

## Opinion

# Biomedical Research and Veterinarians: Where's Waldo?

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I am concerned that veterinary medicine is deteriorating from the stature of an intellectually-driven profession to the status of a trade. This situation has far-reaching impact, and the field of comparative medicine, which encompasses laboratory animal medicine, pathology, and biomedical research, is particularly at risk. The problem begins within our veterinary schools, which emphasize small animal medicine. This emphasis is clearly meeting the needs of our society and the value it places on companion animals. However, such an increasingly unbalanced emphasis to the exclusion of other responsibilities to society tends to distance the profession from needed legislative support that was obvious in the context of an agricultural economy. Veterinary medicine is seriously at risk of being considered a luxury without legislative advocates during times when budgets are apt to be cut due to other state and national priorities. The small animal clinical emphasis also starves the profession of opportunities to advance by limiting the quality and depth of graduate training, limiting basic research funding, and stunting the next generation of veterinarians that is critically needed to invigorate our profession through teaching and scientific discovery.

Most disturbing is the aversion of the profession to laboratory animals as economically and intellectually significant domestic animals. Our veterinary colleges tend to have "exotic" animal programs, but students seldom receive the message that laboratory animals are anything more than just "pocket pets." Furthermore, few students are exposed to mentors other than clinicians, and fail to see the rich rewards of research careers, the importance of such careers to the profession, and the importance of laboratory animals to such careers (and the profession). Veterinarians who matriculate into many graduate programs, particularly at campuses with veterinary colleges, paradoxically receive little exposure to laboratory animals as research tools. As a result, veterinarians who complete advanced training are poorly prepared for competitive NIH-funded research careers.

The profession has created a monster with its emphasis on residency training and board-certification, which has become the hallmark of advanced training. Residency training has tended to be merged with graduate training, at the expense of both. Over the past four decades, policy and funding priorities at the NIH/NCRR level have been strongly influenced by the

board certification perspective. In many ways, comparative medicine has been held hostage by this political control, and the result has not favored the veterinary profession. NIH-funded training programs for laboratory animal medicine, pathology, and research were heavily skewed toward creating service veterinarians with board certification, and not toward creating comparative medical scientists who can invigorate the profession and contribute to biomedical research. Service veterinarians are important to biomedical research, but they cannot fill all niches of comparative medicine.

Laboratory animal veterinarians in biomedical research institutions have been attracted (or forced) like moths to the flame of regulatory and policing roles, but most are not viewed as scientific peers by their institutional colleagues. Because of their clinical training, those laboratory animal veterinarians who enjoy positions of leadership in biomedical research institutions often fail to see the value of including research veterinarians in their programs. There is a tendency to expect board-certified laboratory animal clinicians or pathologists to fill the research role within comparative medicine programs. The very best of our veterinary research talent who gain entry to comparative medicine programs experience "bait and switch," in which they are offered the opportunity to do research, but are given insufficient time and resources to be scientists due to clinical assignments. Indeed, emphasis on board-certification tends to preclude "just" DVM/PhDs (who do not have board certification) from qualifying for veterinary college and comparative medicine academic career opportunities. Thus, many of our strongest scientists with the greatest potential to become principal investigators tend to shed their veterinary identity and become "closet veterinarians" among MD and PhD peers, but not within departments of comparative medicine or within veterinary schools (to the detriment of both). Thus, career opportunities for research veterinarians in comparative medicine departments, the rightful home for such individuals, are becoming limited. Such departments are being converted to entities of lesser stature as service programs, and training environments are deteriorating. Institutions that see the value of academic comparative medicine programs simply cannot find research veterinarians to lead or populate such programs.

Then, there is the mouse. Because of the genomics revolution in biomedical research, Harold Varmus, the former Director of NIH, declared this to be the "decade of the mouse." Veterinarians have contributed significantly to the very roots of mouse

genomics in the 1980's with individuals such as Ralph Brinster, who continues to be a major contributor to genomics research, and to its uppermost branches through Peter Doherty's Nobel Prize winning efforts in mouse immunology (neither is board-certified). Aside from its strong position in genomics research, the mouse has given us the concepts of genetic inheritance, genetic susceptibility and resistance to infectious disease, immunology, cancer, retrovirology, major and minor histocompatibility loci, transplantation biology, and many other fundamental tenets of modern human and veterinary medicine. In spite of this, the veterinary profession, including much of the comparative medicine community, seems to casually ignore the mouse. Laboratory animal medicine and pathology training programs do not emphasize mouse biology, despite the fact that mice now represent the overwhelming majority of research animals used today. Because of our clinical approach to thinking, we see mice as boring.

If the profession is to be true to the Veterinarian's Oath "to use my scientific knowledge and skills for the benefit of society...the promotion of public health, and the advancement of medical knowledge," then it is surely ignoring its obligation to society. Can we afford to ignore a \$50 billion/year "industry," a figure that does not include the even larger financial and emotional cost of illness and disability to our society? We are ignoring laboratory animals as crucially important domestic animals and we are ignoring our responsibility to be active participants in biomedical research that simultaneously advances both human and animal health. We are also ignoring enormous opportunity to improve the profession.

Editorials published in *Comparative Medicine* and in *Contemporary Topics in Laboratory Animal Science* in the last two years have painted a bleak picture of diminishing NIH support for comparative medical research and training. How can we accept that message when the NIH budget has been doubling over the last five years to its current level of \$23 billion (a \$3 billion increase from FY 2001)? Infectious disease, an area in which veterinary medicine has been traditionally well prepared, has gained new urgency with bioterrorism, agroterrorism, and world-wide epidemics of emerging and re-emerging diseases. The NIH mission is entering the "post-genomics" era, a time in which comparative medical training has never been more needed. Because of this need, the Comparative Medicine Program of NCCR has been aggressively expanding its training

programs for veterinary students, veterinary graduate students, and postdoctoral veterinarians. These science-driven training programs have replaced the residency-oriented training programs that failed to produce scientifically rigorous graduates. In addition, veterinarians fare very well in competing for "K" awards through other NIH Institutes. F32 awards (Postdoctoral Individual National Research Service Awards) were once a popular mechanism for graduate training of veterinarians, but are largely under-utilized today.

The days of the "Resource Grant" (Diagnostic and Investigative Laboratories) as the infrastructural framework for comparative medicine have ended. Some may view this to be the fault of NCCR, but the blame belongs entirely on the veterinary profession, which failed to achieve the scientific expectations of NIH. In the past several years, this has been replaced by a new and increasingly vibrant infrastructure for academic veterinary medicine in biomedical research. NCCR has invested in the creation of the Mutant Mouse Regional Resource Program which will be described in an upcoming issue of *Comparative Medicine*. The nation's system of Regional Primate Research Centers and other animal resource centers is thriving. Other NIH Institutes are investing in major animal-related resources and programs, especially in mouse biology through the Trans-NIH Mouse Initiative (see <http://www.nih.gov/science/models/mouse>). As far as laboratory animal-related research is concerned, we cannot fault NCCR for not providing sufficient support. There are opportunities for laboratory animal health-related research, but they are competitive opportunities. If veterinarians are not trained to be competitive scientists, they cannot successfully compete for NIH research funding. If the profession wants to use its incredible talent and comparative training, it has a strong foundation upon which advanced training can be built, but advanced training is needed.

I hate to say it folks, but times have never been better. There is an incredible array of career opportunities for veterinarians in modern biomedical research, representing the full spectrum of veterinary talent: clinicians, pathologists, collaborative scientists, principal investigators, core leaders, program directors, center directors, and teachers...so where's Waldo? Our predicament is best summarized by a quote from Pogo: "We face insurmountable opportunities."