

Comparative Oncology

An Interview with Deborah W. Knapp,
Purdue University College of Veterinary Medicine

EDITORS' NOTE Dr. Deborah Knapp, whose research has centered on invasive transitional cell carcinoma of the urinary bladder, has led comparative cancer research in the Purdue University College of Veterinary Medicine for over 20 years. She is the Dolores L. McCall Professor of Comparative Oncology and Director of the Purdue Comparative Oncology Program. She received her D.V.M. at Auburn University, and M.S. and Residency training from Purdue University.



Deborah W. Knapp

INSTITUTION BRIEF The Purdue University College of Veterinary Medicine (vet.purdue.edu), which enrolled its first class of veterinary students in 1959, is well-known for educating the entire veterinary team (practice-ready veterinarians, veterinary specialists, and veterinary technicians). The College is also home to high-impact research programs including the Purdue Comparative Oncology Program (PCOP; vet.purdue.edu/pcop) established in 1979.

Would you highlight the research you have been conducting?

I work in the field of comparative oncology in which we identify specific forms of naturally occurring cancer in pet dogs that mimic the human condition. We can study the cancer in the dogs and learn information that helps each individual dog and other dogs, and that can be applied in studies to ultimately help human cancer patients.

I knew by age 12 that I wanted to be a veterinarian. I joined a progressive primary care practice when I graduated from veterinary school, and expected to spend my career in that setting. Although I enjoyed it, I found myself looking for additional challenges. I hoped to focus on the more difficult types of diseases that we treat as small animal veterinarians, and this led me to residency training at Purdue. I was very intrigued with the comparative cancer research at Purdue because I always knew I wanted to help people as well as dogs. Now I am grateful to have the opportunity to lead the PCOP here.

What is it specifically about the commitment the institution has put behind this work?

I initially expected to only be at Purdue for a few years. What has kept me here is that the comparative oncology work in the veterinary school rivals that being done anywhere in the world. In addition to support from our veterinary college, we are integrally involved in the National Cancer

Institute-Designated Purdue University Center for Cancer Research, a program that brings together cancer researchers from all across the university and beyond. Purdue has incredibly strong basic science, and in the veterinary college, we have the opportunity to apply that basic research in a clinical setting where we can answer key questions in cancer management.

How far down the line are we with regard to this research?

We've come a long way from a time when no one had heard of comparative oncology to where there is growing appreciation for this type of research across the country.

In the PCOP, we focus on just a few cancer types that truly mimic the human condition, and my work is on invasive urinary bladder cancer. In dogs, this cancer has gone from being one of "no hope" to one in which treatment can allow most dogs to enjoy many months to well beyond a year of quality life.

Our work is also aimed at helping people with cancer, and positive findings from our work have moved into human studies. With the foundation that has been set, we're poised to have an even greater impact on human health while we also help pet animals.

Regarding genetic risk factors for bladder cancer, we are helped by certain breeds of dogs that inherit an incredibly high risk for bladder cancer. We are fortunate to collaborate with Dr. Elaine Ostrander (National Human Genome Research Institute) on work aimed at identifying the specific inherited factors for bladder cancer in dogs that could then be identified in humans with bladder cancer.

I'm incredibly excited about where this field can go in the next five to 10 years.

Is there coordination across different institutions in this area or is it more localized work?

We're working with people at Purdue and institutions across the country. Our approach is to try to collaborate with the best people in their field to apply their talents to critical bladder cancer problems.

Is it difficult to be patient when things take time, and can you celebrate intermediate wins?

It definitely takes patience, and we do appreciate the progress at each step. We are grateful for an early discovery of the anti-tumor effects of a drug called piroxicam, a drug in a class called cyclooxygenase (Cox) inhibitors. Cox inhibitors include aspirin, ibuprofen, and other over-the-counter pain

medicines. Before coming to Purdue and while I was working with Dr. Tommy Needham (out of Wilmington, North Carolina) in general practice, we began to notice some very curious anti-tumor effects of piroxicam in dogs receiving the drug for pain relief while not receiving any cancer drugs. At that time, there were only a few reports in the literature to suggest Cox inhibitors could have anti-tumor effects.

At Purdue, we have taken those initial observations through multiple studies documenting the anti-tumor activity of piroxicam, and now Cox inhibitors are part of the standard of care for dogs with many types of cancer, not just bladder cancer. I'm certainly glad we did the studies even though many people were quite skeptical of our efforts at the time.

Not only do Cox inhibitors have anti-tumor activity by themselves, but they can greatly enhance the activity of chemotherapy. The Cox inhibitor work was also instrumental in leading us into the bladder cancer field, and now we conduct research to address many aspects of invasive bladder cancer including prevention, early detection, and treatment.

I'm excited we have had the opportunity to move Cox inhibitors into a human trial through our collaborators at Indiana University (Dr. Richard Foster, PI). From a biological standpoint, we're seeing the same changes in human bladder tissues that we saw in dog bladder tissues.

Do you find top talent coming into the industry and what do you tell them about the opportunities that exist?

To work in a position such as I do, an individual would most likely need to be a veterinarian with specialty training through an oncology residency program, and they would also greatly benefit from additional research training. For our residency program at Purdue, we might have one or two positions open each year, and we could have 35 applicants or more. It's definitely competitive.

One of the challenges in developing the comparative oncology researchers of the future is that the majority of veterinarians who complete residency training go into the private sector. There are a lot of people coming out of school with tremendous educational debt, and many will go into the private sector to be better able to pay off that debt.

I, however, feel extremely fortunate that I have had the opportunities to do this type of work in my career. It is extremely rewarding to work in a field where we can really help animals and people. ●