Online Ethics Center
FOR ENGINEERING AND SCIENCE

Animal Subjects Bibliography

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Description

A partially-annotated list of books, web resources, and journal articles that describe the issues related to the use of animals in scientific research.

Body

Guidelines

American Psychological Association Guidelines for the Ethical Conduct in the Care and Use of Nonhuman Animals in Research
Ethical guidelines adopted by the American Psychological Association governing all use of animals in research by members of their association. This includes guidelines for justifying the research, the care and housing of animals, experimental procedures, field research, and the educational use of non-human animals.

American Physiological Society. Guiding Principles for the Care and Use of Vertebrate Animals in Research and Training

Outlines key guidelines for the use of animals in teaching and research approved by the APS, and most recently updated in 2014.

Animal Welfare Information Center - Research Animals

Collection of resources, links to federal regulations and guidelines relating to the use of animals in research. Compiled by the U.S. Department of Agriculture's National Agriculture Library.

Guide for the Care and Use of Laboratory Animals

Published by the National Research Council, this is the basic guide for the proper care of animals used in research in the U.S. Can be read online through the National Academies Press website. You can also find it in Japanese, Thai and Chinese.

National Institute of Allergy and Infectious Diseases: How to Write an Application Involving Research Animals

Explains procedures for writing an application and then applying for and maintaining an NIH grant application for research that uses animals.

National Institutes of Health Animals In Research Web Site

This site summarizes the latest news, policies, education, training and information on animals in research, with a focus on animal use in research funded by the U.S National Institutes of Health.

National Institutes of Health (NIH): Animal Research Advisory Committee (ARAC) Guidelines

A collection of guidelines covering all aspects of the use of animals in research for the NIH.

Recognition and Alleviation of Distress in Laboratory Animals

Published in 2008, this report by the National Academies Press focuses on the stress and distress which is experienced by animals when used in laboratory research, and aims to educate researchers on current scientific and ethical issues associated with this issue. It loks at current research on this issue and identifies principles for the recognition and alleviation of distress.

Reproducability Issues in Research with Animals and Animal Models

Results from a public workshop held in 2014 discussing fundamental aspects of experimental design of research using animals and animal models, aimed at

improving reproducability.

United Kingdom, National Centre for the Replacement Refinement and Reduction of Animals in Research. (NC3R). Animal Research: Reporting of In Vivo Experiments Guidelines (ARRIVE Guidelines)
These guidelines are intended to improve the reporting of research using animals- maximizing information published and minimizing unnecessary studies.

The U.S. Government's Principles for the Utilization and Care of Vertebrate Animals Used in Testing, Research and Training
This 2015 reprint of the Public Health Service (PHS) Policy on Humane Care and Use of Laboratory Animals outlines the major regulations governing the care and use of animals in research funded by the U.S. National Institutes of Health, including the responsibilities of institutions receiving funds, the functions of Institutional Care and Use Committees, and information required in applications and proposals for awards submitted to Public Health Service regarding the use of animals in research.

The 3Rs
Introduces the principle of the 3Rs - Replacement, Reduction and Refinement- and provides some excellent materials on how to improve the design, contduct and analysis of research using animals. Maintained by the United Kingdom's National Centre for the Replacement, Refinement and Reduction of Animals in Research.

Altaweb: Alternatives to Animal Testing
This is a web clearinghouse of news, projects, and other resources on efforts to develop alternatives to the use of animals in research. Includes full text of articles, news feeds, and an introduction to the humane use of animals in research.

Animal Welfare Information Center
An excellent resource providing a wealth of information for improving animal care and use in research, testing and teaching.

Animals in Laboratories - Humane Society of the United States (HSUS)
Includes information on the Pain and Distress Initiative; the use of primates in biomedical research; the use of animals in product testing; and the use of animals

in education.

Australia and New Zealand Council for the Care of Animals in Research and Teaching (ANZCCART)

ANZCCART is an independent body which has been developed to promote effective communication and cooperation among all those concerned with the care and use of animals in research and teaching.

Fund for the Replacement of Animals in Medical Experiments (FRAME)

FRAME's ultimate aim is the elimination of the need to use laboratory animals in any kind of medical or scientific procedure. FRAME is dedicated to the development of new and valid methods that will replace the need for laboratory animals in medical and scientific research, education, and testing. Where the use of animals is currently necessary, FRAME supports the reduction of numbers involved to an unavoidable minimum and refinement of experimental procedures to minimize any suffering caused.

Institutional Animal Care and Use Committees

Developed by the American Association for Laboratory Animal Science, this website describes the role IACUCs play in approving research using animal subjects, and guidelines for IACUC committee members.

Lab Animal

A peer-reviewed journal for professionals in animal research, emphasizing proper management and care of animals used in research.

National Institutes of Health Model For Performing Institutional Animal Care and Use Committee: Continuing Review of Animal Research

A *paper on the current functioning of institutional animal care and use committee (IACUC) continuing review of ongoing animal-related activities by the Public Health Service Policy (PHS Policy) and United States Department of Agriculture (USDA) animal welfare regulations.*

Using Animals in Intramural Research: Guidelines for Principal Investigators

This manual (also available as an online tutorial) presents relevant animal research laws and regulations, and provides an overview of how to prepare an NIH Animal Study Proposal.

Books and Reports

For a larger bibliography on this topic, see the Animal Welfare Information Center maintained by the U.S. Department of Agriculture's National Agricultural Library.

Akins, Chana K. Sangeeta Panicker, and Christopher L. Cunningham. 2005. *Laboratory animals in research and teaching, ethics, care, and methods*. Washington, D.C.: American Psychological Association.

Armstrong, S.J. and R.G. Botzler. 2003. *The animal ethics reader*. New York: Routledge.

This large anthology seeks to bring together a number of key essays on the moral status of animals. The book is divided into ten distinct sections, and the essays cover such issues as theories of animal ethics, animal capacities (such as pain, emotion, consciousness), animals for food, animal experimentation, zoos and aquariums, and animal law and animal activism.

Calarco, Matthew. (2015) Thinking Through Animals. Stanford, CA:Stanford University Press.

As the field of critical animal studies expands, this book provides an overview and analysis of philosophical views on the status of animals and their use by humans and uses three rubrics –identity, differences, and indistinction – to differentiate three major paths of thought about animals, and what these schools of thought may mean in our use and treatment of animals in the future.

Carbone, Larry. 2004. *What animals want: Expertise and advocacy in laboratory animal welfare policy.* New York: Oxford University Press.

Cohen C. and T. Regan. 2001. *The animal rights debate.* Lanham: Rowan and Littlefield Publishers.

This unique volume follows a point/counterpoint layout, with the two philosophers authoring this volume arguing about the moral status of animals, and the ethics of

using animal subjects for research purposes

Gluck, John P., Tony DiPasquale, and F. Barbara Orlans. 2002. *Applied ethics in animal research.* West Lafayette, IN: Purdue University Press.
Seven essays, developed from presentations in the series of conferences organized over several years by Barbara Orlans, consider issues of what is called the Troubled Middle—between the idea that research animals are just supplies like glassware, and the idea that no life should be sacrificed for another. Scientists and ethicists strive to avoid sheer rhetoric and attempts to manipulate as they look at philosophy, statutory regulation, and the laboratory application of ethics.

Guerrini, Anita. 2003. *Experimenting with humans and animals: From Galen to animal rights*. Baltimore: Johns Hopkins University Press.
The author looks at the history of using animals in research from vivisection in ancient Alexandria to present-day battles over animal rights and medical research employing human subjects.

Hastings Center Report (2012). Animal Research: Evolving Views and Practices.
Report from a 2011 workshop that summarize recent developments on the ethical use of animals in research, including their use in the research of human diseases, toxicity testing, primate research, and U.S. law and animal experimentation.

Institute of Medicine and National Research Council of the National Academies (U.S.) (2011). Chimpanzees in Biomedical Research: Accessing the Necessity. National Academies Press, Washington D.C.
Recent advances in alternate research tools have rendered chimpanzees largely unnecessary as research subjects. This report evaluates the current status of research involving chimpanzees and while it does not endorse an outright ban on this type of research, it establishes a series of uniform criteria for determining when, if ever, current and future research use of chimpanzees in necessary to treat, prevent, or control public health challenges.

Monamy, Vaughan. 2009. *Animal experimentation: A guide to the issues*. New York: Cambridge University Press.
This book covers the history and ethics of experimentation; discusses the moral status of animals and the obligations of researchers; and introduces alternatives to animal research.

---. 1998. *The human use of animals: Case studies in ethical choice.* New York: Oxford University Press.
This book begins with a brief introduction with a chapter explaining the main types of ethical theory as distinguished by philosophers and how they have been applied to the issue of the moral status of animals. The following sixteen chapters discuss different controversies that emerge over the use of animals in scientific research and case studies that have brought these controversies into public discourse. The driving question asked when looking at each case study is, how far is it morally justifiable to harm animals for the benefit of mankind.

Nuffield Council on Bioethics. The Ethics of Research Involving Animals. London: Nuffield Council on Bioethics, 2005.
A report that talks about the history and current use of animal subjects in research, summarizes some of the major issues raised by animal research, and discussion about replacing animals or using alternatives, reducing the number of animals involved, and refining studies to either not use animal models, or use animal models that are best for the research question being asked.

Rudacille, Deborah. 2000. *The scalpel and the butterfly: The war between animal research and animal protection.* New York: Farrar, Straus and Giroux.
This book explores the ongoing struggle between the promise offered by new research and the anxiety about safety and ethical implications in the context of the conflict between experimental medicine and animal protection that dates back to the mid-nineteenth century.

Silverman, J., Suckow, M.A., Murthy, S. 2007. *The IACUC Handbook.* Boca Raton: CRC Press.
This handbook focuses on basic and advanced concerns of Institutional Animal Care and Use Committees (IACUC) and addresses questions and problems with IACUC committees.

Singer, Peter, ed. 2006. *In defense of animals, the second wave.* New York: Blackwell.
This anthology, edited by Peter Singer, discusses the moral status of animals, the animal movement, and issues such as the use of animals in research and in industrial farming. The volume addresses philosophical questions about humanity's relationship with animals, questions of the treatment of animals in research, zoos, and agriculture, and strategies animal activists use in bringing attention to the mistreatment of animals.

Taylor, Angus. 2003. *Animals and ethics: An overview of the philosophical debate.* Ont: Broadview Press.
This book seeks to map the philosophical debate about the ethical status of animals, and humans' relationship with different species. The author covers the moral status of animals both currently and from a historical perspective, practical issues such as the use of animals for scientific research and the impact of environmental concerns on animals, and the relationship between good individual animal lives and a flourishing ecosystem.

Journal Articles

Aaltola, Elisa. 2011. The Philosophy behind the Movement: Animal Studies versus Animal Rights. *Society & Animals* 19(4), 393-406.
Recently, many pro-animal thinkers have expressed critical views on the animal rights movement. In particular, the movement has been criticized for being philosophically uninformed, politically regressive, and practically unpersuasive. This paper investigates these criticisms and seeks to map out the philosophy behind the grassroots animal rights movement, specifically. It concludes that the criticism presented by animal studies scholars is often misplaced due to a lack of understanding of the philosophical notions within the movement, but that the critics are right to argue that the movement needs to place more emphasis on persuasion.

Aaltola, Elisa. (2005). The Politics and Ethics of Animal Experimentation. *International Journal of Biotechnology* 7.4: 234-49.

Anderson, Warwick. (1990). A New Approach to Regulating the Use of Animals in Science." *Bioethics* 4(1): 45-54.

Balls, M. (2006). Animal Experimentation: Should the Three Rs be Abandoned? Alternatives to Laboratory Animals: ATLA 34(2): 139-41.

Beauchamp, Tom L. (1997). Opposing Views on Animal Experimentation: Do Animals Have Rights? *Ethics and Behavior* 7(2): 113-121.

Beauchamp, T. L., DeGrazia, D., Ferdowsian, H. R., & Gluck, J. P. (2015). The Ethical Challenges of Animal Research. *Cambridge Quarterly of Healthcare Ethics, 24*(4), 391-406. doi:10.1017/S0963180115000067
Drawing on concepts of research involving human subjects, the authors describe cases that illustrate ethical deficiencies in the conduct of animal research, including inattention to the issue of consent or assent, incomplete surveys of the harms caused by specific protocols, inequitable burdens on research subjects in the absence of benefits to them, and insufficient efforts to provide ethical justification. The authors provide a set of recommendations to begin to address these deficits.

Beauchamp, T. L., DeGrazia, D., & Morton, D. B. (2015). The Upper Limits of Pain and Suffering in Animal Research. *Cambridge Quarterly of Healthcare Ethics, 24*(4), 431-447. doi:10.1017/S0963180115000092
Unlike in human research where standards often call for the establishment of upper limits of risk of pain,, suffering or distress, very few upper limits of this kind are set for animal research. The authors discuss the merits of European Directive 2010/63/EU

on the Protection of Animals Used for Scientific Purpose, and discuss why similar regulations are needed to prevent undue suffering of animals involved in research.

Beauchamp, T. L., DeGrazia, D., & Sebo, J. (2015). Necessary Conditions for Morally Responsible Animal Research. *Cambridge Quarterly of Healthcare Ethics, 24*(4), 420-430. doi:10.1017/S0963180115000080
This article presents the necessary conditions for morally responsible animal research that are meant to satisfy people on both sides of the debate. These standards include an expectation of net benefit from the research, a worthwhile life condition, and a no-unnecessary-harm/qualified basic-needs conditions.

Bishop, Laura Jane and Anita Lonnes Nolen. (2001). Animals in Research and Education: Ethical Issues. Kennedy Institute of Ethics Journal 11(1) : 91-112.

Cabrera Trujillo, L., & Engel-Glatter, S. (2015). Human-Animal Chimera: A Neuro Driven Discussion? Comparison of Three Leading European Research Countries. *Science & Engineering Ethics, 21*(3), 595-617. doi:10.1007/s11948-014-9556-6
Research with human-animal chimera raises a number of ethical concerns, especially when neural stem cells are transplanted into the brains of non-human primates (NHPs). Besides animal welfare concerns and ethical issues associated with the use of embryonic stem cells, the research is also regarded as controversial from the standpoint of NHPs developing cognitive or behavioral capabilities that are regarded as 'unique' to humans. This paper summarizes the ethical issues raised by research with human-animal brain chimeras and compares the relevant regulatory instruments and different recommendations issued in national reports from three important European research nations: Germany, Switzerland and the United Kingdom.

Cattaneo, C., Maderna, E., Rendinelli, A., & Gibelli, D. (2015). Animal experimentation in forensic sciences: How far have we come? *Forensic Science International, 254*, e29-e35. doi:10.1016/j.forsciint.2015.06.024
In order to verify how forensic scientists are evolving in this ethical issue, the authors undertook a systematic review of the current literature by investigating the frequency of animal experimentation in forensic studies in the past 15 years and trends in publication in the main forensic science journals. Types of species, lesions

inflicted, manner of sedation or anesthesia and euthanasia were examined in a total of 404 articles reviewed, among which 279 (69.1%) concerned studies involving animals sacrificed exclusively for the sake of the experiment. The most recent call for a severe reduction if not a total halt to the use of animals in forensic sciences was made by Bernard Knight in 1992. In fact the principle of reduction and replacement, frequently respected in clinical research, must be considered the basis for forensic science research needing animals.

Clune, Alan C. (1996). Biomedical Testing on Nonhuman Animals: An Attempt at a 'Rapprochement' Between 'Utilitarianism' and Theories of Inherent Value. *Monist* 79(2): 230-246.

Crozier, G., & Schulte-Hostedde, A. (2015). Towards Improving the Ethics of Ecological Research. *Science & Engineering Ethics, 21* (3), 577-594. doi:10.1007/s11948-014-9558-4
The authors argue that the ecological research community should develop a plan for improving the ethical consistency and moral robustness of the field. They propose a particular ethics strategy, and suggest a particular set of conceptual (in the form of six core values-freedom, fairness, well being, replacement, reduction, and refinement) and analytic (in the forms of decision theoretic software, 1000Minds) tools that, they argue, collectively have the resources to provide an empirically grounded and conceptually complete foundation for an ethics strategy for ecological research.

Ferdowsian, H. (2011). Human and Animal Research Guidelines: Aligning Ethical Constructs with New Scientific Developments. *Bioethics, 25* (8), 472-478. doi:10.1111/j.1467-8519.2011.01923.x
Research involving human subjects is guided by the Nuremberg Code, Declaration of Helsinki, and the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research and the resulting Belmont Report. No similar, comprehensive and principled effort has addressed the use of animals in research. Although published policies regarding animal research provide relevant regulatory guidance, these policies have not emerged from the process of specifying consistent and reasoned ethical principles. This paper explores the historical convergence and divergence in the creation of human and animal research guidelines, as well as opportunities to align ethical frameworks with new scientific discoveries.

Ferdowsian, H. R., & Beck, N. (2011). Ethical and Scientific Considerations

Regarding Animal Testing and Research. *PLoS ONE, 6* (9), 1-4. doi:10.1371/journal.pone.0024059
The “3 Rs” encourage researchers to work to reduce the number of animals used in experiments to the minimum considered necessary, refine or limit the pain and distress to which animals are exposed, and replace the use of animals with non-animal alternatives when possible. The authors argue, however, that these guidelines do not go far enough and reflect the substantial developments in our new knowledge about the cognitive and emotional capabilities of animals, the individual interests of animals, or an updated understanding of potential harms associated with animal research.

Festing, S., and T. Patel. (2005). The Ethics of Research Involving Animals: A Review of the Nuffield Council on Bioethics Report from a Research Perspective." *ATLA Alternatives to Laboratory Animals* 33.6 (2005): 654-8.

Francione, Gary L. (2007). The Use of Nonhuman Animals in Biomedical Research: Necessity and Justification. *Journal of Law, Medicine and Ethics* 35(2): 241-248.

Gagneux, P., J. J. Moore, and A. Varki. (2005). The Ethics of Research on Great Apes. *Nature* 437(7055): 27-9. doi:10.1038/437027a
Discusses the ethical and scientific challenges researchers face when working with great apes.

Gluck, John P. and Jordan Bell. 2003. Ethical Issues in the Use of Animals in Biomedical and Psychopharmacological Research. Psychopharmacology. 171.1: 6-12.

Goodman, J., Chandna, A., & Roe, K. (2015). Trends in animal use at US research facilities. *Journal of Medical Ethics, 41*(7), 567-569. doi:10.1136/medethics-2014-102404
This study analyzes the use of all vertebrate animals by the top institutional recipients of National Institutes of Health research funds over a 15-year period. These data show a statistically significant 72.7% increase in the use of animals at these US facilities during this time period--driven primarily by increases in the use of mice. The authors suggest that their results highlight a need for greater efforts to reduce animal use, and they discuss technical, institutional, sociological and psychological explanations for this trend.

Hendriksen, C. F. M. (2005). The Ethics of Research Involving Animals: A Review of the Nuffield Council on Bioethics Report from Three Rs Perspective. *ATLA Alternatives to Laboratory Animals* 33(6): 659-62.

Koch, L., & Svendsen, M. N. (2015). Negotiating Moral Value: A Story of Danish Research Monkeys and Their Humans. *Science, Technology & Human Values, 40*(3), 368-388. doi:10.1177/0162243914553223
In 2004, twelve capuchin monkeys were moved from the labs of the Danish psychiatric hospital of Sankt Hans to a small private-owned zoo in another part of Denmark in order to be rehabilitated. These monkeys were the last nonhuman primates to be used as research animals in Danish biomedical laboratories. The moral landscape had changed, and it was no longer considered acceptable to use nonhuman primates in Danish biomedicine. From being considered a biological resource serving as a model of man, the monkeys had become moral subjects with a claim to a life suiting their natural needs.

Kolar, R. (2006). Animal Experimentation.” *Science and Engineering Ethics* 12(1): 111-22.
The author examines some of the problems that exist in the regulation of experiments involving human subjects. Though the use of animals in scientific research usually requires an ethical evaluation by an ethics committee, the standards are often unclear, there is often insufficient management of experiments undertaken for specific (e.g., regulatory) purposes, and in some cases conflicts of interest of ethics committees' members. The author discusses these problems in depth and examines European legislation on animal experimentation for cosmetics testing as one area where clear standards have been set, and the need for further examination of other fields and aspects of animal experimentation.

Koppelman, Elysa. (Undated). Federal Regulations for Animal Research. In Group Mentoring in Responsible Research Conduct: A Modular Sequence of Activities in the Responsible Conduct of Research for Faculty, Trainees, and Staff. Cambridge, MA: MIT. Undated.

LaFollette, Hugh and Niall Shanks. (1993). Animal Models in Biomedical Research: Some Epistemological Worries. *Public Affairs Quarterly* 7(2): 113-130.

---. (1995). “Utilizing Animals. *Journal of Applied Philosophy* 12(1): 13-25.

Levin, L. H., & Reppy, W. A. (2015). Reforming the politics of animal research. *Journal of Medical Ethics, 41*(7), 563-566. doi:10.1136/medethics-2012-101043
The authors suggest an update to institutional policies that will better inform the public about the use of nonhuman animals in biomedical research, and to improve the dialogue between the research community and animal welfare and rights communities.

Maloney, Dennis M. (2002). Link Between Animal Studies and Risks for Human Subjects. *Human Research Report* 17(7: 5.

Martins, A. R., & Franco, N. H. (2015). A Critical Look at Biomedical Journals' Policies on Animal Research by Use of a Novel Tool: The EXEMPLAR Scale. *Animals (2076-2615), 5*(2), 315-331. doi:10.3390/ani5020315
Animal research is not only regulated by legislation but also by self-regulatory mechanisms within the scientific community, which include biomedical journals'

policies on animal use. For editorial policies to meaningfully impact attitudes and practice, they must not only be put into effect by editors and reviewers, but also be set to high standards. The authors present a tool that classifies journals' policies on animal use--the EXEMPLAR scale--as well as an analysis by this scale of 170 journals publishing studies on animal models of three human diseases: Amyotrophic Lateral Sclerosis, Type-1 Diabetes and Tuberculosis. Results show a much greater focus of editorial policies on regulatory compliance than on other domains, suggesting a transfer of journals' responsibilities to scientists, institutions and regulators.

Mehdi Naderi, M., Sarvari, A., Milanifar, A., Borjian Boroujeni, S., & Mehdi Akhondi, M. (2012). Regulations and Ethical Considerations in Animal Experiments: International Laws and Islamic Perspectives. *Avicenna Journal of Medical Biotechnology, 4*(3), 114-120.

The Qur'an, the holy book of Muslims, and also Hadiths contain the obligatory ways to keep and treat animals. According to Islamic viewpoint, animals represent Allah's ability and wisdom, and humans must pay attention to their health and living conditions. Several Islamic manuscripts state that animals have their own position in the creation hierarchy and humans are responsible for supplying minimal facilities and their welfare. This paper reviews ethical consideration in animal experiments and guidance Islamic resources have in this area.

National Research Council (U.S.). (2004). Science, Medicine, and Animals: A Circle of Discovery. Washington, DC: National Research Council, National Academies Press.

Nussbaum, M. C. (2006). The Moral Status of Animals. *Chronicle of Higher Education.* 52(22): B6-8.

Perry, Baroness. (2005). Animal Research: Unraveling the Ethical Debate . *Chemical Engineer* (London) 772: 39-41.

Radzikowski, C. (2006). "Protection of Animal Research Subjects. *Science and Engineering Ethics* 12(1): 103-10.

The use of experimental animals, mostly rodents, in biomedical research and especially in oncology and immunology should be acknowledged with respect, recognizing the contribution of animal experimentation in the fascinating scientific progress in these disciplines of research. It is an obligation of the investigator to justify the scientific and ethical aspects of each study requiring the use of animals. The international guiding principles for using animals in biomedical research are well defined and have been distributed worldwide by the International Council for

Laboratory Animal Science (ICLAS) since 1956, when this organization was founded. In Poland, the ICLAS philosophy and principles are highly respected and were implemented.

Rennie, AE., and H.M. Buchanan-Smith. (2006). Refinement of the Use of Non-Human Primates in Scientific Research. Part I: The Influence of Humans. *Animal Welfare.* 15(3) (2006): 203-213.

Rollin, B.E. (2006). The Regulation of Animal Research and the Emergence of Animal Ethics: A Conceptual History. *Theoretical Medicine and Bioethics.* 27(4): 285-304.

Rollin, Bernard E. (2005). Reasonable Partiality and Animal Ethics." *Ethical Theory and Moral Practice: An International Forum.* 8(1-2): 105-21.

Saha, S. and Saha P.S. (1999). Ethical Issues of Animal and Human Experimentation in the Development of Medical Devices." *The Biomedical Engineering Handbook,* ed., J. D. Bronzino, 2nd edition. Boca Raton: CRC Press.
A general review of concerns for the use of animals and humans in biomedical device applications. See especially pages 191-198.

Saucier, Donald A. and Mary E. Cain. (2006). The Foundations of Attitudes about Animal Research. *Ethics & Behavior* 16(2): 117-133.

Schuppi, C.A., Fraser D., and McDonald. M. (2004). Expanding the Three R's to Meet New Challenges in Humane Animal Experimentation. *ATLA Alternatives to Laboratory Animals* 32(5): 525-32.

Shanks, Niall and Keith Green. (2004). Evolution and the Ethics of Animal Research." *Essays in Philosophy* 5(2): 1-12.

Steinmetz, Peter N. and Stephen I. Helms Tillery. (1994). "Animal Models: Some Empirical Worries." *Public Affairs Quarterly* 8(3): 287-298.

Theune, E. et al. (1994). A Comparison of Three Models for Ethical Evaluation of Proposed Animal Experiments. *Animal Welfare* 3(2): 107-129.

Thomas, D. (2005). The Ethics of Research Involving Animals: A Review of the Nuffield Council on Bioethics Report from an Antivivisectionist Perspective. *ATLA Alternatives to Laboratory Animals* 33(6): 663-7.

Zamir, T. (2006). Killing for Knowledge. *Journal of Applied Philosophy* 21(1): 17-40.
Discusses the validity of four commonly used arguments to justify the use of animals in scientific experimentation.

You can also find an extensive bibliography on animals as companions, symbols, use in science, and animals in history at http://www.animalstudies.msu.edu/bibliography.php.

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Bibliography

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