

# Author's Commentary on "The Painful Experience"

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This case study is designed to raise ethical issues encountered in biomedical research. The goal is to have the participants identify moral issues and questionable practices in order to learn how to deal with future ethical concerns more appropriately. The first part of the case addresses the use of animals in pain research, while the second half focuses on concerns in the student-adviser relationship.

## The Use of Animals in Research

Animals have been utilized in the advancement of medicine for decades. However, it was not until 1966 that their use was protected and controlled under the Animal Welfare Act (AWA). Since then, additional regulations have been passed, and the AWA has been revised multiple times. As a result, the number of animals used in laboratories has been reduced, and their treatment has improved. Despite these changes over the years, the use of animals in scientific research is still a controversial issue.

Are animal models appropriate for studying human disease? Can the use of animals in the laboratory be justified? Perhaps these questions could be better answered if considered from two contrasting points of view: first from the standpoint of a knowledgeable member of the community and second from that of a research scientist. Knowledgeable members of the community are required on every university's Institutional Animal Care and Use Committee to represent the community's concerns and interests. Their point of view on this subject is very

important to the advancement of scientific research. They may allow the use of animals as long as unnecessary pain or anxiety is avoided. They could say that the knowledge gained from these experiments could benefit human lives. A member of the community should only justify animal use when the guidelines outlined in the AWA are strictly followed, including all measures to avoid or minimize the animals' suffering and distress.

In contrast, the use of animals can be considered from a research scientist's point of view. It is important to consider the individual animal model and its similarity to human pathology and physiology. The animal model discussed in this case study is used to investigate the transmission of acute visceral pain. According to Ness and Gebhart, Ness, T. J., and Gebhart, G. F. "Colorectal Distention as A Noxious Visceral Stimulus: Physiologic and Pharmacologic Characterization of Pseudoaffective Reflexes in the Rat." *Brain Research* 450 (1988): 153-69. this procedure is a valid model of visceral nociception, as the animals react appropriately to colorectal distention with significant changes in the cardiovascular and visceromotor response.

This type of visceral pain is associated with a variety of clinical pathologies, including a condition known as inflammatory bowel disease. According to de Dombal et al., de Dombal, F. T., Myren, J., Bouchier, I. A. D., and Watkinson, G., eds. *Inflammatory Bowel Disease: Some International Data and Reflections*. New York: Oxford University Press, 1986. 50 to 100 people out of 100,000 suffer from this disease. Furthermore, it has been a challenge to develop better therapeutic agents that will alleviate the pain associated with this condition but will not cause adverse side effects. To develop new therapeutic agents, scientists are using this animal model to further elucidate the mechanisms of visceral pain transmission. When one considers the cost-benefit equation, the cost is the suffering and distress that the animals must experience, and the benefit is that human suffering will be eased through this research with the development of better antinociceptive medications. Ultimately, if animals are going to be used in the laboratory, then the research scientist has an obligation to provide the utmost care and to avoid animal suffering and distress.

Using a within-animal design, each subject is tested repeatedly to obtain its baseline response and its response after multiple drug treatments. This protocol can be changed to a between-animal design where the animal will only be tested once; however, more animals will be needed to complete the study. Which design is better? Again, this question can be considered from opposing points of view. A

knowledgeable member of the community may prefer a between-animal design, as the amount of suffering that each animal experiences will be significantly reduced. However, a research scientist may wish to keep the study a within-animal experiment, thus saving costs, as fewer animals are needed. Further, a considerable amount of variability in the results would be avoided if the within-animal design were retained. Finally, increasing the number of animals would take much more time, as surgery is necessary for every animal used in the experiment.

Overall, the use of animals in the laboratory will always remain a controversial issue between research scientists, members of the community and animal welfare activists. Although some animal models of human disease may be ethically questionable, there will always be a need to study animals to further scientific research and relieve human suffering.

## **The Student-Adviser Relationship**

Relationships within the scientific community are susceptible to all types of conflicts and miscommunications, especially the student-adviser relationship. One of the problems that arise in the second part of this case study is that the student-adviser relationship is suffering from a lack of communication. It initially appears as though Michael is not comfortable working with this particular animal model. Furthermore, he questions his adviser's theory that the specific drug has therapeutic efficacy. Before performing any more experiments, Michael should speak with his adviser about both of these concerns. If Eric is unresponsive to Michael's problems, then Michael should seek other resources. He could speak with his mentor, a member of his thesis committee or perhaps a member of an arbitrary advisory committee. In order to resolve these issues, Michael and Eric must open lines of communication and work toward a compromise.

Another ethical issue in this situation concerns Eric's behavior toward his graduate student. Eric is asking Michael to repeat an experiment after it has already been performed multiple times. Despite obtaining inconclusive results, Eric still believes that the experiment should work. In his advisory role, Eric is placing inappropriate pressure upon Michael to produce positive results. In resolving this situation, Michael could discuss his results with a member of his thesis committee who is familiar with Michael's work. Another option is for Eric to be present in the laboratory while

Michael repeats the experiment, ensuring that he does not make any mistakes. On the other hand, perhaps Michael is performing the experiment correctly but the animal model he is using is not appropriate. Therefore, Eric should seriously consider optimizing the alternative model that Michael found in the literature. Fine-tuning another animal model of visceral nociception may be time consuming, but it may lead to a significant scientific discovery.

## **Additional References**

- Elliot, Deni, and Stern, Judy. *Research Ethics: A Reader*. University Press of New England, 1997.
- Friedrich, A.E., and Gebhart, G.F. 2000. "Effects of Spinal Cholecystokinin Receptor Antagonists on Morphine Antinociception in a Model of Visceral Pain in the Rat." *J. Pharm Exp. Ther.* 292 (2000): 538-44.
- Penslar, Robin Levin, ed. *Research Ethics: Cases and Materials*. Bloomington: Indiana University Press, 1995.