

The Genetics of Intervertebral Disk Disease (IVDD) in Dachshunds & Other Breeds

Research Aim: To identify genes that contribute to Intervertebral Disk Disease (IVDD) in Dachshunds and other affected breeds.

What is Needed: *Blood samples from dogs severely affected with IVDD* Severity can be assured by emphasizing DNA collections from dogs that have suffered any of the following: early age of onset, repeated ruptures, paralysis, and affected first degree relatives (affected parents or siblings). DNA samples from multiple affected dogs of the same bloodline are particularly informative (confidentiality of breeders is strictly maintained).



Intervertebral Disk Disease: IVDD is a debilitating and costly disease that affects multiple breeds, including Corgis, Papillons, Doberman Pinschers, German Pinschers, and Miniature Pinschers. IVDD is particularly prevalent in Dachshunds, where an estimated 1 in 5 dogs is affected. The increased risk in specific breeds demonstrates a very strong genetic component. Identifying the gene(s) that confer IVDD susceptibility is the first step toward developing DNA tests for eliminating risk factors from breed gene pools.

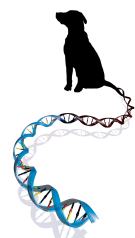
Resolving Complex Diseases in Dogs: Recent advances in canine genetics have created entirely new opportunities to resolve complex traits and diseases in dogs. The conventional strengths of canine genetics (large sibships and multiple generations available for DNA sampling) are matched by some powerful, yet lesser known benefits. The structure of breed populations lends support to assumptions about gene sharing through common descent, such that two Papillons with IVDD will almost certainly share the exact genetic causes (this is seldom true of medical genetics in diverse human populations). Breeders are in a position to ascertain a large number of DNAs from their bloodline, and this can confer enormous power to genetic studies, particularly for complex diseases.

The Dog Genome: The inherent strengths of dog genetics are being matched by unprecedented tools for research. The complete DNA sequence of the dog genome has been deciphered — all 2.4 billion letters of the code are now known. This resource is a complete compendium of canine genes — all 20,000 — as well as their precise location. The code has directly yielded an enormous set of DNA markers that optimize exploration of the genetic landscape. Whereas parentage tests rely on 15 markers, new technologies are provide a readout on 150,000 markers (a 10,000-fold increase in informativeness!).

Improving Experimental Design with Genealogy: Researchers at UC Davis, Johns Hopkins, and the University of Chicago are developing novel methods of gene mapping that exploit the most unique resource in dog genetics — whole breed genealogies. Because the ancestry of purebred dogs is fully known (and usually embedded in a digitized pedigree database), statisticians can identify the most powerful individual dogs for first-phase mapping. The approach has a modest benefit for mapping simple traits in familial pedigrees, but it has a pronounced effect on improving the chances for successfully resolving complex diseases using population-based samples (mostly unrelated dogs). The availability of several pedigree resources for the Dachshund breed could significantly help in the hunt for causative genes.



Improving Health (& Performance) by Resolving HD: The emergence of new resources (the dog genome sequence), new technologies (high density gene mapping chips), and new methodologies (selective sampling via genealogy) make complex diseases like IVDD more genetically tractable. Geneticists at the Veterinary Genetics Laboratory at the UC Davis School of Veterinary Medicine invite clinical experts and breeders to help us develop the necessary DNA bank from dogs severely afflicted with IVDD (regardless of breed type). Multiple samples from bloodlines are of particular interest. Blood samples are needed, and these should be accompanied by registration numbers. The costs of blood draws can be reimbursed; a Federal Express account number will be provided for shipping.



For Information: Contact Katy Robertson at (530) 752-3864 or at katy@ucdavis.edu