Toxicity Testing in the 21st Century: A Vision and Strategy

Committee on Toxicity Testing and Assessment of Environmental Agents

Board on Environmental Studies and Toxicology

Institute for Laboratory Animal Research

Division on Earth and Life Studies

National Research Council
- Develop efficient, high throughput testing strategies to assess the potential health risks of large numbers of environmental agents to which people may be exposed.

- Exploit scientific advances in biology and toxicology to achieve risk assessments that are more relevant to human populations.
Components of the Vision

- Computational Toxicology
- In vitro tests
Endorsement by the Scientific Community

Reaction from the Legal Community

Toxicity Testing in the 21st Century: Better Results, Less Use of Animals

Legal Obstacles Are Bumps, Not Roadblocks

Bret C. Cohen
Senior Associate
Willkie Farr & Gallagher LLP

“Agency rulemaking provides the legal flexibility to implement a new toxicity testing program using existing laws.”
Reaction from the Animal Law Community

International Symposia on Challenges and Opportunities in Implementation

June 21-23, 2010

“There is widespread support for the NAS vision. There are also real but surmountable challenges in moving the vision into routine regulatory practice. Progress is being made in producing the necessary science and knowledge base — we need to redouble our efforts to see that these insights carry over into the worlds of law and policy.”

Paul Locke, Johns Hopkins University Centre for Alternatives to Animal Testing
Reaction from Experts in Risk Assessment

Perspective

Toxicity Testing in the 21st Century: Implications for Human Health Risk Assessment

Daniel Krewski,1* Melvin E. Andersen,2 Ellen Mantus,3 and Lauren Zeise4

“Suresh Moolgavkar, our Area Editor for Health Risk Assessment, asked six experts with different perspectives to comment on the paper. Each praises the vision and offers suggestions for making it more useful.”

Michael Greenberg & Karen Lowrie, Editors
MEMORANDUM OF UNDERSTANDING

ON
High Throughput Screening, Toxity Pathway Profiling,
and Biological Interpretation of Findings

BETWEEN THE
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES (HHS)
NATIONAL INSTITUTES OF HEALTH (NIH)
National Institutes of Environmental Health Sciences (NEIHS)/
National Toxicology Program (NTP)

AND THE
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES (HHS)
NATIONAL INSTITUTES OF HEALTH (NIH)
National Human Genome Research Institute (NHGRI)
NIH Chemical Genomics Center (NCGC)

AND THE
U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)
Office of Research and Development

http://www.epa.gov/osa/spc/toxicitytesting/docs/toxtest_strategy_032309.pdf
"This strategic plan describes an ambitious and substantive change in the process by which chemicals are evaluated for toxicity. The NRC (2007) suggested that such a transformation would require up to $100 million per year in funding over a 10 - 20 year period to have a reasonable chance of reaching its goals."

U.S. EPA, 2009
Dual Motivation for Change

Better Science

Animal Welfare
Expert Panel on the Integrated Testing of Pesticides

“Integrated testing, using in vitro data from diverse fields of study, represents an exciting means by which we can refine and reduce in vivo toxicity testing requirements. By this approach, it may be possible to avoid the need for full batteries of animal-based toxicity tests for each pesticide under assessment, while still maintaining defensibility of the assessments.”

http://www.scienceadvice.ca/pesticides.html
“This convergence of factors, coupled with the need to evaluate the safety of an increasingly large number of chemicals and their mixtures, has prompted some of the world’s leading scientific authorities to call for a fundamental paradigm shift in toxicology . . . .”

Making the Vision a Reality

- National/international coordination of development of the scientific foundation on which the NRC vision rests
- Consideration of the implications of the vision for application of current and future regulatory statutes
- Re-orientation of risk assessment practice to focus on prevention of perturbation of toxicity pathways
- Ongoing oversight by the NRC, with progress reports and mid-course corrections over the next 5 - 10 years