Irish Wolfhound Osteosarcoma study

Susannah Sample DVM,MS,PhD,DACVS
University of Wisconsin Veterinary Medicine

Irish Wolfhound Reference Genome.

- A high-quality Irish Wolfhound reference genome has been created based on a beautiful female dog, Dauphine. At the time of completion, the Irish Wolfhound reference was the most complete of genomes to date. The Dauphine reference will be published with the results of the osteosarcoma study (see below).
- Dauphine has sadly passed away, but her owners allowed us to complete a full post-mortem. This will be important for individuals undertaking future work investigating genetic conditions associated with the Irish Wolfhound and related breeds, as unlike nearly all other reference genomes, Dauphine's complete medical profile is known.
- Why do we need an Irish Wolfhound specific reference genome? Structural variation across the genetic profiles of dog breeds is substantial. Experience from our lab and others strongly supports the need for individual breed reference genomes to optimize genetic discovery work.
- Thank you to sweet Dauphine, Risha and David!

Heritability of Osteosarcoma in the Irish Wolfhound.

- We used the on-line publicly available IW pedigree database to understand the heritability of osteosarcoma in the IW, enabling us to include 5110 pure-bred Irish Wolfhounds for this study.
- A heritability estimate of osteosarcoma in the IW was found to be 0.65, meaning that around 65% of disease risk is due to genetics.
- A heritability estimate of 0.65 is a very high degree of heritability and reflects that osteosarcoma is a complex disease, meaning that it is not the result of a single genetic mutation.

Irish Wolfhound Osteosarcoma Study.

- The goal of this study is to understand the genetic basis of osteosarcoma in the Irish Wolfhound – especially the subset of hounds with osteosarcoma at a young age.
- We know that that osteosarcoma is highly heritable, but whether this is due to a high degree of common risk variants within the breed or the result of one more highly impactful cancer predisposition genes is not known.
- We currently we have 29 cases and 37 controls for the study. All cases are 5 years or younger when diagnosed with osteosarcoma and controls are over 10 years of age with no evidence of osteosarcoma.
- Sequencing for this work is occurring; the final samples are being shipped currently. Due to the complexity of data analysis, this will be completed once all dogs that have been recruited are sequenced. The results will be analyzed using the Dauphine reference genome.