

The ethics of research involving animals

a guide to the Report

Introduction

Research involving animals has been the subject of intense debate in the UK and elsewhere. Too often this debate is presented in a polarised manner, differentiating only between those ‘for’ or those ‘against’ all research involving animals. This is overly simplistic. There is in fact a continuum of views between these two ends of the spectrum.

The Nuffield Council on Bioethics has published a Report, *The ethics of research involving animals*, which seeks to clarify the debate and aims to help people think

through the scientific and ethical issues that are raised. It also makes practical recommendations for future policy and practice. The Report was produced by a Working Party comprised of academic and industry scientists, philosophers, members of animal protection groups, and a lawyer.

This guide sets out some of the arguments and recommendations that are discussed in more detail in the Report.

[Notes in square brackets throughout refer to chapters and paragraphs in the Report]

Use of the term ‘animal’

Strictly speaking, it would be more appropriate to use the terms ‘human animals’ and ‘non-human animals’ to distinguish between humans and other animals. However, for reasons of brevity, the term ‘animals’ is used to refer to ‘non-human animals’ throughout the Report and in this guide. This use should not be taken to imply differences between humans and animals in their ability to suffer or feel pain to an extent that sets humans apart from all other species. Neither should it be taken to imply differences in moral status.

SCIENTIFIC ISSUES

Background

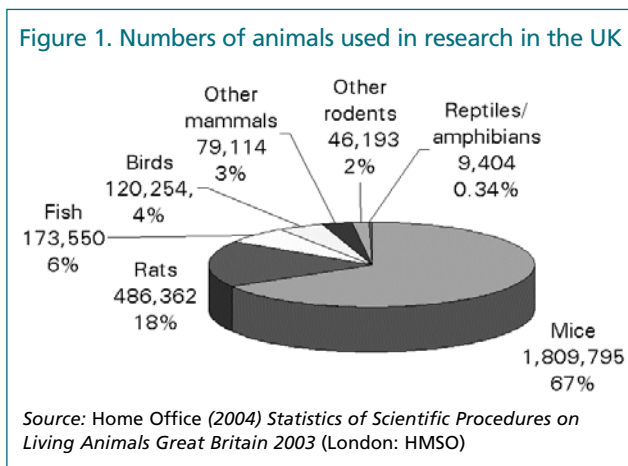
How many animals are used in research?

- Estimates of the total number of animals used annually in research around the world range from between 50 to 100 million.
- In the UK, 2.72 million animals were involved in scientific procedures¹ initiated in 2003, with about a third of these carried out by the pharmaceutical industry, and one third used in basic biological research. The Home Office publishes annual statistics about the numbers of animals used in research in the UK [Chapter 13].

To put this in context, animals are used for many purposes other than research. For example, approximately one billion animals are used for the production of food in the UK per year [Appendix 1].

What species of animals are used?

- Many different species of animals are used in research. In 2003, the majority of procedures used mice and rats (see Figure 1). Other mammals accounted for around 3 percent of the total, including 11,000 pigs, 5000 dogs and 3000 primates (for example, monkeys and marmosets).



Types of research involving animals

There are three main reasons for using animals in research:

- **To advance scientific knowledge**
'Basic research' increases scientific knowledge about the way animals and humans behave, or develop and function biologically. It is not necessarily intended to lead to applications for humans [Chapter 5].

- **To study disease and develop medicines**

Animals are used as models to understand disease processes and to develop new vaccines and medicines. Genetically modified (GM) animals, particularly mice, are used to study the role of genes in disease processes. Both these types of research often draw on findings from basic research [Chapters 6–8].

- **To assess the safety of chemicals**

Animals are used in toxicological studies to help test the safety of a range of substances that could be harmful to animals, humans or the environment. These include household and industrial chemicals, herbicides, fertilisers, and food additives [Chapter 9].

How is research involving animals regulated?

In the UK, research involving animals is regulated by the Animals (Scientific Procedures) Act 1986. The Act requires three types of licences to be obtained from the Home Office before any animal can be used for a procedure that may cause 'pain, suffering, distress or lasting harm': a personal licence for the researcher, a project licence and a certificate of designation for the research facility.

Before a licence is granted, researchers must consider whether the likely benefits of the research (in terms of, for example, knowledge gained) outweigh the costs to the animals used (possible pain, suffering or distress). This process is often called the 'cost-benefit assessment'. A number of people are involved in the decision about whether a licence is granted, but the ultimate decision is made by the Home Office on behalf of the Secretary of State responsible for animal procedures. The Animal Procedures Committee, an independent body, provides advice to the Secretary of State on any matters related to the operation of the Act. Home Office inspectors make visits to research facilities, many of which are unannounced, to ensure that the conditions of the licence are being met [Chapter 13].

Assessing pain, distress and suffering in animals

The impact of research on animals and their welfare depends upon the nature of the experiments. However, many factors other than the experiment itself can have an effect, including conditions during breeding, transport, housing, handling and restraint. Although it is impossible to get 'inside the mind' of an animal, we can make meaningful 'approximations' in assessing pain and suffering that they may experience. Observations of animal behaviour and evaluation of signs of distress, such as increased levels of specific hormones or weight loss,

¹ 'Procedure' is a technical term. It refers not only to experiments, but also to other activities that may cause pain, suffering or distress. For example, the taking of a blood sample counts as a procedure. The breeding of some types of animals may also count as a procedure if there is the potential that offspring suffer throughout their lives, for example, if they are created as disease models.

combined with an awareness of species-specific needs and a critical use of empathy, can lead to useful assessments of animals' well-being [Chapters 4 and 12].

Using GM animals in research may raise particular problems in assessing welfare. The implications of introducing and deleting specific genes cannot usually be predicted and the effects on welfare can be difficult to detect and measure. One report suggested that ten percent of GM animals experienced harmful effects. Another found that 21 percent experienced minor discomfort, 15 percent experienced severe discomfort and 30 percent had an increased risk of death and disease.² Another concern is that most methods of producing GM animals are inefficient, and large numbers of animals are required to produce individual strains [Chapters 4 and 7].

The Three Rs

Before a licence is granted by the Home Office, researchers are required to demonstrate that the 'Three Rs' (Refinement, Reduction and Replacement, see Box 1) have been implemented to reduce animal suffering as far as possible. By law, animal experiments can only be carried out if the desired results cannot be achieved by another method, and a range of replacement methods have been developed in different areas of research. The Report gives examples of all Three Rs, and considers barriers to their implementation and ways in which these could be overcome [Chapters 11–12]. Recommendations relating to the Three Rs are outlined in more detail on page 7.

Box 1: The Three Rs

Based on concepts initially developed by Russell and Burch in 1959,* current definitions of the Three Rs are as follows:

- **Refinement:** Improvement of all aspects of the lifetime experience of animals to reduce suffering and improve welfare.
- **Reduction:** The use of fewer animals in each experiment without compromising scientific output and the quality of biomedical research and testing, and without compromising animal welfare.
- **Replacement:** The use of methods that permit a given scientific purpose to be achieved without conducting experiments or other scientific procedures on living animals.

* See Russell WMS and Burch RL (1959) *The Principles of Humane Experimental Technique* (London: Methuen & Co. Ltd.), available at: http://altweb.jhsph.edu/publications/humane_exp/hettoc.htm. Accessed on: 15 Apr 2005.

Does research involving animals lead to useful and transferable knowledge?

There is disagreement about whether research involving animals is useful for studying human disease and for assessing toxicity of medicines or chemicals. Some say that because of biological differences between humans and animals, results from animal studies cannot reliably be applied to humans. Cases of medical research involving animals where progress has been difficult, such as cancer and HIV/AIDS research, are used to support this view. Other people point to the occurrence of adverse drug reactions (ADRs) as evidence that research involving animals is harmful for humans. Arguments supporting and opposing such views are considered throughout the Report [especially Chapters 4, 6–9 and 10].

Analysis of the scientific literature and the history of medical discovery shows in fact that there is clear evidence that specific types of research involving animals have provided benefits to society. For example, scientists have developed effective preventatives and treatments for diseases such as rheumatoid arthritis, polio and hepatitis C. The results of animal testing have also been used successfully to predict the likely harmful effects of chemicals on human health [Chapters 6–9].

We conclude that because of biological similarities between animals and humans, in principle, animals can be useful models for studying specific aspects of human biology and disease and the likely effects of chemicals and medicines in humans. However, the usefulness of animal models has to be judged on a case by case basis for each type of research or testing [Chapter 10].

We recommend that the Home Office, in liaison with major funders of research, animal protection groups and industry associations, should consider ways of funding and carrying out reviews on the scientific validity of animal research in specific areas. In response to public concerns, priority should be given to research that causes substantial pain and suffering to animals, and research that involves primates [para 15.80].

² Reported in BVA/WF/FRAME/RSPCA/UFAW Joint Working Group on Refinement (2003) Sixth Report: Refinement and reduction in production of genetically modified mice *Lab Anim* 37: 3, Supplement S1–49, available at: <http://www.ingentaconnect.com/content/rsm/lab>. Accessed on: 21 Apr 2005; Thon R, Lassen J, Kornerup Hansen A, Jegstrup IM, Ritskes-Hoitinga M (2002) Welfare evaluation of genetically modified mice – An inventory study of reports to the Danish Animal Experiments Inspectorate *Scand J Lab Anim Sci* 29.

ETHICAL ISSUES

Is it morally acceptable to cause pain, suffering and death to animals?

In Chapter 3 of the Report we consider commonly encountered ethical questions and arguments to try to clarify the debate, identify agreement, and understand what lies behind remaining disagreement on whether research involving animals is morally justified.

The question of defining the moral status of humans and animals often arises in the debate on research involving animals. Are humans morally more important than all animals? Is there a sliding scale with humans at the top and the simplest animals at the bottom? Or are humans and animals morally equal?

We suggest that the proper moral treatment of a being depends on the characteristics it possesses, rather than simply on the species to which it belongs. We identify five morally relevant features [paras 3.20–3.51]:

- Sentience (the capacity to feel pleasure and pain)
- Higher cognitive capacities (for example, the ability to use language and learn complicated tasks, such as making and using tools)
- The capacity to flourish (the ability to satisfy species-specific needs)
- Sociability (being a member of a community)
- Possession of a life (attributing value to life itself)

Ethical decision making

What weight should be given to each of the morally relevant features in considering whether or not research is acceptable? Are they factors to be weighed against human benefit? Should they be understood as absolute constraints? For example, should any use of animals that are capable of suffering be prohibited, or only the use of those that have higher cognitive capacities?

Many people seem to support a 'hybrid' approach. This involves a combination of laying down definite limits for what should and should not happen (for example: 'animals with higher cognitive capacities, such as chimpanzees, should never be used in research') and weighing up the costs and benefits of a particular action (for example: 'research that causes minimum pain to a mouse is acceptable if it helps to ascertain the safety of an important and frequently used chemical'). This approach can also be found in the Animals (Scientific Procedures) Act 1986: the costs and benefits have to be weighed for each project and there are specific policies that prevent the use of the Great Apes and the use of animals in the testing of new cosmetics [Chapters 3 and 13].

The ethical debate comes down to disagreement on two questions:

- What are the definite limits?
- How do we weigh the different morally relevant factors within the permitted limits?

To provide answers, we need to consider at least five further related questions:

- What are the goals of research?
- What is the probability of success?
- Which animals are to be used?
- What effect will there be on the animals used in the experiment?
- Are there any alternatives? [Chapter 14]

Ethical positions

After considering these questions, members of the Working Party agreed that there was no single view to which they could all subscribe, thus reflecting the range of views that exists in society. Instead, we describe four possible ethical positions, which represent points on a continuum:

■ *The 'anything goes' view*

If humans see value in research involving animals, then it requires no further ethical justification (no member of the Working Party took this position).

■ *The 'on balance justification' view*

Research involving animals is morally acceptable if the costs are outweighed by the benefits, but every reasonable step must be taken to reduce the harm to animals.

■ *The 'moral dilemma' view*

Most forms of research involving animals pose moral dilemmas. Animal research is morally unacceptable, but so is avoiding research that could be beneficial to humans or animals.

■ *The 'abolitionist' view*

There is no moral justification for any harmful research on animals that is not to the benefit of the individual animal. Humans experiment on animals not because it is right but because they can.

The Report does not advocate any one viewpoint as 'right'. Rather, the reader is invited to decide which they find to be the most acceptable [Chapter 14].

Reaching consensus

Despite the range of ethical views that exist among members of the Working Party, the Report includes a 'Consensus Statement' that identifies agreement on several important issues. For example, members of the Working Party agreed that, historically, animals have been used in many types of scientific research that have provided benefits to society. They also agreed that a world in which the important benefits of such research could be achieved without causing pain and suffering to animals must be the ultimate goal [paras 15.3–15.20].

All members of the Working Party acknowledge that, as with other areas of ethically contentious issues, such as abortion or euthanasia, any society needs to settle on a single policy for animal research. Steps therefore need to be taken to reduce as far as possible existing disagreement within society, and the Working Party sought to make unambiguous recommendations in specific areas of policy and practice in order to help to achieve this³ [Chapter 15].

³ While it was not possible to attribute to all members of the group the recommendations presented on any one issue, all members do accept that the recommendations are valid contributions to the debate. Several recommendations aim to improve the conditions under which animals are used. All members of the Working Party endorse them, but the endorsement should not be taken to imply the acceptance of animal experimentation by those members who fundamentally oppose it. Some members would like the recommendations to go further in specific areas, but they do accept them as steps in the right direction.

RECOMMENDATIONS FOR POLICY AND PRACTICE

Reducing disagreement

The Report concludes that the concept of the Three Rs and the hybrid moral position underlying the Animals (Scientific Procedures) Act 1986 (some absolute limits, and a case by case weighing of the costs and benefits) could be accepted, or at least tolerated, by all those holding reasonable views. By fine tuning the regulations, relaxing some restrictions and introducing others, more people may be able to endorse the regulations than has been the case so far. Not everyone will be able to fully support this approach, but they may be able to tolerate it as a compromise, while continuing to campaign for changes in policy.

Improving the availability of information

All of those who are involved in the debate need access to relevant information about research involving animals, such as the goals, welfare implications and alternative scientific methods, in order to judge whether specific types of research are justifiable.

Clearer information should be available on how many animals of a particular species experience pain and suffering during experiments, to what degree and for how long. Statistics on research involving animals should be revised to reflect this [paras 15.28–36].

Databases on GM animals should provide detailed descriptions of the implications for welfare for specific strains. Journals publishing this kind of research should require submission of information to the databases as a condition of acceptance of papers [paras 15.71–15.75].

Researchers involved in research on animals must find more ways to open themselves to two-way dialogue in order to improve and sustain public trust [para 15.52].

Relevant funding bodies should fund research on the views of the public on research involving animals to help judge whether or not current or new policies are likely to be supported [para 15.46].

A fair debate

The discussion about appropriate policies on research involving animal must be conducted in a fair and informed manner.

We encourage animal protection groups and organisations representing those involved in research on animals to produce fair and balanced literature on research involving animals [paras 15.39–15.40].

Funding should be provided by the Government under the Science & Innovation Investment Framework 2004–2014 to identify and carry out novel ways of achieving stakeholder engagement and public debate on issues raised by research involving animals [para 15.42].

We conclude that using or threatening to use violence and intimidation to pursue the case against research involving animals is morally wrong [paras 15.47–15.49].

The debate would be enhanced by informing young people about the issues raised by research involving animals, ensuring all sides of the argument are presented.

We recommend that the Department for Education and Skills commissions an academic department of education, which does not have close links to pressure groups or to those involved in research on animals, to produce suitable materials for use across the curriculum [para 15.41].

The importance of the Three Rs

Controversy about animal research is likely to continue. Further discussion of the moral issues alone will not solve the conflicts. But scientific efforts to reduce, refine and replace animal research can help to lessen disagreement. For this reason, the importance of the Three Rs, and especially of the need to find replacements for animals, cannot be overstated. There is a moral imperative to use currently available alternatives and to develop new alternative methods where gaps exist.

A thorough analysis of the scientific barriers to replacements should be undertaken by the Animal Procedures Committee [para 15.62].

Published papers should include more information on how the Three Rs have been applied in the work described [para 15.58].

Research funders should review the case for appointing a professor for the Three Rs [para 15.61].

The Ethical Review Process should play a more active role in promoting the Three Rs [para 15.60].

The Government should consider which 'markers of reduction' can be set, for example, to reduce research that causes substantial suffering [para 15.64–15.67].

Funding bodies should request that researchers submit a short summary to the National Centre for the 3Rs (NC3R) about the way in which the Three Rs were implemented in their research. The description should comment on the obstacles encountered and ways of overcoming them in the future. Funding bodies should support applications for research in areas where implementing the Three Rs poses challenges [para 15.59].

We recommend that relevant international guidelines should be reviewed and revised to contribute to a wider application of the Three Rs in view of current knowledge [para 15.87]

Toxicity testing

Most toxicological testing is carried out to satisfy national and international regulations on the use of new and existing chemicals. Large numbers of animals are often involved and the tests may result in considerable pain and distress for the animals, depending on the type of test being carried out.

We endorse the recommendation of the House of Lords Select Committee Report on Animals in Scientific Procedures (2002) that 'the government and the scientific community should engage more in a systematic and visible search for methods involving the Three Rs in toxicology' [para 15.81].

If various national and international authorities require animal testing to be carried out using different study designs, a single chemical that is marketed in a number of countries might need to be tested several times.

Harmonisation of test guidelines, so that a single study design is acceptable to regulatory authorities in many countries, is a very valuable way of reducing the use of animals in safety testing. We recommend that the UK makes it a priority to identify areas in which harmonisation is difficult [para 15.86].



Summary

- *Animals are used in basic and applied forms of research. In specific cases, they can be useful models for studying aspects of human biology and disease and the likely effects of chemicals and medicines. However, the usefulness of animal models has to be judged on a case by case basis for each type of research or testing.*
- *The Report describes a number of ethical viewpoints on research involving animals and invites the reader to decide which they find to be the most acceptable. Despite the range of views that exist, the Report includes a 'Consensus Statement' that identifies agreement on several important issues.*
- *The Working Party sought to make unambiguous recommendations for policy and practice in order to reduce existing disagreement on research involving animals. In particular, the facilitation of fair and informed debate and the implementation of the Three Rs (Refinement, Reduction and Replacement) are crucial to this process.*

Copies of the Report are available to download from the Council's website:
www.nuffieldbioethics.org

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Published by
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