



UPDATE

National Toxicology Program

JANUARY 2008

Headquartered at the
National Institute of Environmental
Health Sciences NIH-DHHS

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Bucher Outlines NTP Realignment

Article by Eddy Ball, reprinted from eFACTOR, January 2008



During his report to the National Toxicology Program (NTP) Board of Scientific Counselors on December 6 (see related Spotlight story), NTP Associate Director John Bucher, Ph.D., presented an update on the realignment of the program within the NIEHS Division of Intramural Research. These changes are being

implemented in order to give a clearer identify to the activities, staff and resources associated with the NTP.

According to Bucher, "This realignment provides greater transparency to the NTP budget as well as our physical location, capabilities and mission. Our traditional testing and assessment activities are strong, but now we have an organizational scaffold to accelerate fulfillment of our goals in the NTP Roadmap and building new programs."

The realignment was completed on October 28, 2007, with staff assignments to a newly designated program office and five branches. New appointments included Deputy Program Director for Policy Mary Wolfe, Ph.D., and Deputy Program Director for Science Nigel Walker, Ph.D.

- **Program Office** is comprised of the Office of Liaison, Policy and Review, also headed by Wolfe; Office of Nomination and Selection, directed by Scott Masten, Ph.D.; Report on Carcinogens, under Bill Jameson, Ph.D.; the NTP Interagency Center for the Evaluation of Alternative Toxicological Methods (NICEATM), headed by Bill Stokes, D.V.M.; and the Center for the Evaluation of Risks to Human Reproduction (CERHR), under Mike Shelby, Ph.D.
- **Toxicology Branch**, headed by Acting Chief Paul Foster, Ph.D., brings together all of the

Photography by Steve McCaw / Arts & Photography

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NTP Board of Scientific Counselors Meets

Article by Eddy Ball, reprinted from eFACTOR, January 2008

With an observation that "this is a very active time in this field of ours," NIEHS/NTP Acting Director Sam Wilson, M.D., opened the fall 2007 meeting of the NTP Board of Scientific Counselors (BSC) on December 6 in Rodbell Auditorium. The irony of Wilson's understatement soon became evident to members of the board as they plowed through a packed agenda of reports, two precedent-setting initiatives and seven nominations, including the second one involving a nanoscale element.

The meeting began with an update by NTP Associate Director John Bucher, Ph.D., who discussed NTP realignment (see related story) within the NIEHS Division of Intramural Research, an upcoming celebration of the 10-year anniversary of the Interagency Coordinating Committee on the Validation of Alternative Methods (ICCVAM) on February 5, 2008, and a workshop on

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Upcoming Events

January 24-25, 2008

RoC Expert Panel Meeting on Aristolochic Acid Related Exposures and Riddelliine
Chapel Hill Sheraton
One Europa Dr., Chapel Hill, NC

February 5, 2008

ICCVAM 10-Year Anniversary Symposium
U.S. Consumer Product Safety Commission
Bethesda Towers Bldg., 4330 East West Highway
Bethesda, MD, 1-5 PM

February 6-7, 2008

Acute Chemical Safety Testing: Advancing *In Vitro* Approaches and Humane Endpoints for Systemic Toxicity Evaluations Workshop, Natcher Conference Center, NIH, Bethesda, MD

February 27-28, 2008

BSC Technical Reports Review Subcommittee Meeting, NIEHS, 111 T.W. Alexander Dr. Research Triangle Park, NC 27709

March 4-6, 2008

LLNA Peer Review Meeting
U.S. Consumer Product Safety Commission
Bethesda Towers Bldg., 4330 East West Highway
Bethesda, MD

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

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Bucher Outlines NTP Realignment

toxicology efforts within NTP, with a renewed emphasis on integrating toxicology studies with toxicokinetics and toxicogenomics. Significant activities include directing interagency agreements with the Food and Drug Administration's National Center for Toxicological Research and the Center for Disease Control and Prevention's National Institute for Occupational Safety and Health.

- **Cellular and Molecular Pathology Branch**, headed by Robert Sills, D.V.M., Ph.D., provides support for NTP pathology and program archives and support for pathology investigations by intramural researchers. One of this group's many current projects is compiling an atlas of non-neoplastic lesions in rodents.

- **Program Operations Branch**, headed by Acting Chief Cynthia Smith, Ph.D., this branch provides oversight for activities that support NTP research and testing, including chemistry activities, studies related to absorption, distribution, metabolism, and excretion (ADME), quality assurance, maintenance and development of data capture and retrieval systems, the central data repository, and the NTP web site.
- **Host Susceptibility Branch**, headed by Acting Chief Jef French, Ph.D., is responsible for planning, conducting and analyzing assessments of chemical toxicity in multiple murine strains. Another function of this group is putting together collaborations that will foster an interaction among the NTP, intramural and extramural investigators, and potential public-private partnerships to examine the genetic basis of response to environmental exposures and the clinical manifestations of resulting disease states.
- **Bio-molecular Screening Branch**, headed by Acting Chief Ray Tice, Ph.D., is charged with implementing the portion of the NTP Roadmap related to development of high- and medium-throughput screening activities. This branch works cooperatively with the Environmental Protection Agency's ToxCast program and the NIH Chemical Genomics Center to identify and evaluate *in vitro* and cell based high-throughput assays as tools useful for screening and prioritizing chemicals for toxicity testing. This branch also carries out NTP automated screening of *C. elegans* performed at NIEHS by the WormTox Group headed by Jonathan Freedman, Ph.D. ●

Board of Scientific Counselors Technical Reports Review Subcommittee

The NTP Board of Scientific Counselors Technical Reports Review Subcommittee is scheduled to meet on February 27-28, 2008, at the NIEHS, 111 TW Alexander Drive, Research Triangle Park, NC. The subcommittee will peer review the findings and conclusions from six draft NTP Technical Reports, a draft report on photocarcinogenicity studies of aloe

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NTP Board of Scientific Counselors Meets

in vitro approaches and humane endpoints for acute chemical safety testing on February 6 and 7.

Bucher acknowledged special recognition of several NTP staff. In 2006, Susan Elmore, D.V.M., and others from NTP were recognized for the year's best paper by the Society of Toxicologic Pathology. Senior toxicologist Ron Melnick, Ph.D. received the 2007 David P. Rall Award for Advocacy in Public Health at the American Public Health Association's 135th Annual Meeting in November. Bucher also noted the contribution of geneticist Frank Johnson, Ph.D. and the recent paper in *Nature* describing NIEHS/NTP efforts toward identifying single-nucleotide polymorphism maps of 15 commonly used laboratory murine strains.

ICCVAM and the NTP Interagency Center for the Evaluation of Alternative Toxicological Methods (NICEATM) in response to request from the U.S. House and Senate Appropriations Committees have developed a five-year plan to advance alternative test methods of high scientific quality to better protect human health, animal health and the environment. As an example of the potential of this kind of toxicity pathway analysis, Bucher pointed to the development of four *in vitro* alternatives to ocular testing. "If positive findings are coming up in these *in vitro* tests, there is no need to go on to a rabbit eye test," he said.

In the first of two reports on initiatives that involve new directions in NTP studies, Dori Germolec, Ph.D., NTP immunology discipline leader, outlined plans for studying mold. The study will use pooled specimens of several fresh isolates of mold species on different building materials to mimic "real-life exposure" to whole organisms in rodent toxicology studies. As Germolec explained, the proposed study design "is a very significant departure from the traditional NTP study, where we're using a very well characterized compound and have a very good idea of the metabolites and where they go in the tissues."

In his report on nominations for the Center for the Evaluation of Risks to Human Reproduction (CERHR), Director Michael Shelby, Ph.D., described the nominations of low-level exposure to lead and cadmium proposed for expert panel evaluations.

As Shelby noted, "This is the first time the BSC is being asked to provide input on whether there is sufficient concern and scientific data to warrant CERHR conducting an evaluation for a particular nominated substance."

The lead nomination, Shelby noted, also marks the first evaluation by CERHR of a known developmental toxicant, and study results could support the first use of reproductive toxicity to revise occupational exposure limits downward. The current Recommended Exposure Limit is four times that considered elevated

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Moving Day in Chicago — Radiofrequency Radiation Studies to Begin Soon

During his report, Bucher showed slides of workers moving 21 reverberation chambers from flatbed trucks through the sidewalk into a sub-basement area at the Illinois Institute of Technology Research Institute in Chicago. The chambers, which were built in Switzerland and carried by sea to the United States, are being installed as part of NTP studies of exposure to radiofrequency radiation from cellular phones and other wireless communications devices.

According to Bucher, the thermal pilot studies are set to begin in February 2008, with the perinatal pre-chronic studies anticipated to start in the summer and chronic studies in 2009. The overall objective of these studies is to determine the potential toxic and/or carcinogenic effects of exposure to cellular phone radiofrequency emissions in laboratory animals. The Federal Communication Commission and others will use this information to determine the adequacy of current guidelines for protecting against potential adverse effects of chronic exposure. The current FCC exposure limits are designed to protect against acute injury from thermal effects of radiofrequency radiation. ●



NTP Center for the Evaluation of Risks to Human Reproduction (CERHR)



Final Expert Panel Report on Bisphenol A

The NTP-CERHR Expert Panel Report on the Reproductive and Developmental Toxicity of Bisphenol A was released on November 26, 2007, for public comment (the public comment period ends January 25, 2008). Bisphenol A is a high production volume chemical used in the production of epoxy resins, polyester resins, polysulfone resins, polyacrylate resins, polycarbonate plastics, and flame retardants. Following the public comment period, CERHR will prepare the NTP Brief on Bisphenol A. The NTP Brief will include the NTP's conclusions on the reproductive and developmental hazards associated with exposure to bisphenol A. It will be based on the expert panel report, public comments received on that report, and any new relevant scientific literature.

This report is posted on the CERHR website <http://cerhr.niehs.nih.gov/chemicals/bisphenol/bisphenol.html> and also available in hardcopy or on CD from CERHR (contact information below). ●

Contact Information: Dr. Michael D. Shelby, Director CERHR, NIH/NIEHS, P.O. Box 12233, MD EC-32, Research Triangle Park, NC 27709, T: (919) 541-3455; FAX: (919) 316-4511; shelby@niehs.nih.gov

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NTP Board of Scientific Counselors Technical Reports Review Subcommittee

vera performed in the SKH-1 mouse, and a draft NTP Toxicity Report on 90-day studies of estragole (TOX 82).

The draft reports tentatively scheduled are:

TR 544 Dibromoacetonitrile
TR 549 Bromochloroacetic acid
TR 551 Isoeugenol
TR 553 Photocarcinogenicity study of aloe vera
TR 554 5-Hydroxymethyl-2-furfural
TR 555 1,2-Dibromo-2,4-dicyanobutane
TR 556 Chromium picolinate monohydrate
TOX 82 Estragole

Details about this meeting were announced in the Federal Register (72FR70863) and are posted on the NTP website (<http://ntp.niehs.nih.gov> select Calendar of Upcoming Events) or can be obtained by contacting the Executive Secretary, Dr. Barbara Shane. This meeting is open to the public and public comment, both written and oral, is welcome on any report. ●

Contact Information: Dr. Barbara Shane, Executive Secretary, NTP Office of Liaison, Policy and Review, NIH/NIEHS, P.O. Box 12233, MD A3-01, Research Triangle Park, NC 27709; T: 919-541-4253; shane@niehs.nih.gov

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NTP Board of Scientific Counselors Meets

in children and applies to all workers, even women of childbearing age.

The board's responses to reviews on the mold and proposed CERHR evaluations were overwhelmingly positive. The board also approved NTP recommendations for all study nominations except for the compound diethyl phthalate. The board also unanimously approved the recommendations on the findings and conclusions for the six draft NTP Technical Reports presented by Nancy Kerkvliet, Ph.D., chair of the board's Technical Reports Review Subcommittee. The meeting concluded with a progress report by Bucher on implementation of the NTP Workshop and Retreat Recommendations. ●



NTP Interagency Center for the Evaluation of Alternative Toxicological Methods (NICEATM)



Test Method Recommendations Forwarded to Agencies

NICEATM, on behalf of the Interagency Coordinating Committee on the Validation of Alternative Methods (ICCVAM), forwarded the *ICCVAM Test Method Evaluation Report: In Vitro Ocular*

Toxicity Test Methods for Identifying Severe Irritants and Corrosives (NIH Publication 07-4517) to Federal agencies for their consideration for regulatory and other acceptance, where applicable. These are the first alternative non-animal test methods for ocular safety testing reviewed and recommended by ICCVAM. The report describes four ocular toxicity test methods: (1) the Bovine Corneal Opacity and Permeability [BCOP] test, (2) the Isolated Chicken Eye [ICE] test, (3) the Isolated Rabbit Eye [IRE] test, and (4) the Hen's Egg Test – Chorioallantoic Membrane [HET-CAM]. ICCVAM recommends that these *in vitro* test methods should be considered before using animals for ocular testing and used when determined appropriate. Once accepted by Federal agencies, these recommendations will result in a reduction in the number of animals used for safety testing to determine permanent or temporary damage to the eye.

The report includes ICCVAM's:

- Final test method recommendations on the use of these four *in vitro* test methods
- Recommended test method protocols for future testing
- Recommendations for further optimization and validation studies for these test methods
- Recommended reference substances for validation studies

ICCVAM recommends that the BCOP and ICE methods, with specific limitations for certain chemical classes and/or physical properties, can be used in a tiered testing strategy to determine ocular hazards. The report notes that substances that test positive can be classified as ocular corrosives or severe irritants without further testing in animals.

The final background review documents (BRDs) for these four methods provide the data and analyses used to assess their current validation status for identifying ocular corrosives and severe irritants. Electronic copies of the ICCVAM Test Method Evaluation Report and the four BRDs are available from the NICEATM/ICCVAM website at:

<http://iccvam.niehs.nih.gov/methods/ocutox/ivocutox.htm>

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Report on Carcinogens

Captafol and ortho-Nitrotoluene Expert Panel Meeting

Scientific review of the first two candidate substances under consideration for the 12th Report on Carcinogens (RoC), captafol and ortho-nitrotoluene, was held on October 15-16, 2007, at the Chapel Hill Sheraton Hotel in Chapel Hill, NC. NTP convened an expert panel to peer review the draft background documents on these two substances and provide a recommendation on their listing status for the 12th RoC. Details about the meeting are available on the RoC website at <http://ntp.niehs.nih.gov/go/29682> or by contacting Dr. C.W. Jameson (contact information below).

Aristolochic Acid Related Exposures and Riddelliine Expert Panel To Meet

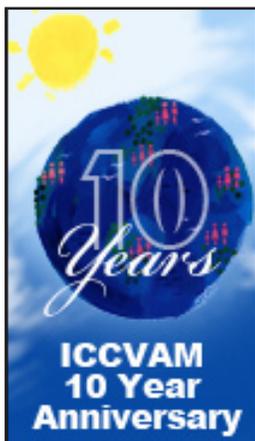
The expert panel to peer review the background documents on aristolochic acid related exposures (two candidate substances: botanical products containing aristolochic acid and aristolochic acid) and riddelliine takes place on January 24-25, 2008, at the Chapel Hill Sheraton Hotel, One Europa Drive, Chapel Hill, NC. This meeting is open to the public, with time set aside for presentation of oral comments. Details about the meeting, including registration, how to submit public comments, and how to gain access to the background documents, were announced in the *Federal Register* (72FR63900) and are available on the RoC website at <http://ntp.niehs.nih.gov/go/29679> or by contacting Dr. Jameson. ●

Contact Information: Dr. C.W. Jameson, Director, Report on Carcinogens, NIH/NIEHS, P.O. Box 12233, MD EC-14, Research Triangle Park, NC 27709, T: (919) 541-4096; jameson@niehs.nih.gov



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NTP Interagency Center for the Evaluation of Alternative Toxicological Methods (NICEATM)



ICCVAM 10-Year Anniversary Symposium

A scientific symposium, *ICCVAM: Celebrating the Advancement of Public Health and Animal Welfare with Sound Science: Envisioning New Directions in Toxicology*, will be held February 5, 2008, from 1-5 PM at the U.S. Consumer Product Safety Commission Headquarters in Bethesda, MD. Invited speakers will highlight ICCVAM's contributions and

leadership during its first 10 years and NICEATM-ICCVAM will unveil its new five-year plan. A panel discussion on test method research, development, translation, and validation: the way forward for ICCVAM and its stakeholders will culminate the event. Speakers and panelists will include Federal agency representatives and representatives from industry and animal welfare organizations.

The NICEATM-ICCVAM Five-Year Plan was prepared in response to requests from the House and Senate Appropriations Committee. The plan focuses on ways to reduce, refine, and replace animal use, while maintaining or improving the protection of human and animal health and the environment.

The symposium is open to the public at no cost, with attendance limited only by available space. Individuals who plan to attend are encouraged to register by January 22, 2008. Registration information is available on the NICEATM-ICCVAM website at <http://iccvam.niehs.nih.gov/meetings/10thAnnivSymp/10thAnnivSymp.htm> or by contacting NICEATM by email niceatm@niehs.nih.gov.

Acute Chemical Safety Testing Workshop

The workshop, *Acute Chemical Safety Testing: Advancing In Vitro Approaches and Humane Endpoints for Systemic Toxicity Evaluations*, will be held February 6-7, 2008, at the NIH Natcher

Conference Center in Bethesda, MD. It will explore how to improve our understanding of key pathways involved in acute systemic toxicity and how to apply that knowledge to developing new *in vitro* test methods and identifying humane endpoints that will further the reduction, refinement, and replacement of animal use for chemical safety testing.

The co-organizers of the workshop are ICCVAM, NICEATM, the European Centre for the Validation of Alternative Methods, and the Japanese Center for the Validation of Alternative Methods. The workshop is open to the public, and there is no registration fee. Attendance is limited only by the available space. Individuals who plan to attend are encouraged to register by January 22, 2008. Registration information is available on the NICEATM-ICCVAM website at <http://iccvam.niehs.nih.gov/meetings/AcuteToxWksp08/AcuteToxWksp08.htm> or by contacting NICEATM by email niceatm@niehs.nih.gov.

Meeting on Modifications and New Applications of the Murine LLNA

NICEATM in collaboration with ICCVAM announces an international independent scientific peer review panel meeting to evaluate modifications and new applications for the Murine Local Lymph Node Assay (LLNA). The LLNA is an alternative test method that can be used to determine the allergic contact dermatitis potential of chemicals and products.

The panel will review:

- The validation status of three modified LLNA test method protocols that use non-radioactive probe chemicals.
- The validation status of a LLNA limit dose procedure.
- The use of the LLNA to test mixtures, aqueous solutions, and metals (applicability domain for the LLNA).
- The use of the LLNA to determine potency (potential for allergic contact dermatitis hazard).
- Revised draft recommended performance standards for the LLNA.

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NTP Staff Honored at Awards Ceremony

The NIEHS held its 2007 Director's Annual Honor Awards Ceremony on December 13. Several NTP staff (noted in bold) received NIH Merit Awards:



- (First image) **Ron Herbert, D.V.M., Ph.D., Nigel Walker, Ph.D., Charles Alden, Ph.D., Ron Melnick, Ph.D., Brad Collins, Leo T. Burka, Ph.D., Dave Malarkey, D.V.M., Ph.D., Raj Chhabra, Ph.D., Kristine Witt, M.S., Michelle Hooth, Ph.D., Grace Kissling, Ph.D. and Greg Travlos, D.V.M.** (not pictured), for highly significant scientific and technical contributions to the analysis and reporting of the NTP studies of sodium dichromate dihydrate, a "hexavalent chromium" compound.
- William Schrader, Ph.D. and **Frank Johnson, Ph.D.** (not pictured) for superior performance in the scientific management of the Mouse Genome Sequencing Project.
- Sheila Newton, Ph.D. and **William Stokes, D.V.M., DACLAM** (pictured in second image) for exceptional performance in the development of the ICCVAM 5-year plan.
- Joel Abramowitz, Ph.D., **Beth Bowden** (pictured in third image), Donna Byrd, Allen Deary, Ph.D., Stephanie Holmgren, Bill Jirles, Dennis Lang, Ph.D., Dona McNeill, Liam O'Fallon, John Schelp, William Schrader, Ph.D., and **Mary Wolfe, Ph.D.** (pictured in top right image), in recognition of productive teamwork and leadership in guiding the creation of the Institute's new web space.

The NIH Merit Award is the highest 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 or administrative management of the institute. ●





NTP Staff Publications: July-September 2007

The names of NIEHS/NTP staff are identified in bold. The URL to the article is provided although in some incidences, access may require a subscription to the journal.

- Auman, J. T., **G. A. Boorman**, R. E. Wilson, **G. S. Travlos** and R. S. Paules (2007). "Heat map visualization of high-density clinical chemistry data." *Physiol Genomics* 31(2): 352-6.
- PMID: 17652165
 - PubMed Abstract: <http://www.ncbi.nlm.nih.gov/sites/entrez?db=pubmed&uid=17652165&cmd=showdetailview>
 - DOI: 10.1152/physiolgenomics.00276.2006
- Bell, D. R., S. Clode, M. Q. Fan, A. Fernandes, **P. M. D. Foster**, T. Jiang, G. Loizou, A. MacNicoll, B. G. Miller, M. Rose, L. Tran and S. White (2007). "Toxicity of 2, 3, 7, 8-tetrachlorodibenzo-p-dioxin in the developing male Wistar(Han) rat. I: No decrease in epididymal sperm count after a single acute dose." *Toxicological Sciences* 99(1): 214-223.
- PMID: 17545212
 - PubMed Abstract: <http://www.ncbi.nlm.nih.gov/sites/entrez?db=pubmed&uid=17545212&cmd=showdetailview>
 - DOI: 10.1093/toxsci/kfm140
- Bell, D. R., S. Clode, M. Q. Fan, A. Fernandes, **P. M. D. Foster**, T. Jiang, G. Loizou, A. MacNicoll, B. G. Miller, M. Rose, L. Tran and S. White (2007). "Toxicity of 2, 3, 7, 8-tetrachlorodibenzo-p-dioxin in the developing male Wistar(Han) rat. II: Chronic dosing causes developmental delay." *Toxicological Sciences* 99(1): 224-233.
- PMID: 17545211
 - PubMed Abstract: <http://www.ncbi.nlm.nih.gov/sites/entrez?db=pubmed&uid=17545211&cmd=showdetailview>
 - DOI: 10.1093/toxsci/kfm141
- Bell, D. R., S. Clode, M. Q. Fan, A. Fernandes, **P. M. D. Foster**, T. Jiang, G. Loizou, A. MacNicoll, B. G. Miller, M. Rose, L. Tran and S. White (2007). "Relationships between tissue levels of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), mRNAs, and toxicity in the developing male Wistar(Han) rat." *Toxicological Sciences* 99(2): 591-604.
- PMID: 17656490
 - PubMed Abstract: <http://www.ncbi.nlm.nih.gov/sites/entrez?db=pubmed&uid=17656490&cmd=showdetailview>
 - DOI: 10.1093/toxsci/kfm179
- Beyer, R. P., R. C. Fry, M. R. Lasarev, L. A. McConnachie, L. B. Meira, V. S. Palmer, C. L. Powell, P. K. Ross, T. K. Bammler, B. U. Bradford, A. B. Cranson, **M. L. Cunningham**, R. D. Fannin, G. M. Higgins, P. Hurban, R. J. Kayton, K. F. Kerr, O. Kosyk, E. K. Lobenhofer, S. O. Sieber, P. A. Vliet, B. K. Weis, R. Wolfinger, C. G. Woods, J. H. Freedman, E. Linney, W. K. Kaufmann, T. J. Kavanagh, R. S. Paules, I. Rusyn, L. D. Samson, P. S. Spencer, W. Suk, R. J. Tennant and H. Zarbl (2007). "Multicenter study of acetaminophen hepatotoxicity reveals the importance of biological endpoints in genomic analyses." *Toxicological Sciences* 99(1): 326-337.
- PMID: 17562736
 - PubMed Abstract: <http://www.ncbi.nlm.nih.gov/sites/entrez?db=pubmed&uid=17562736&cmd=showdetailview>
 - DOI: 10.1093/toxsci/kfm150
- Carey, M. A., J. W. Card, J. W. Voltz, S. J. Arbes, Jr., **D. R. Germolec**, K. S. Korach and D. C. Zeldin (2007). "It's all about sex: gender, lung development and lung disease." *Trends Endocrinol Metab* 18(8): 308-13.
- PMID: 17764971
 - PubMed Abstract: <http://www.ncbi.nlm.nih.gov/sites/entrez?db=pubmed&uid=17764971&cmd=showdetailview>
 - DOI:10.1016/j.tem.2007.08.003



Carey, M. A., J. W. Card, J. W. Voltz, **D. R. Germolec**, K. S. Korach and D. C. Zeldin (2007). "The impact of sex and sex hormones on lung physiology and disease: lessons from animal studies." *Am J Physiol Lung Cell Mol Physiol* 293(2): L272-8.

- PMID: 17575008
- PubMed Abstract: <http://www.ncbi.nlm.nih.gov/sites/entrez?db=pubmed&uid=17575008&cmd=showdetailview>
- DOI: 10.1152/ajplung.00174.2007

Chan, P. C., G. D. Hills, **G. E. Kissling** and A. Nyska (2007). "Toxicity and carcinogenicity studies of 4-methylimidazole in F344/N rats and B6C3F1 mice." *Arch Toxicol*

- PMID: 17619857
- PubMed Abstract: <http://www.ncbi.nlm.nih.gov/sites/entrez?db=pubmed&uid=17619857&cmd=showdetailview>
- DOI: 10.1007/s00204-007-0222-5

Chan, P. C., **R. C. Sills**, **G. E. Kissling**, A. Nyska and W. Richter (2007). "Induction of thyroid and liver tumors by chronic exposure to 2-methylimidazole in F344/N rats and B6C3F1 mice." *Arch Toxicol*

- PMID: 17924096
- PubMed Abstract: <http://www.ncbi.nlm.nih.gov/sites/entrez?db=pubmed&uid=17924096&cmd=showdetailview>
- DOI: 10.1007/s00204-007-0249-7

Chan, P. C., Q. Xia and P. P. Fu (2007). "Ginkgo biloba leave extract: Biological, medicinal, and toxicological effects." *Journal of Environmental Science and Health - Part C Environmental Carcinogenesis and Ecotoxicology Reviews* 25(3): 211-244.

- PMID: 17763047
- PubMed Abstract: <http://www.ncbi.nlm.nih.gov/sites/entrez?db=pubmed&uid=17763047&cmd=showdetailview>
- DOI: 10.1080/10590500701569414

Dunnick, J. K., **G. Kissling**, D. K. Gerken, **M. A. Vallant** and A. Nyska (2007). "Cardiotoxicity of Ma Huang/caffeine or ephedrine/caffeine in a rodent model system." *Toxicologic Pathology* 35(5): 657-664.

- PMID: 17676524
- PubMed Abstract: <http://www.ncbi.nlm.nih.gov/sites/entrez?db=pubmed&uid=17676524&cmd=showdetailview>
- DOI: 10.1080/01926230701459978

Fostel, J. M., L. Burgoon, C. Zwickl, P. Lord, J. C. Corton, P. R. Bushel, **M. Cunningham**, L. Fan, S. W. Edwards, S. Hester, J. Stevens, W. Tong, M. Waters, C. H. Yang and R. Tennant (2007). "Toward a checklist for exchange and interpretation of data from a toxicology study." *Toxicological Sciences* 99(1): 26-34.

- PMID: 17442663
- PubMed Abstract: <http://www.ncbi.nlm.nih.gov/sites/entrez?db=pubmed&uid=17442663&cmd=showdetailview>
- DOI: 10.1093/toxsci/kfm090

Frazer, K. A., E. Eskin, H. M. Kang, M. A. Bogue, D. A. Hinds, E. J. Beilharz, R. V. Gupta, J. Montgomery, M. M. Morenzoni, G. B. Nilsen, C. L. Pethiyagoda, L. L. Stuve, **F. M. Johnson**, M. J. Daly, C. M. Wade and D. R. Cox (2007). "A sequence-based variation map of 8.27 million SNPs in inbred mouse strains." *Nature* 448(7157): 1050-1053.

- PMID: 17660834
- PubMed Abstract: <http://www.ncbi.nlm.nih.gov/sites/entrez?db=pubmed&uid=17660834&cmd=showdetailview>
- DOI: 10.1038/nature06067



Gray, D. E., D. Messer, A. Porter, B. Hefner, D. Logan, R. K. Harris, A. P. Clark, J. A. Algaier, J. D. Overstreet and **C. S. Smith** (2007). "Analysis of flavonol aglycones and terpenelactones in Ginkgo biloba extract: A comparison of high-performance thin-layer chromatography and column high-performance liquid chromatography." *Journal of Aoac International* 90(5): 1203-1209.

- PMID: 17955963
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NTP Interagency Center for the Evaluation of Alternative Toxicological Methods (NICEATM)

The panel will peer review draft background review documents for each topic and evaluate the extent that established validation and acceptance criteria have been appropriately addressed. They will also be asked to comment on the extent that the draft documents support draft ICCVAM recommendations on proposed test method protocols and uses and on revised draft LLNA performance standards.

The meeting will be held March 4-6, 2008, at the U.S. Consumer Product Safety Commission Headquarters, Bethesda Towers Bldg., 4330 East West Highway, Bethesda, MD and is scheduled from 8:30 AM to 5:00

PM each day. The meeting is open to the public at no charge; attendance is limited only by the space available. In order to facilitate planning for this meeting, persons wishing to attend are asked to register by February 20, 2008, via the NICEATM-ICCVAM website. ● http://iccvam.niehs.nih.gov/contact/reg_LLNAPanel.htm

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