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ReachMD
www.reachmd.com
info@reachmd.com
(866) 423-7849

Can Canines Sniff Out Cancer?

Dr. Doghramji:
We have all heard the age-old saying that dogs are man's best friend, and now, that might really be the case for oncologists after a recent study found that 97% of specialty-trained dogs can accurately identify lung cancer.

Welcome to Clinician's Roundtable on ReachMD. I am Dr. Paul Doghramji and joining me today is Dr. Tom Quinn, a Clinical Associate Professor at the Lake Erie College of Osteopathic Medicine and a member of the team who worked on this intriguing study. Thanks for joining us today, Dr. Quinn.

Dr. Quinn:
Well thank you for having me. I appreciate the opportunity.

Dr. Doghramji:
Alright so let's just start with the question on everyone's mind, Tom. Why, of all things, did you choose to study how dogs may be able to identify cancer? What gave you and the team the idea to design such a study?

Dr. Quinn:
I really wish I could claim that it was my idea. I have to give credit to Heather Junqueira. She's a nationally known dog trainer, and her father had died of lung cancer. It was a late diagnosis, so they did not find his cancer until it was in a late stage. And since she was working with dogs and knew their ability to detect things by odor, she got the idea that they should be able to detect cancer, and then she approached us here at the Lake Erie College of Osteopathic Medicine to cooperate with her in this research.

Dr. Doghramji:
Wow, how interesting. Very interesting. Now that we know what led to this study being done, let us dive into the details. Were certain types of dog breeds used, and what kind of training did they receive?

Dr. Quinn:
We will start with what type of dogs. We used dogs from the scent hound group of dogs because these are the dogs with the most acute sense of smell, and we used mainly beagles. And we chose beagles because they are of the temperament that they are very easy to train They are easy to please, and they are very social dogs, so they get along. You can house many dogs together at one place. We are also just now starting to experiment with basset hounds who are also in the scent hound group. And we have some basset hounds that are just puppies, and they're just starting into the training program now. And we're hoping they are going to be as good as the beagles.

Dr. Doghramji:
Wow that's really cool because you have chosen friendly and patient dogs. So, take us through the process. What is it actually like, the training process?

Dr. Quinn:
The training process is an eight-week process. It does not sound like it is long, but we can completely train a dog in eight weeks. What we do is the first two weeks we will set out five samples. And four of those samples will be negative, and in the fifth container, we put a dog treat. So we train the dogs to go around and sniff the different containers, and when they get to the dog treat, then they're trained to sit in front of that container. Then after two weeks, they're fully trained to identify the treat. Then we add cancer to the treat. We add a sample of cancer. Day by day, the amount of treat is made smaller and smaller. By the end of the second set of two weeks, the dog is able to identify just the cancer, and then we have an additional four weeks where we just reinforce that same behavior over and over

again, day after day, until the end of the eight weeks. They are fully trained and very accurate at detecting the sample that has the cancer.

Dr. Doghramji:
Tom, how do the patients interact with the dogs?

Dr. Quinn:
Actually there is no interaction with the patients at all. We get a sample from the patients. Originally we started with blood samples, but we have found that breath samples were even more accurate. Basically we just have the patient breathe into a paper surgical mask just like you could buy in any drugstore. They breathe into the mask for about five minutes. They put the mask into a mailing envelope, and they mail it back to the laboratory. So, somebody can be in California and breathe into a mask and mail the mask to our laboratory in Florida. And then a section of the mask is presented to the dogs, and they can identify whether that patient has cancer or not.

Dr. Doghramji:
So, in the clinical studies that you have done, what have been the results of the study using these cancer-sniffing dogs, the false negatives and false positives?

Dr. Quinn:
The one study that we have published, you have to remember this is a relatively new process that we are doing. So far we have only published one article, and that was in the Journal of the American Osteopathic Association. We tested dogs for non-small cell carcinoma. The dogs were 96.7% sensitive and 97.5% specific in identifying the non-small cell carcinoma. Since that time, we have been experimenting with using breath samples. We have just completed a second study, which we are in the process of getting published right now, on breast cancer, and we have found the dogs are 100% sensitive and 97.5% specific when they are detecting breast cancer.

Dr. Doghramji:
For those of you just tuning in, this is Clinician's Roundtable on ReachMD. I am Dr. Paul Doghramji and today I am speaking with Dr. Tom Quinn about a recent study which found that dogs can detect lung cancer with surprising accuracy. So, Tom, now that we have covered what the study entailed and what was found, let us talk a little bit about its implications. So, this may be a better question for the dogs, but do different types of cancer have their own unique smell and could dogs be used to detect other cancers as well? You said this was with small cell cancer that your study was done.

Dr. Quinn:
Right now, we have dogs that are trained to detect a general cancer odor. We have dogs that are trained to detect breast cancer and dogs that have been trained to detect non-small cell lung cancer. We are just starting, in fact just two days ago we received a research grant from the Fight Colorectal Cancer Foundation, and we are going to start studying colorectal cancers and the diagnosis using dogs.

Dr. Doghramji:
So, looking ahead, then, about the implication of this, how can we expect then our canine friends working alongside oncologists or maybe even other clinicians? Are these dogs there for screening of cancer or are they for the detection of cancer after treatment? How do you envision these dogs to be used?

Dr. Quinn:
All of the above. Primarily in the beginning we are hoping to use it to screen large numbers of people for cancer because it's much less expensive and less invasive than normal screening. Let us just take breast cancer. The normal screening method is a mammography. Mammography is or 87% sensitive whereas our dogs have proven to be 100% sensitive. The test is a lot less expensive to perform and does not expose the patient to radiation and does not cause pain like a mammogram does when they must squeeze the breast in order to do the mammogram. So, there are a lot of advantages and where this can be used for mass screenings. Right now, when a sample is sent into the laboratory, we will have a dog screen the sample for the general cancer, and if it is positive, then we have it screened specifically for the lung and the breast cancer. Now as time goes on, we'll be training dogs for the colorectal cancer, prostate cancer, pancreatic cancer. We're not to that stage yet, but that's what we are going to be doing in the near future.

Dr. Doghramji:
The economic and clinical implications of this are just astounding. Right now, we spend a lot of money doing colonoscopies for colon cancer. The time and the money involved in that as well as you said, mammography, so do you envision at some point sniffing dogs to replace these kinds of testing?

Dr. Quinn:
I think it's the possibility is definitely there. We need to do more research in order to be able to say positively, but yes, absolutely, we

have the potential that we could replace many of those tests, do it a lot more cheaply. With the colonoscopies, the patient would not have to undergo the prep. I have had a colonoscopy, and the prep is worse than the colonoscopy plus you have to be put under anesthesia whereas with this you just simply breathe into a mask and send it off to the laboratory.

Dr. Doghramji:
Tell me about the next study designs. What are you looking at?

Dr. Quinn:
We're doing a number of things. One of the things, like I already mentioned, we're expanding out and we're going to be starting to study additional types of cancer. And by the way, the Lake Erie College of Osteopathic Medicine, we have a collaborative research agreement with a group called BioscentDX. They are the ones that actually train the dogs. And if anybody wants to get the test, all they need to do is go online to BioscentDX, and they will be able to have a kit sent to them. And they can have the testing done right now. Also, the other thing that we are doing is when we do get positive samples, we bring them back to the laboratory here at LECOM and we are trying to fractionate these samples and begin to identify what the biomarkers that the dogs are identifying. Once we identify these biomarkers, and that sounds like it would be really easy to do, but it is not. But once we are able to identify the biomarkers, then we will be able to get a chemical test that could detect it so that I envision in the future a test that you would breathe into a tube, and it would turn positive or negative just like a pregnancy test that you buy at the local drugstore right now.

Dr. Doghramji:
Unbelievable. This is so interesting. Tom, let me ask you another question. Is anybody else doing anything like this?

Dr. Quinn:
Yes, there are. We are not the only ones. We know of four other large universities in the United States that are doing it plus internationally there are many other places that are doing it. But we know of four other institutions in the United States that are experimenting with this.

Dr. Doghramji:
Tom, I would like to thank you for joining me today to talk about this fascinating study and for giving us insights into what the future of cancer detection may potentially look like. It was great having you on the program today.

Dr. Quinn:
Thank you. I enjoyed being here, and hopefully we were able to educate your listeners.

Dr. Doghramji:
Absolutely. I am Dr. Paul Doghramji, and you have been listening to Clinician's Roundtable on ReachMD. To access this episode and others in this case, visit ReachMD.com/clinicians-roundtable where you can be part of the knowledge.