



The Painful Experience

Description

This case highlights potential dilemmas encountered by postdoctoral fellows in a research setting. What are the moral issues and questionable practices in biomedical research with animals? It also explores the potential problems of pain research and the advisor/advisee relationship.

Body

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Part 1

Dr. Eric Brown is a research scientist investigating the treatment of chronic pain. Utilizing a rodent model of inflammatory bowel disease, he is currently elucidating the mechanisms underlying chronic visceral pain associated with inflammation.

The animals used in this model experience varying levels of pain and anxiety throughout the experiment. First, the animals are deeply anesthetized, and surgery is performed under sterile conditions. A catheter is inserted near the spinal cord to administer drugs, and an electrode is sutured into the abdominal muscles to measure the animal's visceromotor response.

After the animals recover from surgery, a compound is administered intracolonically to induce an inflammatory response in the colon. Three to five days later, the ability

of various compounds to reduce visceral pain with inflammation is tested using colorectal distention, a model of visceral pain transmission. Colorectal distention involves inserting a balloon securely attached to flexible plastic tubing into the colon and inflating the balloon with a pressure control device. As the balloon is inflated in the colon, the animal experiences a considerable amount of pain and anxiety. The animal responds by contracting its abdominal muscles, and this reflex is recorded using the electrode implanted in the abdominal musculature. In this model, the animals are tested repeatedly to establish their baseline response and their response after various drug treatments.

Discussion Questions

1. As a knowledgeable member of the community, do you think the use of animals can be justified in these circumstances?
2. How do you think a research scientist would justify use of animals in these circumstances?
3. The protocol specifies an intra-animal study, where the same animals are used repeatedly to test the effects of specific drug treatments. Would it be better to change the study's design from intra-animal to between-animal, thereby minimizing the pain each animal experienced but using more animals?

Part 2

While investigating the mechanisms underlying chronic visceral pain, Eric discovered a report in the literature of a drug used in animal research. Since he believed the drug might have potential therapeutic efficacy, he asked Michael, one of his graduate students, to test it using the rodent model of inflammatory bowel disease. Before performing the experiment, Michael researched the drug Eric wanted to test. He found data suggesting it would not be an effective therapeutic agent against visceral pain and inflammation using the rodent model. He presented these data to Eric; however, Eric decided that there was still a possibility that the experiment would produce successful results.

Michael was very apprehensive about the situation. He felt the procedure was extremely painful to the animals, and he continued to believe that the drug would

not be useful in inhibiting pain transmission. However, he carefully carried out the experimental protocol and obtained inconclusive results. Assuming that a procedural error had occurred, Eric asked Michael to repeat the experiment. Upon meticulously repeating the study, Michael obtained inconclusive results once again.

In the literature, Michael found an alternative model of visceral nociception that is much less painful for the animal. He presented the idea to his adviser, explaining both the advantages and disadvantages of the new animal model. Eric contemplated using the new technique, but in the end he decided to continue using the original animal model since the alternative approach is not widely accepted in the field of pain research. At this point, Eric is still quite confident that the drug will be effective in the treatment of pain. Therefore, he tells Michael to repeat the study once again.

Discussion Questions

4. Should Michael repeat the experiment?
5. What resources are at Michael's disposal to help him?
6. Are Eric's directions to repeat the experiment unethical?

Notes

Brian Schrag, ed., *Research Ethics: Cases and Commentaries, Volume 5*, Bloomington, Indiana: Association for Practical and Professional Ethics, 2001.

Contributor(s)

Brian Schrag

Editor(s)

Brian Schrag

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Resource Type

Case Study / Scenario
Hypothetical / Fictional Case

Parent Collection

Graduate Research Ethics: Cases and Commentaries - Volume 5, 2001

Topics

Animal Use
Research and Practice

Discipline(s)

Life and Environmental Sciences
Research Ethics

Publisher

Association for Practical and Professional Ethics
Authoring Institution
Association for Practical and Professional Ethics (APPE)