A breeder's perspective on the evolving role of DNA in producing healthy dogs

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Serious dog breeders are always searching for new information, strategies, and tools they can use to produce healthier dogs. It is an endless and constantly evolving quest. Breeders want to produce dogs that are sound in mind and body. They want to breed dogs that are true to type and able to do the job they were bred to do. They want their dogs to bring joy to the families who take them into their homes

Breeding dogs involves millions of genetic possibilities and no matter how dedicated or knowledgeable a breeder is or how ethically they conduct their breeding program, unwanted genetic traits and diseases will inevitably appear from time to time. It is always devastating when they do.

DOG BREEDING PRIOR TO DNA

Thankfully, today's dog breeders live at a time when substantial resources are available to help them. There are phenotypic, diagnostic, and genotypic tests, canine health databases to record test results, and foundations dedicated to improving canine health. Working in partnership with breeders and other stakeholders, these groups stand ready to share their extensive resources, launch and oversee scientific studies and offer genetic counseling and expert referrals when appropriate. All of these tools can be utilized to help breeders select away from genetic diseases and toward healthier dogs.

The primary tool used early on by breeders to assess the positive and negative contributions of individual dogs in their breeding programs was progeny testing. The success of this DIY method depended on 1) the quality of breeder observation and record keeping; 2) the inheritance mode of the traits being observed; and 3) the size of the population and gene pool at the breeder's disposal. Progeny testing of this basic kind can be highly effective if the trait being observed is a single-gene (Mendelian) trait and the breeder is a good observer with lots of dogs to work with. It is not effective when the inheritance mode is more complicated, such as when the disease being observed is polygenetic, incompletely penetrant, linked, pleiotropic or has any of the many other complex inheritance modes that we now recognize. It also falls short when the harmful single-gene trait is so widespread within a small gene pool that a large percentage of

dogs carry the deleterious gene(s). As the size of kennel breeding populations and gene pools shrink, more sophisticated and scientific tests are needed.

COLLABORATION BENEFITS AMERICAN DOG BREEDERS

It wasn't until 1966 when the OFA was founded that options began to improve for dog breeders. The founding of OFA was a watershed moment in the advancement of canine health, offering a partnership with dog breeders that has lasted for more than 50 years.

The immediate outcome was the development of a standardized method for evaluating and recording the results of hip radiographs and later, elbow x-rays. The long-term consequence of OFA's creation was the development of extensive canine health databases including phenotypic and genetic results from over one million individual dogs.

AKC recognized the need for canine specific health research and in 1995 launched the Canine Health Foundation with a one-million-dollar donation. Since that time, AKC CHF has provided almost $50 million for more than 950 canine health grants and projects.

By working with AKC CHF and OFA, AKC parent breed clubs have been able to offer guidance to their members about the genetic screenings that are appropriate for dogs of their breed. In collaboration, AKC CHF and OFA established the Canine Health Information Center (CHIC), an open data base that publishes the testing results of dogs that meet all Parent Club required protocols. The CHIC open database is available for breeders to see and use to make informed breeding decisions.

CHIC has also established a DNA bank for all breeds to make DNA samples available to researchers with qualifying grants and studies as well as to breeders and owners when new genetic tests become available.

The close relationship and collaboration between the AKC and the individual AKC parent breed clubs, OFA, and the AKC CHF has conveyed a priceless benefit to American dog breeders, producing and maintaining resources that earlier breeders could only dream of. When canine health challenges emerge today breeders have numerous professional resources they can turn to for answers and further investigation.

TODAY'S CHALLENGES

What breeders need now is an understanding of the benefits and limitations of available testing. When, where and how to test; most importantly how to determine which providers can be trusted to produce the information to develop strategies to maintain and improve health and diversity breeding programs.

Breeders need to understand how to utilize test information to incorporate new and preserve existing dogs in their breeding population. Breeders need to learn how to fully appreciate the differences and relationships among the various types of test results (clear, carrier, at risk and affected) when making breeding selections to further the maintenance of small breeding populations and the long term survival of individual breeds.

WHAT IS A RELIABLE SOURCE FOR DNA INFORMATION?

Genetic testing has exploded in popularity in recent years, and with that surge in popularity, many new companies now manufacture DNA tests. Some of them meet high standards of quality. Some of them do not. There is heavy competition for market share. Even among the companies that offer high quality tests, DNA technology has advanced so quickly, the industry lacks standardization. It is therefore important for breeders to research any company they are considering before contributing any DNA based sample. Breeders who are unsure of a particular test, program or strategy can utilize the information in this White Paper or refer to AKC CHF or OFA whose mission is to promote the health, maintenance and progress of purebred dogs.

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