CAAT*feed*

CAAT Celebrates 35 Years of Promoting Alternatives to Animal Testing

CAAT, founded in 1981, celebrated 35 years of promoting the 3Rs and humane science this September. For a look at CAAT's first 28 years, please see this article by Founding Director (Emeritus) Alan Goldberg: http://online.liebertpub.com/doi/pdfplus/10.1089/aivt.2015.0015

A photo gallery of important people in our history accompanied the article: http://caat.jhsph.edu/publications/history1981to2009.html

CAAT Researchers Uncover Genetic Variability in Cell Culture Lines

Researchers working at CAAT and Brown University on the Human Toxome Project, a National Institutes of Heath funded project, have published their findings that two batches of MCF-7 cells, purchased at the same time from the same cell bank, responded differently in experiments in Nature's *Scientific Reports*.

The findings were verified independently by identical experiments in each laboratory and were traced back to genetic differences between the two batches already at the time of purchase that were not detected in initial authenticity tests of short tandem repeats but only by comparative genomic hybridization. The differences in the cells related to cell growth, response to estrogen, differences in metabolism and gene activation patterns.

MCF-7 (Michigan Cancer Foundation-7) is a breast cancer cell line isolated in 1970 that has been used in original research published in more than 23,000 scientific articles. The discovery raises uncertainty about the reproducibility of experiments using tumor cell lines. Last year, Italian researchers from different laboratories reported instances of genetic instability in another tumor cell line. Separately, three years ago, an international study using MCF-7 also failed because the cells were inconsistent; however, this was not traced back to the cell source but instead blamed on the university laboratories.

The flawed cells cost the Human Toxome Project several years of work and close to $1 million in research funding from the National Institutes of Health. The results are a call to action for cell banks to rethink quality assurance procedures. CAAT's Thomas Hartung led a team that published recommendations for Good Cell Culture Practice aimed at quality standards for cell banks and researchers in 2005. These eventually led to the founding of the International Good Cell Culture Practice Collaboration, which has representatives from organizations and agencies from around the world and formally launched at EuroScience Open Forum (ESOF) in 2016.

A large number of media outlets covered this story, including *Cell Culture*, *GenomeWeb, Science Daily, Quo, News Medical*, and others.

Reference

Kleensang, A., Vantangoli, M. M., Odwin-DaCosta, S. et al. (2016). Genetic variability in a frozen batch of MCF-7 cells invisible in routine authentication affecting cell function. *Scientific Reports 6*, AN 28994. http://dx.doi.org/10.1038/srep28994

This work was supported by an NIH Transformative Research Grant, "Mapping the Human Toxome by Systems Toxicology" (RO1 ES 020750).

Thomas Hartung Discusses the Lesser Evil of E-Cigarettes in *Scientific American*

Excerpt:
No one disputes the fact that cigarette smoking kills, although many people might not realize just how lethal it really is. The World Health Organization estimates that tobacco kills up to one half of its regular users via cardiovascular disease, lung and other cancers, and respiratory illnesses. About 30 percent of current U.S. cancer deaths result from tobacco use.

Electronic cigarettes, however, are taking over at an astonishing pace. They were introduced in the early 2000s, and according to some experts, sales could exceed those of traditional tobacco products within a few years. In reaction, the U.S. Food and Drug Administration announced in May that it would ban sales to individuals younger than 18; it would also require manufacturers to register their products with the agency and submit ingredients for safety testing. Some countries, such as New Zealand, ban e-cigarettes that contain nicotine entirely.

Policies that restrict e-smoking are reasonable. We don't know yet what kind of health risks it carries, so we don't want people who don't smoke – especially kids – to take it up. And yet we should keep in mind that such vaping is almost certainly safer than conventional smoking: some experts have suggested that e-cigarettes carry only between 3 and 5 percent of the health risks of tobacco smoking. We don't want to ban vaping or make it too hard to do, because if smokers can't quit, they should switch to the less harmful habit.

Read the full article in *Scientific American*: http://www.nature.com/scientificameri can/journal/v315/n2/full/scientificamerican0816-9.html

CAAT Researchers Track Metabolic Pathways to Find Drug Combinations for Pancreatic Cancer

Cancer researchers have long observed the value of treating patients with combinations of anti-cancer drugs that work better than single drug treatments. In a new study using laboratory-grown cells and mice, Johns Hopkins scientists report that a method they used to track metabolic pathways heavily favored by cancer cells provides scientific evidence for combining anti-cancer drugs, including one in a nanoparticle format developed at Johns Hopkins, that specifically target those pathways.

"We have to hit cancer cells from more than one angle, and that's made it important to learn how to combine drugs that hit the right combination of pathways," says Anne Le, M.D., H. D. R., assistant professor of pathology at the Johns Hopkins University School of Medicine and member of the Johns Hopkins Kimmel Cancer Center.

Le says that the study of so-called metabolomics to track biochemical reactions in cancer and other cells should help scientists decide how best to combine drugs. A report of the scientists' work appeared online at http://www.pnas.org/content/113/36/E5328.abstract. CAAT's Thomas Hartung and Lian Zhao contributed to the study. The full press release may be found here: http://www.hopkinsmedicine.org/news/media/releases/johns_hopkins_scientists_track_metabolic_pathways_to_find_drug_combinations_for_pancreatic_cancer

CAAT-Europe Updates

At the Eurotox meeting in Seville, Marcel Leist held the Bo Helmstedt memorial lecture "Assessment of functional impairment and transcriptome changes based on human stem cell derived developmental toxicity tests" on September 6. This keynote lecture is always held by a senior European scientist in recognition of his/her significant toxicology contribution in the field of drugs and chemicals.

Also at EuroTox 2016, Thomas Hartung spoke on "Twenty first century toxicology and safer chemical design". At the European Environmental Mutagenesis and Genomics Society two weeks earlier in Copenhagen, he held the keynote lecture on "The Next Generation of Alternative Methods" as well as one day later in Seoul at the meeting of the Korean Society for Alternatives to Animal Experiments (KSAAE) on "Human Biology-based Toxicology".

CAAT-Europe was a co-organizer of a high-level workshop on September 12-14 between key scientists of the European flagship project EU-ToxRisk and representatives of the US Tox21 program. EU-ToxRisk is a €30 million, six-year program designed to develop animal-free risk assessment methods in the areas of developmental and of repeat-dose organ toxicity.

Thomas Hartung Interviewed on Australian Radio Program "Future Tense" (Full Episode Audio)

In this program (the first of two), the Australian radio show "Future Tense" looks at some of the latest achievements, questions the popular computer metaphor for the brain, and examines whether the research and funding structures that have been developed over recent years are fit for purpose. Thomas Hartung is interviewed.

Link: https://radio.abc.net.au/programitem/pgwd6YZDgV?play=true

CAAT Welcomes New Sponsor: UL (Underwriters Laboratories)

CAAT welcomes our new sponsor UL (Underwriters Laboratories) and an exciting new collaboration. UL is a premier global independent safety science company that has championed progress for 120 years. Its more than 11,000 professionals are guided by the UL mission to promote safe working and living environments for all people. UL uses research and standards to continually advance and meet ever-evolving safety needs. They partner with businesses, manufacturers, trade associations and international regulatory authorities to bring solutions to a more complex global supply chain.

CAAT is pleased to welcome UL as a new sponsor with seats on the US and the European board. UL is collaborating with CAAT on read-across and green toxicology. CAAT's pioneering work with both its steering groups and own research on chemical similarity and machine learning for predictive toxicology will be made practically available for companies by UL.

In Wake of Attacks, German Science Bodies Fend for Animal Research (*Science*)

Excerpt from *Science*:
Thomas Hartung agrees that the public is thirsty for information about this controversial topic. But he deplores that the new website (https://www.tierversuche-verstehen.de/) merely seeks to justify animal research and lacks information about the flaws of existing animal tests – such as reproducibility problems and animal suffering. "The progress in recent years in reducing animal testing and introducing modern approaches (such as computer modeling) came from the acknowledgement of the shortcomings of all scientific tools and pursuing evolutionary change of these tools, not from the defense of the methods of the past," Hartung told *Science*Insider in an email.

Read the full article in *Science*: http://www.sciencemag.org/news/2016/09/wake-attacks-german-science-bodies-fend-animal-research

CAAT Academy 2017 Training Sessions Announced

CAAT Academy has announced its upcoming hands-on training sessions for 2017. Sessions include organs-on-a-chip, *in vitro* skin and eye models, hepatotoxicity testing with IPSC, *in vitro* tools for assessing EDC,

IVIVE, *in silico* read-across, *in vitro* lung models, and best practices for kidney toxicity testing.

Full details and registration may be found at http://www.caat-academy.org

CAAT Graduate Student Receives Award

Xiali Zhong received the Graduate Student Innovation Project of Hunan Province, supported by Hunan Province Education Department of China for "Study of gene-environmental interaction effect and toxicity pathway in ASD-3D mini-brain model" (CX2016B057).

Recent Meetings

New Frontiers in 3D Cell Culture-based Screening Technologies

October 13, 2016
Baltimore, MD

This one-day symposium, organized by InSphero AG, National Center for Advancing Translational Sciences (NCATS), CAAT, and Promega Corp. included sessions on current state-of-the-art 3D model systems for drug discovery and toxicology/safety testing. Keynote and invited speakers represented industry, regulatory, and academic perspectives.

ESTIV 2016: CAAT Pre-Congress Workshop: Good Cell Culture Practices

Monday, October 17, 2016
Juan-les-Prins, France

Part of a Continuing Series of CAAT/ESTIV/IVTIP Workshops

This meeting was chaired by Chantra Eskes and Thomas Hartung.

Alternative Methods and Cell Culture

September 29-30, 2016
Genoa, Italy

The program included lectures covering main relevant topics of the field of cell culture and regulatory use of alternative methods, combined with extensive sessions of practical experiments in the lab. The training sessions were aimed at young scientists as well as senior scientists who wanted to expand their knowledge and skills in this fast evolving field. Costanza Rovida from CAAT-Europe delivered a lecture on the regulatory use of *in vitro* methods.

ASCCT 5th Annual Meeting

September 29-30, 2016
US Environmental Protection Agency
Research Triangle Park, NC, USA

Thomas Hartung gave the plenary talk. CAAT presenters included: Thomas Luechtefeld (PsyChemSim – comparing chemical similarity metrics across diverse health endpoints); Lena Smirnova (Impact of autism-associated CHD8 mutation on iPSC-derived mini-brains); and David Pamies (Good Cell Culture Practice (GCCP 2.0): Developments towards the 21st Century).

Kidney Toxicity Testing and Best Practices

September 22-23, 2016
Vienna, Austria

Hosted by Evercyte in cooperation with CAAT Academy

Alternatives to Animal Testing: Emerging Uses and Policy Implications

September 13, 2016
Washington, DC

Sponsored by the American Chemical Society Science & the Congress Project with Johns Hopkins Bloomberg School of Public Health and Honorary Co-hosts Rep. Ken Calvert (R-CA) and Rep. Earl Blumenauer (D-OR)

Paul Locke was a featured speaker.

Recent Publications

Benfenati, E., Berggren, E., Fritsche, E. et al. (2016). Novel chemical hazard characterisation approaches. *EFSA J 14(S1)*, s0506. http://dx.doi.org/10.2903/j.efsa.2016.s0506

Schmidt, B. Z., Lehmann, M., Gutbier, S. et al. (2016). In vitro acute and developmental neurotoxicity screening: An overview of cellular platforms and high-throughput technical possibilities. *Arch Toxicol*, in press. http://dx.doi.org/10.1007/s00204-016-1805-9.

Tong, Z. B., Hogberg, H., Kuo, D. et al. (2016). Characterization of three human cell line models for high-throughput neuronal cytotoxicity screening. *J Appl Toxicol*, in press. http://dx.doi.org/10.1002/jat.3334

Pistollato, F., Ohayon, E. L., Lam, A. et al. (2016). Alzheimer disease research in the 21st century: Past and current failures, new perspectives and funding priorities. *Oncotarget 7*, 38999-39016. http://dx.doi.org/10.18632/oncotarget.9175

EUSAAT

European Society for Alternatives to Animal Testing

Report on the EUSAAT2016 congress in Linz/Austria on August 24-27, 2016, and 25th Anniversary Congress on Alternatives in Linz

http://eusaat-congress.eu/index.php/congress/2016/program-by-days

Although the EUSAAT 2016 congress had to be held in August, which is holiday time in France and Italy, we were again happy to welcome more than 300 participants like in 2015. This success was due to an attractive program that was drafted by a committed Scientific Committee and the generous support of the sponsors. Since EUSAAT is a small society and since we have always aimed at keeping the conference fee moderate, we are most grateful to our sponsors from the Austrian government and from European animal welfare organizations and industry. We also appreciate that many exhibitors used the EUSAAT 2016 congress as a unique platform to meet scientists engaged in promoting research on the 3Rs.

It has been the concept of EUSAAT congresses to exchange new ideas in the first place by providing a forum for oral presentations and lively discussions. In 2016 we received 263 abstracts and 153 of them were presented as oral presentations in 2 or sometimes 3 parallel sessions and 6 h were reserved for visiting the posters.

Thanks to stimulating presentations all keynote speakers initiated lively discussions: Derek Knight (ECHA, FIN) on "The 3Rs in relation to REACH", Michael Liebman (IPQ Analytics, LCC & Drexel University, USA) on "Real world medicine and real world patients: Something that animal testing can never approximate", Claus-Michael Lehr (DDEL, HIPS & Saarland University, GER) on "Combating infectious diseases, novel approaches and *in vitro* models", and Malte Spielmann (MPI Molecular Genetics & Charite Medical School, GER) on "The CRISPR/Cas9 system: a game changer in the life sciences".

To provide a forum for discussing topics that are either scientifically controversial or important to EUSAAT members, we held 2 round-table discussions: Round-Table I on "Building a career in the 3Rs area: successful biotech SMEs" and Round-Table II on "Implementing the concept of "Integrated Approaches to Testing and Assessment (IATA)" into international regulatory testing". The audience and the participants appreciated the round-table discussions and the EUSAAT Board will therefore keep round-table discussions in the program.

To meet the challenges of implementing EU Dir. 2010/63 EUSAAT congresses give ethical and legal aspects of the 3Rs a high priority. Due to the topics favored by the abstracts submitted in 2016 we were able to hold sessions on several hot topics. Disease models "*in vitro* and *in vivo*" was the most attractive topic in 2016 making up 4 sessions. In addition, new 3D-culture techniques including multi-organ-chips have become increasingly important. For the first time we have held a session on bioprinting, which received the highest attention from the audience.

We are happy that several sponsors chose to fund the 2016 YSTA program and we were able to invite 33 young scientists from Europe, Egypt, Japan and the US via the YSTA to the EUSAAT 2016 congress. Two YSTA sessions were held with 13 oral presentations, 13 of the YSTA awardees gave oral presentations in regular sessions and 7 presented posters. It was a great pleasure to attend the oral presentations of the YSTA awardees, since all of them were well prepared and scientifically excellent. We are indebted to Lucia Lee (Hangzhou, CN) and Mardas Daneshian (Konstanz, DE) for their careful evaluation of the YSTA applications and for drafting the program of the YSTA sessions and chairing them. Finally, due to the success of the EUSAAT YSTA program, in 2016 other societies have established YSTA programs, e.g. our Japanese colleagues for participating in the Asian Congress 2016 on Alternatives and Animal Use in the Life Sciences 2016 in Fukuoka, Japan, and the Asian Young Researcher Awards 2016 in Seoul, Korea.

The Practical Training Course focusing on the "Application of commercially available human tissue models" was held as 2-day "satellite" course to the EUSAAT 2016 congress with lectures on the first day and "hands-on-training" on the second. Participant number was limited to 24. The PTC was free of charge and sponsored by EUSAAT and participating companies. We are indebted to all speakers and instructors, who volunteered to share their knowledge with young scientists in the PTC, and also to the companies, who provided funding to this unique and important activity of the EUSAAT society.

Kathy Ryder and Anne Dominique Degryse from the FELASA/ESLAV/ECLAM working group examined the process and challenges of achieving consensus on how animal welfare may be affected, how to minimize welfare impact and how to classify severity according to the Directive 2010/63 (prospectively and retrospectively) in the Seminar on Classification and Reporting of Severity. Using models developed within the EU guidance document and the FELASA/ECLAM/ESLAV Working

Group on severity, participants identified the components within the procedures that may cause pain, suffering, distress or lasting harm, defined the adverse effects associated with these, identified actions to mitigate the adverse effects, identified appropriate end points and finally assigned a prospective severity classification. Each group then defined what clinical welfare assessment criteria should be used and examples of actual severity assessment were discussed. This workshop was held three times (on different days) to allow active participation by all interested.

Since the World Congress on Alternatives and Animal Use in the Life Sciences (WC10) will be held in August 2017 in Seattle, no EUSAAT congress is scheduled in 2017. The next EUSAAT congress will be held September 23-26, 2018 at the JKU in Linz.

Collaboration between EUSAAT and ASCCT, the American Society for Cellular and Computational Toxicology

The board of EUSAAT and the board of ASCCT, the American Society for Cellular and Computational Toxicology, have agreed to sign a memorandum to strengthen the two societies' friendship, capabilities and interactions. The boards agreed to mutually exchange information relevant to their scientific and educational activities. This mutual information exchange will be made by but not necessarily limited to the following means:

1. Encouraging experts in our fields of joint interest, e.g., alternatives to animal experimentation (3Rs), to exchange visits in order to share their expertise.
2. The mutual arrangement, whenever possible, of academic meetings, symposium and workshops in this field.
3. The mutual exchange of educational tools concerning the 3Rs.
4. Any other activities to strengthen our two societies' friendship and advance their respective missions.

This agreement will set the stage for continued and sustained engagement between our two societies.

The Agreement on mutual information exchange between EUSAAT and ASCCT was signed at the conference dinner of the EUSAAT 2016 congress on August 29, 2016 in Linz by Ellen Fritsche, President of EUSAAT, and Erin Hill, Treasurer of ASCCT, on behalf of the two societies.

Horst Spielmann
EUSAAT Secretary General

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

UNITED STATES
ICCVAM
Advancing Alternatives to Animal Testing

Advisory Committee Discusses Roadmap for Replacing Six Acute Toxicity Tests

The Scientific Advisory Committee for Alternative Toxicological Methods, which advises NICEATM and ICCVAM, met at the National Institute of Environmental Health Sciences (NIEHS) in Research Triangle Park, NC, on September 27. ICCVAM agencies outlined a roadmap for the replacement of animals for the six most commonly used acute toxicity tests: ocular and dermal irritation; dermal sensitization; and acute oral, dermal, and inhalation toxicity. In addition, the advisory committee's input was requested on developing a strategy to implement human-based predictive approaches for complex toxicological endpoints such as developmental toxicity and carcinogenicity. Materials from the meeting are available at http://ntp.niehs.nih.gov/go/8202.

NICEATM Director Participates in Briefing to U.S. Congress

NICEATM Director Warren Casey, Ph.D., was a panelist for a September 13 briefing on "Alternatives to Animal Testing: Emerging Uses and Policy Implications" to the U.S. Congress. Casey and other panelists discussed how to use non-animal and a lternative testing methods to better protect public health while using fewer animals. Topics included how to spark research that advances the development and application of alternatives, as well as how to ensure regulatory frameworks can adapt while realizing the fastest possible innovation. The briefing was organized by the American Chemical Society and the Johns Hopkins Bloomberg School for Public Health, and sponsored by the offices of Representatives Earl Blumenauer (D-OR) and Ken Calvert (R-CA).

ICCVAM 2014-2015 Biennial Progress Report Now Available

The ICCVAM 2014-2015 Biennial Progress Report is now available on the National Toxicology Program website at http://ntp.niehs.nih.gov/iccvamreport/2015/index.html. This report, prepared in accordance with requirements of the ICCVAM Authorization Act of 2000 (42 U.S.C. 285l-3), describes ICCVAM and ICCVAM agency activities from January 2014 through December 2015.

Key ICCVAM, ICCVAM agency, and NICEATM accomplishments summarized in the report include:

- A computational approach developed by ICCVAM that integrates several types of data to predict human skin sensitization hazard without using animals
- A U.S. Environmental Protection Agency (EPA) plan to adopt high throughput assays and computational models for detecting and measuring estrogen receptor bioactivity as an alternative for three Tier 1 tests, including the uterotrophic assay, currently used in the Endocrine Disruptor Screening Program to assess estrogen receptor activity
- Establishment of the ICCVAM Communities of Practice webinar series
- A NICEATM evaluation of acute oral and dermal toxicity data to determine if oral toxicity tests are sufficient to assign EPA dermal hazard classifications, eliminating the need for separate acute dermal toxicity tests
- A series of workshops supported by NICEATM and ICCVAM agencies that drafted recommendations on use of an *in vitro* test with potential to replace animal use for pertussis vaccine testing

Links to this report and all past ICCVAM annual and biennial reports at are available at http://ntp.niehs.nih.gov/go/iccvam-bien.

TSCA Reform Bill Becomes Law, Promotes Use of Alternatives

On June 22, U.S. President Barack Obama signed into law an update of the Toxic Substances Control Act (TSCA). The Frank R. Lautenberg Chemical Safety for the 21st Century Act (H.R. 2576) provides EPA with the authority and a consistent funding source to evaluate the health risks of chemicals. The new law also includes language that requires EPA to develop a plan to promote the use of alternative methods that reduce, refine, or replace vertebrate animal testing and include in that plan a list of acceptable alternative methods.

The highlights of the Lautenberg Chemical Safety Act were outlined in a blog post by EPA Administrator Gina McCarthy, available at http://bit.ly/28MEitC. A news release from the Physicians Committee for Responsible Medicine summarizes aspects of the bill relevant to alternative methods development: http://bit.ly/2dxnVb2. The final text of the bill is available at http://bit.ly/2dzRuFv.

NICEATM and PISC Convene Meeting on Inhalation Alternatives

NICEATM and the PETA International Science Consortium (PISC) organized an expert meeting on "Alternative Approaches for Acute Inhalation Toxicity Testing to Address Global Regulatory and Non-regulatory Data Requirements". Participants in the meeting, held September 22-23, 2016, in Bethesda, MD, identified four key activities needed to reduce and replace animal use for required inhalation toxicity testing:

- Establishing a database of existing toxicity data
- Preparing a state-of-the-science review on how chemicals cause inhalation toxicity and identify the non-animal methods that are available to identify such hazards
- Developing computer models to help identify testing needs
- Designing a proof-of-concept study for a non-animal testing approach

Meeting participants are currently being organized into working groups that will address each of these goals. A follow-up meeting is planned for late 2017 or early 2018 to assess progress.

Attendees at the expert meeting included representatives from U.S. regulatory agencies and academia, companies that develop non-animal tests and chemical companies that might ultimately use these tests to address regulatory requirements.

The expert meeting followed a series of webinars presented by NICEATM and PISC that provided background and context for the in-person meeting. Information about the webinars is available at http://bit.ly/2djlSBT.

Funding Opportunities for Alternative Methods Development

NICEATM encourages U.S. small businesses involved in alternative methods development to apply for NIEHS Small Business Innovation Research Phase IIB Awards for Validation and Commercialization of Approaches to Reduce Animal Use in Toxicology Testing. These awards are intended to support the validation of promising methods that replace or reduce animal use in toxicity testing/screening and can be used to address current U.S. federal agency testing requirements. See the NICEATM website at http://bit.ly/2dxnKML for more information about this and other funding opportunities for alternative methods development.

EPA Training Videos on Data Requirements for Antimicrobials

EPA has produced training videos providing guidance on EPA's 40 CFR Part 158W data requirements for antimicrobial pesticides. These videos will help the public and the pesticide industry better understand the pesticide registration process and make the process more efficient and transparent. The videos include the 2013 amendments to the data requirements that were made to ensure pesticide risk management decisions are founded on the best available sound science. The videos are available at http://bit.ly/2dDrpVm.

Recent NICEATM Publications and Impact

The NIEHS *Environmental Factor* newsletter recently recognized two NICEATM papers as NIEHS Intramural Papers of the Month.

- The September *Factor* recognized the report on the Collaborative Workshop on Aquatic Models and 21st Century Toxicology. The workshop, organized by NICEATM and North Carolina State University, reviewed emerging issues and developed recommendations for enhancing the use of small fish species in toxicology studies. A summary of the report is available at http://bit.ly/2dznSYy. The workshop report is published in this issue of ALTEX and is available at http://dx.doi.org/10.14573/altex. 1601281.
- NICEATM and ICCVAM scientists developed an integrated decision strategy that uses the results of non-animal tests and other inputs to predict the results of animal tests to identify potential skin sensitizers. The paper describing the integrated decision strategy is summarized in the October *Factor* at http://bit.ly/2dDs5db. The paper was published *in in J Appl Toxicol* and is available via PubMed at http://dx.doi.org/10.1002/jat.3281.

An August 2015 NIEHS workshop evaluated the scientific support for the Low-Dose Mixture Hypothesis of Carcinogenesis and developed a research agenda. A report from this workshop is now available on the *Environ Health Perspect* website at http://ehp.niehs.nih.gov/ehp411/. NICEATM Deputy Director Nicole Kleinstreuer, Ph.D., was a breakout group moderator and co-authored the report.

IIVS
Institute for In Vitro Sciences
Advancing Science & Animal Welfare Together

Register for the 2017 Practical Methods for *In Vitro* Toxicology Workshop

Register now for this annual multi-day workshop (http://conta.cc/2duxzbG) that combines expert lectures and hands-on laboratory experience with new and novel *in vitro* assays. Whether you are new to *in vitro* testing or you have strategically integrated non-animal methods into your testing programs, this workshop will provide the scientific information and expertise you need. Save with early bird rates through November 30, 2016.

IIVS Webinar on GLPs in *In Vitro* Toxicology

View our one-hour webinar presented by IIVS Director of Quality & Compliance, Amanda Ulrey, RQAP-GLP: "How GLPs Enhance the Quality of Both Regulated and Non-Regulated *In Vitro* Toxicology". The webinar introduces concepts of Good Laboratory Practices (GLPs) designed to promote study and data integrity within an *in vitro* toxicology framework. Visit www.iivs.org to access the recording.

New Training Video on Replacing Animals in Testing

IIVS has produced a technical training video on non-animal methods to help scientists from industry and regulatory agencies perform the techniques in their own laboratories. The video explores a cell-based method for assessing phototoxicity – or the potential for chemicals to cause damage after being exposed to light. The method is used widely around the world by many industries, including the cosmetics and pharmaceutical sectors. The video is available in English with subtitled versions in Chinese and Portugese.

The video is supported by a grant from the European Partnership for Alternative Approaches to Animal Testing (EPAA). Watch the video at: http://bit.ly/2efObq4

Workshop Report from IIVS Respiratory Toxicology Workshop Now Available

View the Workshop Report from the April 2016 IIVS Workshop, "*In Vitro* Exposure Systems and Dosimetry Assessment Tools for Inhaled Tobacco Products" at http://bit.ly/2ex4qPD. The 2.5-day workshop, held April 4-6 in Bethesda, MD, brought together stakeholders from industry, government and academia to discuss considerations for exposure and dosimetry for non-animal testing. Uniquely focused on *in vitro* testing, the workshop is the only known event of its kind.

Keep Current with the Latest IIVS News and Information

Visit the IIVS website at http://www.iivs.org. Questions? Contact us at info@iivs.org.