

Letter to the Editor

Laboratory animal veterinary medicine

The commentary¹ by Dr. Steven Niemi recommending that laboratory animals be treated more as veterinary patients struck a chord with me. Laboratory animal veterinarians often face conflict in their goals of supporting research efforts and caring for research animals, and this conflict may cause some veterinary students to shy away from laboratory animal medicine. Having entered veterinary medicine because of their compassion for animals, they are reluctant to enter a field where animals are intentionally made sick. However, one can do a lot of good working as a veterinarian with the authority to impact research planning, strategy, and procedures and improve the welfare of animals used in research as well as maximize the benefits of their use to science and clinical medicine.

Having recently retired from academia-based laboratory animal medicine, I believe that I have positively impacted the design of studies and procedures and the care of research animals through collaborative relationships with investigators. It is necessary to recognize and respect the challenges facing researchers and the contributions made by them to gain their cooperation in the interventions that may be taken on the animals' behalf.

In his commentary, Dr. Niemi says that he "envision[s] yet another new phase of laboratory animal medicine in which individual animals are managed simultaneously as research subjects and veterinary patients without compromising the scientific aims of their use." In my opinion and experience, this is already occurring. However, this approach does place a burden on laboratory animal veterinarians to become knowledgeable about disease entities and relevant animal models, adding to the challenges of this continuously evolving profession.

Dr. Niemi discusses three ways in which this new restorative medicine approach can benefit research

animals while supporting research goals. These include making animal models more similar to human patients by mimicking the standard of care for clinical patients, preventing death or euthanasia of animals before research goals have been accomplished by relieving animal stress, and improving the testing of new drugs, biologics, and medical devices for human patients by mirroring as closely as possible the actual circumstances under which they would be used. A concern is that planned restorative interventions must be designed in collaboration with regulatory agencies so that pivotal studies will be considered acceptable.

It is noteworthy that > 95% of research animals used today are mice. Genetically modified mice, which today provide some of the most important disease models, may be very expensive and difficult to obtain and, thus, more likely to receive individual attention from laboratory animal veterinarians. However, rodents are frequently treated with a herd medicine approach, with individual care more often provided to more highly sentient animal species.

I congratulate Dr. Niemi on an important commentary; he has shed light on an undervalued role for laboratory animal veterinarians, and I think that his recommendations are insightful and timely.

Eva B. Ryden, PhD, DVM, DACLAM
Hudson, Mass

1. Niemi SM. Laboratory animals as veterinary patients. *J Am Vet Med Assoc* 2013;242:1063–1065.

The author responds:

Dr. Ryden's letter is greatly appreciated, not because we are in agreement but because her long and dedicated career in this ethically challenging sector of veterinary medicine has been exemplary. One statement by Dr. Ryden merits further comment: that "> 95% of research animals used today are mice." Zebrafish (*Danio rerio*) are rapidly approaching mice in popularity in many large academic research institutions, but the total number of mice and zebrafish combined is likely not even a fraction of the number of fruit flies (*Drosophila melanogaster*) or nematodes (*Caenorhabditis elegans*) raised and used for biomedical research and toxicological screening. These two invertebrates have been veritable workhorses for many decades in helping elucidate basic biological processes, such as how genes control embryonic development and how cells are programmed to die, for which Nobel prizes have been awarded. Now these animals are used for an ever-widening array of investigations, including new strategies for fighting Alzheimer's disease¹ and how the brain controls sleep.² Expanding the breadth of human disease models through the use of invertebrates leads me to anticipate a corresponding transi-

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tion to the use of fewer mammals in some situations, with their use more commonly for confirmation rather than discovery of new biological and medical phenomena. Thus, we simultaneously realize two of Russell and Burch's 3 R's (replacement and reduction),³ an outcome I have already observed in several instances at my own institution. And as fruit flies and nematodes become more integral to biomedical research, it is reasonable to expect that optimizing their husbandry and eliminating their spontaneous diseases will be of growing importance to reduce the influence of unwanted variables on experimental data. This, in turn, may lead to new opportunities for laboratory animal veterinarians to apply their expertise in colony health management to these and other invertebrates.⁴

Steven M. Niemi, DVM, DACLAM
Director, Animal Welfare Assurance
Massachusetts General Hospital
Charlestown, Mass

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1. Hassan WM, Merin DA, Fonte V, et al. AIP-1 ameliorates beta-amyloid peptide toxicity in a *Caenorhabditis elegans* Alzheimer's disease model. *Hum Mol Genetics* 2009;18:2739–2747.
 2. Nall AH, Sehgal A. Small-molecule screen in adult *Drosophila* identifies VMAT as a regulator of sleep. *J Neurosci* 2013;33:8534–8540.
 3. Russell WMS, Burch RL. *The principles of humane experimental technique*. London: Methuen and Co, 1959.
 4. Smith SA. Spineless wonders: welfare and use of invertebrates in the laboratory and classroom. *ILAR J* 2011;52:121–220.