advisory Committee on Alternative Toxicological Methods (SACATM). JaCVAM Director Hajime Kojima, Ph.D., attended the SACATM meeting in June.

While attending the JaCVAM advisory council meeting, Stokes presented an update of NICEATM-ICCVAM and ICATM activities and an overview of U.S. initiatives to reduce, refine, and replace animal use in testing, including outcomes of the recent NICEATM-ICCVAM workshop on alternative methods for rabies vaccine testing.

(Debbie McCarley is the special assistant to Rear Adm. William Stokes, D.V.M., director of NICEATM. Cathy Sprankle is a communications specialist with ILS, Inc., support contractor for NICEATM.)

Return to table of contents *Next page*

NICEATM workshop report on vaccine testing now available

By Debbie McCarley and Cathy Sprankle reprinted from *eFACTOR*, January 2012

A workshop organized last year by the NTP Interagency Center for the Evaluation of Alternative Toxicological Methods (NICEATM) and the Interagency Coordinating Committee on the Validation of Alternative Methods (ICCVAM) is the subject of the current issue of the journal Procedia in Vaccinology.

The International Workshop on Alternative Methods to Reduce, Refine, and Replace the Use of Animals in Vaccine Potency and Safety Testing: State of the Science and Future Directions was convened to review the state of the science of available alternative methods for human and veterinary vaccine potency and safety testing. Workshop participants also identified specific activities that will be needed to advance test methods with the potential to reduce, refine and replace animal use for vaccine testing.

As acting chair of ICCVAM, Jodie Kulpa-Eddy, D.V.M., of the U.S. Department of Agriculture, welcomed participants to the workshop. *(Photo courtesy of William Stokes)*

In her keynote speech, Rear Adm. Anne Schuchat, M.D., director of the National Center for Immunization and Respiratory Diseases within the CDC, underscored the important role of safe and effective vaccinations in promoting public health. *(Photo courtesy of William Stokes)*

Identifying high priority vaccines for alternative testing

The workshop described in the current Procedia in Vaccinology was held Sept. 14-16, 2010, at NIH in Bethesda, MD. Nearly 200 scientists from 13 countries attended the workshop. Over 30 invited participants included scientists from U.S. government research and regulatory agencies as well as representatives from the governments of Japan, Canada, the United Kingdom, the Netherlands, and the European Union. National and multinational corporations and research institutions were also represented. The workshop report is comprised of 27 manuscripts and summarizes the plenary session speaker presentations as well as the conclusions and recommendations developed by the workshop participants.

"One of the key accomplishments of this workshop was the identification of the highest priority vaccines for future reduction, refinement, and replacement efforts," noted Rear Adm. William Stokes, D.V.M., director of NICEATM. "Targeting specific vaccines will help focus research and validation efforts that can have a real impact on animal use and animal welfare." He added that rabies vaccines were identified as one of the high priority vaccines. Reduction, refinement, and replacement of animal use for rabies vaccine potency testing was the subject of a recent workshop in October organized by NICEATM and ICCVAM.

Recommending alternative methods

Vaccines improve animal and human health by preventing infectious diseases in people and animals. As a result of widespread human vaccination, smallpox has been globally eradicated, and many other diseases such as polio, measles, and rubella now occur only rarely in North America. Veterinary vaccines prevent a wide range of diseases in many animal populations, and contribute to human health by controlling diseases such as rabies that can be transmitted from animals to humans. However, testing necessary to ensure vaccine effectiveness and safety can involve large numbers of animals, and result in significant animal pain and distress. NICEATM and ICCVAM, whose mission is to promote alternative methods that can reduce, refine (enhance animal well-being, or lessen or avoid pain and distress), and replace animal use in testing, identified alternative test methods for vaccine potency and safety testing as one its highest priorities in a five-year plan issued in 2008.

In addition to prioritizing specific vaccines for future efforts, recommendations made by the participants of the September 2010 workshop included:

- Specific non-animal antigen quantification approaches that have successfully replaced animals for potency testing for some vaccines should be expanded for use with other vaccines through identification, purification, and characterization of vaccine protective antigens.

Next page

- Procedures should be implemented to reduce both the numbers of animals used and the pain and distress experienced by animals while and where animal testing is still needed.
- Efforts should be made to facilitate international harmonization and cooperation, as well as closer collaboration between human and veterinary vaccine researchers, as this will allow faster progress towards reduction, refinement, and replacement of animal use.

The workshop was organized by NICEATM and ICCVAM in partnership with the European Centre for the Validation of Alternative Methods, the Japanese Center for the Validation of Alternative Methods, and Health Canada. The workshop was co-sponsored by the Society of Toxicology.

(Debbie McCarley is the special assistant to Rear Adm. William Stokes, D.V.M., director of NICEATM. Cathy Sprankle is a communications specialist with ILS, Inc., support contractor for NICEATM.)

Return to table of contents

Comments Sought Relevant to Updating of NICEATM-ICCVAM Five-Year Plan

In 2008, NICEATM and ICCVAM published a five-year plan that identified priorities and outlined goals and objectives for the years 2008-2012. NIEHS and NICEATM now invite public input for consideration as the current plan is updated for the years 2013-2017.

The current Five-Year Plan addresses: (1) identification of areas of high priority for new and revised non-animal and alternative assays to reduce, refine, and replace the use of animals in testing and (2) research, development, translation, and validation of new and revised non-animal and other alternative assays for integration into Federal agency testing programs.

With regard to reducing, refining, and replacing animal use, ICCVAM identified and ranked the types of regulatory safety tests in the 2008-2012 plan that it considered of the highest priority for the development and validation of alternative test methods. These priorities were based on the severity of unrelieved pain and distress and the number of animals involved in each type of testing. The highest priority testing areas included: acute eye irritation and corrosion, acute skin toxicity (including irritation/corrosion, sensitization, absorption); acute systemic toxicity (acute poisoning) by oral, dermal, and inhalation routes; and biologics and vaccines testing. Other priority testing areas included immunotoxicity, endocrine disruptors, pyrogenicity, reproductive/developmental toxicity, and chronic toxicity/carcinogenicity. Neurotoxicity was also an area of interest.

NIEHS and NICEATM seek public input on the following questions:

- Are the priority areas listed above appropriate with regard to NICEATM and ICCVAM activities over the next five years?
- Considering available science and technology, what development, translation, and validation activities are most likely to have the greatest impacts within the next five years on reducing, refining, or replacing animal use in the priority areas?
- What research and development activities hold the greatest promise in the long-term for reducing, refining, or replacing animal use in the priority areas?
- What are appropriate measures for evaluating progress in enhancing the development and use of alternative test methods in the priority areas?

Input is welcome and should be submitted via the NICEATM-ICCVAM website at http://iccvam.niehs.nih.gov/contact/FR_pubcomment.htm. Individuals submitting comments are asked to include appropriate contact information (name, mailing address, phone, fax, email, and affiliation or sponsoring organization, if applicable). All comments received will be posted on the NICEATM–ICCVAM website and identified by the individual's name and affiliation or sponsoring organization. Comments received before January 15, 2012, will be considered in development of the draft 2013–2017 Five-Year Plan, which will be made available for public comment later in 2012.

Next page

OECD Adopts Guidance Document Developed by ICCVAM Working Group

A guidance document developed and proposed by NICEATM and a working group administered by NICEATM was adopted by the Organisation for Economic Co-operation and Development (OECD). This document supports further development of the *in vitro* bovine corneal opacity and permeability (BCOP) and isolated chicken eye (ICE) test methods, which can identify ocular corrosives and severe irritants without the use of live animals. Further development of these test methods could potentially lead to their use for a wider range of testing applications, decreasing animal use for ocular safety testing.

In 2006, the Interagency Coordinating Committee on the Validation of Alternative Methods (ICCVAM) recommended that the BCOP and ICE test methods are useful to screen for ocular corrosives and severe irritants in appropriate circumstances and with specific limitations. If either of these alternative methods yields a positive result, the product can be labeled as an ocular corrosive or severe irritant, and no live animal testing is required. This recommendation formed the basis for the OECD Test Guidelines 437 (for the BCOP test method) and 438 (for the ICE test method).

The ICCVAM Interagency Ocular Toxicity Working Group developed a guidance document for use with Test Guidelines 437 and 438. The goals of the guidance document are to (1) promote histopathology evaluation as an additional endpoint for ocular safety testing and (2) provide specific guidance on using the BCOP and ICE test methods to expand their respective databases and optimize the test methods' usefulness for identifying all hazard categories.

OECD recently adopted the guidance document, "The Bovine Corneal Opacity and Permeability and Isolated Chicken Eye Test Methods: Collection of Tissues for Histopathological Evaluation and Collection of Data on Nonsevere Irritants" after international review. The guidance document includes general procedures to guide the routine collection of tissues for histopathology evaluation. An expanded histopathology database will support future evaluations to determine if histopathology can increase the accuracy of the *in vitro* methods and potentially support broader applications of the BCOP and ICE test methods

NTP staff honored at NIEHS annual awards ceremony

The NIEHS held its 2011 Director's Annual Awards Ceremony on December 6, 2011. "This ceremony spotlights the hard work and dedication of so many worthy people, and it's always such a pleasure to be a part of it," said Nigel Walker, Ph.D., NTP deputy director for science and the event's master of ceremonies.

Several staff from the NIEHS Division of the NTP (DNTP) received NIH Merit Awards, which is the highest level honor award an Institute director can approve. It recognizes contributions in the areas of leadership, significant scientific research or administrative support, creativity, and notable competence and resourcefulness in improving the scientific or administrative management of the Institute.

NIH Merit Award

Warren Casey for excellent performance in leading the National Toxicology Program's international validation and interagency evaluation of new testing methods to support the federal government's endocrine disruptor chemical screening program.

NIH Merit Group Award

- Beth Bowden, Jack Bishop, Chad Blystone, Mark Cesta, Helen Cunny, Jennifer Fostel, Paul Foster, Ronald Herbert, Grace Kissling, David Malarkey, Barry McIntyre, and Molly Vallant for diligent attention, cooperative contribution of expertise, and investment of time beyond normal duties for the establishment of reproductive database capabilities for the National Toxicology Program
- Quashana Denise Brown, Natasha Clayton, Glenda Corniff, Norris Flagler, Heather Jensen, Tina Jones, Debra King, Tiwanda Misande, Eli Ney, Pamela Ovwigho, Yvette Rebolloso, Deloris Sutton, and Ralph Wilson – To recognize the Pathology Core lab staff for the significant contributions they make to the NTP and NIEHS testing and research programs
- Angela King-Herbert, and David Malarkey for significant contributions to the NTP training programs in pathology and laboratory animal medicine

Next page

NIH Merit Cross-Divisional Group Award
[DNTP staff included in the group award]

- Beth Bowden, John Bucher, Gloria Jahnke, Shawn Jeter, Ruth Lunn, Sharon Soward, Diane Spencer, and Mary Wolfe for exceptional performance in handling the release of the 12th Report on Carcinogens
- John Bucher, Michael Devito, Darlene Dixon, Jennifer Fostel, Jef French, Michelle Hooth, Kembra Howdeshell, Grace Kissling, Alex Merrick, Eli Ney, and Gregory Travlos for exceptional performance in initiation, implementation, and management of the Pulse Survey and development of action plans to enhance work-life quality across the NIEHS Community

Unsung Hero Award

Charles Alden for maintaining the high standards expected of the NTP Technical Report Series

Peer Award

- Gordon Flake for working beyond normal expectations in order to provide regulatory agencies pathology data
- Diane Spencer, in recognition of consistent, extraordinary guidance and support of fellow employees and of programs that enhance the NIEHS environment

Fellows Award for Research Excellence Award

- Xiaoqing Chang (Mentor Ray Tice)

Also recognized were Danica Andrews and Rachel Frawley, part of the group that received the HHS Green Champions Honorable Mention for Environmental Stewardship, and Linda Birnbaum and John Bucher, part of the Deepwater Horizon Gulf Oil Spill Response Team that received the NIH Director's Award. These awards were presented earlier in the year.

In memorial

With sadness, the NTP would like to let you know that a former colleague, Dr. Kamal M. Abdo, passed away on December 22, 2011. Dr. Abdo enjoyed his research focusing in the field of Toxicology as evidenced by his 25 years of service at the National Institute of Environmental Health Sciences. A memorial service was held at Jamaat Ibad Ar-Rahman in Durham, NC and he was laid to rest at Union Grove United Methodist Church in Bahama, NC. He will be missed by his many friends at NIEHS.

Kamal Abdo at his NIEHS retirement party in 2005 with fellow Toxicology Operations Branch staff scientists Jack Bishop and Po Chan.

Return to table of contents

Subscribe to the NTP Listserv

To subscribe to the listserv and receive the NTP Update as well as other NTP news and announcements electronically, register online at http://ntp.niehs.nih.gov or send e-mail to ntpmail-request@list.niehs.nih.gov with the word "subscribe" as the body of the message or contact the NTP Office of Liaison, Policy and Review. Additional information about the NTP along with announcements of meetings, publications, study results and its centers is available on the Internet at http://ntp.niehs.nih.gov.

The NTP website offers electronic files of the Report on Carcinogens and the library of NTP Technical Reports and NTP Toxicity Reports. The PDF files of these reports are available free-of-charge through the NTP website at http://ntp.niehs.nih.gov (see Resources).

Contact Information: NTP Office of Liaison, Policy and Review, NIEHS, P.O. Box 12233, MD K2-03, Research Triangle Park, NC 27709; T: (919) 541-0530; FAX: (919) 541-0295; CDM@niehs.nih.gov

NTP Study Reports

Available at: http://ntp.niehs.nih.gov/go/reports

NTP Publications

Available at: http://ntp.niehs.nih.gov/go/pubs