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Call it a pet scan

Research suggests dogs may be able to detect cancer in patients' breath

By **SUSANNE RUST**
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Most dog owners can regale you with tales about their pooch's smelling acumen: the Labrador who dived tens of feet to the bottom of a lake to retrieve an old tennis ball; the pug who found a stray peanut behind the couch; the beagle who bee-lined to the carcass of a chipmunk half a mile away.

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But an international team of scientists says it may have harnessed that talent to help detect cancer.

Researchers at the Pine Street Foundation in San Anselmo, Calif. - a non-profit educational and research organization dedicated to fighting cancer - and the Polish Academy of Sciences exposed dogs to breath samples from lung and breast cancer patients, as well as samples from healthy people. They said the dogs were able to detect cancer with astounding sensitivity: They identified 99% of the lung cancer breath samples (including early stage cancer patients) and 88% of the breast cancer samples.

The researchers say the dogs' diagnoses rival those retrieved from more conventional routes, such as CT scans, PET scans, X-rays and mammograms.

The study was released this week and will be published in the March edition of the

Cancer Hounds

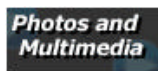


Scientists say that dogs are able to detect cancer with astounding sensitivity and accuracy.

Here are some examples:

- **41%** Bladder cancer
- **88%** Breast cancer
- **99%** Lung cancer, including early stage cancer patients

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journal for Integrative Cancer Therapies.

For years, there has been anecdotal evidence that dogs could detect the presence of cancer in their owners. For example, there are reports of dogs warning their owners of the presence of melanoma by incessantly sniffing or licking skin discolorations and blemishes.

Subsequent studies suggest that dogs can also detect melanoma and bladder cancer - albeit with only 41% accuracy for the latter.

"That's better than chance," said Nicholas Broffman, executive director of the Pine Street Foundation. "But it's not clinically significant."

However, Broffman and his colleagues saw promise in these perceptive pets - and as dogged investigators of cures and early warning systems for cancer, they decided to dig a little deeper.

"It's all about early detection," Broffman said. "If you find the cancer early enough, you can give patients options."

That's particularly true for cancers such as those in the lung and breast, which clinicians say can be removed with high levels of success if caught very early.

Unfortunately, particularly in the case of lung cancer, these cancers aren't always detected early on and the methods used to find them are not without fault.

Indeed, according to a 2003 report in the journal Lung Cancer, chest X-rays and sputum analyses - two conventional methods for detecting lung cancer - have high false-negative rates, therefore failing to detect many early stage cancers. And both CT scans and mammograms are sensitive to non-cancerous lesions, which can lead to unnecessary biopsies.

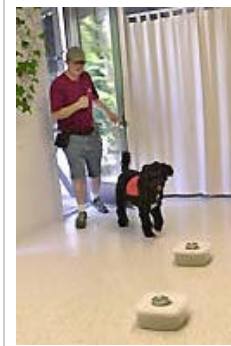
Was there, wondered Broffman and his colleagues, a chance that dogs could detect these cancers accurately at early stages?

Training the dogs

To figure this out, the foundation "employed" five dogs - three Labrador retrievers and two Portuguese water dogs - from local dog owners and a group called Guide Dogs for the Blind, a canine training organization in San Rafael, Calif.

The dogs had no prior detection training, although they all had some basic obedience under their belts. They were also fairly young, between the ages of 7 months and 18 months.

The dogs were given a two- to three-week course in cancer detection.



A trainer works with Isabell, one of the first dogs who was taught to sniff out cancer, at the Pine Street Clinic in San Anselmo, Calif., in 2003. For each trial, the dog was presented with five samples, four from healthy volunteers and one from a cancer patient.

To do this, the researchers collected breath samples from healthy people with no prior cancer history as well as from people who'd been recently diagnosed with either lung or breast cancer, but before they'd received any treatment.

The dogs were exposed to both kinds of breath samples and rewarded with a biscuit when they correctly identified the cancer samples from the mix. To indicate a positive detection, the dogs would either sit or lie down in front of the sample.

In the trials, the dogs were exposed to new breath samples taken from 28 lung cancer patients, six breast cancer patients and 17 controls. For each trial, the dog was presented with only five samples, four from healthy volunteers and one from a cancer patient. The samples were given numbers and randomly placed so that the handler, dogs and trial observers were not given any information about the contents of the individual vials.

The dogs picked the positive samples with amazing sensitivity. And it didn't seem to make a difference how old the samples were (from one day to several weeks old), which stage of cancer or which dog was doing the sniffing.

The researchers believe the dogs pick up on chemical cues from the cancer - however, they can't rule out the possibility that the dogs are sensitive to other factors associated with cancer, such as inflammation, infection or dead tissue.

There was one curious result that was excluded from the trial: The foundation initially recruited three patients who had been treated for cancer previously but were in remission at the time of the study. For one of these patients, in 24 out of 25 scent trials, the dogs either sat or lied down in front of her sample, indicating she was a "patient."

According to the study, the woman was seen frequently for checkups by her doctors, and during the trial, there was no evidence of breast cancer. Twelve months later, an MRI again showed no indication of new growth. But at her 18-month appointment, her doctors discovered recurrence.

The dogs did not indicate that the other two patients had cancer, indicating that a history of cancer was not something the dogs were zeroing in on.

Some 'overreaching'

James C. Walker, director of the Sensory Research Institute at Florida State University in Tallahassee, Fla., who wasn't involved in the study, said the researchers were probably "overreaching" in their interpretation of this one case, adding that is very important to be careful when writing about such issues.

"I'd rather say too little" than blow something out of proportion, he said. "It's too early to know how good they (dogs) are."

Nevertheless, Walker, who published a study in 2004 on dogs' ability to detect melanoma in urine samples, said he thinks the work "certainly looks worth pursuing."

However, he cautions that before this line of investigation moves too far forward, scientists need to better understand how dogs process scent and how they discriminate between smells and trial samples.

Rosanne Harrigan, director of complementary and alternative medicine at the John A. Burns School of Medicine at the University of Hawaii in Manoa, said the results need to be confirmed

in a larger trial before she's completely convinced. But she thinks the idea that dogs could prove able cancer detectors makes sense.

"We use them to smell for drugs. At the airport, they are used to assess whether someone is carrying contraband. We can train them to detect many different smells," she said, so why should cancer be an exception?

In addition, they are low-tech, they don't cost much and they won't cause any harm, she said. "If a dog smells your breath, it is not going to hurt you."

Broffman said his next step is to create a showdown between dogs and more conventional techniques: Can a dog pick up cancer before an MRI?

It's something Broffman - and probably many pet owners - would like to know.

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