

Q What is the Canine Heritage Breed Test?

A The Canine Heritage Breed Test is a DNA-based breed test, giving mixed breed dog owners the opportunity to find out just what breeds comprise their beloved four-legged family member. PETCO offers two versions of the Canine Heritage Breed Test the “Standard” test and the “XL” test. The testing kit includes all you need to perform the test, including all laboratory processing, shipping charges and a Certificate of DNA Breed Analysis.

Q Why does PETCO offer multiple versions of the Canine Heritage Breed Test?

A PETCO offers two test versions to better suit their customers needs and budget. The “Standard” test is a smaller version of the “XL” test in the sense that it identifies fewer breeds than the “XL” version. The “Standard” version can identify just over 50 breeds and costs less than the “XL” version which can identify a little over 100 breeds. The size or weight of the dog has no bearing on what test the customer can purchase or should purchase.

Q How do I purchase a Canine Heritage Breed Test kit?

A Test kits can be purchased on-line at PETCO.com or in the Grooming salon at your local PETCO store.

Q How long will it take for me to receive my testing kit if purchased on-line?

A Once ordered, your Canine Heritage testing kit will be sent via USPS from our California fulfillment center. Depending on where you live, you should receive your testing kit in 3-7 days.

Q What type of sample is required for testing?

A Drawing blood can be painful and traumatic for your pet and we believe such procedures should only be done for necessary medical treatment. Therefore, our K9CheekSwab DNA Collection method is specifically designed to be non-invasive and painless for your pet. Testing is performed on cheek cells collected with a soft-bristled nylon brush. At this time, we do not accept any other type of sample for testing.

Q Is a cheek swab as accurate as a blood test?

A DNA is present in all living things from bacteria to plants to animals. In animals, it is found in almost all cell types: muscles, reproductive cells, hair roots, and skin cells -- any cell that has a nucleus. The procedure for extracting DNA is the same, regardless of its source

Today the most common and preferred format for collecting a DNA sample is a buccal cheek swab. In fact, buccal swabs are so easy and effective that, according to the American Association of Blood Banks, of the reported nearly 1 million DNA samples processed by laboratories in 2006 over 98% were buccal cheek swabs and less than 1% were blood samples¹ Here at MMI Genomics we have been on the forefront of DNA technology and have been using buccal cheek swabs for nearly 12 years with both consistent and accurate results.

Some of the benefits to using a cheek swab to collect DNA:

- Fast and easy
- Safe and Painless to your pet
- Better for small dogs and puppies
- Does not require a trip to the vet
- Does not require an additional fee for collection
- Easy to ship, no risk of breaking, damage or contamination

¹ ANNUAL REPORT SUMMARY FOR 2006, American Association of Blood Banks.

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Q Do I need the help of a veterinarian to take the DNA sample?

A No, because the swabbing procedure is so easy and completely non-invasive, swabbing can be done effortlessly and comfortably by the pet owner, avoiding the trauma and expense of other sampling methods. However, if you purchase the test at your local PETCO store a *certified* Canine Heritage Associate would be happy to collect your pet's DNA sample for you or answer any questions you may have.

Q How long does it take to get my results?

A Results are usually available within 4-6 weeks from receipt of each sample.

Q How do I send my K9CheekSwab DNA Collection Brush to the lab for testing?

A Once DNA sample has been collected, simply place the K9CheekSwab DNA Collection Brush into the provided pre-paid mailer and drop in a mailbox - No special handling or postage is required.

Q How are my results reported?

A Your results are printed on a frame quality Certificate of DNA Breed Analysis that will display your pet's breed composition. If you provide a digital photo of your pet, it will also be printed on the certificate at no extra charge. Visit www.petco.com/dna to submit a photo.

Q How do I submit a photo of my pet?

A You can submit a photo of your pet to be printed, free of charge, on your Certificate of DNA Analysis. Submitting a photo of your pet is completely optional. To do so, simply visit www.petco.com/dna.

Q How do I interpret my dog's results on the Certificate of DNA Breed Analysis?

A **Primary** – This category is intended to help owners recognize when their pet's DNA contains a majority of a specific breed (i.e. 50% or greater). If your dog has a strong match to one of our validated breeds, then it is categorized as primary. Most mixed breed dogs will not usually have a breed in this category unless one or both of their parents are purebred.

Secondary – This category reports breeds that are easily recognizable within your dog. While these breeds may have a strong influence on your pet, each breed listed makes up less than the majority of your dog's DNA.

In the Mix – This final category identifies breeds that have the least amount of influence on your pet's composition, however, they still appear, at a low and measurable amount, in your pet's DNA.

Q Why are there no results in the Primary category?

A It should be understood that test results often do not appear in each category. If the dog has been mixed over many generations, it will most likely not show a very strong influence of any one particular breed. Thus its results will show up only "In the Mix" category. If, on the other hand, a dog has at least one purebred parent, it most likely will have a result in the Primary category.

Q What happens if my sample fails testing?

A Unfortunately, a small percentage of samples do not contain enough cheek cells to complete the test. If this occurs, you will be contacted to resubmit another sample at no charge. Therefore, getting a good sample is important to minimize turn-around time, please carefully review the included K9CheekSwab™ DNA collection instructions. If you need help or have questions on sample collection visit your local PETCO store and ask to speak to a *certified* Canine Heritage Associate.

Q What happens if my dog is composed of breeds that are not identified by the test?

A The Canine Heritage Breed Test can only determine if any of the validated breeds make-up your pet's breed composition. If your pet's composition contains non-validated breed(s), the test may identify a breed earlier in your dog's ancestry. This may cause identification of apparent unlikely breeds for your animal's composition.

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Q Can the Canine Heritage Breed Test be used to determine if my dog is purebred?

A The Canine Heritage Breed Test is not designed for use as a purebred or paternity verification test and is not an established legal tool. A kennel or breed club certifies a dog's breed based on pedigree documentation. If necessary, kennel and breed clubs use legally recognized DNA paternity testing to verify relationship. These tests use a different type of DNA analysis than the Canine Heritage Breed Test. Kennel clubs will not accept the Canine Heritage Breed Test as proof of being purebred.

Q Will you be validating more breeds? If so, what breeds?

A We believe a very large percentage of the mixed breed population is covered by our current list of validated breeds, however, we expect to continue to validate more breeds and add them to the test in the future.

Q How successful is the test in finding unique DNA breed identifiers in a dog?

A In a blind study using thousands of dogs that have been verified to be purebred by AKC certification, the Canine Heritage Breed Test is able to successfully assign the correct breed over 99% of the time when testing purebred dogs that are among our identifiable breeds.

Q Why would my dog look different than the breeds detected?

A Sometimes a dog's visual appearance may vary from the breeds reported due to several reasons:

1. A dog's visual appearance may vary from the breeds shown in the results due to the inherent randomness of how traits (e.g. genes) are expression in every pet. Therefore a dog may be comprised of 3-4 breeds, but may only show a few characteristics of 1 or 2 of the breeds depending on gene interaction and dominance. Furthermore, each breed that is in a dog's composition will carry several variants for a specific trait (e.g. hair and eye color, etc.) and how these traits interact with the same trait variants of another breed(s) in the dog's composition can create quite a wide variety of visual outcomes, some of which will not resemble any of the breeds in the dogs composition.
2. The test can not determine every recognized breed. If the dog is made up of a breed(s) outside of the validated breeds, the test results will identify ancestral breeds within the validated breeds used in the analysis. This may cause identification of apparent unlikely breeds for a pet's composition; however, these breeds are still part of the dog's ancestry, they simply occurred further back in the dog's genealogy.
3. The Canine Heritage Breed Test was developed using populations of breeds within the US and Canada and has not been tested on dog breed populations in outside regions. Therefore, the Canine Heritage Breed Test can not be guaranteed to work as well on dogs that are tested from outside the US and Canada.

Q Can I check the status of my test that has already been sent to the lab?

A Yes, visit www.petco.com/dna. You will need your unique test ID (MPA-XXXXXXX) to check your test status.

Q What happens if I have a question about the Canine Heritage Breed Test?

A The testing laboratory has a trained customer service staff that can answer all your questions. The toll-free Canine Heritage PETCO hotline is 800.211.0254. We are available Mon. – Fri., 9 am to 5 pm.

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How the Canine Heritage Breed Test Works

Q Is this the same type of DNA test I see on popular TV crime solving shows?

A No, the Canine Heritage Breed Test is a much more advanced and complex type of DNA analysis than those seen on TV. While a few basic forms of DNA analysis, such as PCR, are used in processing the DNA, the key DNA analysis used in the test comes from the latest advances in genomics science and technology – most of which have occurred in the past seven years. Every DNA sample undergoes a lengthy analysis and results are reviewed as part of an extensive quality assurance and control process. Unlike TV, where DNA results are ‘magically’ done between commercial breaks, the test does take several weeks to complete. We hope the information presented here will give you a better idea of what is involved in testing your dog’s DNA.

Q Who is MMI Genomics, Inc.?

A With nearly 15 years in the canine DNA business and having tested over one-half million canine DNA samples, MMI Genomics, Inc. (MMIG) is a highly experienced laboratory. We set ourselves apart in the animal DNA field by researching, developing and marketing all of our own DNA tests. MMIG is the primary DNA service provider for numerous canine registries around the world, including the American Kennel Club (AKC), United Kennel Club (UKC) and Professional Kennel Club (PKC). In 2001, while a business unit of Celera Genomics, the company that decoded the human genome, we participated in the most advanced genomic research in the world – years ahead of other companies. We led the private effort to sequence the canine genome. With this unique experience, knowledge, and state-of-the-art genomics technology, we have developed our current line of advanced DNA-based products and services.

Q How was the Canine Heritage Breed Test Developed?

A Already a world leader in canine DNA technology, we began to dig deeper into canine genomics as part of our desire to provide dog-owners a better understanding of the genetic make-up of their dog. Our mission is to improve a pet’s well-being and strengthen the bond between pet and pet parent. We hope that pet parents will use this information to improve health, promote wellness, and gain a better understanding of the behavior and personality of their canine companion. The Canine Heritage Breed Test also provides a unique means of satisfying the curiosity of mixed-breed dog owners wishing to fill in the missing pieces of their pet’s breed and ancestry puzzle.

The Canine Heritage Breed Test began with the search for a set of unique DNA markers, known as SNPs (Single Nucleotide Polymorphisms), which could identify the breed of a purebred dog. We started by testing over 400 different DNA markers on over 100 purebred breeds[i] to identify the unique combination of markers that describe each breed. After testing thousands of purebred dogs, a unique breed DNA profile was developed using over 400 DNA markers per breed. From these initial markers we identified a smaller subset of markers used for the Canine Heritage Breed Test. This final marker set, based on a blind study using thousands of dogs that have been verified to be purebred by AKC certification, was able to successfully assign the correct breed over 99% of the time when testing purebred dogs that are among our identifiable breeds. These markers were then applied and validated on mixed breed dog populations.

While the Canine Heritage Breed Test has gained unprecedented media attention and satisfied the curiosity of tens of thousands mixed breed dog owners, we see it as just the first in a series of products that will allow you to use genetic information to better manage health and wellness throughout the entire lifetime of your pet.

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Q What happens to my sample?

A Once we receive your dog's DNA sample, it goes through multiple laboratory processes and rigorous quality control mechanisms. The following is a brief summary of the steps that each sample must go through prior to reporting the results.

1) **Sample arrives via USPS at laboratory** – Each sample must be properly opened, examined and logged into our proprietary Laboratory Information Management System so that it can be easily tracked and monitored through each laboratory process. At this time your pet's information is logged into our system and the sample is given several forms of identification.

2) **DNA Isolation and Amplification** – Each sample is then delivered to our DNA isolation laboratory where your dog's DNA is extracted from the cheek swab. We then perform PCR, a laboratory process that amplifies the concentration of your pet's DNA by making copies of it, to give us a sufficient amount of DNA for the test.

3) **Breed Test Processing** – Once the PCR process is complete, we are ready to begin the Canine Heritage Breed Test for your dog. DNA is then chemically enhanced and run through state-of-the-art laboratory equipment that identifies hundreds of key SNP marker locations.

4) **Analysis** – Now that the markers have been identified for your pet's sample, these markers are put through a complex proprietary analytical program that compares your pet's markers with that of our pure breed database markers, ultimately determining which breeds are in your pet's composition. The analysis software puts its findings into three categories.

a) First, it determines if your dog's genetic profile is a strong match with any of the profiles of the purebred dogs in our database. If so, the breed(s) identified is placed into the "primary" results category and represents a very large portion of your pet's breed composition.

b) If a good match is found, but it's not a perfect match, this information is placed into the "secondary" results category. While these breeds may have an influence on your pet's look and personality, each breed listed makes up a smaller portion of your pet's breed composition.

c) If the match looks good, but fewer markers match the profile of a purebred dog that information is placed "In the Mix" results category. This final category identifies breeds that have the least amount of influence on your pet's composition. They appear at low but measurable amounts in your pet's DNA.

Once analyzed, each sample is then carefully reviewed by a scientific review panel to ensure that it meets all of our rigorous standards and numerous quality control checks.

5) **Reporting** – After final approval of your dog's breed results, it is ready for reporting. If you uploaded a picture of your dog, it is then linked to the results. Our Canine Heritage Team prints your Certificate of DNA Breed Analysis and ships your results to you via USPS.

[i] These breeds are registered and recognized by the AKC.