

Innovative screening can detect 'cancer fingerprint' in dogs

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A dog undergoes a health checkup at the Virginia-Maryland College of Veterinary Medicine. Credit: Andrew Mann for Virginia Tech

Cancer is common in dogs, with some breeds being more prone to certain variations of the disease than others. Recent studies have shown

that nearly half of dogs over the age of 10 will develop cancer, making early screening a crucial precaution for dog owners of any breed.

Researchers in the College of Engineering, College of Agriculture and Life Sciences, and the Virginia–Maryland College of Veterinary Medicine have developed a new, noninvasive, [rapid test](#) using a dog's urine that allows for potential early detection of [cancer](#). Currently, there are three genomic blood tests that can test for tumor or cancer proteins, but no noninvasive rapid tests using urine currently exist. The team's [findings](#) were published in *Frontiers in Veterinary Science*.

Researchers considered a broad spectrum of cancer types and decided to focus on the most common types present in [dogs](#), such as lymphoma. Using a new application of Raman spectroscopy, researchers sampled urine and found through the display of molecules that cancerous subjects had a unique "fingerprint" that could be used to indicate the presence of cancer.

"If a new patient comes into the clinic and provides a [urine sample](#), we can compare it against our database of urine scans to determine if the sample more closely matches a cancer fingerprint or a healthy fingerprint," said Ryan Senger, associate professor in the Department of Biological Systems Engineering. "With the research that we have done so far, we were more than 90% accurate at being able to tell if a new sample had cancer fingerprint or a healthy fingerprint."

These results are significant for several reasons. Blood tests are often only about 60% accurate, are expensive, and are performed in a lab. Instead of having to wait for the results of a blood test, this cost-effective screening provides a preliminary understanding into whether a dog has the markers of cancer in a matter of minutes. As a noninvasive screening, it also has the potential to be done at home.

"Owners could go from paying for expensive testing every few months, to having a urine screening done once every few months, depending on the dog's risk for cancer, if they wanted to," said Nikolaos Dervisis, associate professor of oncology at Virginia–Maryland College of Veterinary Medicine. "This screening would allow veterinarians to decide if further comprehensive testing is needed based on the results."

As the research progresses, the team hopes to be able to not only detect cancer in dogs, but assess a dog's response to therapy and evaluate the recurrence of tumors and cancer. Additionally, team members hope to use the [screening](#) tool in other animals. There is even potential future use in human health studies.

More information: John L. Robertson et al, Cancer detection in dogs using rapid Raman molecular urinalysis, *Frontiers in Veterinary Science* (2024). [DOI: 10.3389/fvets.2024.1328058](https://doi.org/10.3389/fvets.2024.1328058)

Provided by Virginia Tech

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