

Unnecessary Animal Use

Some years ago, while I was still an undergraduate, I worked in a lab that did research on topics pertaining to cardiothoracic surgery. Most of the projects in the lab used animal subjects.

Our project required us to put mice to sleep by injecting chemicals, and then cannulating their hearts while the hearts were still beating. This was quite difficult because their aortas are very tiny and it was hard to insert the cannula without puncturing the vessel. Initially, the plan was to perfect the cannulation procedure on normal mice, and then perform the procedure on genetically mutant mice that would be provided to us by collaborators.

In retrospect, neither the other student nor myself had the experience to be able to perform this intricate surgical procedure. We ended up sacrificing many mice, without ever being able to establish a working model. I believe we sacrificed these mice needlessly due to our inexperience and, in fact, the inexperience of our research team. Ironically, a week after we stopped doing the procedure, a surgical fellow visiting from a foreign country took over the project and after sacrificing only a few mice was able to develop a working model within a week.

It might be expected that researchers become desensitized given the frequency with which animals are sacrificed for experiments, but I continue to feel poorly about the unnecessary sacrifice and suffering of animals.

What kinds of ethical recommendations might this situation invite in order to diminish harm to laboratory animals?

Expert Opinion

Russell and Burch's classic 1959 text, *The Principles of Humane Experimental Technique*, offered the "3Rs"—replace, reduce, refine—to guide ethical sensibilities about animal use in research. Continuing today as a popular moral reference on the ethical use of animals, the 3Rs recommend that researchers 1) replace methods that use animals with those that do not (assuming that research findings or extrapolations are not compromised by the replacement), 2) reduce the number of animals used (such as laboratories coordinating their sharing laboratory animals, or taking multiple tissues simultaneously from a single animal), and 3) refine existing procedures such that animals experience less pain and distress (e.g., by administering tranquilizers or analgesics).

The professional distress the researcher relates in this dilemma seems appropriate since the scenario involves a situation where animals might indeed have been needlessly sacrificed. Perhaps much of the dilemma could have been eliminated if the researcher and his or her colleagues had, very early on, called the lab's attention to their difficulties in evolving a cannulation model. Doing so might have induced a collective anxiety that could have resulted in some creative ideas from other laboratory personnel to contain the problem. The researcher does mention, however, that the

entire research team was inexperienced in the methodology, which suggests that a collective realization of the same might have stimulated a search for a remediative strategy sooner rather than later. In fact, it seems entirely fair to ask whether this experiment should have even been launched, given the way the absent skill set compromised the ethical use of laboratory animals.

Clearly, the skill set that the researchers lacked was obviously within reach if the surgical fellow had little difficulty in evolving a model. Their problem was a lack of awareness that, combined with a lack of support or advice regarding a model, might have made the actual number of mice that were sacrificed seem inordinately large (when the actual number might have been small). This case clearly posed the psychological challenge to the investigator to become callous to the death of an animal for the sake of the investigator's advantage (career advancement, publications, etc.). This is an important reality that keeps many wonderful people out of research biology and/or directs them to studies involving tissue culture, etc. It can feel as though with each animal carcass tossed in the animal bag, one is also tossing a bit of one's soul or spirit away. If the sacrifice ultimately led to generalizable data, then the animal deaths might not have been in vain; but animal deaths that have no good outcome whatsoever can hurt. The toxic effect of this experiment was not only on the mice but on the investigator as well.

In any event, let us assume for the sake of argument that a "replacement" approach, where the study could have been completed without laboratory animals, was not feasible. Still, artificial mouse models constructed from laminate, vinyl, or latex might have been available to afford practice opportunities. Also, the researchers could have conducted a literature or computer search to determine if a cannulation model was already discovered and described.

Indeed, they could have shared their problem with other labs in the interest of locating one where cannulation training might be available and then *visit that site and be adequately trained*. Quite possibly, the costs involved in such training would be justified by the acquisition of the skill set, the opportunity of the researchers to teach it to their peers, and whatever further benefits per future experiments might accrue with duly trained personnel.

Even if that option was unavailable, however, the researchers might have "scavenged" from other labs. They could have practiced on cadaveric mice or thoracic sections from already sacrificed ones. Although perhaps unavailable when this dilemma occurred, virtual reality training devices have come on the market, such as the P.O.P. Simulator, which can be used for training in laparoscopic surgery.

Ultimately, the ethically beleaguered researchers seemed handicapped by insufficient support that could have at least identified some possibilities whereby the number of animals used in the project could have been reduced. Had they contacted their Institutional Animal Care and Use Committee (IACUC), sage advice might have been available. It might be worth pointing out, however, that the researcher's remarking about the mice "suffering" is arguable. To the extent that proper anesthesia was used, there was little if any suffering. On the other hand, the needless use of

animals is not only a waste of resources but deprives animals of their natural interest in maintaining their welfare and self-preservation.

Summary: Oftentimes, ethical dilemmas require numerous inputs and creative ideas that exceed what one or two people can conjure up. Labs should be encouraged to think and brainstorm collectively about the ethical dilemmas that occur among researchers since, even if a satisfying resolution remains elusive, the fact that a serious, collective attempt is made might relieve some of the moral distress that a dilemma like this can cause.

References:

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See the following databases:

NORINA (<http://oslovet.veths.no/NORINA>)

AVAR (<http://www.arav.org>)

AWIC (<http://www.nal.usda.gov/awic>)

CALF (<http://www.calf.vetmed.ucdavis.edu>)

InterNICHE (<http://www.interniche.org>)

HSUS (<http://www.hsus.org>)

Laboratory Animals (<http://www.lal.org.uk>)

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