Chapter 1

Introduction

Introduction

Research involving animals: outline of the controversy

1.1 Humans have a variety of different relationships with animals. They bring pleasure to our lives as companions, and when we observe them in their natural environment, or in zoos and wildlife parks. In some cultures, certain animals are thought to have religious significance and are treated with special reverence. But we also use animals extensively for food, clothing, transport and sports such as racing or hunting.[1] Animals are sometimes culled to maintain stable populations in natural ecosystems, or killed when they come into conflict with humans. For example rats, flies and mosquitoes are generally considered to be pests. These examples show clearly that the relationships between humans and animals differ in terms of the benefits they bring to humans, and their effects on the welfare of the animals. This Report focuses on an examination of the ethical issues raised by the use of animals in one particular area: basic and applied scientific and medical research.[2]

1.2 Debate about research on animals is not new. Animals have been used in basic and applied research for more than 2,000 years and the acceptability of this practice has been contested for a similar length of time (paragraph 2.6). During the last century, the technological capacity of the medical, biological and pharmaceutical sciences has developed substantially and both the number of researchers and the number of animals used in research have increased. In recent years the debate has intensified and has become more public in several countries.[3]

Box 1.1: Use of the term 'animal'

Strictly speaking, it would be more appropriate to use the terms 'human animals' and 'non-human animals' (and likewise 'human primates' and 'non-human primates') to distinguish between humans and other animals. According to systems of biological classification, humans are within the animal kingdom and belong to the taxonomic group referred to as primates. However, for reasons of brevity, the term 'animals' is used to refer to 'non-human animals' throughout this Report. 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.

1.3 There is a wide range of opinions concerning the acceptability of research involving animals. It is unhelpful to describe the debate as being only between those who are in favour of research and those who are against it. A very brief overview would need to include at least the following range of views. Most medical research charities, many patient groups, the current UK Government and most members of the scientific community emphasise the scientific and medical benefits that have resulted from animal research. They stress that it has made a substantial contribution to our understanding of biological processes, and that it has been responsible for many crucial biomedical advances. Historically, the discovery of the circulation of blood, the function of the lungs, and the hormonal system in humans has involved research on animals. More recently, the development of important therapies and preventative treatments, including antibiotics, insulin, vaccines, organ transplantation and modern medicines, has involved animal research and testing. Moreover, such research has begun to provide critical insights into some of the more complex diseases, such as cancers,

1 For a brief statistical overview of the numbers of animals used in different contexts see Appendix 1 and see Appendix 2 for information about the numbers of animals used in scientific procedures.

2 In this report, we generally use the term 'research' in a broad sense, encompassing experiments undertaken in basic and applied research, as well as for the purpose of toxicity testing. We use the term 'testing' to refer exclusively to toxicity testing.

3 A recent survey in China, South Korea and Vietnam commissioned by the International Fund for Animal Welfare concluded that 77–90% (variation across different countries) of people believed 'we have a moral duty to minimise suffering', when asked about their views on the treatment of animals. MORI 2005 *Asian Nations Share British Concern for Animals*, available at: http://www.mori.com/polls/2005/ciwf.shtml. Accessed on: 6 Apr 2005.

heart disease, depression, human immunodeficiency virus (HIV), malaria and tuberculosis. Farm animals and pets have also benefited from the development of new veterinary medicines and vaccines.[4] Those who support research involving animals argue that on both ethical and scientific grounds, it is necessary for such research to continue.[5]

1.4 Others also drawing on ethical and scientific arguments object to this conclusion.[6] Campaigning organisations, with support from some scientists, question whether the results of experiments undertaken on animals can be reliably applied to humans.[7] They argue that animal research is too often perceived as the only means of addressing specific research questions, that scientists are reluctant to explore other methodologies and that more effort should be made in exhausting the potential of alternative scientific methods. They also question whether it is right for humans to subject animals to procedures that cause pain and suffering, and from which they will not benefit. Accordingly, some commentators take the view that all animal research should be abandoned immediately.[8]

1.5 A range of further positions can be found in the debate. Many people may have sympathy for some assumptions, but reject others made by those taking the two positions sketched above. For example, some accept the basic scientific validity and necessity of animal research, but question whether enough effort is made to reduce the suffering of the animals involved. Others object to specific kinds of research, and have concerns about the species used, or the aims of the research. There are also those who, in wishing for an end to all research on animals, acknowledge that a sudden abandonment is not straightforward. For them, a phasing out of all such research, combined with maximum efforts to reduce any pain, suffering or distress that animals might experience, is a highly desirable goal.

Types of research and numbers of animals used

1.6 Research involving animals is varied in both its nature and purpose, in the types of animals involved and in the effect that it has on them. At its least harmful, it takes the form of passive observations of wild animals in their natural habitats. Scientists also observe animal behaviour under laboratory conditions. Such studies may have a negative impact on the animals' welfare if they are kept in an environment that is incompatible with their species-specific needs. Certain invasive laboratory techniques may affect the welfare of animals in relatively mild ways. For example, some pharmaceutical research requires the repeated taking of blood samples. More harmful research, such as testing the safety of novel medicines (toxicology), may cause substantial pain and suffering. Almost all laboratory animals are killed once experiments are complete; in some cases research is undertaken on anaesthetised animals that are killed before they recover consciousness. In the UK, any 'procedures' involving vertebrates (and the common octopus) that may cause 'pain,

4 For 2003, 150,679 procedures in the category *Applied studies – veterinary studies* were recorded, comprising 5.4% of the total number of procedures and 5.5% of the total number of animals. Of the total number of procedures in this category, the farmed animals pigs, sheep, cattle, poultry and fish accounted for 79%. Home Office (2004) *Statistics of Scientific Procedures on Living Animals Great Britain 2003* (London: HMSO).

5 See, for example, websites for: the Coalition for Medical Progress, available at: http://www.medicalprogress.org/; The Association of Medical Research Charities (AMRC), available at: http://www.amrc.org.uk/; UK Home Office Animals in Scientific Procedures, available at: http://www.homeoffice.gov.uk/comrace/animals/index.html; RDS Understanding Animal Research in Medicine, available at: http://www.rds-online.org.uk. All accessed on: 21 Feb 2005.

6 In this Report, the terms 'ethics' and 'morals' are used synonymously. For further discussion see Crisp R (1998) Ethics, in *Routledge Encyclopedia of Philosophy*, Craig E (Editor) (London: Routledge), available at: http://www.rep.routledge.com/article/L132. Accessed on: 23 Mar 2005.

7 See British Union for the Abolition of Vivisection (BUAV) *Frequently asked questions about vivisection*, available at: http://www.buav.org/faqs.html#faq13. Accessed on: 23 Mar 2005.

8 A very small group of those opposed to the use of animals also protest by damaging property and by using violence against individual researchers, institutions and business partners, paragraphs 2.22–2.24 and 15.47–15.50.

suffering, distress or lasting harm' must be licensed by the Home Office. The term 'procedure' is a technical term that covers more than just the conditions entailed by an experiment (or series of experiments). Procedures also include specific conditions relating to the breeding, handling and housing of laboratory animals that may affect their welfare.

1.7 Estimates of the total number of animals used annually in research around the world are difficult to obtain and range from between 50 to 100 million animals.[9] In the UK, approximately 2.72 million animals were used in scientific procedures during 2003.[10] Thirty years ago, twice as many animals were used. However, it is widely expected that advances in genetic research will reverse this decline and lead to a renewed increase in the coming years, mainly in the use of rodents (see paragraph 5.23).

Issues raised by specific types of animal research

1.8 Two questions are fundamental to the debate about research involving animals. First, does the scientific use of animals lead to valid, useful and relevant results in specific areas? Secondly, is it permissible for one species to cause pain, suffering and death to another to achieve aims that primarily benefit the former species? In order to consider these questions, we must explore a number of complex issues. These include a discussion of the arguments about the moral status of humans and animals, and ways of morally justifying specific kinds of treatment. The usefulness and relevance of the different kinds of research in which animals are involved need to be examined, as well as the degree of pain and suffering which they may experience in research.

1.9 It is unhelpful to consider these issues merely in the abstract. Rather, it is necessary to examine the types of research that give rise to particular concerns and we briefly consider four examples. First, knowledge about the genetics of animal traits enables researchers to 'design' animals with specific features, using different methods of genetic modification (GM). Some people perceive such activities as an instance of increasing commodification of animals. Critics of the GM approach are also concerned about the large numbers of animals (mostly rodents) required to produce GM strains and the fact that the welfare implications of genetic modification are often unforeseeable (see Chapters 4, 5 and 7).

1.10 The second example concerns the use of animals as models for human disease. In the case of hepatitis C, in the 1980s researchers infected chimpanzees in order to understand the pathology of the disease and to develop a vaccine (see Chapter 6). Researchers have also bred or created by other means animals that are affected by particular diseases so that they can study the processes involved, and develop possible interventions. These models include mice with diseases such as cystic fibrosis, rheumatoid arthritis (RA) or transmissible spongiform encephalopathies (TSEs) such as BSE (Bovine Spongiform Encephalopathy, see Chapters 6 and 7). Many people object to the idea of producing animals that will exhibit the symptoms of a serious disease, whether by selective breeding, genetic modification or other means.

1.11 Thirdly, experiments on animals that, in evolutionary terms, are most closely related to humans, such as primates, have been particularly controversial. They are used in many areas of neurobiology because their brains share a great number of structural and functional features with human brains (see Chapter 5 and 6). While this similarity has scientific

9 Orlans FB (1998) History and ethical regulation of animal experimentation: an international perspective, in *A Companion to Bioethics*, Kuhse H and Singer P (Editors) (Oxford: Blackwell), p400.

10 See Appendix 2 and Home Office (2004) *Statistics of Scientific Procedures on Living Animals Great Britain 2003* (London: HMSO). The *Statistics* give details about all animals used under the Animals (Scientific Procedures) Act 1986 (A(SP)A), i.e. all living vertebrates and members of the *Octopus vulgaris* (common octopus) species used in research. They do not include animals that are outside of these categories, such as insects.

advantages, it poses some difficult ethical problems, because of an increased likelihood that primates experience pain and suffering in ways that are similar to humans.

1.12 Fourthly, the use of animals for toxicity testing in the development of pharmaceuticals and non-medical products such as agricultural and household chemicals has attracted criticism with regard to the degree of pain and suffering that is involved, and the numbers of animals killed. Some opponents of this type of animal use also consider that the scientific validity of such tests is doubtful (see Chapters 8–10).

The context of the debate

1.13 Debate about the value of research on animals and the degree of suffering involved is often influenced by the media. Some people take a positive view, believing that reporting by the media has contributed to a more focused and factual debate about the costs and benefits of animal research. For example, the role of animal research in the development of new treatments for diseases has been explained in a wide range of newspaper reports. Others think that publication of the findings of undercover investigations in animal research laboratories have been a useful complement to the public debate, by showing how animals are affected (see paragraphs 2.19–2.21). However, the media are also occasionally responsible for sensationalist items of news that either exaggerate the likely medical benefits of animal research or the suffering caused to animals. There are fears that such reporting could lead to further unhelpful radicalisation and polarisation of the debate.

1.14 Assessing the views of the public about research on animals is difficult. The evidence from surveys of public opinion is inconsistent. According to an opinion poll commissioned by *The Guardian* newspaper in 2001 that asked 1,004 adults their views on a range of issues, 46 percent of respondents supported the use of animals in the scientific testing of new medicines for humans, 36 percent were opposed and 18 percent were undecided.[11] By contrast, in 2003, a poll commissioned by the British Union for the Abolition of Vivisection (BUAV), carried out by TNS, found that 76 percent of respondents said that, as a matter of principle, they opposed experiments on any animals which caused pain, suffering, distress or lasting harm.[12] A Market & Opinion poll Research International (MORI) poll commissioned by the Coalition for Medical Progress in 2002 suggested that 90 percent of the UK population were willing to accept animal research, provided that certain criteria relating to the research objectives and the degree of animal suffering were met. This poll also found that 35 percent of the UK population did not support any kind of animal research because of implications for welfare, that 21 percent wished for a government ban on all kinds of animal research and that 61 percent of all respondents wanted to know more about research involving animals before forming a firm opinion.[13]

1.15 Inconsistent views about animal research that are revealed in opinion polls may illustrate that people often hold conflicting views simultaneously. Surveys are also relatively superficial in their attempts to evaluate what are often complex ways of reasoning. It is therefore important to distinguish between opinion polls, which commonly fulfil the role of

11 ICM (2001) *The Guardian/ICM Monthly Poll*, available at: http://www.icmresearch.co.uk/reviews/2001/guardian-poll-jan-2001.htm. Accessed on: 7 Apr 2005.

12 BUAV (2005) Press release *Government in ruse to thwart Freedom of Information Act*, available at: http://www.buav.org/press/2005/01-01.html. Accessed on: 7 Apr 2005.

13 MORI (2002) *The Use of Animals in Medical Research*, Research Study Conducted for The Coalition for Medical Progress, p24, available at: http://www.mori.com/polls/2002/pdf/cmp.pdf. Accessed on: 7 Apr 2005. See also MORI (1999) *Attitudes Towards Experimentation on Live Animals*, commissioned for *New Scientist,* available at: http://www.mori.com/polls/1999/ns99038t.shtml. Accessed on: 7 Apr 2005; MORI (1999) *Animals in Medicine and Science*, General Public Research conducted for Medical Research Council, available at: http://www.mori.com/polls/1999/pdf/mrc99.pdf. Accessed on: 7 Apr 2005.

market research, and academic research, which is usually better suited to analysing the subtleties of peoples' views and opinions. Methodology and findings of opinion polls are not normally subject to academic peer review, and the results of polls frequently appear to correlate with the views of the organisations that commission them.[14] Despite their limitations, results from opinion polls are widely cited and treated authoritatively. For example, MORI's finding that 90 percent of people in the UK accept animal research under certain conditions has been quoted extensively in the media. It has also been referred to by several organisations, and the UK Government, without further qualification.[15]

1.16 Opinion polls should in general be treated with caution.[16] There is little recent peer-reviewed research that would allow a reliable assessment to be made of public opinion on animal research. One recent study, based on focus groups, indicated that participants were caught in a moral dilemma by wishing to maximise both animal welfare and human benefits in research on animals. Most people preferred not to confront the issue, although there appeared to be acceptance of animal suffering when there was a genuine human need, typically expressed in developing cures for life-threatening diseases.[17]

1.17 This Report does not seek to summarise public opinion or derive conclusions from it. While we have conducted a wider Consultation (see Appendix 5) and have additionally considered facts and opinions from a range of external experts (see Appendix 4), our primary aim has been to undertake a thorough qualitative analysis of the scientific and ethical issues. The value of this examination does not depend on support from particular professional, political or social groups, but on the clarity and force of the arguments.

Structure of the Report

1.18 The Report focuses on ethical issues arising from the fact that animals are used by humans for research in ways that may cause pain, suffering or death. This is a substantial task. We have therefore avoided extending our terms of reference to more specific issues, such as the use of animals in education and training, issues raised by the unintended release of GM animals into the environment, the patenting of animals, and xenotransplantation.[18] We begin in Chapter 2 by providing a brief overview of the historical, and current social and

14 In a recent study that reviewed 56 surveys on how people view the use of animals in research, the authors concluded that there were marked discrepancies in the results reported in different surveys. See Hagelin J, Carlsson H-E and Hau J (2003) An overview of surveys on how people view animal experimentation: some factors that may influence the outcome *Public Understand Sci* **12**: 67-81. The design of the 2002 MORI poll mentioned above has been criticised by the BUAV. See BUAV (2004) Press release *New survey shows that doctors do not share government support for animal experiments*, available at: http://www.buav.org/press/2004/09-01.html. Accessed on: 7 Apr 2005.

15 See, for example, the website of the Coalition for Medical Progress, which commissioned the research, available at: http://www.medicalprogress.org/reference/mori.cfm; The Bioscience Innovation and Growth Team (BIGT) (2003) *Bioscience 2015*, p22, available at: http://www.bioindustry.org/bigtreport/; Home Office, Attorney General and Department for Trade and Industry (2004) *Animal Welfare – Human Rights: Protecting people from animal rights extremists*, p7, available at: http://www.homeoffice.gov.uk/docs3/humanrights.pdf. In a parliamentary debate on 7 July 2004, the Parliamentary Under-Secretary of State for the Home Department, said 'Whatever the extremists say, most people in the United Kingdom – a recent survey gave the figure of 90 percent – believe that the use of animals for medical research is justified so long as it is done without causing unnecessary suffering to the animals'. See transcript, available at: 15) http://www.publications.parliament.uk/pa/cm200304/cmhansrd/vo040707/halltext/40707h02.htm. All accessed on: 7 Apr 2005.

16 See Chapter 1, footnote 14.

17 The study focused on attitudes towards genetic modification of animals and also considered the wider context of animal research. With regard to GM animals, views were similar; people had major concerns but generally accepted the use of the technology for medical research and testing. However, the group responded negatively to examples of genetic modification that would benefit humans in other ways, such as faster-growing farm animals and cats that do not cause allergies. Macnaghten P (2004) Animals in their nature: a case study on public attitudes to animals, genetic modification and 'nature' *Sociology* **38**: 533–51.

18 The Council published a Report on xenotransplantation in 1996. See Nuffield Council on Bioethics (1996) *Animal-to-Human Transplants: The ethics of xenotransplantation* (London: NCOB). Members of the Working Party on the ethics of research involving animals do not necessarily share the conclusions of other Council Reports.

regulatory context of research involving animals. In Chapter 3, we discuss the way in which moral philosophy relates to issues raised by such research. We focus in particular on the kind of questions that need to be asked when considering whether, and if so how, the use of animals by humans for research can be justified. We consider whether there are particular features of animals that are of special moral relevance, and we outline ways in which different philosophical frameworks can be related to morally relevant characteristics. We also discuss the relation of moral theory to regulatory codes and practices, and how it should contribute to achieving appropriate regulation. Chapter 4 explores philosophical and scientific issues in relation to the assessment of pain, suffering and distress caused by research on animals.

1.19 The areas of research in which animals are used are described in Chapters 5–9. They include: basic research to understand how animals and humans develop and function (Chapter 5), the use of animals for the study of human disease (Chapter 6), genetic modification of animals in the study of disease (Chapter 7), the development of medicines and vaccines by the pharmaceutical industry (Chapter 8) and toxicological testing of substances that are potentially hazardous for animals, humans or the environment (Chapter 9). Within each of these sections we provide examples of specific types of research. A summary of Chapters 5–9, that also considers in more detail the transferability to humans of results obtained from animal research, is provided in Chapter 10.

1.20 Chapters 11 and 12 discuss the Three Rs: Refinement, Reduction and Replacement. These terms represent widely accepted principles of humane experimental technique, whereby animals should be replaced by alternatives wherever possible, and the numbers and suffering of animals kept to a minimum. Chapter 11 focuses on replacements. It addresses the scope and limitation of the approach, and identifies scientific and non-scientific obstacles. Reduction and Refinement are similarly addressed in Chapter 12. An overview of the regulatory framework governing animal research in the UK and the formal provisions and operation in practice of the principal law, the Animals (Scientific Procedures) Act 1986 (A(SP)A), is provided in Chapter 13. Developments at the international level are also considered briefly.

1.21 The initial discussion of moral issues in Chapter 3 is resumed in Chapter 14. We aim to identify areas of practical consensus, which leads to some conclusions and recommendations for policy in Chapter 15. While our observations focus mainly on animal research in the UK, we have tried to consider the broader context and hope that the Report will be of use internationally.

1.22 As with all the Reports published by the Nuffield Council on Bioethics, this document has been produced primarily by a Working Party that was established for the specific purpose of writing this Report. The draft Report has also been considered, and commented upon, several times by all members of the Council, before final adoption. The members of the Working Party reflect in their own convictions the diversity of views held in the wider population. In the Report, we have avoided the search for a spurious show of agreement on all topics, but have instead attempted to clarify the varied ethical and scientific views that are held. Inevitably, some members of the group find some parts of the Report difficult to accept, and sometimes contrary to their own beliefs. It is therefore all the more important that a consensus statement was achieved after many hours of discussion (see paragraphs 15.3–15.20). Members have recognised that although disagreements will remain on both fundamental and very specific issues raised by animal research, nevertheless, all can respect the deeply held ethical convictions from which the views of others are derived.

1.23 It is in this spirit that we present this Report and its recommendations. Readers will therefore need to bear in mind that while the Working Party has tried scrupulously to give fair coverage to the widest possible range of ethical and scientific arguments, it is not possible, outside the consensus statement, to attribute to all members of the group the views described on any one issue. Rather, the Council adopted the Report as a whole, recognising it as a fair and balanced study of the wide range of views, trusting that it is valuable to lay out the range of opinions and beliefs about the use of animals in research, and to give a detailed analysis of the ethical arguments that should be the basis of any informed and fair debate.