

**Update: AKC Canine Health Foundation Grant 266  
Canine Epilepsy: Inheritance, Genes and Linkage Test  
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**LAY ABSTRACT.** This project continued our genetic studies attempting to develop a screening linkage test for predicting epilepsy in a number of breeds including Vizslas, English Springer Spaniels, and Beagles. In previous studies we determined that Vizsla epilepsy might be a single gene autosomal recessive trait (1), but that more than one gene might be involved. Unfortunately, we have not yet been successful in identifying epilepsy genes using the approach known as genetic linkage analysis using Vizslas pedigrees and microsatellite DNA markers. We did identify a possible area for an epilepsy gene on canine chromosome 1, but additional analysis has not yet verified this area. We also have tested genetic markers near 50 genes and closely related genes know to be involved in human epilepsy. None of these 50 genes are associated with epilepsy in Vizslas (2). There is still some chance of a single gene causing Vizsla epilepsy if the diagnosis of idiopathic epilepsy (IE) is not always correct in our current database due to IE being a diagnosis of exclusion. At this time, however, we believe that it is most likely that there is more than one gene involved in Vizsla epilepsy (polygenic) or there is more than one form of epilepsy in Vizslas.

Nevertheless, sufficient Vizsla samples have now been collected to attempt an alternative genetic approach known as whole genome association analysis which can detect chromosomal segments containing disease genes even when the condition is polygenic or complicated. We have sufficient funds in new grants to perform whole genome analysis with the newly developed canine single nucleotide polymorphism (SNP) arrays. In this we are still trying to identify the regions of the canine genome containing the defective genes that would hopefully lead to genetic tests for epilepsy that would allow breeders to screen potential breeding animals for this common, frustrating, and potentially devastating disorder. We anticipate obtaining results of SNP array mapping of Vizsla Epilepsy for 25 affected dogs and 25 unaffected dogs within 6-12 months.

1. **Patterson EE, Da Y, Mickelson JR, Roberts MC, McVey AS, O'Brien DP, Johnson GS, Armstrong PJ.** (2003). Clinical characteristics and inheritance of idiopathic epilepsy in Vizslas. *Journal of Veterinary Internal Medicine.* 17, 319-325.
2. **Lena DeTar, Edward E. Patterson, Kari Ekenstedt, Katie Minor, James Mickelson.** A Gene Targeted Approach to Idiopathic Epilepsy in Vizslas. Proceedings, Merck-Merial Symposium. August 4-6, 2006. Baton Rouge LA.

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