The Use of Animal Models in Biomedical Research: Challenges and Opportunities

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NIH supports the use of a variety of animal models in research...
Today’s conversation...

• The use of animal models is **critical** to biomedical research and to NIH’s ability to fulfill its mission.
  – Relation to NIH mission
  – NIH role in funding and oversight
• The use of animal models in research is facing major challenges.
  – Social, legal, and ethical context
• We must work together to meet and overcome these challenges.

Animal models are critical to biomedical research...

• Genes
• Molecular pathways
• Computer modeling
• … inform but cannot replace an understanding of processes in the whole organism.
The reality for biomedical research…

• The use of animal models is critical to the present and future of biomedical research because:
  – Animal models provide whole-organism knowledge that cannot be replicated in any other way at this time.
  – Whether invertebrate or vertebrate, non-mammalian or mammalian, animal models highlight the common evolutionary threads that link organisms and their physiological processes.

• The use of animal models in basic or clinical research is an appropriate precursor to safe and ethically sound research using humans (as described in the Nuremberg Code).

• The best science relies on research to evaluate and continually redefine how best to use animal models in research, including the development of alternative non-animal models.

NIH’s ability to fulfill its mission depends on the use of animal models…

Mission of NIH
“Science in pursuit of fundamental knowledge about the nature and behavior of living systems & the application of that knowledge to extend healthy life & reduce the burdens of illness and disability.”

• In carrying out its mission, NIH…
  • Encourages the use of the most appropriate models for biomedical research, including animal models;
  • Applies scientific knowledge to improve human health;
  • Communicates the knowledge gained;
  • Upholds federal regulations and guidelines.
NIH has a major role in the funding of biomedical research…

NIH supports investigators in every state and throughout the world.

NIH oversees the humane care and use of animals in biomedical research…

• Oversees compliance with PHS Policy on Humane Care and Use of Laboratory Animals

• Institutional Animal Care & Use Committee (IACUC) training

• Supports publication of Guide for the Care and Use of Laboratory Animals
NIH oversees the humane care and use of animals in biomedical research...

Health Research Extension Act

PHS POLICY

require PHS assurance

US Gov’t Principles

REVISED PHS POLICY

require IACUC

NIH Revitalization Act

ICCVAM Authorization Act

1960s 1970s 1980s 1990s 2000s

AWA *

PHS POLICY

REVISED

PHS POLICY

* = AWA amended

1960s 1970s 1980s 1990s 2000s

'66  '70  '76 '79 '85  '90 '93 '00 '02

NIH over sees the humane care and use of animals in biomedical research...

ARENA/OLAW IACUC Guidebook

ILAR Recognition and Alleviation of Pain & Distress in Laboratory Animals

1st SCAW animal welfare conference

1st PRIM&R animal care & use meeting

1st AVMA Panel on Euthanasia

ILAR The Psychological Well-Being of Nonhuman Primates

ILAR Monoclonal Antibody Production

ALM Adequate Veterinary Care in Research, Testing & Teaching

ARENA/OLAW IACUC Guidebook (revised)

ILAR Guidelines for the Care & Use of Mammals in Neuroscience & Behavioral Research

1960s 1970s 1980s 1990s 2000s

'63 '65 '68 '72 '78 '82 '86 '92  '93 '96 '98 '99 '00 '02 '03

ILAR Guide for the Care & Use of Animals

* = new edition

Incorporation of AAALAC
Use of animal models in biomedical research is facing major challenges...

- Immediate challenges
  - Terrorism – threats and violence against investigators and institutions

- Long term challenges
  - Push to change to the legal status of animals
  - Social and cultural changes to the roles of animals in daily life

Immediate challenge: violence and threats to investigators...

The Animal Zealotry That Destroyed Our Lab

By Mark S. Blumberg
Washington Post
Sunday, July 17, 2005; B03

IOWA CITY, Iowa - "With this break-in, my department had become the latest poster child of the animal rights movement. After years of escalating attacks on research facilities in the United Kingdom, animal rights and environmental extremists have turned to North America, which is fast becoming a breeding ground for their type of violence. But because the number of individuals affected is still relatively small, most Americans remain unaware of the seriousness of the threats. As my experience shows, even among decision-makers, few are taking it seriously enough."...
Immediate challenge: violence and threats to investigators...

- 61.6%: report no **opportunity** to discuss research with the general public
- 60.2%: **institution neither encourages nor discourages** discussion of research with the general public
- 71.3%: **more discussion w/in the biomedical community** about the use of animals in research is needed.
- 70.7%: “believe that the animal rights movement makes it difficult for a researcher to voice a nuanced opinion on animal research”

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**Animal Activism: Out of Control**

The scientific community has responded to several important science policy issues this year and is getting a little public traction on some, including stem cell research policies and global climate change. We have mostly ignored another, however, and it’s a big one: Scientific progress depends on experiment, and in the life sciences that usually involves the use of live animals. In many countries, animal rights organizations have successfully used extreme tactics to intimidate scientists and their institutions.

Scientists in the United Kingdom have been engaged in this struggle longer than those in the United States, and they appear to have been vigilant enough to secure at least some moderation of the problem. In the United States, however, if you conduct experiments on primate nervous systems, you might have the following experience. Photographs, allegedly of your subjects suffering injuries of some sort, are circulated in your workplace. Crowds would huddle in your yard; your children would be frightened; your landlord would call the police; your neighbors would declare that you commit “atrocity” are distributed to your neighbors. Your colleagues who work on monkey behavior have been called in on numerous occasions, the most often plausible explanation being your good name is that the monkey died, but the Federal Bureau of Investigation (FBI) says the last might well have killed those monkeys. Don Kennedy’s editorial in *Science* Sept. 15, 2006 (313(5789):1541)
Long term challenge: push to change the legal status of animals...

- International legal campaigns to give animals rights
- Guardianship and civil court cases

Hiasl, 26 y/o chimp in Vienna, Austria

AP Photo/Lilli Strauss

Has anyone seen this article on Yahoo’s homepage? It appears my babies life (sic) is not priceless. Judge says they are worth no more than a TV or microwave oven .... Is this sad or what?

I understand, class action suits are being filed against those responsible for the contaminated food, and they will be suing for more than the medical costs involved in the victim pets’ care. They will try to recover the true value of these pets (and their suffering) and their owners pain and suffering. I wish them luck in this endeavor--the outcome may effect change in the laws in the rest of the country.
Long term challenge: push to change the legal status of animals...

- Funding animal-rights oriented law programs

Long term challenge: changes to the roles of animals in daily life...

Social and cultural changes in how people view animals - from ...
- co-laborers
- predators
- protectors
- pests
- raw material
- nourishment

Dog-powered tread mill, circa late-1800s

Long term challenge: changes to the roles of animals in daily life...

... toward limited perceptions and roles:

- Family members
- Icons for natural world
- Faceless food
- Faceless raw material

“Fit-fur-life” dog treadmill, circa 2006

We must work together to meet and overcome these challenges...
We must work together to meet and overcome these challenges...

UCLA Chancellor appointed a Task Force
UCLA is in process of implementing Task Force recommendations

What are other institutions doing?

- 5-years legal and political effort
- coalition-building and outreach
We must work together to meet and overcome these challenges...

Critically important legislation:

• Expanded scope of victims
• Increased criminal penalties
• Recognize activities as domestic terrorism

… changes the rules of the game!

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We must work together to meet and overcome these challenges...

AETA – changes in penalties

<table>
<thead>
<tr>
<th>Offense</th>
<th>Old penalty</th>
<th>New penalty</th>
</tr>
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<tbody>
<tr>
<td>Does not instill fear of serious bodily injury or death and results in no economic damage or bodily injury or results in economic damages not &gt;$10k</td>
<td>Not &gt;6 months imprisonment and/or fine</td>
<td>Not &gt;1 year imprisonment and/or fine</td>
</tr>
<tr>
<td>Results in no bodily injury and results in economic damage between $10k-$100k, or instills fear of serious bodily injury or death</td>
<td>Not &gt;3 years imprisonment and/or fine</td>
<td>Not &gt;5 years imprisonment and/or fine</td>
</tr>
<tr>
<td>Results in economic damage &gt;=$100k or results in serious bodily injury</td>
<td>n/a</td>
<td>Not &gt;10 years imprisonment and/or fine</td>
</tr>
<tr>
<td>Results in serious bodily injury or results in economic damage &gt;$1.0 million</td>
<td>n/a</td>
<td>Not &gt;20 years imprisonment and/or fine</td>
</tr>
<tr>
<td>Results in death of an individual</td>
<td>Imprisonment for life or for any term of yrs</td>
<td>Imprisonment for life or for any term of yrs</td>
</tr>
</tbody>
</table>
We must work together to meet and overcome these challenges...

- What does NIH do (generally speaking)?
  - Encourage research through funding.
  - Participate in national discussions of the role of animal models in research, their care and use, and alternatives.
  - Promote humane practices through education, outreach, and assurances.
  - Bring institutions “into compliance” rather than penalizing.
  - Avoid overregulation and respect the unique needs of the diverse institutions we fund.

- What can NIH not do?
  - NIH cannot lobby.
  - NIH cannot forget that it is a publicly funded organization and therefore must be sensitive to a broad diversity of public viewpoints.

An investigator expresses his/her needs…

“Every year around December, we are being submerged by a nasty and dishonest and gradually worsening campaign against animal research ("no such experiments have nor will ever cure a genetic disease" …).

We have decided not to answer frontally, but to prepare ourselves to questioning of various kinds.

For this we want to assemble documents proving the opposite, demonstrating beyond any doubt the impact of such research in translational medicine (or to paraphrase another idiom, from animal models to the hospital’s bed).

I am sure that … some … NIH body must have gone through this already. My question thus if this material could be shared with us, whether you could send it to us or give us the right contacts.

I thank you in advance for your help and look forward to hearing from you.”

We must work together to meet and overcome these challenges…

• OER “Toolkit”: focused on two communities …
  – Resource for extramural program staff:
    • Consult with investigators to prepare for and reduce the risk of threats/harassment
    • Understand how to respond when contacted by a PI or institution experiencing threats/harassment
  – Resource for extramural researchers & institutions:
    • Understand regulations and responsibilities of researchers & their research “home”
    • Prepare for and reduce risk
    • Respond to threats/harassment
    • Help investigators communicate to lay audiences about their research
We must work together to meet and overcome these challenges...

- Educate the community about regulatory basis of roles & responsibilities:

"What are the roles of the Institutional Official and the IACUC in developing plans to prepare, protect and respond if the institution or its employees become a target of animal activists?"

Acts of vandalism and the threat or use of violence are tactics used by some animal rights extremist groups. Such actions endanger lives, cause millions of dollars in damage and destruction, and jeopardize the entire biomedical research enterprise. These actions are considered domestic terrorism by the FBI and are a source of serious concern for NIH and the grantee community.

The PHS Policy does not address these issues and only one paragraph in the Guide (p. 45) recommends a disaster plan, as part of an overall safety plan, that takes into account both personnel and animals, but gives no further specific guidance.

- Educate the youth about the role of animals in research:

"We often have to make difficult decisions to save the lives of many animals in order to save the lives of many human beings. This is a difficult reality."

The core ethical principles of the National Institutes of Health Animal Care and Use Policy (NIH-ACUP) guide all NIH-supported activities. These principles require that the institution, and its employees, take responsibility for the humane care and use of animals in research, teaching, and testing. The principles establish policies and procedures to ensure that the health and well-being of the animals is maintained, and that the animals are used in accordance with the established guidelines.
We must work together to meet and overcome these challenges...

We need to learn from one another, draw from our strengths, and face this challenge together, as a community.

- Long term vision
- Strong coalitions
- Data
- Communication