Summary of genetic studies of Chiari-like Malformation with Syringomyelia (CM/SM) in the Cavalier King Charles Spaniels (CKCS)

Clare Rusbridge BVMS PhD DECVN MRCVS, European and RCVS Specialist in Neurology
Penny Knowler BSc (Hons)
Stone Lion Veterinary Center, Wimbledon, UK SW19 5AU

This study was initiated in 2000 when research suggested a possible hereditary basis for CM/SM. We constructed a genealogy and database which currently holds 11,800 related CKCS dogs including over 700 MRI confirmed dogs with relevant phenotypic information and over 1,500 DNA samples.

Collecting and archiving DNA began in 2003 in collaboration with Dr Guy Rouleau, Director of CHU Sainte Justine Research Centre in Montreal (formally at McGill University) and Dr Berge Minassian at the Children's Hospital Toronto. Funding was provided by the Cavalier Health Foundation (#104), UK DNA Archive, Boehringer Ingelheim UK, Utrecht University, the Cavalier Club UK and TDDS Laboratories UK. Our worldwide campaign, known as 'DNA for Healthy Cavaliers', has been supported by many dedicated breeders, dog owners and veterinarians from the UK, Netherlands, France, USA, Canada, Australia and South Africa. We are particularly indebted to Dana Schuller-Kuyper (Netherlands), Margaret Carter (UK), Randi Rosvoll and Anne Eckersley (USA), Pat Barrington (Canada), and Tania Clapham (RSA) for their work as Club Health Representatives. There has been a variety of imaginative fundraising initiatives from supporters: Sandy Smith's book, 'For the Love of Ollie'; Karlin Lillington's CavalierTalk Forum; 'Friends of Cavaliers'; David Harwood; Sue Robinson's Plant Sale; Carol Fowler's efforts, to name just a few. Further information can be found by reading our eight research newsletters starting Jan 2004 http://www.thecavalierclub.co.uk.

The genetic research has been made possible because owners, who been screening their dogs for breeding purposes or dogs have been diagnosed with CM/SM, have made their MRI's available to Clare for phenotypic evaluation. The DNA collection is also biased because, for the last two years, we have specifically targeted dogs over 5 years of age that do not have syringomyelia. SM is a 'late onset' condition and a syrinx may only develop as the dog gets older. Unfortunately these dogs can produce puppies with the more severe, painful form of SM so it is very important to obtain data on older dogs.

The current genetic investigation is led by Dr Zoha Kibar at Sainte Justine Research Centre. An initial CKCS whole genome scan was completed in 2005 with 173 CKCS dogs conducted at the Mammalian Genotyping Centre at the Marshfield Clinic in Wisconsin USA. Selection was based on SM-affected status and familial relationship in the CKCS database. Genetic analysis was undertaken by Dr Marie-Pierre Dube at University of Montreal and six genomic regions that could harbour the CM/SM gene/s were identified.

A recent grant from the American Kennel Club Canine Health Foundation (#954) has allowed our genetic studies to continue. Dr Kibar is undertaking the fine mapping of the six genomic regions with a larger sample size. Additional DNA samples have been provided by North Carolina State University and Guelph University as a side study from their own investigations into CM/SM. A new whole genome scan using the innovative canine SNP (single nucleotide polymorphisms) genotyping technology is planned in the near future. The candidate genetic interval(s) identified in both genome scans will be narrowed down using genetic studies in the CKCS and other toy breeds affected with CM/SM. Once the candidate genomic region(s) have been well defined, the positional candidate gene approach will be used to identify the defective gene(s) in CM/SM.

Finding the gene/s responsible for CM/SM will help to understand what causes the physical signs and find the most effective treatments. An important aspect for breeders is that it should be possible to use a simple DNA test such as a buccal swab to identify carriers at birth. It will no longer be necessary to MRI dogs at 2.5years or older. We are collaborating with Dr Sarah Blott at the Animal Health Trust in the UK who is developing an optimization breeding programme for dogs aimed to help breeders breed away from the condition, reduce and hopefully eliminate this devastating disease.

If you would like to help the genetic research you can do so by encouraging owners to scan their dogs and send the MRI report and pedigree information to Clare or Penny. Email neuro.vet@btinternet.com or penny.knowler@ntlworld.com
We are specifically looking for dogs that are at least 5 years that do NOT have syringomyelia and any family members that have also been MRI'd.

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