Letters to the Editor

Clostridium perfringens enterotoxin A gene

I read with interest the study by Tupler et al[1] regarding enteropathogens identified in dogs entering a Florida animal shelter. One of the real-time PCR assays used in the study was described as identifying the *Clostridium perfringens* enterotoxin A gene. However, the GenBank reference (AM888388) that was given refers to the alpha toxin (phospholipase C) gene of this organism, and to my knowledge, there is no such thing as a *C perfringens* enterotoxin A gene.

Detection of the alpha toxin gene identifies an organism as *C perfringens* because all *C perfringens* isolates, including type A isolates, possess this gene. However, type A isolates are identified as those lacking the three other major toxin genes, and the alpha toxin gene is not the same as the enterotoxin (cpe) gene. There is considerable interest in the possible association of the cpe enterotoxin gene with diarrhea in dogs, but all this study may have shown is that *C perfringens* is more frequent in dogs with diarrhea than in dogs with normally formed feces. It does not address the issue of enterotoxin.

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1. Tupler T, Levy JK, Sabshin SJ, et al. Enteropathogens identified in dogs entering a Florida animal shelter with normal feces or diarrhea. *J Am Vet Med Assoc* 2012;241:338–343.

The author responds:

We would like to cordially thank Dr. Prescott for his comments on our manuscript.[1] We would like to confirm that we did intend to measure the alpha toxin gene for this study as part of the diagnostic panel obtained through IDEXX Laboratories. The enterotoxin ELISA was available but not the genetic test for the enterotoxin gene at the time of the study. We do recognize that this has been confusing and therefore changed the nomenclature from enterotoxin A to alpha toxin at the beginning of this year. This will be effective by the beginning of 2013 in the directories of services. In the meantime, we have also added the *Clostridium perfringens* enterotoxin gene to the canine diarrhea panel to have a more complete toxin screen available for clinicians.

With regard to the comment that all type A *C perfringens* isolates contain the alpha toxin gene, in a clinical validation study, we were able to determine the frequency of the alpha toxin gene in fecal samples from dogs with diarrhea and clinically normal dogs was 76.1% and 54.1%, respectively, with a weak association between diarrhea and detection of the alpha toxin gene with sick dogs (P = 0.032; OR, 2.69). However, when we used results of a quantitative real-time PCR assay to quantify the number of toxin genes present, we were able to determine a cutoff value that improved the association with diarrhea. On the basis of the quantitative data, the frequency of the alpha toxin gene in sick versus healthy dogs was 47.8% versus 2.1%, respectively (P < 0.001; OR, 25.44).[2,3] Furthermore, we also determined that all of the alpha toxin genes were transcriptionally active by analyzing at the mRNA level, and transcriptional activity was also associated with the disease state. A similar finding was obtained for *C perfringens* enterotoxin, with associations of the number of enterotoxin genes and transcriptional activity in sick versus healthy dogs.

In summary, we believe that over time, we have added medical value to the canine diarrhea panel by complementing the panel with the detection of the enterotoxin gene and by confirming earlier reports that the amount of toxin produced is a predictor for gastrointestinal disease.

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1. Tupler T, Levy JK, Sabshin SJ, et al. Enteropathogens identified in dogs entering a Florida animal shelter with normal feces or diarrhea. *J Am Vet Med Assoc* 2012;241:338–343.
2. Leutenegger CM. Diagnostic real-time PCR panels for infectious GI problems: worldwide prevalence data and clinical validation (abstr), in *Proceedings*. Annu Meet Comp Gastroenterol Soc 2011.
3. Leutenegger CM, Marks SL, Robertson J. Toxin quantification of Clostridium perfringens is a predictor for diarrhea in dogs and cats (abstr), in *Proceedings*. Am Coll Vet Intern Med 2012;ID-38.

Sow housing: a swine veterinarian's perspective

In his recent letter,[1] Dr. Raymond Tarpley expresses concerns regarding the welfare of farm ani-

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mals. He suggests that veterinarians "have adopted a higher threshold for what constitutes animal suffering when industrial economics come into play," and he points to the "crowding required to obtain current industrial production efficiencies" as a major source of animal welfare compromises. As a veterinarian who has worked for more than 20 years with pigs and farmers in the United States and around the world, I must take issue with these statements.

Dr. Tarpley bases his statements on the assumption that modern pig barns are overcrowded, but I contend that this assumption, although much repeated, is incorrect. Extensive research[2] guides farmers in their efforts to provide optimal space for the health and welfare of their pigs at each stage of development. Crowding pigs does not result in efficiency.

It is recognized that animal housing systems involve compromises.[3] In fact, compromises in the expression of an animal's natural behaviors are inherent in the decision to use any animal for human purposes, whether that purpose is companionship, service, exhibition, or food. Many dog owners impose a sedentary lifestyle on their pets, despite the fact that research[4] demonstrates that dogs are "wired to run." In contrast, the sows we care for are genetically well adapted to the environment in which they are raised. The health and welfare parameters we can measure, along with our daily observations, indicate that sows' basic needs are met and that they are content in their environment. Farmers and researchers working with systems where sows may choose to be in a stall or an open pen observe that most choose to spend much of their time in individual stalls. This is compelling evidence that sows do not find the confinement of individual housing to be as objectionable as Dr. Tarpley suggests.

With his statement that "it is critical that we lead as thoughtful advocates of animal welfare," Dr. Tarpley implies that this is not currently the case. Great strides in animal health and welfare have taken place over the past few decades, many of which are a direct result of veterinary guidance and the development of modern production methods. Swine producers and veterinarians have been incredibly successful at eliminating a number of historically devastating diseases from pigs in the United States, including classical swine fever (hog cholera), foot-and-mouth disease, pseudorabies, brucellosis, and tuberculosis. Modern management practices have virtually eliminated internal and external parasites, predation, sunburn, and frostbite and have improved both pig and worker safety. Pigs receive optimally balanced diets in an environment where they can eat without fear. Veterinarians are actively engaged with farmers to develop herd health programs that encompass biosecurity, vaccination, treatment of illness and injury, and the timely application of euthanasia when necessary. Clearly, swine veterinarians have long been engaged in providing "counsel that sets the bar on animal health and welfare" and will continue to do so as long as pigs are kept by people.

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1. Tarpley R. Animal crowding and farm animal welfare (lett). *J Am Vet Med Assoc* 2012;241:417–419.
2. McGlone J. Sows and space. *Swine Welf Fact Sheet* 2003;2(3):1–4. Available at: www.pork.org/filelibrary/SowHousing/SWINEWELFARsowsandspace.pdf. Accessed Sep 13, 2012.
3. AVMA. Pregnant sow housing policy. Available at: www.avma.org/KB/Policies/Pages/Pregnant-Sow-Housing.aspx. Accessed Sep 13, 2012.
4. Raichlen DA, Foster AD, Gerdeman GL, et al. Wired to run: exercise-induced endocannabinoid signaling in humans and cursorial mammals with implications for the 'runner's high.' *J Exp Biol* 2012;215:1331–1336.

Thoughts on how to evaluate complementary and alternative medicine

Dr. McKenzie's recent commentary, "Is complementary and alternative medicine compatible with evidence-based medicine?,"[1] highlights some important distinctions that may exist between various techniques that may be used by licensed veterinarians. Science is fundamental both to the veterinary oath and to the practice of evidence-based medicine and is, in my opinion, an appropriate tool with which to evaluate complementary and alternative medicine (CAM) practices. In fact, the National Center for Complementary and Alternative Medicine of the National Institutes of Health explicitly states that "The mission of NCCAM is to define, through rigorous scientific investigation, the usefulness and safety of complementary and alternative medicine interventions and their roles in improving health and health care."[2]

However, I believe Dr. McKenzie's commentary may have overlooked two important points. First, some claims made by advocates of CAM do not need to be evaluated, in that the lack of scientific plausibility alone makes it possible to reject certain highly improbable claims, such as the effectiveness of extremely diluted homeopathic preparations or the ability to alter the immeasurable energies claimed by practitioners of so-called energy medicine. There is little reason to investigate claims for something that cannot be shown to exist or that contradicts centuries of well-established science. Indeed, spurious findings associated with false-positive results obtained when evaluating such claims serve only to muddy the waters of evidence-based medicine.

Second, it is not clear to me whether evidence truly matters to practitioners of CAM. For example, acupuncture has been studied for decades, and although thousands of studies of the use of acupuncture in humans and animals exist, there is no firm evidence that acupuncture is efficacious for the treatment of any condition in animals. Nevertheless, this failure of a strong body of evidence to appear as well as the extensive literature showing negative or no results for acupuncture[3] has apparently done little to dissuade proponents from the practice.

Ultimately, veterinarians must decide whether evidence is important to the practice of veterinary medicine. In 2003, I argued that unless the veterinary profes-

sion adopted objective criteria of efficacy, the privileged status of veterinarians to provide health care to animals might be threatened.[4] Subsequently, nonveterinarians have taken legislative action in states such as Colorado, Oklahoma, Maryland, Nevada, Michigan, Pennsylvania, and New Hampshire to allow them to practice acupuncture and chiropractic on animals. Only the profession's willingness to discard ineffective practices on the basis of scientific evidence can protect against such intrusions. As such, the questions raised in Dr. McKenzie's commentary surely need to be answered.

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1. McKenzie BA. Is complementary and alternative medicine compatible with evidence-based medicine? *J Am Vet Med Assoc* 2012;241:421–426.
2. National Center for Complementary and Alternative Medicine. NCCAM Facts-at-a-glance and mission. Available at: nccam.nih.gov/about/ataglance. Accessed Aug 25, 2012.
3. Madsen MV, Gøtzsche PC, Hróbjartsson A. Acupuncture treatment for pain: systematic review of randomised clinical trials with acupuncture, placebo acupuncture, and no acupuncture groups. *BMJ* 2009;338:a3115.
4. Ramey DW. Regulatory aspects of complementary and alternative medicine. *J Am Vet Med Assoc* 2003;222:1679–1682.

Adjunct faculty and nonclinical practice

I agree with Dr. James Ferguson's recommendation that veterinary colleges should use adjunct faculty more effectively.[1] The idea already has some support, and many colleges invite visiting lecturers from private practice and public and corporate organizations to participate in their teaching programs, especially in the second half of the curriculum. The title adjunct faculty is not always used, although I believe it should be. However, I suggest a word of caution. Although many colleagues are willing to share their expertise without pay, others may not be. Out-of-pocket expenses and some form of compensation should be provided, unless it is formally declined.

Dr. Chip Beckett[2] proposes that the veterinary colleges should offer short courses that permit general practitioners to compete more successfully for employment positions in nonclinical practice. I certainly agree, although I object to the notion that "Such programs give dissatisfied and disabled practitioners a career path...." Public and corporate veterinary medicine should not be viewed as a default career for tired practitioners or as something to fall back on when all else fails. These areas include > 20% of the veterinary profession, many of whom are distinguished colleagues who serve our profession in numerous ways, including as adjunct college faculty. Dr. Beckett's letter illustrates a common problem: colleagues in one particular area of the profession may not fully appreciate the roles and responsibilities of others working in different sectors.

Nonclinical career options should be thoroughly explained to veterinary students, and appropriate coursework and clinical experiences should be made available. If such opportunities are not accessible during the educational experience, then some veterinary graduates will choose private practice by default. It is hard to correct this failure retroactively.

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1. Ferguson J. Adoption of adjunct faculty by veterinary schools (lett). *J Am Vet Med Assoc* 2012;241:418.
2. Beckett C. Pursuing nonclinical practice in the veterinary profession (lett). *J Am Vet Med Assoc* 2012;241:551.

Dr. Chip Beckett's letter, "Pursuing nonclinical practice in the veterinary profession,"[1] prompted me to add some thoughts based on my own personal experiences. I was a clinical practitioner for 15 years, including nearly 13 years as a practice owner, before pursuing another career path. After selling my practice, I applied for jobs in the field of human medical and pharmaceutical sales. Although I believed that I had unique qualifications for these positions, including a Bachelor of Science degree in zoology (the minimum qualification for most of these jobs), all my efforts were rejected in part, I believe, because of my veterinary degree.

Still uncertain as to my career path, I enrolled in a nearby Medical College Occupational Medicine and Environmental Health program, earning a Master of Public Health degree, and was eventually hired as an injury epidemiologist through a federal grant to the Kentucky Department for Public Health. After 4 fulfilling years as an injury epidemiologist, I accepted the newly created position of State Public Health Veterinarian, where I focused on infectious disease control and prevention. Over the rest of my career, I concurrently held several supervisory and principal investigator positions on federal grants and was an adjunct faculty member at 2 medical colleges.

Now that I am retired, I would say that although I had a successful career outside clinical practice, my pay level and career advancement opportunities were hindered by having a veterinary degree. There is no doubt in my mind that I had a more-rounded, more-inclusive basic professional education suitable for public health than any of my colleagues. However, in my department, physicians, dentists, pharmacists, nurses, radiologic technologists, and many nonmedical professionals earned higher salaries than I did, even when some of these individuals were in positions that I supervised. Additionally, my opportunities for advancement in government practice were limited or denied, compared with opportunities for these other professionals. Because all my job evaluations were excellent and I received state- and national-level peer awards for my work, I can only conclude that the reason was my veterinary degree. Although those who worked directly with me respected my skills and knowledge, others higher in the bureaucracy must have perceived veterinarians as animal doctors with limited skills outside the animal care setting.

After many discussions with peers at the state and federal level and with veterinarians trying to leave clinical practice, I know that my situation was not unique. I believe that there is a solution for these employment, salary, and advancement issues and that it lies with our veterinary colleges. With the addition of a minimal amount

of new curriculum (eg, basic human anatomy, physiology, and pathology), students could be offered a Doctor of Comparative Medicine degree, rather than the traditional Doctor of Veterinary Medicine degree. Graduate veterinarians could return to college and complete these new requirements for a DCM degree in a semester or at home online. Although I am proud to be a veterinarian, there is still a negative job bias associated with the veterinary degree outside the traditional clinical practice setting. I believe that individuals with a DCM degree would be viewed more positively as medical scientists by those not familiar with the depth of basic veterinary education. Veterinary colleges have the ability and the responsibility to help change the existing job bias against veterinarians who are not in clinical practice.

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1. Beckett C. Pursuing nonclinical practice in the veterinary profession (lett). *J Am Vet Med Assoc* 2012;241:551.

Relationship between private practice and animal welfare

Katie Burns' informative and well-researched news article,[1] "Competition or coexistence," on the relationship between private practitioners and animal welfare organizations that offer veterinary services provides important information for our profession about the animal care and control community. With regard to efforts in Colorado to improve the relationship between private practitioners and animal welfare organizations,[2] including the CATalyst Council's Connecting Top to Top: Partnering to Make a Difference program, we might consider an additional alliterative alternative: collaboration.

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1. Burns K. Competition or coexistence: relations strained between private practitioners, animal welfare organizations that provide veterinary services. *J Am Vet Med Assoc* 2012;241:530–535.
2. Burns K. Evolving relations in Colorado. *J Am Vet Med Assoc* 2012;241:536.

Support for AVMA presidential candidate

The veterinary medical profession is moving into a critical time frame in the early 21st century. Politically, economically, and intellectually, veterinarians need to be represented not just by the very best available leaders, but by visionary men and women. Throughout my nearly 50 years as a veterinarian, I have considered Dr. Ted Cohn, now running for AVMA 2013–2014 president-elect,[1] to qualify as such an extraordinary leader.

Dr. Cohn is considered by many of us in the one health movement to be an invaluable, visionary leader and a strong supporter of and advocate for the concept of one health.[2,3] I strongly support Dr. Cohn's candidacy and hope that others will too.

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1. Nolen RS. Cohn campaigns for AVMA presidency. *J Am Vet Med Assoc* 2012;241:677.
2. Cohn T. One health—at the crossroads. *One Health Newsletter* 2010;3(1):1–2. Available at: www.doh.state.fl.us/Environment/medicine/One_Health/OHNLWinter2010.pdf. Accessed Sep 13, 2012.
3. One Health Initiative. One health—at the crossroads. Available at: www.onehealthinitiative.com/publications/Ted%20Cohn%20AVMA%20%20President-elect%20candidate.pdf. Accessed Sep 13, 2012.