

GENETIC TESTING: YES OR NO?

By Jan Grebe

In 2005, the genetic sequence of a Boxer named Tasha was published. In the 14 years since then there has been an explosion of research to try to identify and map genes that cause canine diseases and defects. There has also been an explosion of companies trying to make money from selling the results of the research to dog owners and breeders. So how can a breeder know what genetic tests are appropriate for her breed, which are indicated for her own dogs, what genetic test providers offer accurate tests, and how to interpret the results of a test and apply it to her own breeding program correctly? Luckily there is now an online resource that can help you avoid making decisions based on Facebook posts, or selecting a test provider based on which costs the least.

First, genetic tests are not a panacea for breeders. They can be a valuable asset for a breeder but are no substitute for more thorough health testing, or for common sense. They should also not be used as a marketing tool to sell puppies.

The Canine Health Foundation has listed the 10 most common ailments in dogs in general. They are:

1. Hip dysplasia
2. Allergies.
3. Epilepsy
4. Hemangiosarcoma
5. Hypothyroidism
6. Lymphoma
7. Patellar luxation
8. Cataracts
9. Bloat
10. Atopic dermatitis

Only a couple of those things on the list are caused by a single gene, as is the case with most health problems. Although genes control and determine the anatomy and physiology of a dog, they generally work in groups and collaborate so that a single gene test, which is what most genetic testing provides, may not be possible.

And most importantly, do you notice what is not on that list if you are thinking specifically about Frenchies?

In 2009, the French Bull Dog Club of America did a health survey whose results were not surprising. High on the list were:

- **AIRWAY PROBLEMS, AKA BOAS** - Brachycephalic Obstructive Airway Syndrome: stenotic nares, narrowed nasal cavities, elongated soft palate, inverted sacculles, tracheal stenosis.
- **SPINAL PROBLEMS**: asymptomatic vertebral malformations such as hemivertebrae, and premature intervertebral disc degeneration.
- **EYE PROBLEMS**: especially corneal ulcers.

Those problems are common in Frenchies because over the years we have selectively bred for anatomical abnormalities that in our breed are considered desirable. The result is that some Frenchie health problems occur because of their conformation. They have, therefore, a “breed disposition” for some health prob-

lems because the anatomical abnormalities of short faces, dwarfism, and prominent eyes are considered “normal” in the breed.

Not all disorders and diseases have known modes of inheritance, nor do all diseases have screening tests of any sort that can determine whether a dog will develop them. So health testing should include a physical examination and evaluation by a veterinarian (such as hips, eyes and hearts). Disorders / diseases known to occur in Frenchies that are known to be caused by a single gene may have a genetic (DNA) test available. It is important to remember that even though a dog may have a negative DNA test for cataracts, he still should have an annual eye exam by a veterinary ophthalmologist to check for many other eye problems that occur in the breed.

So here are the things you should consider.

- What DNA tests are available?
- Which are appropriate for Frenchies?
- How do you know which of the tests offered by various different companies you should select?
- How do you interpret and apply the results?

First, you should know that there is no organization in the world with the authority to set and enforce quality standards in canine DNA health testing. And unlike the rigorous authentication and steps required to get a human DNA test for disease on the market, which can take 10 years, canine DNA tests may bypass some of the steps that should be taken so that companies can rush to start making, marketing, and most importantly for them, selling the tests.

Fortunately, an online database is now available that can help make this daunting process more transparent. This database, called Harmonization of Genetic Testing for Dogs (HGTD), is part of a larger online resource called DogWellNet: International Partnership for Dogs (<https://dogwellnet.com/ctp/>). It is being updated on an ongoing basis as the types and providers of DNA tests is expanding.

The HGTD works as a database in which test providers voluntarily submit important information about their accreditation and quality of testing, and will provide guidance on DNA test reliability, lab quality assurance, and test result and breeding advice.

There are three main ways to search the HGTD: by Breed, Test/Disease, Genetic Test Provider/Lab. Since there are currently 200-300 canine DNA tests available, with more being added, begin by searching BREEDS.

The available tests listed for French Bulldogs, along with alternative names of and details about diseases, and literature citations, are:

- Coat Color Dilution, Alopecia
- Chondrodysplasia
- Chondrodystrophy (Type 1 IVDD)
- Cystinuria Type 1-A
- Degenerative Myelopathy
- Congenital Hypothyroidism
- Hyperuricosuria and Hyperuricemia (HUU)
- Progressive Retinal Atrophy crd 4 (PRA crd4/crd1)
- Canine Multifocal Retinopathy (cmr1)

Primary Hereditary Cataract (PHC)
Cystinuria Type 2-A
Cystinuria Type 2-B

So...what to do?

First be aware that not all of the diseases for which DNA tests are available for Frenchies are problems in our breed. For example, there has never been a diagnostically confirmed case of Degenerative Myelopathy (DM) in French Bulldogs. Also, a disease may be considered a problem in some countries, but not necessarily in the US. Also when you search by Breeds, alternative names are listed. For example Primary Hereditary Cataract (PHC) may be listed by some providers as Cataract, Early Onset (HC).

To learn more about a disease that the BREEDS section lists as available for Frenchies, next go to TESTS.

In the Search line enter the abbreviation in parenthesis after the name of the test as shown in the Frenchie list of tests. That will give you a lot of scientific information about the disease, description about when and how it develops in dogs, patent and license holders, literature references for scientific papers about the gene test, and a list of test providers in all the countries offering it. Each test provider company has information it has provided for such things as whether they hold a patent, do testing in house or out of house, what accreditations they hold, and whether they are a Leadership Sponsor for the HGTD.

Finally, for information about the companies offering the tests, click on GTP/LAB (GTP refers to Genetic Test Provider). That page offers help on how to use and interpret the information.

If you want to get up to speed before embarking on a trip through the HGTD database, or have questions while using it, on its home page (<https://dogwellnet.com/ctp/>) and on each opening page for Breeds, Tests, GTPs/Labs, look on the right side of one of those pages and you will find a wealth of very helpful information. This includes links to articles about how to use the results of genetic testing in a breeding program, including their use in deciding whether you might breed a dog known to carry a recessive gene.

Finally, keep in mind that DNA testing is just one component of a balanced breeding program that should also include a dog's overall health, temperament, health history, and physical exams by a veterinarian. Consult the Orthopedic Foundation for Animals and its CHIC program to see what tests the French Bull Dog Club of America considers desirable, both those required in order to receive a CHIC number, plus any additional optional ones that the FBDCA Health And Genetics Committee recommends (<https://www.ofa.org/recommended-tests>). The searchable CHIC Database will let you search for a specific dog and obtain valuable health information about its relatives. This information is available not only for the dog's ancestors (a horizontal pedigree), but also for its contemporary relatives (vertical pedigree), and the latter type of information is of much more value in making breeding decisions. To read about this, a good article can be found at this link: <https://www.ofa.org/pdf/hovanart.pdf>

Finally, keep in mind your own dogs' welfare and your reasons for breeding. And ask for help in decision-making when you need it.