



## AUBURN UNIVERSITY

College of Veterinary Medicine

### CDPA MAY BE THE TRUE “DWARFISM GENE” IN DACHSHUNDS

This is a Breeder Summary of the paper entitled [\*Case Report: FGF4L1 Retrogene Insertion is Lacking in the Tall Dachshund Phenotype\*](#) by Stacey Sullivan, Katarzyna Julia Szeremeta, Michelle Kutzler.

**Study Background.** In dogs, there are multiple genes that have the effect of shortening limb-length. Although the gene for chondrodystrophy (CDDY, scientific name: FGF4L2) is considered by most dachshund breeders to be “the dwarfism gene,” the scientific literature shows that the effect of CDDY on limb length is modest compared to the effect of the chondrodysplasia (CDPA, scientific name: FGF4L1) gene. For genetic traits like limb length, each dog inherits 0, 1, or 2 copies of each gene that affects the trait. The scientific literature identifies a gene dose effect for CDDY and CDPA in regard to limb length. This means dogs with 2 copies of these genes have shorter legs than dogs with 1 copy. Most dachshunds have 2 copies of both CDDY and CDPA, but in some breeds of dogs like beagles, the typical pattern is 0 copies of CDPA + 2 copies of CDDY. Dachshunds, therefore, are short due to both CDDY and CDPA, but beagles are short solely due to CDDY.

**Importance of This Work.** Understanding the genetic mechanisms for short limb length in dachshunds is critical to equip breeders to make informed breeding decisions that ensure the puppies they produce have the best chance of a healthy life. It is also critical to address political actions like the October 2024 declaration by the German government that CDPA is a “torture breeding trait,” a decision which banned short-legged dogs from exhibition in that country. While partial reversal of this ban is under consideration, it is unclear whether the government’s position on CDPA is specifically under reconsideration, or if they are reconsidering other aspects of the ban.

**Study Overview.** This is a Case Report that shows the relative impact of CDPA and CDDY on limb length in a family of dachshunds in which the CDPA gene is absent in two of the dogs. The report also discusses the typical pattern of CDPA and CDDY in beagles and explains why CDPA is an important consideration for spinal health breeding schemes, even though CDPA itself is not known to affect disc disease risk in dogs.

**Is CDDY the Dwarfism Gene in Dachshunds?** The authors reported CDPA and CDDY gene test results in a family of standard wirehaired dachshunds that produced unusually tall (16-18 inches, 41-48 cm) puppies in each of two litters. In this dachshund family, all dogs (tall and short) carried CDDY, but only the short dogs carried CDPA. These findings suggest that the presence of CDPA rather than CDDY may be the primary determinant of short limb length in dachshunds. CDPA appears to be the true “dwarfism gene” in this breed.

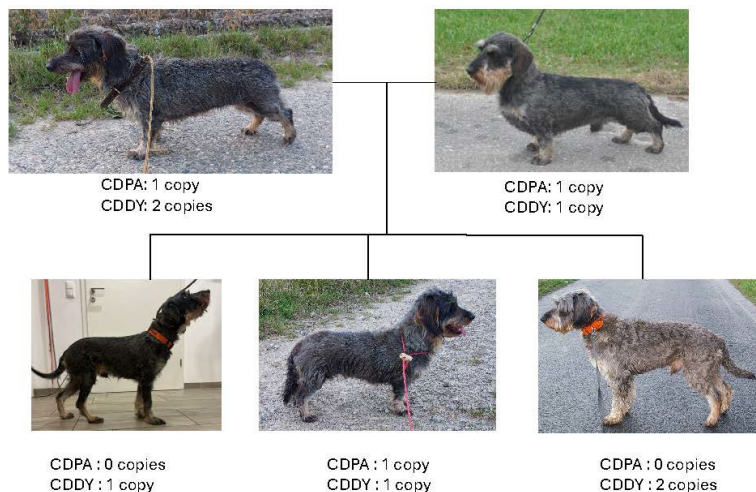
**Gene Dose Effect and Implications for Breeding Practice.** The scientific literature tells us that CDPA is 2.5x more powerful than CDDY for creating short limbs in dogs, and the findings in the dachshunds of this report support that claim. In dachshunds, the power of CDPA to create short limbs appears to outweigh the gene dose effect for CDDY. This is of interest because CDDY is also known to increase disc disease risk. Many breeders assume that it is impossible to breed away from disc disease risk and still maintain working ability and breed-typical body morphology based on the understanding that CDDY is the gene responsible for short limbs in dachshunds. The dogs of this report suggest that, in dachshunds, breeding away from CDDY (and its attendant disk disease risk) is possible, as long as CDPA is present. It is estimated that 99% of dachshunds carry at least 1 copy of CDPA.

In contrast, most beagles carry 0 copies of CDPA + 2 copies of CDDY. This tells us that CDDY may be the most important determinant of short limb length in beagles. Since beagles lack CDPA, it may be harder to breed away from CDDY in this and similar breeds with a 0 CDPA + 2 CDDY pattern, unless there are other as yet unknown determinants of limb length in those breeds.

**Limitations.** Although these dogs illustrate important points in regard to CDPA, CDDY and limb-length, the rarity of the CDPA-negative genotype in dachshunds means we can never study more than a small number of dachshunds lacking CDPA. Additionally, no dogs in this report lack CDDY, so no observations were made about limb-length in dachshunds with 0 CDDY copies. Caution must be exercised in extrapolating results from 5 dogs too widely. Breeders should remain vigilant for exceptions to the observations made in this study.

**How Can Breeders Use this Information Now?** The findings of this Case Report and a companion paper entitled “*The Relationship Between Radiographic Disc Calcification Score and FGF4L2 Genotype in Dachshunds*” <link to Gene Dose Breeder Summary> tell us that dachshund breeders can use CDDY and CDPA genotype as a tool to improve spinal health in dachshunds. By ensuring the presence of CDPA in their breeding stock and minimizing the number of CDDY copies, breeders may be able to retain breed-typical short limb length while decreasing the risk of disc disease.

**What does a “tall dachshund” look like?** Here’s the family tree, with gene test results included:



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***This Breeder Summary was written by: Stacey Sullivan and Kat Meyers.***