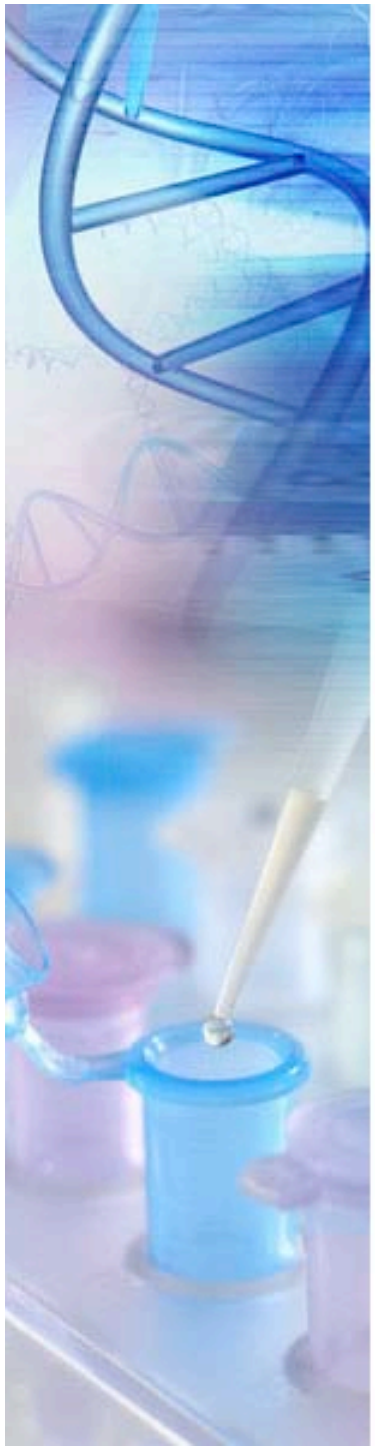
Replacing Animal Tests – Do Other Continents do it Better?

Emily McIvor
EU Director
Humane Society International

Emily McIvor, ECOPA Workshop 29/11/2008



About the Humane Society

Celebrating Animals, Confronting Cruelty

- Among the largest animal protection organisations in the world
  - **10+ million supporters**
- Vision regarding animal experiments
  - **To see the day when no animal is used in harmful testing or research**
- Spheres of activity
  - **Public and corporate policy and education**
- Approach
  - **Long history of building lasting partnerships for progress**
  - **First extend carrot – then the stick**
  - **Reject violence and harassment as tactics**
- Affiliations
  - **The HSI is a member of Eurogroup for Animals**

THE HUMANE SOCIETY OF THE UNITED STATES

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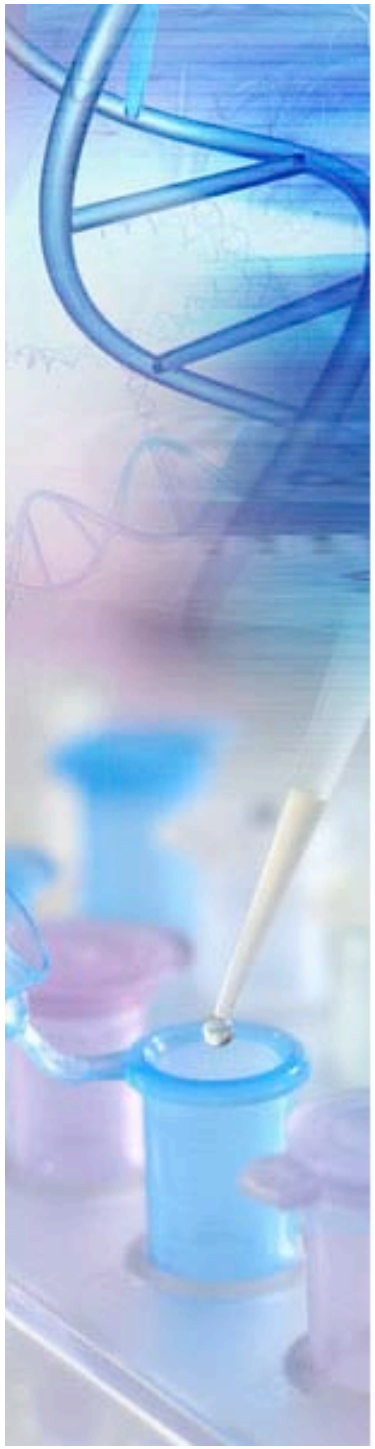

HIS-EU

Celebrating Animals, Confronting Cruelty

- **Member of Eurogroup for Animals**
- Spheres of activity:
  - **REACH: monitoring implementaion**
  - **Test Methods Regulation**
  - **Classification and Labelling**
  - **Plant Protection Products**
  - **Contacts in the Parliament, continuity for REACH political input**
  - **Revision of Directive 86/609**
- The Team:
  - **Troy Seidle, Senior Scientific Advisor HSI-EU**
  - **Emily McIvor, EU Director**
  - **Links to: Sara Amundson (HSLF) Martin Stephens (HSUS) Andrew Rowan (HSI and HSUS)**

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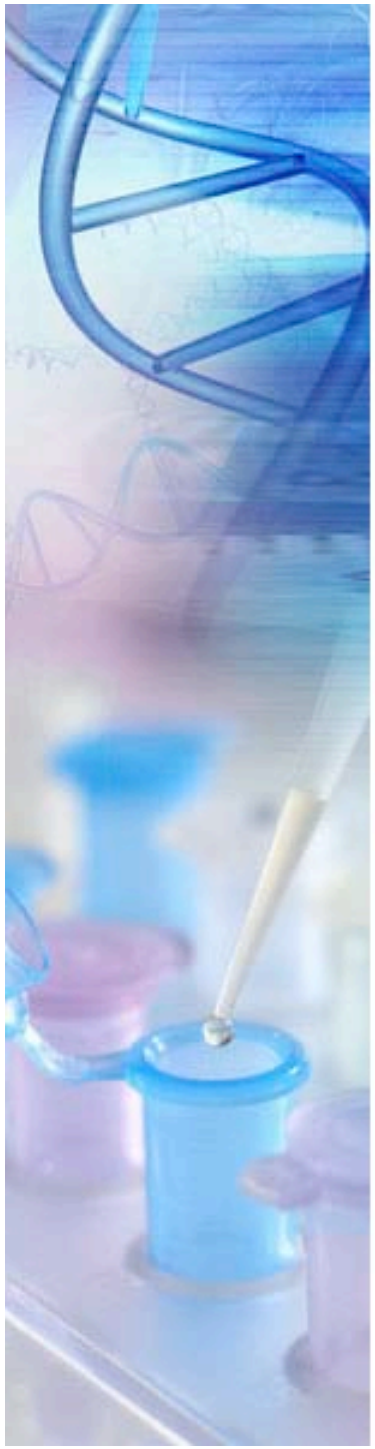


Emerging Global Challenges

Chemicals

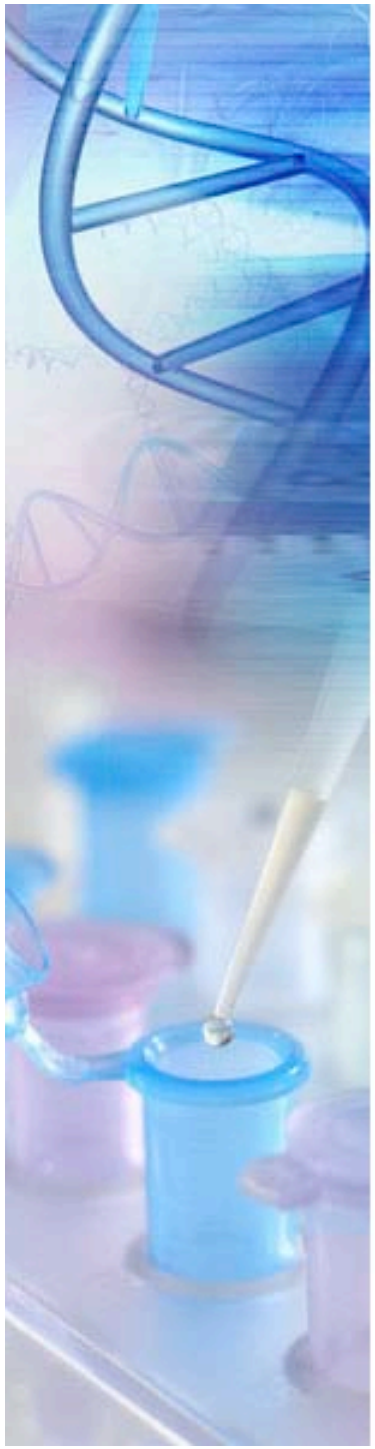
- REACH impact assessments forecast testing costs up to €2.3 billion and the use of up to 45 million animals (EC, 2003)
  - **Up to 6X more *in vivo* testing per HPV chemical than prescribed under OECD SIDS battery**

Pharmaceuticals

- Current costs of bringing a new medicine to market can range from $0.8 to $1.7 billion, consuming up to 7,000 animals (FDA, 2004)
  - **92% of drugs that pass preclinical testing fail clinical trials**

Nanomaterials

- Already in consumer products/environment, yet validated risk assessment methods are not currently available (SCENIHR, 2006)
  - **Scientists around the globe have questioned the applicability of conventional animal tests and called for expedited development of *in vitro* methods for nanotoxicology**



Change is Clearly Needed

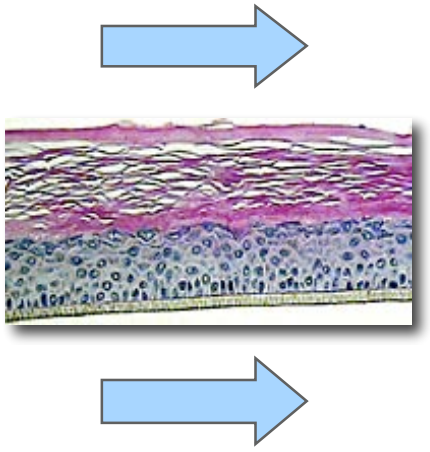
"It is simply not possible with all the animals in the world to go through new chemicals in the blind way that we have at the present time and reach credible conclusions about the hazards to human health. We are at an impasse. It is one with deep scientific roots and we had better do something about it."

–Dr Joshua Lederberg
Nobel Laureate in Medicine
(Chemical Engineering News, 1980)

3Rs Progress to Date

Incremental, Time-Consuming, Expensive

Research & Development	Pre-validation	Valid-ation	Peer review	Regulatory acceptance (regional)	Regulatory acceptance (international)
? yrs	~2 yrs	~1 yr	~1 yr	~2 yrs	3+ yrs



Is replacing animal tests one endpoint at a time a viable long-term strategy

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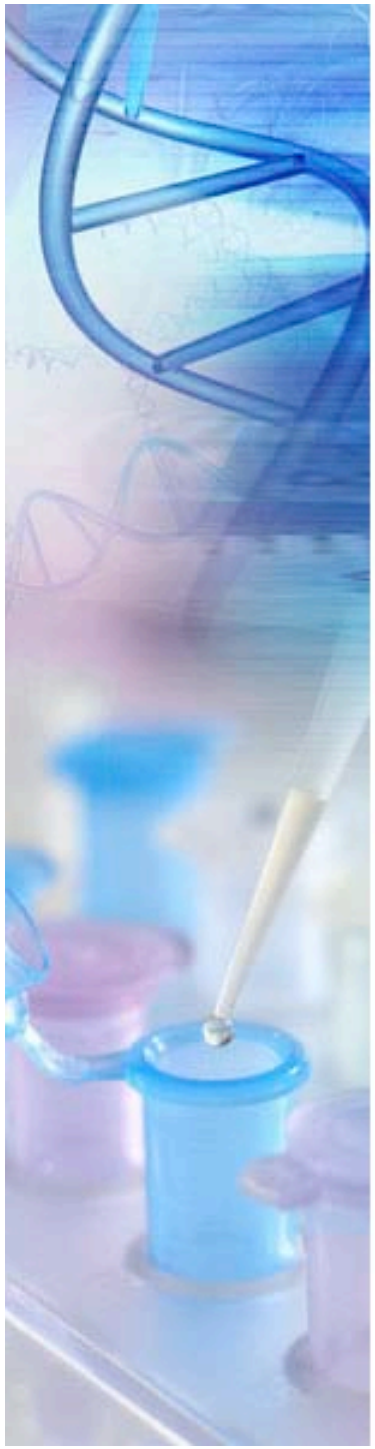


The ‘New Paradigm’: Strategic Steps or Fantasy? EU and US Activity

- Growing agreement that new technologies may be harnessed (and are needed) to bring about a major transformation in the way we assess chemicals – without using animals.

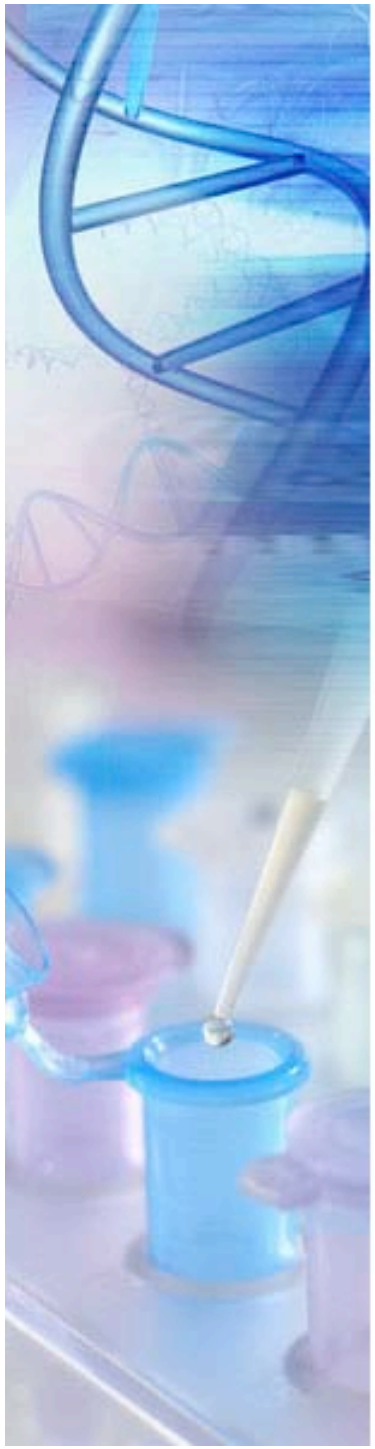
- Europe: EPAA Workshop ‘New Perspectives in Safety Testing’ 28/29 April 2008

  Question posed:

  ‘Against the current landscape of expertise in biology and chemistry, and drawing upon recent developments in technology, what opportunities now exist to design alternative approaches to toxicity testing – the goals being to improve our ability to characterise the potential of chemicals and drugs to cause adverse health effects while providing animal welfare benefits’.

- Workshop report:

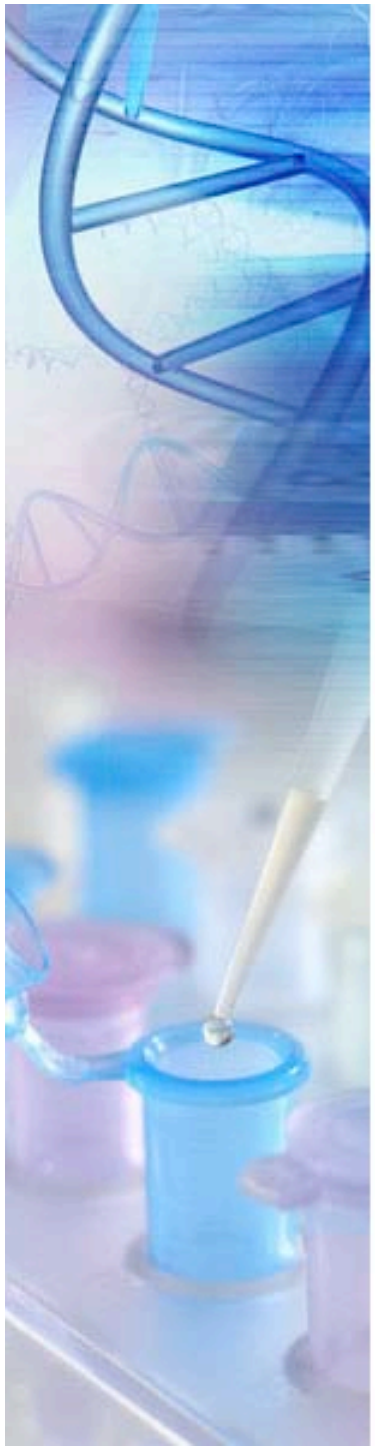
  ‘[animal models] allow an integrated evaluation of the potential to cause adverse effects relevant to humans, but do not provide the possibility of understanding fully how all the biological processes function individually and in concert.’



The ‘New Paradigm’: Strategic Steps or Fantasy? EU and US Activity

US National Research Council (2007):

- Recognises the low predictive value of animal tests
- Calls for a systems biology approach in toxicology, based on an understanding of toxicity pathways at cellular & genomic levels
- Recommends use of automated high throughput *in vitro* assays
- Stresses the need for more relevant data by using human-source material
- Calls for a centrally coordinated, multilateral research effort to implement the vision
- Foresees (tentatively) a future without animal testing



The NRC ‘vision’

- **WASHINGTON -- Recent advances in systems biology, testing in cells and tissues, and related scientific fields offer the potential to fundamentally change the way chemicals are tested . . ..**

- **The report outlines a new approach that would rely less heavily on animal studies and instead focus on in vitro methods that evaluate chemicals' effects on biological processes using cells, cell lines, or cellular components, preferably of human origin. The new approach would generate more-relevant data to evaluate risks people face, expand the number of chemicals that could be scrutinized, and reduce the time, money, and animals involved in testing, said the committee that wrote the report.**

- **Over time, the need for traditional animal testing could be greatly reduced, and possibly even eliminated someday, says the report.**

Current HTS Capabilities at NIH Chemical Genomics Center (NCGC)

Concentrations per chemical	15
Assays	200
No. of compounds per plate	1,408
Total wells per plate (including controls)	1,536
Concentrations x assays x wells	~4.2million wells
… with controls	~4.6 million wells
Costs per well	10¢
Costs per plate	$500,000
Full cost with overhead, etc.	$1,000,000
NCGC current effort	2 million wells per week
Time needed to run 1,408 chemicals (5 million wells)	2.5 weeks

Advantages of a High Throughput Screening (HTS) Paradigm

	2-species cancer bioassay	NCGC HTS platform
Cost	$3-4 million	$3 million
# chemicals	1	4,000
# animals	800+	0
# endpoints	?	~100
Duration	150 weeks	5 weeks

Toward Implementation

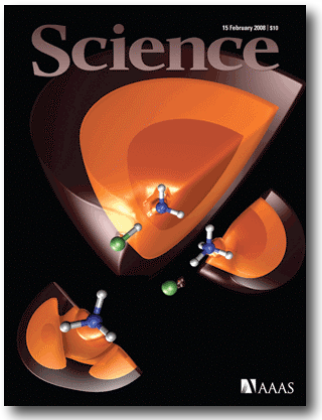
MEMORANDUM OF UNDERSTANDING

ON

High Throughput Screening, Toxicity Pathway Profiling, and Biological Interpretation of Findings

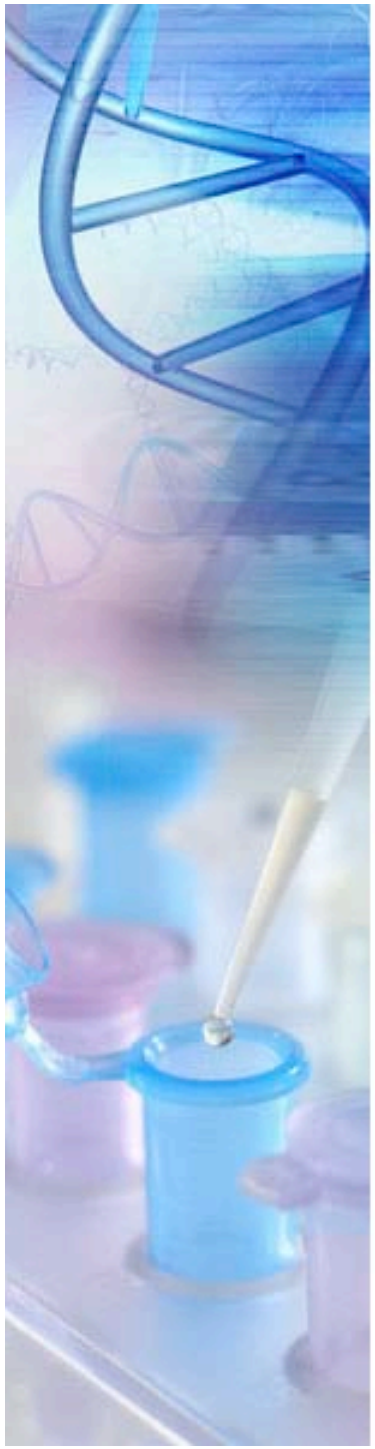
The European Partnership for Alternative Approaches to Animal Testing

EPAA Workshop – *New perspectives on safety*



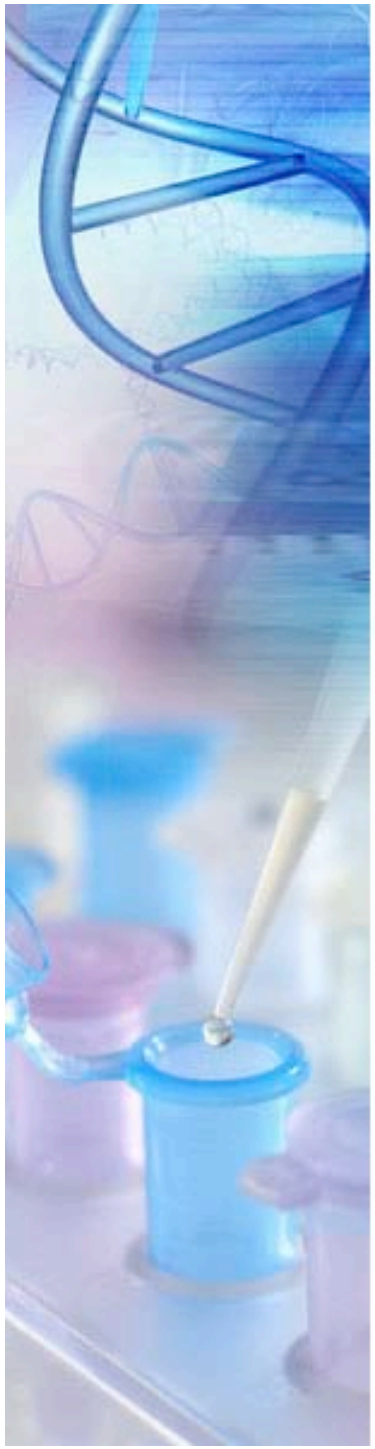
We propose a shift from primarily in vivo animal studies to in vitro assays, in vivo assays with lower organisms, and computational modeling for toxicity assessments.

Francis S. Collins,[1*†] George M. Gray,[2*] John R. Bucher[3*]



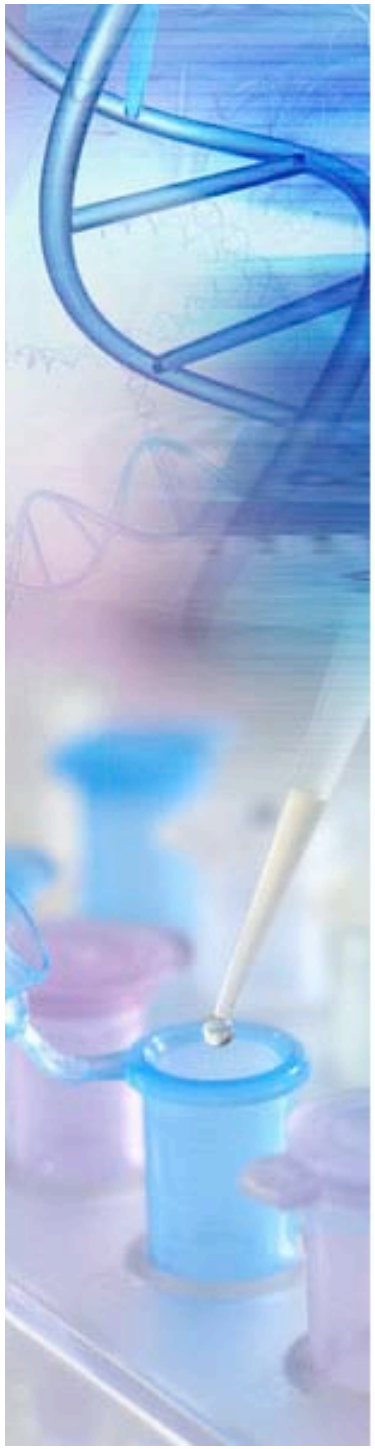
International Progress and Next Steps

- US 2007: ToxCast – priority setting and early screening
- US 2008: EPA/NTP/NCGC: Memorandum of Understanding (MOU): three agencies combine to promote and develop high throughput methods
- ILSI (2006): International panel to discuss how to apply new technologies to risk assessment (with financial support provided by Canada)
- Need for global strategic partnership, and coordination of international efforts: progress should genuinely reflect the input of all players: EU/US/Regulators/Industry/Academia/Animal Welfare Organisations
- Should not supplant efforts to replace endpoint by endpoint, but should compliment other work
- Build on acknowledgement that animal test methods have low predictive value, to help create a radical shift in thinking



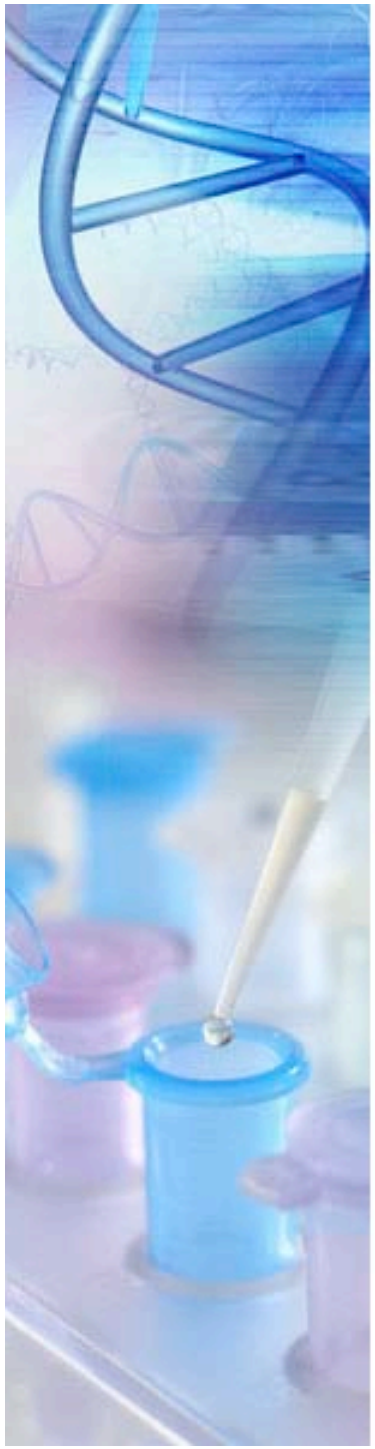
Humane Society Efforts to Date

- US: Member of NRC Committee on Toxicity Testing
- EU: Member of EPAA Mirror Group and contributor to working groups
- Meetings with US agencies prior to MOU/collaboration announcement
- Peer reviewer of US EPA tox testing strategic plan
- Pursuing US Congressional report language
  - **Earmarked federal appropriations to support and expand MOU**
- Exploring international funding opportunities
- EU and US: seeking potential corporate partners
- Outreach at scientific and public policy forums
- Co-founder of **AltTox.org**, an online platform for information exchange among stakeholders interested in non-animal methods of toxicity testing



Human Toxicology Project

- "Big biology" initiative akin to the Human Genome Project
- Target: $200M per year over 10 yrs (total: $2B)
  - **Funds from governments and corporations in G8 countries**
- Goal: a targeted research program that is:
  - **Multi-year**
  - **Multi-disciplinary**
  - **Multi-national**
  - **Overseen by an international, multi-stakeholder consortium**



Animal Testing / Other International Efforts

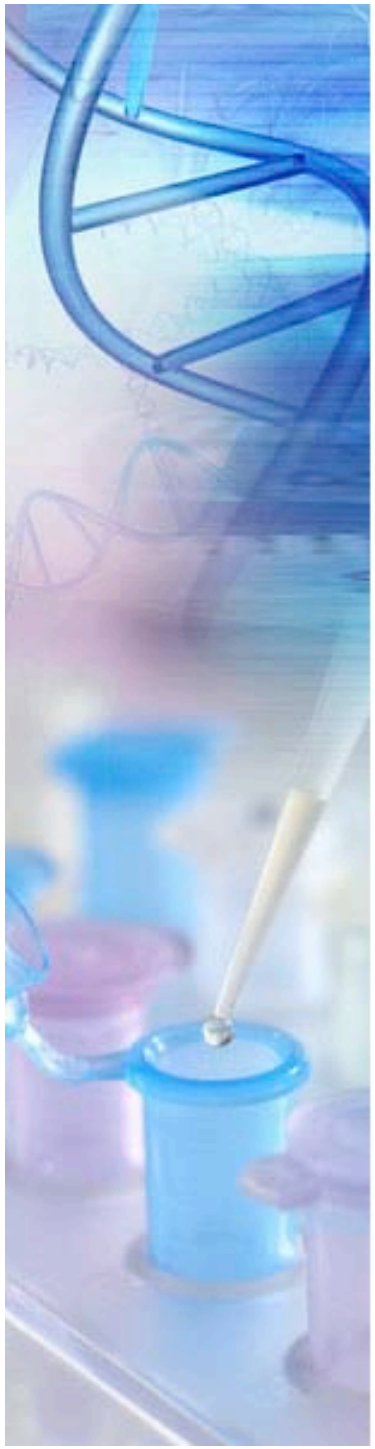
Need for better coordination:

Animal housing and care standards, with targeted efforts to improve (eg single housing)

International acceptance of validated test methods

Greater cooperation at all levels to eradicate duplicate testing and replace animal methods

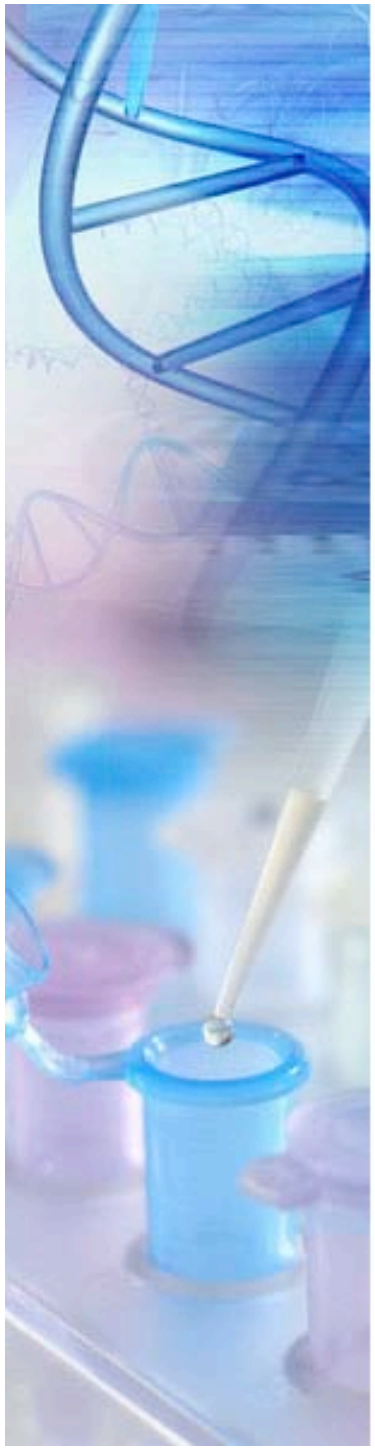
EU companies to promote animal welfare throuhg application of EU standards in third countries



Conclusions International Cooperation is Key!

- The vision is there, but many are still skeptical
  - **e.g. Tox Forum response: "pie in the sky"**
- But Human Genome Project shows how it **can** be done
- Necessary technology is already available, but refinement and improvement will be needed
- **Let us grasp the vision!**

"If you think you probably can,
or think you probably can't,
you are probably correct!"



Thank You!

emcivor@hsi.org

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