

The following letters refer to Gray *et al.* Nutritional adequacy of two vegan diets for cats. *J Amer Vet Med Assoc* 2004, 225(11):1670-1675, in which two commercially-available vegan cat foods were found to be deficient in a range of essential nutrients (see www.vegepets.com. Vegetarian feline diets, Appendix II).

Knight, A. In defense of vegetarian cat food. *J. Amer. Vet. Medical. Assoc.* 2005; 226(4): 512-513.

It is tempting to leap to the conclusion that cats cannot survive without meat after reading Gray, Sellon, and Freeman's recent *JAVMA* article titled "Nutritional Adequacy of Two Vegan Diets for Cats" (*JAVMA*, December 1, 2004, pp 1670-1675). Two commercially available vegan cat foods were subjected to blind nutritional analyses and found to be deficient in certain amino acids, trace minerals, vitamins, and arachidonic acid. One was found to be deficient in overall protein content.

Yet, does this necessarily mean that cats cannot survive without meat? Not at all. Although this was certainly true for cats forced to hunt to survive in their natural environments, the evolutionary adaptations their forebears consequently acquired are of diminished relevance for domesticated cats fed commercial diets from cans or packets at predictable times each day.

For cats, as for all other species, the key requirement is that their diets be nutritionally complete and balanced. It is also essential that they be provided in sufficiently palatable and bioavailable forms. There is absolutely no scientific reason why diets comprised entirely of plant, mineral, and synthetically based ingredients cannot meet all of these requirements, and several commercially available diets indeed claim to do so.

Concerned by Gray *et al.*'s study results, I contacted the manufacturers of the two cat foods tested. In response, the CEO of one company stated, "We have ten to twenty

thousand healthy and long living dogs, cats and ferrets living on the Evolution Diet. ... Major animal sanctuaries use our products and stand behind them. These sanctuaries use our products because they have lower rates of illness and mortality when their animals are placed on our foods." (a)

The most likely explanation is that the sample tested was nutritionally inadequate, but most samples sold and used are adequate, and that a formulation error occurred at the factory.

Similar reasoning explains the anomalies detected in the other tested brand. This was confirmed by the manufacturer, who, greatly concerned by the study results, scrutinized their manufacturing process, thereby locating the key mixing error that accounted for the anomalies. The manufacturer then established control quality procedures to prevent a recurrence.

It is entirely feasible that repeated independent laboratory analyses of a range of commercial brands, both vegan and meat-based, would similarly demonstrate nutritional inadequacies, and also inconsistency of nutritional content over time. Of course such findings in no way negate the ability of well formulated vegan or meat-based diets to meet all the nutritional requirements of the normal animals for which they are intended; they merely illustrate the need for good quality control during production.

For vegan cats and dogs, a complete and balanced nutritional supplement or complete diet is required to ensure that all of these nutritional needs are met. Regular urine pH monitoring is also important to detect and allow prevention of the urinary

alkalinization, with its consequent potential for urinary calculi, blockages, and infections that may result from a vegetarian diet in a minority of cats.

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a. Weisman E. Evolution Pet Foods.

Gray CM, Sellon RK, Freeman LM. The authors respond. *J. Amer. Vet. Medical. Assoc.* 2005; 226(4): 513-514.

We thank Dr. Knight for his interest in our article and agree that our results do not prove that all vegan cat foods are nutritionally inadequate or that cats are incapable of surviving without meat. We looked at only two foods, so our conclusions are appropriate only for the foods analyzed. We recognized study limitations in terms of the number of samples analyzed and acknowledged that variations among batches or in nutrient content of key ingredients could explain our results. Dr. Knight offers another explanation; namely, that at the time of manufacture of our samples, quality control on the part of both manufacturers was wanting, emphasizing Dr. Knight's point that good quality control is essential, particularly when marketing diets for a species that is physiologically less capable of adjusting to dietary deficiencies than others.

Dr. Knight points out that several commercial manufacturers claim to make nutritionally adequate nonmeat diets for cats. Our search for information about vegan cat foods found little rigorous nutritional analysis to support these claims, which are not intuitive given what is known about the physiology of cats. This was the basis for undertaking the study in question. We believed our results would interest the veterinary community so that recommendations regarding these diets could be made on the basis of more than unsubstantiated claims of diet manufacturers.

While a manufacturer's statement that thousands of healthy and long-living animals are on their diets is interesting, additional information is needed to support the diets' nutritional adequacy. Thousands of cats may be fed these diets, but we are not aware of any data that have emerged from a comprehensive health assessment of any of

them. We consider it the responsibility of any pet food manufacturer to submit samples of their diets from multiple lots for independent nutritional analysis before claiming adequacy as a sole source of nutrition for cats or other species. In addition, while it is important to meet the Association of American Feed Control Officials (AAFCO) Nutrient Profile minimums for nutrients, an AAFCO feeding trial is the preferred method to establish nutritional adequacy. These feeding trials help to establish whether the nutrient amounts actually available to the cat are adequate to support health.

We are pleased if our paper served to help manufacturers identify formulation or mixing errors. We encourage the manufacturers to submit their diets for independent laboratory analysis and AAFCO feeding trials to ensure that any errors have indeed been corrected and that these diets are adequate to maintain the health of cats eating them.

Finally, the pathogenesis of the various forms of feline lower urinary tract disease (FLUTD) is still debated, but most cats with FLUTD today do not have urolithiasis, and in those that do, most uroliths are now composed of calcium oxalate. Although much additional research is needed on the nutritional factors affecting FLUTD, urinary acidification is not indicated for all cats.

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Fox MW. More on vegetarian/vegan cat foods. *J. Amer. Vet. Medical. Assoc.* 2005; 226(7): 1047.

Andrew Knight's defense of vegetarian cat food (*JAVMA* February 15, 2005, pp 512-513) is based on faith rather than on the biology of the cat as a functional carnivore. His science-based faith is an echo of those who have claimed for many years that various formulations of processed cat and dog foods were complete and balanced, only to discover later that they were responsible for certain diet-related health problems and nutritional deficiency diseases.

While Dr. Knight asserts that there is "absolutely no scientific reason why diets comprised entirely of plant, mineral and synthetically based ingredients cannot meet all these requirements", there is surely no scientific certainty that vegetarian/vegan cat foods will be good for all cats. Such diets are based more on the anthropocentric values of those advocates of vegetarianism for humans who find some ethical discomfort in feeding animal products to their feline companions. To use the science of nutrition that is still in its infancy to support the feeding of vegetarian food to cats is to ignore the precautionary principle with regard to "synthetically based ingredients", as well as the basic biology of the cat as a carnivore.

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Knight A. The author responds. *J. Amer. Vet. Medical. Assoc.* 2005; 226(7): 1047-1048.

I thank Dr. Fox for raising the important concept of faith during his discussion of vegetarian cat and dog diets. To the believer, faith provides the justification for a belief held in defiance of logical reasoning or evidence to the contrary. Exactly such a belief is held by those opposed to nutritionally sound vegetarian companion animal diets without first critically reviewing the evidence.

I recently spent several months examining that evidence. After extensively searching the biomedical literature, I can confirm that one study (1) does report development of malnutrition, namely hypokalemic polymyopathy, in cats fed a vegetarian diet. However, the diet was known prior to the commencement of the study to have been nutritionally inadequate. The predictability of the outcome in such a case raises questions about whether the study might have been conducted for political reasons, rather than to answer genuine scientific questions about the viability of vegetarian diets.

Despite the belief of many veterinarians that vegetarian diets are inevitably harmful for companion animals, there were no studies demonstrating this popular “fact,” using nutritionally complete and balanced vegetarian diets. Interestingly, though, numerous studies do exist demonstrating increased risks of degenerative diseases such as kidney failure (2); liver, musculoskeletal, and neurologic diseases (3); birth defects (4); and bleeding disorders (5), following chronic maintenance on commercial meat-based diets.

Until studies examining the long-term health status of cats and dogs fed nutritionally sound vegetarian diets are published, our evidence will remain limited to case reports. Fortunately, a large number of these are

described on Web sites and in books. (6) They commonly illustrate substantial benefits for dogs and cats after transitioning to a vegetarian diet, including decreased ectoparasites and food allergy reactions, improved coat condition, obesity reduction, regression in signs of arthritis, diabetes, cataracts, and urogenital disease, and improved vitality. I have observed some of these effects in my vegetarian feline patients, and enjoy receiving glowing accounts from their owners.

To be fair, there are also accounts of animals that have been harmed by nutritionally inadequate vegetarian (and meat-based) diets. However, these are of little scientific relevance to an examination of the viability of nutritionally sound vegetarian diets. All they establish is the necessity of education about the importance of using a complete and balanced vegetarian diet or nutritional supplement.

Regular urine pH monitoring is also important to detect and allow prevention of the urinary alkalinization that may occur in a small percentage of vegetarian cats, with consequent increased risks of urinary calculi, blockages, and infections.

Whether we like it or not, ever increasing numbers of clients concerned about vegetarianism, health, and ethics are going to attempt to maintain their cats and dogs on vegetarian diets. It is our responsibility as scientists, veterinarians, and animal welfare advocates to put aside any faith-based opposition to vegetarian diets for companion animals we may have had and instead learn about them so that we may best assist our clients to maintain the health and well-being of their pets.

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