



**The Poodle
Club of America
Foundation, Inc.**

POLYMICROGYRIA IN STANDARD POODLES: RESEARCH UPDATE

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The Comparative Neurology Program at the University of Missouri has continued our research into polymicrogyria in Standard Poodles. This disease appears to be inherited as an autosomal recessive trait. Affected pups are born with a brain malformation called polymicrogyria. The brain is normally folded into a wrinkled surface. The folds are called "gyri" from the Greek word "gyros" meaning "to turn" as in gyroscope or gyrate. In polymicrogyria, rather than forming large, well organized folds, the back portions of the brain form many (poly-) small (-micro-) folds (-gyria). The area of the brain affected is the portion that controls vision. Thus affected pups have varying degrees of vision problems and may circle incessantly. While affected pups can survive, they tend to have serious difficulties and may develop seizures and serious behavioral issues as they get older.

To map the gene responsible for polymicrogyria, we utilized the latest generation of SNP chips, automated gene mapping tools that permit us to find an association between a disease and markers in an area of the genome. With this approach we located the area where the gene for polymicrogyria should reside to a small area of the genome referred to as a locus. Within this locus there are 17 genes, one of which is probably the culprit.

We utilized the grant provided by the PCA Foundation as matching funds to leverage a \$60,000 challenge grant from the University of Missouri. With these funds, we will sequence the *entire* genome of an affected pup, Oliver. To put this in perspective, this will essentially be a repeat of what was accomplished in the human and canine genome projects seven and five years ago respectively at a cost roughly 1,000 times what we will be investing. Knowledge and technology in the field have advanced so rapidly that we can now apply these same techniques to an individual dog, the ultimate in personalized medicine. This approach will allow us to identify all the variations between the pup with polymicrogyria and what is known about the genome of dogs in general. Knowing the locus where the mutation responsible for polymicrogyria lies will allow us to focus on the changes within that area. We can then investigate those genes and with luck identify the mutation. At the same time, we will be adding to the overall knowledge about the genome of the dog in general and Standard Poodles in particular, the latter already immortalized when Craig Venter, the leader of the human genome project, initiated research into canine genomics when he sequenced about 80% of the genome of his own Standard Poodle, Shadow.

As with any research, there are still pitfalls ahead and we cannot guarantee we will succeed. Nonetheless, we are optimistic that we will find the gene responsible and provide a DNA test for polymicrogyria as we did for neonatal encephalopathy. **We welcome additional samples from polymicrogyria-affected poodles. For information on sample submission, please contact Liz Hansen at 573-884-3712 or Hansenl@missouri.edu.**

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