

# How trustworthy is your dog's DNA test?

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For some dog DNA tests, companies require pet owners to upload a photograph of the pet with the DNA sample. In other tests the photo can be optional. This photo of Lila, a purebred beagle, accompanied her cheek swab. Credit: DBMI associate professor Monica Munoz-Torres, PhD.

Lila is a registered purebred beagle, but depending on what company does her DNA testing, she might be part rottweiler, part American foxhound, or not a beagle at all.

A [new study](#) published in February by researchers in the Department of Biomedical Informatics (DBMI) at the University of Colorado School of

Medicine, revealed that some direct-to-consumer (DTC) dog DNA testing companies may rely more on a photograph of the dog than genetics.

One of the six companies the researchers selected to use in their study concluded that Lila was 50% poodle, 50% bichon frisé, and 0% beagle.

"I was at a meeting where we were talking about the reliability of direct-to-consumer genetics tests, and we hatched this plan to investigate dog [breed](#) tests," says DBMI founding chair Casey Greene, Ph.D.

"Somebody said that these testing companies have you upload a photo of your dog and I thought, 'are they actually doing a DNA test at all?' That's when we decided to figure it out."

## **Fetching for results and accuracy**

The study, which began in late 2021, recruited 12 different dogs from across the country that represented 12 different breeds—each dog was either registered or eligible for registration with a breed organization to ensure their status as purebred. Cheek swabs were taken from each of the dogs and sent to six different DTC companies that claim to test canine DNA to determine breed.

"We wanted to work with dogs where we already had a pretty strong idea of what the test would show," explains Halie Rando, Ph.D., postdoctoral researcher in Greene's lab and lead researcher in the study. "By working with purebreds, we thought we knew what the test results should look like."

For half of the tests, the sample was sent along with an accurate photo of the DNA donor, but for the other half, the sample was submitted along with a photo of a different dog, one that was genetically and physically much different.

"In one swap, we paired a photo of Brittany spaniel, which is a big, silky-haired dog, with a Chinese crested, which is a small, hairless dog," Rando says. "We made sure that there was no chance that the two dogs would get conflated by the nature of being closely related."

In five of the six companies, results for the Chinese crested dog that included a photo of the spaniel came back mostly accurate. But one test, completed by Accu-Metrics, determined in an "official analysis" that the dog was part border collie and part [golden retriever](#)—a conclusion that seems to align more with the photo of the dog than the DNA sample.

Accu-Metrics is the same company that determined Lila the beagle wasn't any part beagle, even when her own photo accompanied the cheek swab.

There is no scientific reason why a photo of the dog would be needed to analyze the DNA, the researchers say.

"In most cases, at least one test provided a breed prediction that did not match the registered breed," researchers write in their findings. "Because our analysis focused on evaluating whether the reported ancestry deviated from the expected ancestry, which in purebreds is 100% of a single breed, minor differences in how results were reported by different companies did not affect our analyses."

Variances in testing mechanisms, or the markers used in testing, might explain why some tests reported Lila to be 100% beagle and others reported her to be 90% beagle. It doesn't explain why one test would report she's not a beagle.

"Even among our team of people well-versed in genetics, it can be difficult to understand these small differences, what's spurious, and what's meaningful," Rando says. "It's a really challenging environment to

navigate even with significant genetic literacy."

## **A wag toward transparency**

Inaccurate DNA testing can also have significant consequences for pet owners.

Controversial breed-specific legislation started gaining popularity more than four decades ago and outlawed people from owning certain breeds, such as "pit bulls" and rottweilers, in some cities. Insurance companies and leasing companies have used breed lists to deny coverage and housing to people owning specific dog breeds.

"One of our concerns was that some of these tests can have real financial implications for a person's ability to rent, get insurance, or live in a particular city without compelling evidence that it is a valid result," Greene says.

In the CU study, a company called DNA My Dog identified a bulldog as a wolf hybrid and Lila the beagle as rottweiler. Accu-Metrics identified a German shorthaired pointer and a golden retriever as having ancestry that would qualify them as part pit bull.

"None of these ancestry predictions were supported by any other DTC tests. Therefore, it would be possible for dog owners to face severe financial repercussions in terms of home insurance and even housing rental eligibility if they view the results of a DTC test as definitive and self-report a dangerous breed, or if DTC canine genetic testing were adopted for housing and insurance purposes," the researchers say.

While the researchers didn't investigate the health or trait analysis that some of the companies offered in the DNA testing, they say they're an added cause for concern for pet owners and veterinarians.

Ancestry predictions from Accu-Metrics were more often at odds with many of the dogs' pedigree registration, even for the 10 American Kennel Club-registered dogs, which requires dogs to meet strict breeding standards over many generations.

"Genetic information can contribute to [pet owners](#)' decisions regarding their pets' health, and when this information is incorrect or is being interpreted incorrectly, it can lead to tragedy," the researchers say.

Rando and Greene say dog owners should be cautious about DTC dog DNA testing and the companies that offer those services.

"Not all tests are created equal," Greene says. "It is important the services are evaluated independently with careful experimental designs to understand their strengths and weaknesses. That's part of what we contribute as scientists."

**More information:** Halie M. Rando et al, Many direct-to-consumer canine genetic tests can identify the breed of purebred dogs, *Journal of the American Veterinary Medical Association* (2024). [DOI: 10.2460/javma.23.07.0372](#)

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