NC STATE UNIVERSITY

RESEARCH ETHICS MINI ROUNDS

a series of modular study units

Module IV
Animal Subjects in Research
An Overview

This is the fourth in a series of instructional modules and is part of the Research Ethics Initiative. Selection of materials and commentary by Nell Kriesberg, The Graduate School, with the assistance of Dr. Richard Fish, Director of University Animal Resources, North Carolina State University.

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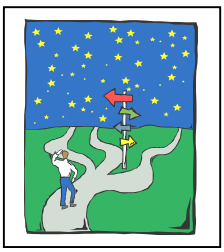
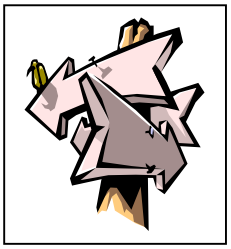




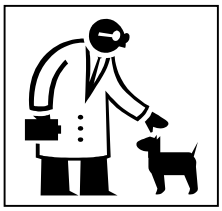
ABSTRACT

This module is an overview of the current discussion about scientific integrity as it relates to working with animal subjects. In the Introduction we summarize some of the current philosophic discussion, presenting all sides of the issue, albeit in summary fashion, with resources for further study. In the Overview Section you will find a description of three different book chapters that have been widely used in classes on research ethics and animals in institutions that use animals in research. We focus on the regulations and guidelines, both at the national and local level and devote the Theme section to the training requirements at NC State. The Case Study talks about research with pigs and how this relates to dealing with issues of human welfare. In the Thinking Outside the Box section we discuss the Institutional Animal Care and Use Committee (IACUC) and ask what its involvement with and responsibility to the larger community might be. As usual, we include an annotated bibliography of articles, books and websites. I want to thank Dr. Tom Regan for his assistance in developing portions of this module.

All readings mentioned in this module are available as electronic reserves via the NC State Library electronic course reserves system. To access the hyperlink, click on the title of the article or book chapter with the embedded URL indicated by the blue underlined typeface. Many of the books mentioned are also on three-day circulating print reserve. You can access the general library list of readings by going to the NC State Library home page, clicking on course reserves, and then entering GRAD500. Scroll through the pages to locate a specific reading.

"There surely is ethical truth. If people did not believe that certain ways of behaving were morally better than other ways they would not bother arguing about right and wrong. But at the same time, ethics is intensely personal. Each of us must decide for ourselves what we think is right and wrong. The questions we find pressing and the answers we find satisfying often have a great deal to do with what we have experienced and what we feel most deeply."

Jerrold Tannenbaum, Preface, Veterinary Ethics: Animal Welfare, Client Relations, Competition and Collegiality (Mosby: St. Louis, 2nd ed. 1995) A copy of this book is available as a three-day circulating print reserve at the NC State University Library.



ABBREVIATED TABLE OF CONTENTS

INTRODUCTION This section is an introductory forum to the complicated, historic debate about the use of animals in research. We review Utilitarianism, the Abolitionist position, Speciesism, and the pro-animals in research viewpoint. We present the animal rights/animal welfare discussion and discuss the idea of moral status and membership in the moral community. We close this section with a summary of past research with animal subjects. This Introduction serves as a beginning for further study, a vehicle to begin to become articulate about difficult ethical matters. We quote several experts in the laboratory animal field who note the value of entering the ethical debate and becoming conversant with the moral issues. The rest of this module will present selected readings and resources on the responsible conduct of research (RCR) as it relates to the use of animals subjects.

OVERVIEW

Beauchamp, Tom L. "The Moral Standing of Animals in Medical Research," "The Journal of Law, Medicine & Health Care, 20, no. 1-2, Spring-Summer, 1992, pp. 7-16.

Fuchs, Bruce A., "Use of Animals in Biomedical Experimentation,". Chapter 6 of Scientific Integrity: an Introductory Text with Cases, 2nd Edition, Francis Macrina, Editor. (Washington, D.C., 2000) pp. 101-129.

Rowan, Andrew "Ethical Principles for Animal Research and the Sundowner Principles," and "Important Concepts, Terms, and Definition," in Bioethics and the Use of Laboratory Animals: Ethics in Theory and Practice, A. Lanny Kraus and David Renquist, editors (Dubuque, IA: Gregory C. Benoit, Publishing, 2000)

Tannenbaum, Jerrold "Animal Research," and "What is Animal Welfare?" and "Animal Rights and Animal Research," Part 1 and Part 2 from Veterinary Ethics; Animal Welfare, Client Relations, Competition and Collegiality, and (St. Louis: Mosby, 1998).

APPLIED PHILOSOPHY
Continuation of themes in applied philosophy from other modules:
The conflict between the good and the good;
Conflicts in duties;
Stakeholders;
The right balance, in this case between subject and object.

"In practice, I take the most important question to be the assessment of the scientific value of an experiment, of the knowledge or benefit to be gained and of the suffering (if any) involved, and the question of how to balance these. It is ultimately a moral problem, and a question of responsibility borne both by the scientist and by the rest of society in the characteristically human task of removing ignorance and minimizing suffering."
R.G. Frey and Sir William Paton, "Vivisection, Morals, and Medicine: An Exchange," in Animal Rights and Human Obligations, Tom Regan and Peter Singer, Eds., (Englewood Cliffs, Prentice Hall, 1976) p. 235. This reading selection available electronically.

MAJOR THEME
Working with institutional guidelines nationally and at NC State University.
Sponsored Programs and Regulatory Compliance – IACUC website.
Guidelines about minimizing pain and distress nationally and at NC State.
The Three R's: Reduction, Refinement and Replacement – what this means nationally and at NC State University
Regulations as an articulation of the values of society
Training modules from the University of Minnesota, and others

CASE STUDY
People and Pigs, case courtesy of University of Iowa Bioethics Center

THINKING OUTSIDE THE BOX The question of community involvement in Institutional Animal Care and Use Committees (IACUC).

ADDITIONAL RESOURCES
Articles, books and websites

The use of animals is essential to the teaching, extension, and research missions of North Carolina State University. Significant benefits to the health and welfare of both animals and humans have resulted from animal use in research, and continued use is crucial to future advancements. Without the use of animals, adequate instruction of students in many programs such as agriculture, the biological sciences, and veterinary medicine would be impossible. However, those who utilize animals are morally and legally obligated to care for them properly and use them humanely. Each faculty member, staff member, or student involved in the use of animals is directly responsible for promoting and protecting their welfare within the instructional, extension, and research programs of the University. Those who use animals should assume this responsibility through precept and example.

The complete policy statement can be found at: Animal Care Policy. Expanded mission and scope of the Institutional Animal Care and Use Committee is available as well. Access the website and links at:
http://www.ncsu.edu/sparcs/compliance/iacuc.html

Introduction

The subject of using animals in research is complicated and contentious. In this module we seek neither to resolve the many dilemmas nor to explicate every issue. Instead, we will present the different sides of the issue, albeit briefly. Open and complete inquiry is the bedrock of philosophy and the first step in examining ethical questions. This topic, the use of animals in research, involves questions that have not yet been fully answered or agreed upon. The "animal question" as it is often called in philosophy, is one that demands much study and thought; both the introductory section and the module in general should be seen as starting points for your own further exploration.

When we debate the animal question, we are taking part in a discussion that began in earnest several hundred years ago with the advent of scientific experiment and discovery. There are many ways to think about our relationship with animals and to decide what responsibilities we as humans owe to animals. With the caveat that sometimes simplifications are useful when a topic is complicated, this introductory section will summarize some of the major ongoing conversations, each of which looks at the question from a different set of premises.

Animal Rights/Animal Welfare

Many people think that animals have rights of some sort, usually the right to humane treatment or the right to remain free of unnecessary suffering. However, the philosophic animal rights position involves, at its core, a world-view about where animals and human beings fit into the ecosystem. Either animals are, as Henry Beston says (see box at the right) "other nations" having independent value, or they are, to again use his word, "underlings" having value only relative to our needs and interests.

Those holding the animal rights position would say that to help animals would be our duty, out of innate respect for other living creatures who are valuable in and of themselves. Those holding to the animal welfare position say that we have a duty to treat animals humanely and help them if we can do so, but only after the needs of human beings are taken care of. In this case, the words "innate respect" are interpreted differently. Some say that it is a sign of "innate respect" to give animals humane treatment and consider their needs, while others say that it is a sign of "innate respect" to not make use of animals in any way.

> "We need another and a wiser and perhaps a more mystical concept of animals. We patronize them for their incompleteness, for their tragic fate of having taken form so far below ourselves. And therein we err, and greatly err. For the animal shall not be measured by man. In a world older and more complete than ours, they move finished and complete, gifted with extensions of the senses we have lost or never attained, living by voices we shall never hear. They are not brethren, they are not underlings; they are other nations, caught with ourselves in the net of life and time, fellow prisoners of the splendour and travail of the earth."
>
> Henry Beston (1928) as quoted by Vaughan Monamy, Animal Experimentation: A Guide to the Issues, (Cambridge: Cambridge University Press, 2000) frontispiece.

This distinction between animal welfare and animal rights is one way to examine the wide spectrum of societal attitudes toward animals. One who holds an animal welfare position believes that animals are worthy of our consideration; we ought to treat them humanely, but we are within our moral rights as humans to use non-human animals for our needs. Even though we may use animals for our needs, we still have a moral obligation to see that they are given decent treatment, adequate food, water and shelter and in general a lifestyle as close to what is normal for them as possible.

The animal rights position is very different. Here the right that matters is not decent treatment, but the right to be left alone, to not be used merely as a means to an end. Even if life in a lab is full of good food, shelter and safety, the act of making use of an animal as a "research subject," as an object for our use, is morally wrong. For the abolitionist, it is morally wrong to make use of an animal for food, scientific research or entertainment in any form.

We can see, immediately, that there is no easy middle ground between these two positions. If you hold that animals are not here for our use, then using them for research—or anything else—no matter how humanely you care for them, is immoral. If, on the other hand, we have a moral imperative to improve the quality of life on our planet for our species and other species, then it is up to us to decide how best to do this. In a recent article, David Degrazia discusses the possibility of common ground on some of the difficult questions concerning animals in research; this article is a good summary of the major issues.

"Animal welfare is a human responsibility that encompasses all aspects of animal well-being, from proper housing and nutrition to preventive care, treatment of disease, and when necessary, humane euthanasia. The AVMA's commitment to animal welfare is unsurpassed.

However, animal welfare and animal rights are not the same. AVMA cannot endorse the philosophical views and personal values of animal rights advocates when they are incompatible with the responsible use of animals for human purposes, such as food and fiber, and for research conducted to benefit both humans and animals."

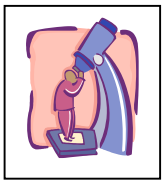
From the American Veterinary Medical Association Website: http://www.avma.org/care4pets/morewelf.htm#rights

"Whether because they have moral status or because needlessly harming them strongly offends many people's sensibilities, sentient animals deserve some measure of moral protection."

David Degrazia, "The Ethics of Animal Research: What Are the Prospects for Agreement?" in Cambridge Quarterly of Healthcare Ethics (1999) 8, pp.23-34. Article available via electronic reserve.

Gary Varner has set up a website entitled, "Some materials for teaching about animal rights and animal welfare" at Texas A& M University. Access it at: http://www-phil.tamu.edu/~gary/awvar/

In defining animal welfare, Varner states:
"We are stewards of animals. Their lives and experiences have intrinsic value, but it is up to us to decide how to maximize value in the aggregate by using animals in various ways."



How ought we decide which position is morally correct? Historically, the classic questions that are asked to help make this decision involve determining the moral status of animals.

What Is The Moral Status of Animals?

One way to answer the question, what is our correct relationship with animals, is to ask about their moral standing, vis-à-vis the moral community. What do we mean by "the moral community?" Very simply, we can say that members of the moral community are to be treated as valuable in and of themselves, so much so that they cannot ethically be treated as mere means to an end. Human beings are considered part of this moral community; we are morally obliged to treat people not only with respect but also not to use them as means to an end, as an object for our use.

"Now, for some, the beating of a horse is bad because it's bad for the man, for his immortal soul, or because it dulls him to interactions with human beings. But for most of us now in this century, beating the horse is bad for the horse's sake. That's because we do believe that there's something in that horse that's worthy of moral consideration. So we are saying that horses have a moral status, deserving of consideration, in and of themselves."

Dr. Richard Fish, DVM, Ph.D., Director of University Animal Resources, NC State University

How does one qualify as a member of the moral community and what keeps one out? Are animals members of the moral community? Historically, animals have been excluded because they lack a variety of characteristics, such as the ability to think intellectually, to make moral decisions, self-awareness, and possession of language.

Some philosophers offer a different basis for membership in the moral community.

What Question Should We Ask?

In the eighteenth century, a utilitarian philosopher, Jeremy Bentham asked a different question. He said that the crucial issue is about suffering, not cognitive ability. This shifted the focus of the conversation from one mainly about people to one where the needs of animals became part of the moral consideration. His famous statement is quoted in the box at the right.

"But a full grown horse or dog is beyond comparison a more rational, as well as more conversable animal than an infant of a day or a week, or even a month, old. But suppose they would otherwise, what would it avail? The question is not, Can they reason? nor Can they talk? but Can they suffer?

Jeremy Bentham, Introduction to the Principles of Morals and Legislation, 1789. Quoted in James Rachels, The Elements of Moral Philosophy, 3rd Edition (NY: McGraw-Hill College, 1999) p. 103. See Chapter 7, "The Utilitarian Approach," for full quotation and discussion.

Tom Regan, in articulating the rights position, uses the subject-of-a-life criterion for determining membership in the moral community. For Regan, if a creature is the subject of a life, they have the status of an individual such that it is immoral to use them merely as a means, even to a good end.

"To be the subject-of-a-life, in the sense in which this expression will be used, involves more than merely being alive and more than merely being conscious. …the ability to initiate action in pursuit of their desires and goals; a psychophysical identity over time; and an individual welfare in the sense that their experiential life fares well or ill for them, logically independently of their utility for others and logically independently of their being the object of anyone else's interests. Those who satisfy the subject-of-a-life criterion themselves have a distinctive kind of value—inherent value—and are not to be viewed or treated as mere receptacles."

Tom Regan, The Case for Animal Rights, (Berkeley: University of California Press, 1983) p. 243. Chapter 8, "The Rights View" Part 1, Part 2, Part 3 and Part 4 is available online.

Peter Singer, in criticizing the decision to keep animals out of the moral community, does not see that the immorality is due to disregarding the rights of an individual animal. Singer, like the Utilitarian Jeremy Bentham, considers suffering to be the key point; building on Bentham's approach, Singer says that the principle of equality demands that suffering be considered equally, regardless of species. Not doing this is a form of prejudice he calls "speciesism."

"We have seen that experimenters reveal a bias in favor of their own species whenever they carry out experiments on nonhumans for purposes that they would not think justified them in using human beings, even brain damaged ones. This principle gives us a guide toward an answer to our question. Since a speciesist bias, like a racist bias, is unjustifiable, an experiment cannot be justifiable unless the experiment is so important that the use of a brain-damaged human would also be justifiable."

Peter Singer, Chapter 1, "All Animals are Equal…," Part 1 and Part 2 from Animal Liberation, 2nd Edition, (NY: Avon Books, 1990) p. 25. Is available electronically.

Speciesism is a prejudice similar to racism—not the same, but still a moral issue. For Singer, speciesism is philosophically inconsistent because there is no rational justification for favoring our own species over another. There is nothing inherently moral or right about this; it is only a preference and as such, cannot be morally defended as a valid reason for a moral decision. Since for Singer pain is to be avoided whatever the species, in considering a research protocol we must be willing that it be done to our own species, if we propose it to be done on animals.

This view is different from the Rights View that says animal research is wrong because an individual has the right not to be used merely as a means to an end. As is true of Singer's view, however, the rights view is critical of speciesism. In particular, the rights of animals cannot be overridden simply because animals belong to a different species than we do.

Many people think that both positions are misguided, saying that there are morally relevant differences between both humans and animals that justify our use of them. They say that our species' intellectual abilities put us in the unique position of making decisions for other species. Indeed, they believe that we are morally obligated to use our unique skills for the improvement of the general health and welfare. Although animal welfarists agree that suffering is indeed to be avoided or minimized, whenever possible, our moral imperative as human beings is to make the difficult decisions that will benefit all species, even if it means using or harming some of them.

In the box below, we quote Jerrold Tannenbaum (1998) a leading proponent of the welfare position, a lawyer and one of the first to write in the field of veterinary ethics. Would you say he is using the word "rights" in the same way as the philosophers?

"The concept of welfare, unlike the concept of rights, allows for liberal balancing of human against animal interests and for deciding in many circumstances that human interests should prevail. …Sometimes, a condition conducive to or constituent of animal welfare is so important to an animal that we can say the animal's claim to this condition rises to the level of a right. Adequate food and water are critically important to animal welfare. …It is therefore not just wrong, but terribly wrong, to deprive an animal one keeps or uses of adequate food and water. One may subject animals to such treatment only for the most important of reasons. Here, those of us who believe that animals have some moral rights would say, is a right based on considerations of welfare."

Jerrold Tannenbaum, "What is Animal Welfare?" in Veterinary Ethics: Animal Welfare, Client Relations, Competition and Collegiality, (NY: Mosby, 1998) p. 173.

The Utilitarian Stance and Animal Research

In Module I, An Introduction to Research Ethics, we noted a major split in the road between two types of moral theory, non-consequentalism and consequentalism. In the former, an act is right or wrong depending on how closely it adheres to an overreaching principle, such as honesty or justice. In the latter, what makes an act right or wrong are the results. Singer, as noted above, follows the utilitarian point of view in looking at the overall results, the aggregate good or bad, to make a moral decision of right or wrong.

Utilitarianism appeals to many people—it is practical and concrete and seems to make sense in daily life. Utilitarianism does not say using animals for research is wrong; what it does say, is that to decide on the moral rightness of an action you need to look at whether that research might promote an aggregate good for a greater number of people than not doing the research. Some would include animals in this equation since animals do benefit from research. For the Abolitionist, animal research would be wrong since it is morally wrong to use an animal merely as a means, even—as we said above—to a good end.

It is not uncommon for those concerned with making moral decisions about animals in research to think in terms of costs and benefits. In a recent textbook, author Kevin Dolan addresses the cost-benefit method of decision making, asking, "Given that pain is of the very warp and weft of life, can we feel justified in "hurting a little to help a lot." (Dolan, 1999, p. 213)
While it might seem that making decisions via the Utilitarian framework is easier, more practical, than following a theoretical principle, to do it properly, one must be sure that all the details, sacrifices, outcomes and stakeholders are accounted for. In his chapter on Utilitarian decision-making, Dolan presents flow charts and checklists that are used in Britain to aid in making decisions about animal use.

"We by no means claim that the use of experimental animals is desirable but is there a case for saying it may be acceptable? This may be so if we choose to regard restricted animal suffering in research as a lesser evil than allowing a continuation of suffering which could be prevented by science. … Because this ethical approach is far from absolute, there is certainly lacking the solid ring of confidence of deontology. Consequently, caution is inherent in making decisions in the context of the teleological approach. Judgements are formed on a case-by-case basis. It is necessary to pay attention to details and circumstances. It is all-important to ask the right questions."

Kevin Dolan, Ethics, Animals and Science, (Oxford, Blackwell Science Ltd., 1999) p. 214. Chapter 13, "Cost-Benefit-The Balancing Act," Part 1 and Part 2.

Some research that has made use of animals

In reviewing these scientific discoveries, it may be of use to look at both the Abolitionist and Welfarist positions, as well as thinking about the differences between non-consequentalism and consequentalism. Is the greatest good for the greatest number the best (or only?) way to think about some of the projects listed below? Does your point of view depend on the nature of the research project? We have gotten this list from the Foundation for Biomedical Research website at: (http://www.fbresearch.org/home-body.html)

1726	first measurement blood pressure	horse

1790	vaccine for smallpox	cow
1880	vaccine for anthrax	sheep
1885	vaccine for rabies	dog, rabbit
1902	malaria life cycle	monkey, mouse
1905	pathogenesis of Tuberculosis	sheep
1923	Insulin developed	dog, fish
1932	function of neurons	dog, cat
1939	anti-coagulants	cat
1954	Polio vaccine	monkey, mouse
1956	Open heart surgery and pacemaker development	dog
1970	Lithium developed	rat, guinea pig
1982	Treatment for leprosy	armadillo
1984	Monoclonal antibodies	mouse
1992	Laproscopic surgery developed	pig
1995	Gene transfer for Cystic Fibrosis	mouse, non-human primate
2001	Promising drug for prevention of AIDS developed	monkey

Interestingly enough, two of the many hyperlinks to be found on the Foundation for Biomedical Research's website concern new developments in the area of animal models (http://www.nih.gov/science/models/) and alternatives to using animals (http://www.iacuc.org/). We will return to both of these topics later in the module. In the Major Theme section, where we focus on guidelines and regulations, we will include a discussion of and resources for the "Three R's:" Replacement, Reduction and Refinement. This section also includes material about Institutional Animal Care and Use Committees (IACUC.) The IACUC website noted here is another valuable resource for self-education.

"At some level, many scientists are abolitionists. That is, if we were able to acquire the information needed to adequately answer compelling research questions without the use of animals, who among us would not gladly do so? Nevertheless, one of the best methods we have developed to advance biomedical knowledge involves the use of animals, which, unlike the test tube, have interests. They have interests in obtaining sufficient food, in remaining free from pain, in reproducing themselves, and perhaps in living out a normal life span. Experiments can frustrate the interests of laboratory animals, and most scientists recognize this both in their concern for the humane treatment of animals and in their belief that research should be directed at important problems. The fact that animals have interests does not necessarily mean that we should never use them in biomedical experiments; however, it does mean that any such use should be preceded by a moral judgment. Do the benefits derived from the biomedical research that is being considered offset the associated moral costs?"

Bruce A. Fuchs in "Use of Animals in Biomedical Experimentation," in Scientific Integrity: An Introductory Text with Cases, Francis L. Macrina, ed. (Washington, DC. ASM Press, 2000) p. 121. Chapter available as an electronic course reserve.

Overview Selections: Three Chapters from Three Books

"Use of Animals in Biomedical Experimentation," by Bruce A. Fuchs, Chapter 6 of Scientific Integrity: An Introductory Text with Cases, edited by Francis L. Macrina (Washington, D.C., ASM Press, 2000) This chapter is available online via the NC State Library Electronic Course Reserves.

Dr. Richard Fish, director of Laboratory Animal Resources at NC State University, uses this chapter in his coursework with students. It offers a summary of the range of both ethical issues and regulations you need to know for your work with animals. Once you have a thorough understanding of the topics and guidelines in general, at the national level, as well as a familiarity with the social implications of animal research, you will be ready to learn the specific guidelines applicable to NC State and your particular project.

Bruce A. Fuchs presents a clear and organized summary that will be useful for anyone using animals in research, not just in the biomedical disciplines. His review of the philosophic issues is helpful, as is his organized discussion of the various rules, regulations and guidelines on the national level. His discussion of the Institutional Animal Care and Use Committees (IACUC) is valuable. The summary of current political ferment concerning animal subjects in research will be helpful in your own discussions of these complicated matters. The set of case studies at the end of the chapter make for good exercises and the annotated bibliography presents the classic readings that make up a well-stocked library. Also included is a good selection of the major URLs.

"Most scientists will interact directly with the IACUC when they submit a research protocol for approval. An approved protocol is required before any experiments involving animals, even pilot projects, are conducted. The NIH will not fund a grant that has not had its animal research protocol reviewed and approved. Graduate students, postdoctoral students, and technicians who work with animals must be operating under an approved protocol submitted by the laboratory's principle investigator. It is important that persons working under an approved animal protocol be familiar with that protocol to prevent accidental deviations from existing techniques that might require new approval before being adopted."

Bruce A. Fuchs, "Use of Animals in Biomedical Experimentation," in Scientific Integrity: An Introductory Text with Cases, Francis L. Macrina, Ed., (Washington D.C. ASM Press, 2000) p. 113.

Case Study 6.2

"A colleague is planning a project to isolate a protein factor that appears in the blood at a very low level. To facilitate the early stages of the project, she plans to make one trip each week to a local slaughterhouse to collect about 15 gallons of bovine blood after the animals are killed in the usual manner. Do you think that it is a good idea to use tissues collected from a slaughterhouse? Do you think that your colleague needs to submit a protocol to the IACUC for review?"

(Fuchs, p. 123)

"Ethical Principles for Animal Research and the Sundowner Principles," by Andrew N. Rowan, from Ethics and the Use of Laboratory Animals: Ethics in Theory and Practice, Lanny Kraus and David Renquist, Editors (Dubuque, Gregory C. Benoit Publishers, 2000). Another essay available electronically is "Attitudes to Animal Research," by Andrew N. Rowan and Valerie de Liedekerk.

In May of 1998, The American College of Laboratory Animal Medicine (ACLAM) held a symposium and published a monograph of the proceedings. The contributors read like a "Who's Who" in the world of lab animal practice and philosophy; all of them have spent a great deal of time thinking about and discussing the ethical issues, and the essays in this collection present a wide range of opinions.

In his essay, Andrew R. Rowan, the founding director of the Center for Animals and Public Policy, Tufts University School of Veterinary Medicine, summarizes central ethical issues relating to animal subjects in research. He describes being a member of a task force that involved the National Aeronautics and Space Administration (NASA) and their Bion Program, a program that utilized animals in space research. There was some public concern about the non-human primates used and, as a result, a multidisciplinary working group gathered in October of 1996 in the Sundowner Inn in California to set forth some recommendations. This meeting resulted in the publication of the "Sundowner Principles."

The "Sundowner Principles" that Andrew Rowan describes include a number of statements that have similar language to the Belmont Report, a document protecting human subjects in research. In particular, the principles of Respect for Life, Societal Benefit and Non-maleficence are cited in the Belmont Report. In the box below we quote directly from Rowan in his citation of three specific principles.

"Respect for Life – Killing entails moral costs

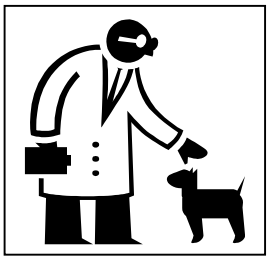
Living creatures deserve respect. This principle requires that animals used in research should be of an appropriate species and health status and should involve the minimum number required to obtain valid scientific results. It also recognizes that the use of different species may raise different ethical concerns. Selections of appropriate species should consider cognitive capacity and other morally relevant factors. Additionally, methods such as mathematical models, computer simulation, and in vitro systems should be considered and used whenever possible.

Societal Benefit – Advancing Knowledge and health is a strong justification for research

The advancement of biological knowledge and improvements in the protection of the health and well being of both humans and other animals provide strong justification for biomedical and behavioral research. This principle entails that where animals are used, the assessment of the overall ethical value of such use should include consideration of the full range of potential societal goods, the populations affected, and the burdens that are expected to be borne by the subjects of the research.

Non-maleficence – Minimization of distress, pain, and suffering is a moral imperative

Vertebrate animals are sentient. This principle entails that the minimization of distress, pain, and suffering is a moral imperative. Unless the contrary is established, investigators should consider that procedures that cause pain or distress in humans may cause pain and distress in other sentient animals." (Rowan, p. 25)



"Animal Research," Chapter 24 in
Veterinary Ethics: Animal Welfare, Client Relations, Competition and Collegiality
By Jerrold Tannenbaum, M.A., J.D.
(St. Louis, Mosby, 2nd edition, 1995.)

This chapter is available online as an electronic course reserve. The book is available from the Course Reserves Desk as a three-day circulating print reserve.

Although this text is primarily written for the audience of veterinary students and practitioners, it is useful for those using animals in research as well. The author, like Andrew Rowan, is a well-known writer and speaker on animal welfare issues; reading Tannenbaum's chapter 24 will help organize your thinking and increase your ability to discuss the complicated topics as they relate to your particular project. Other chapters in this book that are particularly helpful are "The Interests of Animals," "Animal Rights." The chapter entitled "Oaths and Principles," (Part 1) and (Part 2) is also available electronically, as is chapter 5, "Veterinary Ethics and Moral Theory."

Jerrold Tannenbaum reviews what he calls the "basic premises" in animal research ethics and talks about standards of assessment such as mental states, distress, discomfort and pain. He, like Bruce Fuchs, reviews some of the current political questions. Because Tannenbaum is looking at the issue from both a legal and a veterinary point of view, his discussion has a different emphasis from Fuchs: the two chapters work well together. In the box below we list 5 questions out of the total of 21 that Tannenbaum presents in Table 24-1 on page 486 in the chapter "Animal Research."

Some issues relevant to assessing the value of proposed animal research

"How many people or animals does the project aim to benefit?"

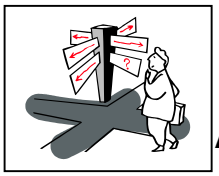
"How serious is the problem that is experienced by potential beneficiaries?"

"To what extent is the research aimed at providing knowledge that could be relevant to several areas or fields of theoretical or practical importance?"

"Does the proposed project seem sound from a scientific point of view, or does it rest on questionable premises or assumptions? (For example, does it propose the use of too many or too few animals to achieve meaningful results? Is a proposed animal model scientifically sound?)"

"To what extent does the project have a clearly defined purpose and rationale, as distinguished from being a scattershot attempt to "see what will happen if certain things are done to animals?"

Jerrold Tannenbaum, Veterinary Ethics: Animal Welfare, Client Relations, Competition and Collegiality, (St. Louis, Mosby, 1995) p. 486.



Applied Philosophy: Conflicts in Duties

"Biomedical researchers feel a strong duty to heal. That is the goal that drives them and it is a respectable calling. This is a duty we need to consider, just as we have a duty to our family and our friends. Also, all scientists have a drive to increase knowledge, which can also be considered a duty."

Dr. Richard Fish,
Director of University Animal Resources, NC State University

There is a question at the heart of veterinary medicine that is directly applicable to using animals as research subjects: "Who is the client? The patient or the owner?" Another way to put this is, who are the stakeholders when making decisions about animal subjects in research?

STAKEHOLDERS

- Individuals who are ill
- The public in general
- The research animals, "the subjects"
- Animals in general
- Science
- Researchers on the project

The Stakeholders all have a particular interest in the outcome of the research. The researcher feels obliged to consider their interests when making decisions; you can say that these are special interest groups worthy of moral consideration, even though all might not be equally affected in the same way or the same degree or at the same time. The public has a more general interest as opposed to the sick person who has a strong interest within a particular time frame. The scientific community may have a long-term interest, and not feel any particular need for speed.

Richard Fish notes that of all the stakeholders, the research animal has the ultimate interest. This, of course, brings us back to the dilemmas at the heart of research using animals. There is no way around the fact that in most cases an animal or a group of animals will die for the sake of the results. For all the stakeholders, but particularly for the animal subjects, the protocol must be impeccable. By impeccable, we mean, for example, that decisions such as the choice of species used, the sample size chosen (see Module IX, Responsible Use of Statistical Methods) the husbandry and personnel demands and the lack of available alternatives to using animals for this particular research question, have been rigorously studied. The reason for the research must be above reproach.

In the Major Theme section of this module, we present some of the major resources and guidelines available to assist researchers in answering these sorts of questions. Looking back at Jerrold Tannenbaum's first two questions on the previous page,"How many people or animals does the project aim to benefit?" "How serious is the problem that is experienced by potential beneficiaries?" Which is more important in terms of stakeholders, the number of interested parties or the seriousness of the need? How does the research animal's "ultimate interest" to use Richard Fish's words, play out in both situations? We can see the Utilitarian viewpoint expressed in Tannenbaum's approach.

THE RIGHT BALANCE BETWEEN SUBJECT AND OBJECT

A scientist might well feel a conflict in duties when faced with the task of investigating the natural world using animal subjects. She feels an obligation to her discipline, to advance knowledge for the public good, and to improve the lives of individuals suffering from a particular illness. She feels an obligation to the animal subjects, to give them as good a quality of care as possible and yet still get the data.

For research purposes, the laboratory animal becomes objectified. She might feel a conflict between seeing the animal as within the moral community on one hand -- intrinsically worthwhile, with needs and desires, and at the same time as an object, a research tool. But is it necessarily black or white, either-or?

Henk Verhoog writes about this tension in science, between the reverence for life, and the desire to have knowledge that is objective. Animals used as experimental "tools" are valuable because they are "of nature" and yet, at the same time, can be turned into "data." Researchers can feel this conflict, with some resolving it in one way, others in another.

> …The naturalistic animal is the subject of anthropomorphic identifications. In the process of research this animal is transformed into the analytic animal, into data….Analytic animals are de-individualized and treated as anonymous beings. Social norms in the laboratory prevent scientists and animal technicians from treating laboratory animals as pets; they are instead treated as models, as supplies in grant proposals, etc." Henk Verhoog, "Animals in scientific education and a reverence for life," in Attitudes to Animals: Views in Animal Welfare, Francine L. Dolins, ed. (Cambridge University Press,

We often make the assumption that scientists are detached, viewing their animal subjects as objects for use. But this is not necessarily the case. As an example, in the box below we quote from an essay by Gustav Eckstein (1890-1981), professor of physiology and psychiatry at the University of Cincinnati. Eckstein worked with Ivan Pavlov in the early animal behavior studies. In this essay he describes his life with two pet rats—one was his research subject in the laboratory before he brought him home. A short while later he brought a female rat home as well, as a companion for his pet.

> "Toward ten every evening the two take turns to bathe. I have fitted a board across the basin under the tap where the water drips one drop at a time. To be wet all over makes them very weak and very unhappy, but to catch one drop, and wash vigorously with that, and then catch another, that is different. I myself also look forward to it—to see the way they rise from the board, put out those marvelous hands, and wait for the drop."
>
> Gustav Eckstein, "Two Lives," in The Norton Book of Nature Writing, Robert Finch and John Eler, Eds., (NY, W.W. Norton & Company, 1990) p. 426.

The Three R's: Reduction, Refinement and Replacement

At the end of the Introduction we spoke briefly about alternatives to animal research. Although the term "alternative" is often used synonymously with "replacement," the Three R's, as they are known in research, (refinement, reduction, and replacement) (see box below), involve a wide array of strategies to minimize animal pain and distress. Refinements in animal research include such things as attention to proper animal husbandry and handling, environmental enrichments, improvements in the use of aesthetics and analgesics, and better recognition of pain and distress.

Increased attention to alternatives is the result of several historical trends. First, the moral dilemma that many feel about using animals in research gave impetus to the search for alternatives. Second, there has been a shift in social consciousness over the last twenty to thirty years, with people asking questions about animal welfare in general. Europe has a long tradition of making changes in their welfare laws and our country is feeling pressure from public opinion. Third, the scientific advances already made, the increasing skills in technology, have begun to make the creation of alternatives to animal models a possibility.

A good resource for information on this is the Johns Hopkins website for alternatives at: http://caat.jhsph.edu/. The Johns Hopkins center was initially funded with money from companies engaged in cosmetics testing. These companies were responding both to public opinion and their own interest in finding new methods. There are many cases where the IACUC at an institution will ask if the research protocol included a search for viable alternatives to live animals. The John's Hopkins Center, as well as the IACUC website at (http://www.iacuc.org/) have clearinghouse information as to alternatives.

The University of California Center for Animal Alternatives is another resource. Part of their mission statement reads: "The least explored of The Three R's—refinement of animal care and use—can include new behavioral, husbandry, or veterinary procedures that improve the well-being of research animals, and may enhance the scientific results by providing more accurate data. Recently, a fourth R has been added-responsibility-referring to integration of concerns for the welfare of animals into the ethical and responsible conduct of science and teaching." (http://www.vetmed.ucdavis.edu/Animal_Alternatives/mission.htm#The%200Objectives)

From the Mission Statement
Promote and support research in the development of in vitro and other alternative techniques.

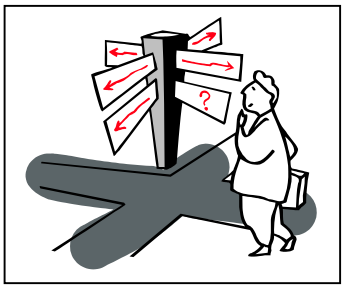
Serve as a forum to foster discussion among diverse groups leading to creative approaches to facilitate acceptance and implementation of alternatives.

Provide reliable information on the science, philosophy, and public policy of alternatives to academia, government, industry and the general public.

Educate and train in the application of alternatives.

- Alternatives are defined as new methods that refine existing tests by minimizing animal distress, reduce animal usage, or replace whole animal tests.

Center for Alternatives to Animal Testing: http://caat.jhsph.edu/about-us/vision.htm



Major Theme

Working with Institutional Guidelines and Regulations both those at the National level and those at NC State University

Every project that uses animal subjects at NC State is bound by relevant federal regulations and institutional policy. When you begin to work with your team, you will be given training on the particular species you are working with, the parameters of your experiment (s) and the specific guidelines for administering anesthesia and medications, taking samples, housing, feeding, etc. In addition, all personnel who work unsupervised with animals must complete a web-based training program. This training relies heavily on training used by the University of Minnesota. You can find this web-based instruction at: http://www.research.umn.edu/subjects/animals/training/

Each department and division will differ and your supervisor is the first person to go to with specific questions and concerns.

More general information about NC State regulations can be found on the Sponsored Programs and Regulatory Compliance (SPARCS)—Institutional Care and Use Committee (IACUC) website. On this site you will find links to specific IACUC forms, such as the "Application for Vertebrate Animal Use." There are also links to the policies and guidelines such as the "Training and Certification Requirement" and "Intra- and Postoperative Monitoring and Record Keeping. " Also useful are the links to the various federal agencies and published guidelines, as well as access to the major organizations involved with animal subjects, such as the Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC) and the American Association for Laboratory Animal Science (AALAS).

One way to look at such guidelines is that they are the values of our society made tangible. In Module V, Professional Responsibility and Codes of Conduct, we commented on the idea that professional codes are a kind of contract between society at large on one hand and the trained experts on the other. Continuing this thought, can we think about the guidelines for animal care and use as a kind of contract between researchers and society? Can we think of these regulations and guidelines as analogous to the Belmont Report, protection for animals similar to the protection in place for children?

What about as a contract between researchers and animals? Or, is this idea irrelevant, because animals cannot give consent?

Federal Regulations, Principles and Guidelines

The NC State University Policy on Animal Use (http://www.ncsu.edu/sparcs/policy/lab1.html) includes adherence to two sets of federal regulations that govern use of animals in research, teaching, and testing: the Animal Welfare Act (http://www.aphis.usda.gov/ac/publications.html) and the Health Research Extension Act (and the corresponding Public Health Policy on Humane Care and Use of Laboratory Animals: (http://grants.nih.gov/grants/olaw/references/phspol.htm). The latter relies heavily on another important standards document, the Guide for the Care and Use of Laboratory Animals (http://www.nap.edu/readingroom/books/labrats/). Although there are some differences in the two sets of regulations, they agree in most areas, such as the need for and responsibilities of an Institutional Animal Care and Use Committee (IACUC). Also included are standards for veterinary care, husbandry, and the animals' physical environment, personnel qualifications, and occupational health and safety.

Another vital component of federal policy is the "U.S." Government Principles for the Utilization and Care of Vertebrate Animals Used in Testing, Research, and Training" (http://grants.nih.gov/grants/olaw/references/phspol.htm#principle) Each of these principles articulates an essential facet of what constitutes humane treatment of animal subjects in research. One of the most important of these is Principle IV, which refers to the imperative for minimization of discomfort, distress and pain. When pain or distress may occur, the federal Animal Welfare Act requires the researcher to search for and carefully consider alternatives to those procedures.

Agricultural animals used for agricultural purposes are not specifically regulated by the federal government, but NC State University, like most academic institutions, includes them under its animal care and use umbrella. For these species, the university relies heavily on the Guide for the Care and Use of Agricultural Animals in Agricultural Research and Teaching (available from the Federation of Animal Science Societies: (http://www.fass.org/).

There are research projects at NC State University that are funded by government organization such as the National Science Foundation (NSF) or the National Institute of Health (NIH). For those working on these projects, not only must NC State University guidelines be followed, but also those of the granting agency. For many projects, the NIH guidelines are followed. You can access these guidelines at: (http://grants.nih.gov/grants/olaw/references/phspol.htm#principle).

"Each of these principles articulates an essential facet of what constitutes humane treatment of animal subjects in research. One of the most important of these is Principle IV, which refers to the imperative of minimization of discomfort, distress and pain. When pain or distress may occur, the Federal Animal Welfare Act requires the researcher to search for and carefully consider alternatives to those procedures."

Dr. Richard Fish
Director of University Animal Resources
NC State University

Case Studies

The material of ethics, the "stuff" we are going to work with are qualitative values such as honesty and responsibility and justice. The method of analysis we will use is the case study.

A case study is a little story, a little drama similar to the hundreds of situations we all go through in our lives whether we are scientists or not. Storytelling is a currency in our social community. Running experiments and reporting on them is another kind of currency-one special to the scientific community. The case study is a kind of thought experiment that gives us a "work-out" in doing science with integrity.

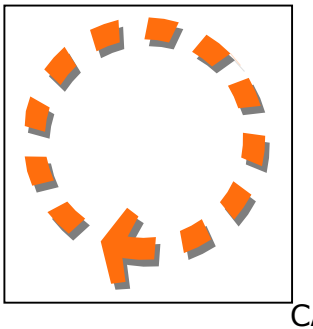
Many classes in ethics spend the majority of class time working with case studies, using them as exercises in moral reasoning, helping students gain familiarity with qualitative problem solving. We have included two case studies in each module: most of them are from the series of case studies prepared by the Association for Practical and Professional Ethics, Brian Schrag, Editor. (http://php.indiana.edu/~appe/home.html)

We have also a simplified version of Dr. Regan's "Moral Checklist" from his essay in Module 1 Research Ethics: An Introduction. What we advise is to use this as a template when analyzing case studies.

First, the facts of the case. Who, what, where, when, and why.	Next, the values of the case. For example, fairness, honesty, and collegiality-these are the qualitative values.

If clear, go on to the heart of the matter, the conflict in duties, the what we owe to whom, or as Dr. Regan notes, the conflict between "the good and the good." How will we be fair to everyone? He suggests we divide our obligations (our moral duties) into these categories:

Non-discretionary:	Discretionary:	Special:
What we owe to everyone; for example, the person sitting next to us at lunch in a restaurant.	Extra commitments we owe to no one in particular; the duty to help the needy.	What we owe to our family, friends, students, colleagues and teachers; the people to whom we are especially committed.



CASE STUDIES OFTEN FOCUS ON CONFLICTS IN DUTIES

When working with case studies, it is helpful to organize our materials, the quantitative and qualitative values in a sequential way, organizing what we owe to whom, in a methodical manner.

For instance, take the Pigs and People case study, printed on the next page, and analyze it as Dr. Regan has outlined, in sequence. Once you have listed all your ethical variables, arrange them in a hierarchy, from most important to least important. If a tie, arrange in a group. If unsure or in a conflict, what additional information might be useful? Is it always "either-or?" (We've put down a few items just to get started….)

1. Facts of the Case *(you are on an IACUC, research subjects will die, frequent blood and biopsy testing will be done….*)

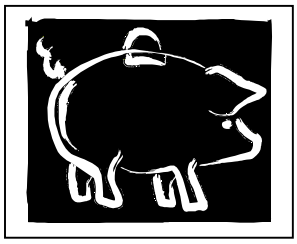
2. Values in the Case (*honesty, personal stand on where pigs are in the moral community, justice (towards whom?….)*

3. Conflicts in Duties (to members of IACUC, fellow researchers, pigs in the study, pigs in general, malnourished babies….)

4. Universalization of Actions (*What if everyone were say yes to this type of research? And, what if everyone were to say no?)*

5. Bad Consequences of Actions (*What if you were the only one on the IACUC to say yes to research? Or, conversely, the only one to say no?)*

What do you think the objective solution is?
What would you do?



Case Study: Pigs and People

The Animal Welfare Act requires that research facilities appoint an Institutional Animal Care and Use Committee (IACUC) that has the authority for review and approval of all animal-use protocols. As the attending veterinary of a large mid-western university, you are a required member of the IACUC. A protocol has been submitted to the IACUC by Professor Fae Moss, in which she proposes to determine the effect of extreme nutrient deprivation on muscle and fat metabolism in young pigs. The experimental design will be to feed groups of pigs graded percentages (25, 50, 75 and 100%) of maintenance diet until pigs on the poorest diet die (estimated to be about 60 days). Frequent blood and biopsy samples will be taken to monitor tissue breakdown. The stated goal of the project is to devise better grower diets for the pork industry.

- Would you vote to approve the proposed study?

Prior to the IACUC you meet with Prof. Moss' graduate student, who says that the actual goal of the study is to use the swine model to develop an "early warning" test of nutritional deprivation in children. The student says that the test—designed to be used in the field—will save thousands of malnourished babies by allowing aid workers to identify "at risk" infants at an early age.

- Does this information change your decision?
- The project will be the thesis of the graduate student, a citizen of a desperately poor third-world country; her baby sister has just died of starvation. Does this news alter your decision?

In subsequent conversation with Professor Moss, you learn that another component of the project is to develop and test (on starving swine) a cheap nutritional supplement that will rapidly restore starving babies to health, even those near death. She claims that 40,000 lives per day might be saved.

- Does this information change your attitude?
- How would your view change if the study were proposed to be conducted in dogs? Rats?

(Case courtesy of National Agriculture Biotechnology Council Bioethics Institute Handbook, North Carolina State University, May 22-27, 1999, case #3)

Thinking Outside the Box: How Should IACUC members be chosen?

The general rule is that the IACUC needs to have a group with a minimum of five members from the following categories:

1) a veterinarian;
2) a practicing scientist who has experience with animal subjects;
3) someone who is concerned for non-scientific aspects (e.g. a member of the clergy or a lawyer);
4) a person unaffiliated with the institution represented by the IACUC, including not being related to a family member employed by the institution.

Usually, the person from the community is in category 3 or 4. One of the common dilemmas is the attitude this person has toward animal research in general. Scientists feel it unfair that someone without scientific knowledge—perhaps even antagonistic to the work of science—would have a say on the research protocols. At the same time, the guidelines that set forth community involvement are attempting to bridge the gap between the scientific experts and society at large.

How would you design an IACUC? What about the problem of lay people having enough understanding of the scientific process? What of the other side of the problem, the charge that IACUCs just "rubber stamp" what the institution wants in the first place?

The question of the make-up of animal review committees is interesting in light of an issue that came up in Module 1, Research Ethics: an Introduction, in the reading selection from Kristin Shrader-Frechette, The Ethics of Scientific Research. In Chapter 9, "The Duty To Do Research," the author comments on the inter-relationship between the research university and the taxpayers that fund the work. If scientists have a duty to do research—a duty to heal, as Dr. Rick Fish points out—do they have a duty to involve the community at large in their plans and procedures?

"The term "community member" means what it says although in common parlance it is often used rather loosely. Terms such as community, public, lay, unaffiliated, non-institutional, and non-scientific member, are sometimes used as if they were interchangeable, although some of these terms mean quite different things. The rationale for including such members lies in the consensus that, where federal funding is concerned, decision concerning social values should be made in a forum that includes societal involvement. Congress wanted to make clear that scientists are not free to do whatever they wish to animals—decision making should not rest solely in their hands."

Barbara Orlans, "Community Members on Animal Review Committees," in In the Name of Science: Issues in Responsible Animal Experimentation, (New York: Oxford University Press, 1993), pp. 99-117. This chapter is available online via the NC State Library electronic course reserves.

Additional Resources

Articles

Beauchamp, Tom L. "The Moral Standing of Animals in Medical Research," The Journal of Law, Medicine & Health Care, 20, no 1-2, Spring-Summer, pp. 7-16. This essay is used by the Poynter Center in their annual "Teaching Research Ethics" workshop.

Cohen, Carl, "The Case for the Use of Animals in Biomedical Research," The New England Journal of Medicine, October 2, 1986, pp. 865-870. This article is often quoted as basic reading for people using animals.

Huffman, Nick, "Polls Show Researchers Favor Lab Animal Protection," Science 290: 711 (2000).

Nature 407 (6805): 659 (2000). "In Defence of Animal Research,"

Nicoll, Charles S. and Sharon M. Russell, "Mozart, Alexander the Great, and the animal rights/liberation philosophy," in FASEB Journal, Vol. 5, November 1991. pp. 2888-2892.

Phillips, Donald F., "Conference Explores Ethics of Animal Research with Critical Thinking and Balanced Argument". /.JAMA, 276 (2): 87-88 (1996).

Raloff, Janet. "Of Rats, Mice, and Birds," Science News 158 (54): 334-335 (2000).

Regan, Tom, "Empty Cages - Animal Rights and Vivisection," from Animal Experimentation: Good or Bad? (Hodder and Stoughton, 2002) Current work from Tom Regan articulating the Abolitionist stance vis-à-vis research using animal subjects.

Rowan, Andrew et. al., "The Benefits and Ethics of Animal Research," in Scientific American, February 1997. Special Forum. A roundtable discussion of the issue from all sides, by various writers. This article is used in the Poynter Center's annual "Teaching Research Ethics" workshop.

Rowan, Andrew N., "Ethics Education in Science and Engineering: The Case of Animal Research," Science and Engineering Ethics 1(2): 181-184 (1995)

Books

Dolan, Kevin, Ethics, Animals and Science, (Oxford: Blackwell Science, Ltd., 1999) A recent book that covers a wide range of topics: introduction to ethical theory, issues around pain and distress, ethics committees, and alternatives. The bibliographies throughout the book are useful resources. Chapter 13, "Cost-Benefit-The Balancing Act," (Part 1) and (Part 2) is on electronic reserve.

Comstock, G. The Iowa Sate University Model Bioethics Institutes, in: Handbook: National Agricultural Biotechnology Council Bioethics Institute, North Carolina State University, May 22-27, 1999.
(http://www.biotech.iastate.edu)

Lynette A. Hart, ed. Responsible Conduct with Animals in Research (New York: Oxford University Press, 1998). A collection of essays by well-known researchers on a variety of topics. Two that are available electronically are:

John P. Gluck, "Change During a Life in Animal Research: The Loss and Regaining of Ambivalence." This is an autobiographical account of a well-known scientist's work with animals—primates—and how his personal conflict between what he owed to science and what to animals worked itself out over the years.

Arluke, Arnold and Julian Groves, "Pushing the Boundaries, Scientists in the Public Arena,". This is a readable, useful discussion of the interface of science, the media and the public as it relates to animal subjects in research. The authors do a good job of portraying the dilemmas of scientists trying to explain their research to the public amidst the rhetoric on all sides.

Institute of Laboratory Animal Resources and the National Research Council, Guide to the Care and Use of Laboratory Animals, National Academy Press, Washington, D.C. 1996. Available as an electronic book at: http://bob.nap.edu/html/labrats/

Kraus, A. Lanny and David Renquist, Eds. Bioethics and the Use of Laboratory Animals: Ethics in Theory and Practice.,(Dubuque, IA: Gregory C. Benoit, Publishing, 2000) "Attitudes to Animal Research." By Andrew Rowan and Valerie de Liedekerk, pp. 171-183.

Midgley, Mary, "Should we let them go?" in Attitudes to Animals: Views in Animal Welfare, Francine L. Dolins, Editor, (Cambridge: Cambridge University Press, 1999) pp. 152-163. Recent writing from a well-known moral philosopher

Monamy, Vaughan. Animal Experimentation: A Guide to the Issues. (New York: Cambridge University Press, 2000) pp. 35-56. "The Moral Status of Animals,"

Orlans, F. Barbara, In the Name of Science, Issues in Responsible Animal Experimentation, (Oxford University Press: New York, 1993) This book by a well known ethicist at Georgetown University is excellent for in depth analysis of

complex issues in a straightforward fashion. See chapter 4, "Legislation and the Growth of Protagonist Organizations," Chapter 11, "From Sunshine Laws and Civil Disobedience to Raids," gives an account of some of the situations at various research institutions that faced violence from protestors.

Petrinovich, Lewis, Darwinian Dominion: Animal Welfare and Human Interests (Cambridge: MIT Press, 1999) For a deeper investigation of the discussion of subjective/objective stance and how it affects scientific research, particularly with animal subjects, Chapter 4, "Research Methods and the Aims of Science," is available electronically. Although this chapter is intense and slow going at times, it is a valuable resource for those wishing to further investigate the relationship between the scientific method and the use of animals in research. A copy of this book is on print reserve with three-day circulation.

Rachels, J. The Elements of Moral Philosophy, 3rd ed. (McGraw-Hill, 1999). This is an accessible, handbook type of volume, with straightforward descriptions of the major philosophic schools of thought. Good for becoming articulate about complex issues.

Regan, Tom. The Thee Generation. (Philadelphia: Temple U Press, 1991) pp. 31-63. Chapter 3, "Ill-Gotten Gains," is on electronic reserve.

Rudacille, Deborah, The Scalpel and the Butterfly: The War Between Animal Research and Animal Protection, (New York, Farrar, Straus and Giroux, 2000) Very readable account of the history of scientific research with animal subjects and the evolution of the animal protection movement.

Rollin, BE. An Introduction to Veterinary Medical Ethics: Theory and Cases, (Ames:Iowa State University Press, 1999) A readable book with a large number of cases and a good introduction to ethical theory as it relates to animal issues.

Singer, Animal Liberation (NY: Avon books, 1990) A classic reading in the history of moral philosophy, this chapter focuses on animals in research. "Tools of the Trade," Part 1, Part 2, Part 3, Part 4, Part 5,

Taylor, Angus, Magpies, Monkeys and Morals: What Philosophers Say About Animal Liberation, Peterborough, Broadview Press, 1999. A very readable book covering the major issues. Two chapters on electronic reserve are: "Animals and the Moral Community," and "Is It Wrong to Use Animals for Scientific Research?" Part 1 and Part 2

van Autphen, L.F.M. and M. Balls, Eds. Animal Alternatives, Welfare and Ethics. pp. 43-54. (New York: Elsevier, 1997) "Ethics, Codes and Animal Research," by Andrew Brennan available electronically as is "The Study of Animal Welfare: A Moral Obligation," by HRH Prince Laurent.

Websites

Animal Welfare Information Center
http://www.nal.usda.gov/awic/

American Veterinary Medical Association Welfare Policies:
http://www.avma.org/care4pets/morewelf.htm

Ethics and Animals—These pages contain links and text concerning animal-related ethics; they include information on animals rights, animal welfare, animal research, environmentalism, hunting and vegetarianism:
http://www.geocities.com/~amazondoc/ethics.html (This link may no longer be valid.)

The Pain and Distress Initiative of the Humane Society of the United States
http://www.hsus.org/ace/11400

Institute for Laboratory Animal Research
http://www4.nationalacademies.org/cls/ilarhome.nsf

National Institutes of Health has a website for the mouse as a model animal for research: http://www.nih.gov/science/models/mouse/

National Institutes of Health Health http://oacu.od.nih.gov/ is one of the larger and most complete web addresses to go to for information about rules, regulations and the latest news in research using animal subjects. Another site of theirs is from the Office of Extramural Research, from the Office of Laboratory Animal Welfare:
http://grants.nih.gov/grants/olaw/olaw.htm

Public Responsibility in Medicine and Research
http://www.primr.org/

Veterinary and Animal Science Organizations: netvet
http://netvet.wustl.edu/vetorg.htm

Society for Veterinary Medical Ethics:
http://www.vetmed.wsu.edu/org_SVME/

"Few areas of applied philosophy have witnessed more dramatic growth in the recent past than bioethics; moreover, in light of the pace of advances in the life sciences, from developments in preventative medicine to the cloning of sheep and mice, few areas of ethical concern are likely to grow more dramatically in the foreseeable future. …Whatever the future holds, one thing is certain: other-than-human animals will be used in the name of advancing scientific knowledge, both basic and applied….While people of good will can and often do disagree in the answers they give to questions about the morality of using animals for scientific purposes, one point on which virtually everyone agrees is that these are legitimate ethical questions that must be addressed."

Tom Regan, Defending Animal Rights (Champaign, University of Illinois Press, 2001). P. 4. Chapter 1, "Ethical Theory and Animals" Part 1, Part 2, and Part 3 is on electronic reserve.