Filling a void by developing the next generation of toxicology experts

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Veterinary toxicology is an underserved discipline in veterinary medicine, with < 100 active toxicologists nationwide. Toxicologists who are focused on diagnostic investigations in production animals number in the few. Kansas State University (K-State) has developed a training program utilizing diagnostic service, collaborative research, and teaching in the professional program to address this need.

Practitioners utilize diagnostic laboratories to perform and interpret testing in clinical cases as well as recommend further analyses based on clinical histories and prior test results. Diagnostic laboratories that employ a veterinary toxicologist as part of the diagnostic team are surprisingly rare, limiting practitioner access to specialists with unique expertise in sample and test selection as well as interpretation of results. This is especially true in postmortem case workups involving large groups of animals that may have limited clinical history altogether. At the K-State Veterinary Diagnostic Laboratory, the toxicology section caseload is approximately 80% bovine and evaluation of trace mineral concentrations is a top assay. The section also has unique expertise in the analysis and interpretation of drinking water quality in production animals.

Monitoring for potential issues in manufactured feeds is an essential duty of diagnostic laboratories, and K-State has a long-standing collaboration with the FDA Veterinary Laboratory Information Response Network in both analyzing and reporting potential issues to safeguard animal feeds.

The group also teaches the core toxicology course to every veterinary student who attends K-State, actively contributing to the teaching mission of the college. Diagnostic cases are utilized as teaching examples to provide a contemporary experience for DVM students and an opportunity to learn from specialists. This teaching experience is a necessary part of a training program that encourages familiarity with the material and develops presentation skills that will serve a career in toxicology well.

This program also leverages collaborative research opportunities within the college to expand upon the training experience. This includes training in Good Laboratory Practices, analytical method selection and development, data analysis, and practical reporting of research findings to veterinarians.

Current projects are focused on the safety of oral anti-inflammatory drugs in calves, nongenetic contributors to heart disease in feedlot cattle, and how xylazine and ketamine are affected by the rendering process. Identifying safety thresholds for analgesic drugs can allow better and longer-term pain control in food animals improving animal welfare during common management procedures or disease conditions.

The group makes it a priority to disseminate information regarding common toxicology issues to practitioners and is able to do so with the support of grants funded by the USDA National Institute of Food and Agriculture. To date, the program has resulted in the board certification of 1 diplomate and currently has a resident in training.

The toxicology program at K-State is committed to serving practitioners investigating food animal toxicology issues and utilizing its service, teaching, and research responsibilities to train the next generations of specialists.