Ethics of Animal Research

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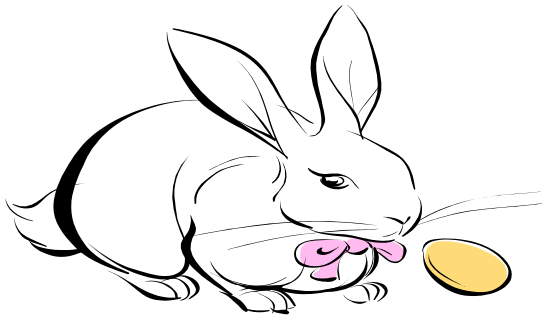
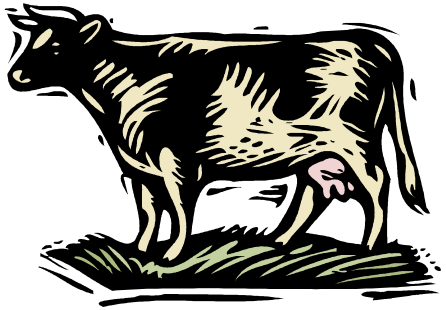
Outline

- Why animals are used in research
- Importance of ethics in animal research
- Principles of ethics in animal studies
- IACUC protocol review
- Conclusion

Animals are used in biomedical research to understand and treat many human and animal diseases.





Should animals be used as research subjects?

Animals should not be used for research - why?

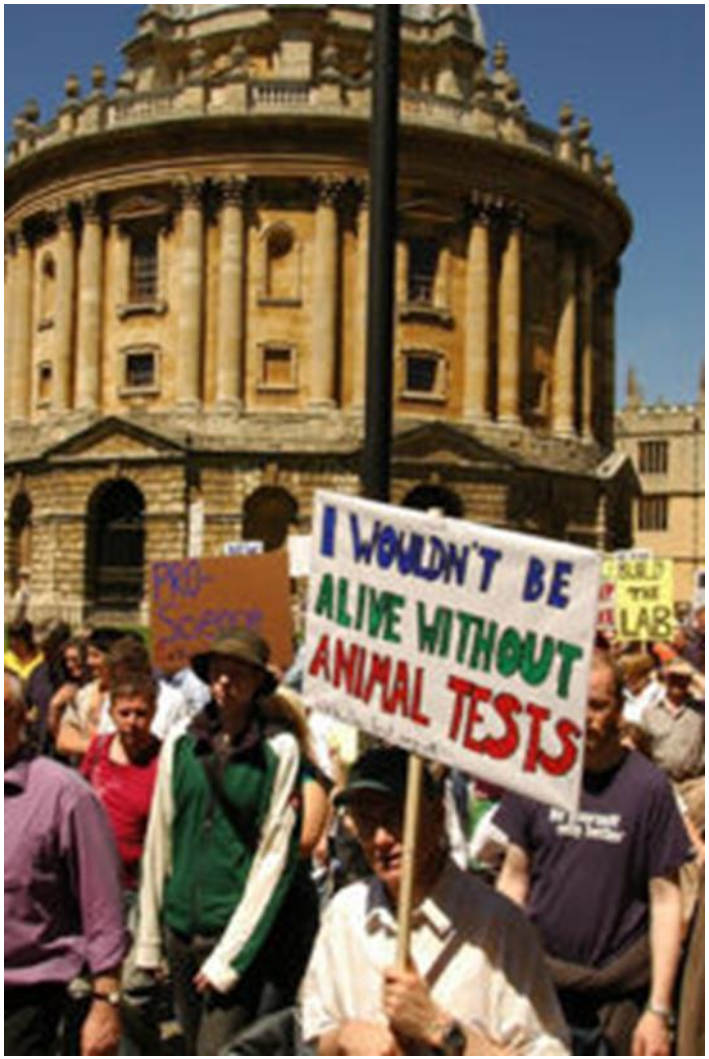
1. Animals have rights!
2. Animals surely deserve to live their lives free from suffering and exploitation.
3. Animals are not ours to:
   - eat
   - wear
   - experiment on
   - use for entertainment
   - abuse

People for the Ethical Treatment of Animals

http://www.peta.org/

Use of animals in scientific and medical research

While controversial, it is an unavoidable fact that animal research has allowed the development of medicines and vaccines, surgical techniques and advanced scientific understanding in many areas.



Why are animals used

- Man and animal body have the same chemical composition i.e. water and dry matter
- Man is vulnerable to many same or similar diseases as animals.

- Humans have 65 infectious diseases in common with dogs, 50 with cattle, 46 with sheep and goats, 42 with pigs, 35 with horses, and 26 with fowls.
- Man has lived with these animals for thousands of years and we are susceptible to some of the same parasites, viruses, and bacteria including zoonotic diseases e.g. rabies.

Can't Computer Models and Cell Cultures Replace Animal Research?

- Models cannot replicate complicated interactions in the whole system.
- Final testing depends on studies in animals; sometimes it is required by law.
- Animal and non-animal models used in conjunction achieve the best answer.

- ***Many questions about molecular, cellular, tissue, and even organ functions can be investigated using test tube, cell culture, and tissue culture models, bioinformatics-driven analysis of data from human cell cultures. But questions on how the digestive system interacts with the cardiovascular system or how the environment affects an organism, can only be answered using animal models.***

- Animals provide index of safety.
  - Nuremberg Code mandates that animal studies precede and support human studies.
  - Declaration of Helsinki mandates that medical research on humans must be supported by preceding animal research.

Do scientists treat them well?

- Instances of abuse have been reported
- Do animals have moral status?

Are these ethical?

Why is Ethics of Animal Research Important?

- Animals can be easily exploited
- Animals feel pain, need to consider what is humane
- Good science & good animal care go hand-in-hand." –FASEB Statement of Principles for the Use of Animals in Research & Education, 1994
  - for good research results; pain or distress can affect physiological functions.
  - Animal research is very expensive, need to take good care of them.

- Laws are in place for care and use of laboratory animals.
- Regulations and regulatory bodies are put in place to ensure that animals used in research and education are treated humanely e.g.
  - Animal Welfare Act
  - Public Health Service
  - IACUCs
  - NHREC?

Institutional Animal Care & Use Committees (IACUCs)

- Required at all research institutions
- Committees to consist of veterinarians, scientists, members of the public.
- Without IACUC approval no research using animals may proceed.
- Among IACUC considerations are the measures used to control potential pain and avoid distress as well as the potential value of the proposed studies.

Principles of Ethics in Animal Research

- Investigators are required to implement the 3Rs when planning animal studies

- The 3Rs: Replacement, Reduction and Refinement (Russel and Burch, 1959)

Principles of Ethics in Animal Research

The 3Rs principle:

Russell and Burch: The Principles of Humane Experimental Techniques 1959

Replacement: Use alternative, non-animal methods to achieve the same scientific aim

- Avoid or replace the use of animals where otherwise animals would have been used
- Absolute replacement : replace animals with inanimate systems eg mathematical and computer models, literature searches, in-vitro systems
- Relative replacement : replacing vertebrates with invertebrates (lower potential for pain)

Reduction: Use statistical methods so that a smaller number of animals are required e.g. 5 in each group

- Maximize information obtained per animal through improved experimental design
- Use statistical approach to determine sample size eg power analysis
- Too few samples may not detect biologically important effect
- Too large sample causes unnecessary waste of animals
- Rule of thumb : smaller animals more, bigger animals few

Refinement: to improve the experiments so that animals do not suffer e.g.

Modification of procedure to minimize pain and distress

- Refinement improves quality of research findings
- Refinement alternatives include anesthesia, analgesic, handling and restraint, housing and care
- Humane endpoint

Other Issues

- Source and stock
- Transportation
- Environment: standard animal facility
- Identification : animals must be properly identified
- Cage card : source of animal, strain, name of investigator, pertinent dates and protocol number

Questions ……

- Does death itself harm the animal??
- What constitutes well being for an animal?
- Who protects the animals?
  - IRB
  - Society for the Protection against Cruelty to Animals
  - Vets Associations
  - Researchers

Guidelines on research involving animals

- International guiding principles for research involving animals : Geneva: CIOMS ; 1985

  Principle 4 – “Investigators and other personnel should never fail to treat animals as sentient and should regard their proper care and use and the avoidance or minimisation of discomfort, distress, or pain as ethical imperatives”.

IACUC protocol review

- Qualifications of the PI/ applicant- does he have the necessary skills?
- Aim & objectives - Are the specific aims, hypotheses and research questions clearly identified?
- Experimental design – Is the experimental design of the project in line with aim and objectives of the proposal?

IACUC protocol review

- Animal number – Is there adequate statistical or technical justification for the number of animals requested?

- Justification – Does the protocol adequately justify the use of live animals?

IACUC protocol review

- Pain, discomfort & distress - Has pain, discomfort and distress to the animal(s) been minimized or avoided to the fullest extent possible?
- What is the end of the trial? -Humane endpoint.
- Benefit vs harm to animals - Is the harm to animal reasonable in relation to potential benefits of the proposal?

What are our obligations in animal research?

- Be aware of regulations and institutional policies
- Follow regulations and international guidelines
- Set up necessary structures (ACUC) and policies
- Follow the 3Rs
- Improve welfare of the animals

Conclusion

- Animal research is important in promoting human health.
- Use of animals in research is a privilege and not a right
- Animal research should have value.
- Institutions involved with animal studies must have functional IACUC
- No IACUC approval, no animal study
- Training on animal care and use should be mandatory for researchers involved in animal studies.
- Good science requires good animal care.
- Standard animal facility and humane endpoint important

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