

02263-MOU: Characterization of Kidney Disease in Dalmatians

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ABSTRACT: Chronic kidney disease is a significant progressive problem in dogs. Two different hereditary diseases of the urinary system are being studied in Dalmatian dogs: urinary stone formation (urolithiasis) and glomerular disease. These diseases cause distinct clinical signs: urolithiasis leads to urinary tract obstruction while glomerular disease results in protein loss into the urine (proteinuria). The genetic cause of urolithiasis is known while the genetic cause of glomerular disease has not yet been identified. Although one specific type of glomerular disease has been reported in the literature, preliminary investigations indicate that there may be multiple causes of proteinuria in Dalmatians. Evaluation of kidney tissue by the International Veterinary Renal Pathology Service has revealed diverse types of glomerular diseases in Dalmatians, at least 4 of which might be hereditary. Therefore, the most common disease type is unknown and must be identified and characterized. A detailed review of autopsy and biopsy sample archives previously obtained from Dalmatians with proteinuria will be performed. Next, prospective examination of select kidney samples using advanced techniques (electron microscopy and immunofluorescence) will ensure an accurate diagnosis of the glomerular disease. Ultimately, genetic analyses could be performed on related dogs that demonstrate similar glomerular lesions to identify candidate genes.

Summary of findings prepared by the DCAF board.

The goal for participation was 50 affected Dalmatians, with 20 of those providing tissue samples – necessary for definitive diagnosis. In total 45 Dalmatians were enrolled in the study and 18 provided tissue samples. We appreciate the owners and breeders who participated in this important research and our donors who helped fund it.

What did we learn?

- 1) Renal disease is not just one condition. In this study, 12 different categories of renal diseases were diagnosed in the cohort of Dalmatians reviewed. Some of these categories may be inheritable and others are not. However, none of the different categories were predominant within this study, including no inheritable ones. Therefore, no genetic sequencing was conducted.
- 2) Canine Alport syndrome, a disorder identified in some Australian Dalmatians, does not appear in the cohort of Dalmatians available for this study.
- 3) Comprehensive evaluation of renal tissues versus solely clinical data, such as urinalyses and bloodwork, is necessary to accurately classify something as complex as renal disease in dogs.

So what does it mean?

- 1) No Dalmatian-specific renal disease was identified in this study. The study was not designed to reach a conclusion about the prevalence of renal disease in the breed.
- 2) Breeders should continue to implement good breeding practices which include striving for genetic diversity within their breeding programs since a lack of genetic diversity can predispose dogs to a variety of inherited conditions.
- 3) Breeders and owners should ensure their dogs are represented in the OFA CHIC DNA Repository with updated associated health histories.
- 4) If you have a younger dog that is diagnosed with renal failure and there are no known causative factors, accurate diagnosis of the type of renal disease should be secured through tissue biopsy (either while still alive or through autopsy) as well as bloodwork and urinalysis for use in subsequent studies that may help future generations.