Before Reading

Use of Animals in Biomedical Research
Position Paper by the American Medical Association

Do the ENDS justify the means?

You have read about Jane Goodall’s objections to some aspects of animal research. In “Use of Animals in Biomedical Research,” the American Medical Association addresses the issue of whether improving human health outweighs the suffering of animals in medical laboratories.

DISCUSS Think of a situation in which an unpleasant or disturbing action may lead to a worthy outcome. Create a balance scale like the one shown. Jot down the possible benefits of the action in one box and the harm caused by the action in the other. Share your balance scale with your classmates, and discuss whether the possible benefits outweigh the harm.
TEXT ANALYSIS: COUNTERARGUMENTS
Although the American Medical Association is firmly in favor of using animals in research, it does not ignore the views of opponents. Instead, it states the opponents’ views and then disputes them with counterarguments. As you read “Use of Animals in Biomedical Research,” use a chart like the one shown to keep track of counterarguments in the selection.

<table>
<thead>
<tr>
<th>Opposing Viewpoint</th>
<th>Counterargument</th>
<th>Support for Counterargument</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal experimentation isn’t needed.</td>
<td>Most modern medical advances have required such experiments.</td>
<td>Many Nobel Prizes have been awarded for medical research involving animals.</td>
</tr>
</tbody>
</table>

READING STRATEGY: SUMMARIZE AND CRITIQUE
To summarize an argument, you restate the argument’s main points. A summary should include only information that appears in the original text. When you want to discuss your opinions about or criticisms of an argument, you write a critique. A critique allows you to share more of your own ideas than you would in a summary, but these ideas must be backed up by examples and evidence.

In the article you are about to read, “Use of Animals in Biomedical Research,” the authors summarize animal rights’ arguments and then critique them. As you read, practice this strategy yourself by summarizing the American Medical Association’s arguments and developing your own critique.

VOCABULARY IN CONTEXT
Figure out the meaning of each word from the context provided, and, in your Reader/Writer Notebook, write a sentence that shows your understanding.

1. support from a proponent of this plan
2. a speculative and unreliable conclusion
3. a speech full of insincere rhetoric
4. obstacles that impede our progress

Complete the activities in your Reader/Writer Notebook.
Use of Animals in Biomedical Research

Animals have been used in experiments for at least 2,000 years, with the first reference made in the third century B.C. in Alexandria, Egypt, when the philosopher and scientist Erisistratus used animals to study body functions.

Five centuries later, the Roman physician Galen used apes and pigs to prove his theory that veins carry blood rather than air. In succeeding centuries, animals were employed to discover how the body functions or to confirm or disprove theories developed through observation. Advances in knowledge made through these experiments included Harvey’s demonstration of the circulation of blood in 1622, the effect of anesthesia on the body in 1846, and the relationship between bacteria and disease in 1878.

Today, animals are used in experiments for three general purposes: (1) biomedical and behavioral research, (2) education, (3) drug and product testing. . . . Biomedical research increases understanding of how biological systems function and advances medical knowledge. . . . Educational experiments are conducted to educate and train students in medicine, veterinary medicine, physiology,1 and general science. In many instances, these experiments are conducted with dead animals. . . . Animals also are employed to determine the safety and efficacy2 of new drugs or the toxicity3 of chemicals to which humans or animals may be exposed. Most of these experiments are conducted by commercial firms to fulfill government requirements. . . .

A basic assumption of all types of research is that man should relieve human and animal suffering. One objection to the use of animals in

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1. **physiology** (fif’ə-ol’ə-jē): a branch of biology that deals with the functioning of organisms.
2. **efficacy** (ěf’i-kā’sē): the capacity to produce a desired effect.
3. **toxicity** (tōk-sī’tē): the quality of being poisonous or harmful.
Biomedical research is that the animals are used as surrogates for human beings. This objection presumes the equality of all forms of life; animal rights advocates argue that if the tests are for the benefit of man, then man should serve as the subject of the experiments. There are limitations, however, to the use of human subjects both ethically, such as in the testing of a potentially toxic drug or chemical, and in terms of what can be learned. The process of aging, for instance, can best be observed through experiments with rats, which live an average of two to three years, or with some types of monkeys, which live 15 to 20 years. Some experiments require numerous subjects of the same weight or genetic makeup or require special diets or physical environments; these conditions make the use of human subjects difficult or impossible. By using animals in such tests, researchers can observe subjects of uniform age and background in sufficient numbers to determine if findings are consistent and applicable to a large population.

Animals are important in research precisely because they have complex body systems that react and interact with stimuli much as humans do. The more true this is with a particular animal, the more valuable that animal is for a particular type of research. One important property to a researcher is discrimination—the extent to which an animal exhibits the particular quality to be investigated. The greater the degree of discrimination, the greater the reliability and predictability of the information gathered from the experiment.

For example, dogs have been invaluable in biomedical research because of the relative size of their organs compared to humans. The first successful kidney transplant was performed in a dog, and the techniques used to save the lives of “blue babies,” babies with structural defects in their hearts, were developed with dogs. Open-heart surgical techniques, coronary bypass surgery, and heart transplantation all were developed using dogs.

Another important factor is the amount of information available about a particular animal. Mice and rats play an extensive role in research and testing, in part because repeated experiments and controlled breeding have created a pool of data to which the findings from a new experiment can be related and given meaning. Their rapid rate of reproduction also has made them important in studies of genetics and other experiments that require observation over a number of generations. Moreover, humans cannot be bred to produce “inbred strains” as can be done with animals; therefore, humans cannot be substituted for animals in studies where an inbred strain is essential.

Scientists argue repeatedly that research is necessary to reduce human and animal suffering and disease. Biomedical advances depend on research with animals, and not using them would be unethical because it would deprive humans and animals of the benefits of research.

Benefits of Animal Experimentation
The arguments advanced by animal rights activists in opposing the use of animals in biomedical research . . . are scientific, emotional, and philosophic. . . . The scientific challenge raised by animal rights activists goes to the heart

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4. coronary bypass surgery: open-heart surgery to improve the blood supply to the heart.
5. inbred strains: groups of animals produced by the mating of siblings over at least 20 generations, resulting in individuals as genetically similar as possible.
of the issue by asking whether animal experiments are necessary for scientific and medical progress and whether all the experiments being performed and all the animals being used are justified and required. Scientists insist that they are; animal rights activists insist that they are not.

Scientists justify use of animals in biomedical research on two grounds: the contribution that the information makes to human and animal health and welfare, and the lack of any alternative way to gain the information and knowledge. Animal rights activists contest experiments that utilize animals on both these grounds and assert that this practice no longer is necessary because alternative methods of experimentation exist for obtaining the same information. In an appearance on the Today show in 1985, Ingrid Newkirk, representing People for the Ethical Treatment of Animals (PETA), stated: “If it were such a valuable way to gain knowledge, we should have eternal life by now.” This statement is similar in spirit to one made in 1900 by an antivivisectionist who stated that, given the number of experiments on the brain done up to then, the insane asylums of Washington, D.C. should be empty.

Scientists believe that such assertions miss the point. The issue is not what has not been accomplished by animal use in biomedical research, but what has been accomplished. A longer life span has been achieved, decreased infant mortality has occurred, effective treatments have been developed for many diseases, and the quality of life has been enhanced for mankind in general. One demonstration of the critical role that animals play in medical and scientific advances is that 54 of 76 Nobel Prizes awarded in physiology or medicine since 1901 have been for discoveries and advances made through the use of experimental animals. Among these have been the Prize awarded in 1985 for the studies (using dogs) that documented the relationship between cholesterol and heart disease; the 1966 Prize for the studies (using chickens) that linked viruses and cancer; and the 1960 Prize for studies (using cattle, mice, and chicken embryos) that established that a body can be taught to accept tissue from different donors if it is inoculated with different types of tissue prior to birth or during the first year of life, a finding expected to help simplify and advance organ transplants in the future. Studies using animals also resulted in successful culture of the poliomyelitis virus; a Nobel Prize was awarded for this work in 1954. The discovery of insulin and treatment of diabetes, achieved through experiments using dogs, also earned the Prize in 1923.

In fact, virtually every advance in medical science in the 20th century, from antibiotics and vaccines to antidepressant drugs and organ transplants, has been achieved either directly or indirectly through the use of animals in laboratory experiments. The result of these experiments has been the elimination or control of many infectious diseases—smallpox, poliomyelitis, measles—and the development of numerous life-saving techniques—blood transfusions, burn therapy, open-heart and brain surgery.

6. antivivisectionist (ən’tə-viv’sə-kshən-ist): someone opposed to the act of operating on live animals for science experiments.
7. infant mortality: the death rate during the first year of life.
8. inoculated (i-nək’ətəd): injected.
9. poliomyelitis (pə-lə-mə-lē’təs): a highly infectious viral disease that generally affects children and may lead to paralysis and deformity. Also called polio.
This has meant a longer, healthier, better life with much less pain and suffering. For many, it has meant life itself. Often forgotten in the rhetoric is the fact that humans do participate in biomedical research in the form of clinical trials. They experience pain and are injured, and in fact, some of them die from this participation. Hence, scientists are not asking animals to be “guinea pigs” alone for the glory of science. . . .

Scientists feel that it is essential for the public to understand that had scientific research been restrained in the first decade of the 20th century as antivivisectionists and activists were then and are today urging, many millions of Americans alive and healthy today would never have been born or would have suffered a premature death. Their parents or grandparents would have died from diphtheria, scarlet fever, tuberculosis, diabetes, appendicitis, and countless other diseases and disorders. . . .

The Danger of Restricting Research

The activities and arguments of animal rights and animal welfare activists and organizations present the American people with some fundamental decisions that must be made regarding the use of animals in biomedical research.

The fundamental issue raised by the philosophy of the animal rights movement is whether man has the right to use animals in a way that causes them to suffer and die. To accept the philosophical and moral viewpoint of the animal rights movement would require a total ban on the use of animals in any scientific research and testing. The consequences of such a step were set forth by the Office of Technology Assessment (OTA) in its report to Congress: “Implementation of this option would effectively arrest most basic biomedical and behavioral research and toxicological testing in the United States.” The economic and public health consequences of that, the OTA warned Congress, “are so unpredictable and speculative that this course of action should be considered dangerous.”

No nation and no jurisdiction within the United States has yet adopted such a ban. Although . . . laws to ban the use of animals in biomedical research have been introduced into a number of state legislatures, neither a majority of the American people nor their elected representatives have ever supported these bills.

Another aspect of the use of animals in biomedical research that has received little consideration is the economic consequences of regulatory change. Clearly, other nations are not curtailing the use of animals to any significant degree. Some of these, like Japan, are major competi...
tors of the United States in biomedical research. Given the economic climate in the United States, our massive trade imbalance, and our loss of leadership in many areas, can the United States afford not to keep a leading industry, i.e., biomedical science, developing as rapidly as possible? Many nations are in positions to assume leadership roles, and the long-term economic impact on our citizens could be profound. This economic impact would be expressed in many ways, not the least of which would certainly be a reduction in the quality and number of health services available for people who need them.

Through polls and by other means, the American people have indicated that they support the use of animals in research and testing. At the same time they have expressed a strong wish that the animals be protected against any unnecessary pain and suffering. The true question, therefore, is how to achieve this without interfering with the performance of necessary research. Scientists already comply with a host of federal, state, municipal, and institutional guidelines and laws. However, in this era of cost containment, they fear that overregulation will become so costly that research progress will suffer. Scientists emphasize that a reasonable balance must be achieved between increased restrictions and increased cost. What must be recognized, say scientists, is that it is not possible to protect all animals against pain and still conduct meaningful research. No legislation and no standard of humane care can eliminate this necessity. The only alternative is either to eliminate the research, as animal rights adherents urge, and forego the knowledge and the benefits of health-related research that would result, or to inflict the pain and suffering on human beings by using them as research subjects.

The desire by animal welfare proponents to ensure maximum comfort and minimal pain to research animals is understandable and appeals to scientists, the public, and to legislators. But what also must be recognized and weighed in the balance is the price paid in terms of human pain and suffering if overly protective measures are adopted that impede or prevent the use of animals in biomedical research.

In short, the American people should not be misled by emotional appeals and philosophic rhetoric on this issue. Biomedical research using animals is essential to continued progress in clinical medicine. Animal research holds the key for solutions to AIDS, cancer, heart disease, aging, and congenital defects. In discussing legislation concerning animal experimentation, the prominent physician and physiologist Dr. Walter B. Cannon stated in 1896 that “. . . the antivivisectionists are the second of the two types Theodore Roosevelt described when he said, ‘Common sense without conscience may lead to crime, but conscience without common sense may lead to folly, which is the handmaiden of crime.’”

The American Medical Association has been an outspoken proponent of biomedical research for over 100 years, and that tradition continues today. The Association believes that research involving animals is absolutely essential to maintaining and improving the health of the American people. The Association is opposed to any legislation or regulation that would inappropriately limit such research, and actively supports all legislative efforts to ensure the continued use of animals in research, while providing for their humane treatment.
Comprehension

1. **Recall**  What is the AMA’s position on the use of animals in medical research?

2. **Recall**  How important has animal research been to medical science?

3. **Clarify**  How do the animal rights and animal welfare movements differ from each other?

4. **Summarize**  According to the AMA, what consequences will result from banning or restricting the use of animals in medical experiments?

Text Analysis

5. **Summarize and Critique**  Why do you think the authors chose to summarize animal rights activists’ arguments and then critique them? How does this strategy help their argument?

6. **Interpret Statements**  Reread lines 301–336. Does the AMA favor any changes in current practice to minimize the pain and suffering of research animals? Give reasons for your interpretation.

7. **Draw Conclusions**  What values have influenced the AMA’s position on animal research? Cite evidence to support your conclusion.

8. **Make Judgments**  Does the AMA fairly represent the opposing viewpoints of the animal rights movement in this paper? Explain why or why not.

9. **Evaluate Support**  Consider the reasons and evidence that the AMA gives to support the view that animal research is necessary for medical science. Does the AMA provide sufficient support for its claim? Explain your opinion.

10. **Evaluate Counterargument**  Supporters of animal rights argue that it is morally wrong for humans to use animals in a way that causes them to suffer or die. Review the chart you created as you read. Does the AMA offer a satisfactory counterargument to this viewpoint? Cite evidence to support your opinion.

11. **Compare Texts**  The AMA’s position on animal research differs greatly from the views expressed by Jane Goodall in “I Acknowledge Mine.” Compare and contrast the techniques that the AMA and Goodall use to persuade readers.

**Do the ENDS justify the means?**

Are humans justified in using animals in medical research? Why or why not?
Vocabulary in Context

▲ VOCABULARY PRACTICE

Choose the word from the list that best completes each sentence.

1. Until we get the facts from the proper sources, everything is __________.
2. Concrete actions speak louder than empty _________.
3. As a _________ of conservation, she signed a petition for the preservation of wetlands.
4. I do not want to _________ your work, so please let me know if I’m a distraction.

ACADEMIC VOCABULARY IN SPEAKING

- cite  • controversy  • convince  • objective  • statistic

How do statistics affect an argument? Use the AMA’s article as the basis for a discussion. Analyze three statistics cited in the article. Why was each statistic included, and how does it affect the overall argument? Use at least one Academic Vocabulary word in your response.

VOCABULARY STRATEGY: CONNOTATION

A word’s connotation is the overtone of meaning that it has beyond its denotation, or basic meaning. Some connotations may be positive or negative. For example, although the nouns rhetoric and discourse can both be used to refer to written or oral expression in language, rhetoric can have a negative connotation because it can suggest language that is empty or insincere. When you choose words in writing, be sure to consider whether their connotations fit the context of the sentence and of the larger piece you are writing.

PRACTICE  Place the words in each group on a continuum like the one shown, to identify whether they have positive, negative, or neutral connotations. You can use a dictionary or thesaurus to help you. Then compare your answers with those of a classmate.

Negative  Neutral  Positive

1. sentimental, overemotional, romantic
2. childlike, youthful, immature
3. thrifty, economical, stingy
4. strange, quaint, peculiar

Go to thinkcentral.com. KEYWORD: HML10-686
Language

◆ GRAMMAR AND STYLE: Consider Audience

Review the Grammar and Style note on page 684. When deciding how to craft a particular piece of writing, it is important to consider your audience. For example, your writing style in an e-mail to a friend will probably differ from the style you use in a research paper. For most school and business communication, you should use formal language. Typically, this style of language does not contain contractions and consists of standard punctuation and more complex vocabulary and sentence structure. Here is an example of how the American Medical Association uses formal language in its position paper.

*Animal rights activists contest experiments that utilize animals on both these grounds and assert that this practice no longer is necessary because alternative methods of experimentation exist for obtaining the same information.* (lines 143–148)

Notice how the revisions in blue create a more formal writing style. Use similar methods to revise your responses to the prompt.

REVIEWING CONCLUSION

Explore the ideas presented in “Use of Animals in Biomedical Research” by responding to this prompt. Then use the revising tip to improve your writing.

WRITING PROMPT

Extended Constructed Response: Summarize

In two to three paragraphs, write a summary of the American Medical Association’s arguments for using animals in biomedical research. Remember, this is a summary, so only include information from the article. Do not include a critique—your criticisms of or perspective on the arguments.

REVISIGN TIP

Review your response. Did you use formal language like that the American Medical Association uses in its paper? If not, revise for a more formal style.