IWHG Newsletter

December 2016

PATRON: TRUDIE SUMNER

Welcome

As we leave 2016 behind, it is customary to reflect on the past 12 months, and look forward to the year ahead.

The most important development for us came in April, when we became independent of the Breed Clubs. This led to a change in group membership and a September relaunch.

Since our relaunch, we have been busy producing a new Puppy Buyer's Guide available to download here . We are working on revamping our Breed Guide Booklet. This new version should be available in January 2017. In the meantime, the existing booklet is still available to download from the IWHG website

We are also working to introduce a Longevity Recognition Programme, based on the scheme that the IWCA run. There is an article in this issue on (page 15) with more details on this.

In the coming months, we will be adding a library of scientific papers to our website. This library will enable everyone to freely access in- depth information and research resources.

We are currently putting the final touches to planning our 2017 seminar. We have something very special in mind, something that will be informative and interesting; educational and entertaining. More details will be available in January 2017.

We continue to have an active Facebook Group, open to all, and encourage questions and discussion relating to the health of our breed.

In response to a request on our Facebook Group, regarding neutering of Irish Wolfhounds, we have produced a Neutering Fact Sheet. If you are a breeder, we think it would be a good inclusion in your puppy pack. If you are a new owner, we hope it provides you with plenty of advice and guidance so that you can make informed decisions about neutering your pet.

It is included in this newsletter (pages 20-21) and will be on our website in January.

In this issue, we have an interview with Dr Serena Brownlie (page 2) as we celebrate her 30 years of involvement with heart testing; we have updates from Mark Dunning from NVS; we have an article on using the Irish Wolfhound Database (pages 12-14); and an update on heart testing in Ireland (page 19), as well as updates from the AHT's Catheryn Mellersh, Mike Starkey and Victoria Mclaughlin.

We thank you so much for your continued support and generosity throughout the year and also remind you that we are always looking for people to help the IWHG with its work http://www.iwhealthgroup.co.uk/volunteer.html. The returns are great and in no time at all you will be rich beyond your dreams! Not in a monetary way, of course but, much more importantly, rich in happiness and fulfilment.

Why not make it your New Year's Resolution?

Finally, we hope you had a lovely Christmas and wish you a very Happy New Year for 2017 with good health to you and your dogs.

IWHG

Dr Serena Brownlie (Sykes)

Celebrating 30 Years of Irish Wolfhound Heart Testing and Research

As many of you are already aware, 2016 saw Dr Serena Brownlie celebrate 30 years of Heart Testing and Research in Irish Wolfhounds. For those of us who were there at the inception of this ground-breaking work, it really doesn't seem that long ago – and Serena hasn't changed a bit!

At the time that heart testing and research was first introduced, medicine, science and technology were a long way behind the developments seen recently. As in humans, little was known about heart disease in dogs, let alone Irish Wolfhounds specifically, regular heart screening was not available and dogs were usually seen when there was a crisis and then the prognosis was very poor. To be diagnosed with a heart problem was usually a quick death sentence.

The breed has always been proactive about health issues and a few pioneering people recognised that there was a problem that needed addressing and were determined to make it happen. And although progress may seem to be slow, if we compare where we are today with where we were then, we have made huge strides – we now have regular, regional heart screening sessions that enable us to screen before breeding and to pick up early if there are any problems. Technology is far superior and diagnostic techniques are far more sensitive and sophisticated. Medication has advanced and for many dogs, an early diagnosis combined with a treatment programme that suits the dog now means that many dogs can expect to lead a normal lifespan even though they have a heart condition.

In addition, over the last few years we have seen a welcome collaboration between Serena and the Nottingham Veterinary School, which has taken Serena's data to a new level and is pioneering new research to help us identify how best we can beat this disease. The latest paper to be published has just been announced and is explained later in the newsletter. It is testimony to an ongoing commitment to helping the breed, which has been made possible by Serena.

We owe Serena a huge debt of gratitude for all her work over the years and for continuing to dedicate so much time to the breed. We are very, very lucky to have her.

To celebrate this landmark, we thought it would be interesting to look back over the last thirty years and asked Serena to tell us how it all started and how far we have come.

How did you become interested in heart testing IWs?

In 1986 I was working at the Royal Veterinary College as a Lecturer in Small Animal Medicine (Cardiology, Respiratory diseases and Neurology) and was looking for a research project.

What inspired you to start on your research?

Hilary Jupp approached me and told me that she and other breeders were concerned about heart disease causing deaths in Irish Wolfhounds.

Why did you think this research would be important?

I had no idea that it would develop in the way it has. We saw very few Irish Wolfhounds in the Small Animal clinic and therefore I knew that doing a "retrospective study" ie looking back at previous case records, wasn't going to be very helpful. At that time, what we knew about small animal cardiology was very general – just about "the dog", as opposed to "the cat" or "the

horse", and vets did not really think of disease problems being in any way "breed-related". It seems surprising now looking back, but there were very few papers in the literature about large or giant breeds, and we did not know what "normal" was.

How did your research project get started? Who did you contact and work with?

We came up with the idea of doing a survey and it seemed that the most logical way of doing it was to go to shows, rallies and big breeders' kennels to examine dogs. Hilary came to the shows with me and frog marched people to have their dogs tested! People didn't want to say "no" to her, it seemed!

How did you go about funding the heart testing?

Hilary started raising money to pay my travel expenses and to fund equipment. We bought an ECG machine for the project, and eventually, in 1993, a second-hand ultrasound machine. This year two new ECG machines were purchased using the remainder of Hilary's fund and the Health Group has continued to raise funds and has purchased a newer ultrasound machine. It should be realised that this machine may need to be replaced soon as it will become obsolete, so it is an ongoing expense if the heart testing is to continue in its present form. Unfortunately, equipment is very expensive, but entirely necessary.

What were you trying to accomplish? What did you expect to find?

> *"It is good to see that the Health Group website now has the facility to publish results, but it is a pity that more people have not yet decided to use it. If I could change anything, I would beg people to be open and honest about their results.".*

We did not know what we would find – we hoped to find a cause of the disease that we could eliminate, but we knew it would be difficult as we didn't know where to start. We were purely observers, reporting what we found, and that is still pretty much what we are today. I became fascinated because wolfhounds seemed to present with almost every abnormality in the Cardiology textbooks, and there is no doubt that I became addicted to that – I could not wait to see what the next dog would show me! It has become a kind of odyssey, a never-ending quest!

What obstacles did you encounter in the early years?

There were some Wolfhound people that were very supportive and open to the idea of having their dogs examined, but equally there were plenty who were not keen on the idea. Many were very suspicious of our motives, I think.

How was it structured?

Initially there was no structure at all – we just examined any dog that presented. As numbers increased, we tried having an appointment system at the shows but of course if a dog was due to be in the ring, then that took precedence and the timing would go out of the window. People usually ended up queuing, but most were quite good natured about it. By the time of the formation of the Health Group, there were too many dogs needing to be examined for the limited number of sessions, and the HG came up with the idea of regional testing. This required the participation of a larger number of cardiologists and at one time we had a group of eight, but that has reduced now to the ones we have today.

What were the numbers of IWHs tested in the early years?

In the first 5 years, we tested just under 500 dogs. I examined 56 dogs in one day at a show, but of course the examination was shorter as we had no ultrasound. If we do a full examination, we cannot manage more than about 15 dogs / day.

By the end of 2015 the number of individual dogs (i.e. not including re-examinations) was 2,202. I do not yet have full figures for 2016.

What checks were carried out? When was ECG introduced?

Dogs have always been examined first by auscultation ie listening with a stethoscope, for heart murmurs or rhythm abnormalities. We had no access at the start to ultrasonography, which has told us so much in recent years about heart function. We had a portable electrocardiography (ECG) machine though, and X rays, but I could not X ray dogs at shows etc so we made do with ECG. We did that from the beginning in 1986. After 1993 we went through a short phase of only doing ultrasound, but it soon became clear that we could not do without the ECG.

What kind of response has there been to your research?

The interesting thing is that in the years shortly after we started looking at wolfhounds, other people also began to do breed surveys, in UK and in other countries – both in wolfhounds and other breeds, such as Cavaliers, cocker spaniels, boxers, Newfoundlands, Dobermanns etc. I am not saying they were copying us, just that it was being realised at that time that we could not go on thinking that all dogs were the same. Some countries eg Germany chose to make heart testing compulsory, which is not the case here.

How have things changed and developed over the years?

The most gradual change has been the progressive acceptance by owners and breeders that it is a good thing for the dogs, and I think there is less suspicion now that there was going to be some sort of "witch hunt". The Health Group regional testing sessions have made it easier for owners in different parts of the country to see a cardiologist and the number of sessions has now increased to 23 in 2016, with 10 – 15 dogs a session. There has also been pressure from abroad – dog breeding is a global business!

Which results from this study are most important? And why?

Right from the beginning of the study it was obvious that wolfhounds as a breed were very prone to a heart rhythm disturbance called atrial fibrillation. The heart damage underlying it has been shown to progress in an affected dog until it goes into heart failure, (unless it dies of another disease first), and a small but significant number of affected dogs have died suddenly. Atrial fibrillation affects at least 10% of the adult population of wolfhounds at any one time, and there is a slightly increased risk for males, which tend to be affected younger. Most affected dogs have an affected parent, suggesting that the condition is familial, and often I can trace it back right through the generations. There are also other heart rhythm and conduction abnormalities which may be dangerous, especially under anaesthesia, and it is very important that these are identified and monitored. I believe strongly that dogs with atrial fibrillation should not be bred from, especially affected bitches, as the stress of pregnancy and lactation is considerable and may tip them over the brink into heart failure.

Is heart-testing synonymous with research?

Yes, and no. The data collection has enabled us to draw conclusions about the different manifestations of heart disease in Irish wolfhounds, and in recent years has given us the opportunity to collect DNA. However, the heart screening is mainly carried out for the benefit of each dog and owner, so that the owner can be alerted to any problems and sent to their veterinary surgeon for onward referral to a cardiologist. This is nothing to do with research.

What are your next steps? What questions still need to be answered?

There are still many unanswered questions. I have little time left to answer these questions unfortunately and I shall have to rely on others to take it forward. There are many dogs which have minor abnormalities and the significance of these is still uncertain. Some dogs have obvious valve abnormalities which need to be followed up. We need to know more about the nutritional and immune status of affected dogs and any possible role of viral infections. The DNA studies at Nottingham University are producing interesting results, and a paper has been accepted for publication. There is still much statistical information which can be extracted from the data I have. The Kennel Club is interested in seeing if we can produce Estimated Breeding Values i.e. a sort of "risk assessment" for breeding wolfhounds to see if we can steer

the breed away from early onset heart disease, but the process is difficult and time consuming.

How can breeders and owners best support your research?

Progress has been slow for a number of reasons. The main one is that we still do not have enough information about old dogs. The "Super Veteran" scheme has allowed dogs over eight to be heart tested free but there are still very few of them presenting for testing. I see people posting pictures of their old dogs on Facebook so I know they are out there. There is nothing more frustrating than testing a dog at 2 or 3 years of age and then never seeing that dog again. Of course, it will have been reassuring for the owner at the time, but considering the peak age of onset of heart disease in males is 4.5 years and females 5.5 years, you can deduce that data from most young dogs is really wasted effort for us, although we do pick up occasional very young dogs with problems.

It is good to see that the Health Group website now has the facility to publish results, but it is a pity that more people have not yet decided to use it. If I could change anything, I would beg people to be open and honest about their results. The Kennel Club would like to see all results published – good and bad, and so would I. After all everyone is in the same boat and it helps no-one to keep secrets.

Do you believe it has made a difference to the breed?

Yes, because it has raised awareness about the importance of having these dogs' hearts checked on a regular basis. It does not have to be through the Health Group – any vet can refer you to a cardiologist, and there are enough of them now in all parts of the UK, except unfortunately Northern Ireland at present.

What are the most common misconceptions about your work?

I hope there are not many – I have written many articles and given talks at seminars, and there is plenty of information on the internet for new owners. However I suppose there are still people breeding wolfhounds who just do not believe that it is important, or who just want a certificate so they can mate their dog and after that they don't really care. I think maybe some people think I want to stop dogs being bred from. That is not the case as the gene pool is too small as it is. I would actually prefer if more dogs were bred from (unless they are sick) but that the number of litters a dog can sire was reduced – that way it would not be such a disaster if a dog develops a heritable problem in later life. The "popular sire" effect is a well-recognised reason for undesirable traits becoming widespread in a breed.

Are you optimistic for the health of the breed?

Yes of course but progress is very slow, and there are other diseases to worry about.

I'm not sure if you'd be willing to share any data in a general sense eg what the percentage of heart issues are in the hounds that are tested, and whether there is a general trend? (are things improving?)

We are hoping to get some statistics done soon but unfortunately, I have to take advice on that as I am not a statistician. The last time we looked at the data it appeared that the number of affected dogs had actually increased, but that the age range was greater (reflecting the fact that we have been seeing a slightly older population.) My next exercise will be to compare the results from 1986 – 1991 with those from the last 5 years. It should be very interesting.

Thank you, Serena, and here's to the next 30 years!

Latest Heart Research -

Multiple Genetic Associations with Irish Wolfhound Dilated Cardiomyopathy

Siobhan Simpson, Mark Dunning, Serena Brownlie, Janika Patel, Megan Godden, Malcolm Cobb, Nigel Mongan, Catrin Rutland

The IWHG was very excited to learn of the upcoming publication by our dedicated research team at Nottingham Vet School. This research paper is the culmination of Siobhan Simpson's PhD research and utilises some of the data which Dr Serena Brownlie has been collecting and collating for the last 30 years. We announced the publication, along with a link to Multiple Genetic Associations with Irish Wolfhound Dilated Cardiomyopathy, on 14th December 2016, just as soon as the paper was available online.

The IWHG would like to thank the entire research team, all our cardiologists, and also all the owners who take their dogs along to the IWHG regional heart testing sessions, provide DNA samples and complete the associated questionnaires.

The paper describes how the team have used data collected from nearly 400 Irish Wolfhounds over a 4 year period to validate and re-analyse previously published associations between DCM and certain genetic locations, or loci. Detailed statistical analysis of previously unavailable data which marries DNA sample collection, cardiologist validated heart test results and in-depth information provided by dog owners, allowed the researchers to re-evaluate what we currently know about Irish Wolfhound DCM. They confirmed that in contrast to human DCM, Irish Wolfhound DCM is very often associated with atrial fibrillation (AF). This allowed the researchers to use dogs who had been diagnosed with DCM ***or*** AF to be included in the cohort of 'affected' dogs, and more importantly for dogs affected ***only*** with AF to be discounted from the 'unaffected' or control group. They also analysed in greater detail than previously achieved the differences in age of onset between the sexes, finding that affected males are most likely to have a diagnosis of AF or DCM before the age of 6.5 years, whilst for females the significant cut off age is 8.5 yrs. The mean age of onset for dogs diagnosed with AF ***and*** DCM was 4.82 years and for females with a joint diagnosis the mean age was 6.14 yrs. This precision has allowed the researchers to only use those dogs who meet these new criteria into the 'unaffected' cohort, that is males over the age of 6.5 years and females over the age of 8.5 years with a normal heart test result. From a general population of 379 Irish Wolfhounds, this gave 36 IWs diagnosed with DCM and 36 with AF in the 'affected' group, and 14 males and 9 females in the 'unaffected' group, with a total of 284 individuals not included in the genetic association analysis.

The team revisited 5 SNP's (single nucleotide polymorphisms) previously shown to be associated with DCM in IW's described in a 2012 paper published in PLOS ONE, Multiple Loci are Associated with Dilated Cardiomyopathy in Irish Wolfhounds. These SNP's appear on chromosome (chr) 1, chr10, chr15, chr21, and chr37 with the most significant association being with the SNP on chr37. They found that only 3 of these 5 loci were associated with IW DCM/AF in the UK cohort and of these, only one had the same allele associated with the disease. This shows the difficulty in choosing the correct analytical methods and the need for robust selection criteria when assigning dogs to either affected or unaffected groups. In this study, they have established the risk of developing DCM/AF based not only on the individual locus but also looked at various combinations of these loci and established which combinations give the highest and lowest risk of developing disease in comparison to the general population. Obviously this is still very early days and there would be a need to further test the risk analysis on more of the population, but there is obvious potential for a diagnostic test to be developed which may help to indicate the relative risk of an individual dog developing DCM/AF. If the locus or loci which influenced the age of onset of the disease could also be identified, that really would be a significant development.

This paper also highlights the importance of our contribution as dog owners to these research projects. Without us and our dogs the research would not be able to proceed. We all want to help but we must be aware that simply donating some of our dog's saliva is often not enough. Once we have signed up to the project by donating DNA samples or attending heart testing sessions, we must make a commitment to;

1) provide all the health and lifestyle data that is required through questionnaires and surveys
2) continue to attend heart testing sessions especially as the dog grows older so that a lifetime picture can be built up of our dog's health
3) maintain contact with the research team and update them with news of our dog's health on a regular basis.

Only then can the research team move forward with their analyses and attempt to give definitive explanations of disease-causing processes or genotypes.

It is very straightforward to share the results of your Wolfhound's heart test on the IWHG's website.

Just follow this link

Publish Heart Test Results

It should only take a few minutes to upload your results and you can do it from the comfort of your sofa.
If you prefer, you can print out the form and send by post by following the same link.

If you are still unsure, then please contact any member of the Health Group and we will be happy to help you.

Animal Health Trust

The IWHG thought it would be nice to introduce the team that we work with at the Animal Health Trust. If you have attended our seminars or the KC Breeders Education days you may have already met them, but for those of you haven't, here they are. We started working with the AHT back in 2005, when they announced a research project working to uncover the genetics of osteosarcoma. The first stage of this research, carried out in conjunction with project groups at the Broad Institute at MIT and the University of Uppsala, led to a paper being published in 2013. The latest stage of this project involves sequencing the entire genomes of 5 wolfhounds with osteosarcoma and 1 unaffected wolfhound. For this part of the project Mike Starkey is collaborating with Cathryn Mellersh and the Give A Dog A Genome project. This will enable the wolfhound sequences to be directly compared to other dog breed genomes. The other ongoing project which Vickie McLaughlin spearheads as the sample curator is the DNA Storage Repository. This is a storage facility to allow owners and breeders to store a blood sample from every puppy in an entire litter. Provided that new owners are informed and engaged, they fill in health updates for the life of the puppy and the DNA is stored so that it will be available for further research.

Dr Cathryn Mellersh

Head of Canine Genetics

The Animal Health Trust is a registered charity that exists to fight disease and injury in companion animals. Scientists, veterinarians and support staff at the AHT undertake pioneering work to improve diagnosis, treatment and prevention in horses, dogs and cats and as a result countless animals in the UK and across the world are living healthier, happier lives http://www.aht.org.uk/.

The Kennel Club Genetics Centre at the AHT undertakes research aimed at understanding and eradicating inherited diseases in purebred dogs. Our research over the last 20 years has greatly advanced our knowledge of canine genetics, and the DNA tests we have developed have helped countless dog breeders improve the genetic health of their dogs.

All my life I have been fascinated by Genetics and passionate about animals, in particular dogs. Dogs share a unique relationship with humans and are the only species to choose the company of another species, humans, over their own kind. Dogs have evolved alongside humans and I believe we have a special responsibility towards this species that we have, quite literally, shaped to fit our lives. I am privileged to have had the opportunity to build a career that enables me to combine my love for dogs with my passion of

genetics, undertaking research that helps prevent inherited disease in purebred dogs. By playing my small part in improving the health and well-being of dogs I know I am having a positive impact on my small, canine-orientated corner of the world – nobody can ask for more. I completed my PhD in developmental genetics in 1991, from the University of Leicester, and immediately commenced my first post-doctoral position, also at the University of Leicester, identifying genetic markers within the canine genome. The field of canine genetics was in its infancy at that time and the markers I identified were among the first canine markers ever characterised.

From Leicester I took a position in Dr Elaine Ostrander's laboratory at the Fred Hutchinson Cancer Research Centre in Seattle, USA, where I spent five years constructing increasingly dense genetic and physical maps of the canine genome, as well as mapping some of the first inherited disorder loci in the dog. The dog has always been postulated as a unique model with which to study the genetics of a wide variety of inherited traits, but full exploitation is only possible in the presence of a good understanding of the genome architecture.

After five years developing resources with which to investigate the canine genome I became interested in applying the tools I and others had developed to understanding inherited disease in the dog. I took up my current position at the Animal Health Trust in 2001, where I now lead a team of twelve investigating the genetic basis of a wide variety of inherited canine disorders.

Since 2001 I have expanded the research group considerably as well as securing significant funding from the Kennel Club, to manage the Kennel Club Genetics Centre at the Animal Health Trust, as well as from other funding bodies. My research group liaises with both veterinarians and dog breeders and owners to identify inherited disorders that represent a significant health and welfare burden for specific breeds of dog, and develop DNA tests that dog breeders and veterinarians can use to inform breeding strategies and to aide with differential diagnoses and treatment of dogs. We put considerable effort into communicating with and educating key stakeholders with respect to our research findings, the DNA tests we develop and how to use them to maximum effect to improve the genetic health of dogs.

Since 2001 my research team has identified mutations responsible for close to 20 different inherited canine disorders and developed DNA tests that benefit 35 different breeds of dog; we have now tested close to 90,000 dogs from around 50 different countries for these disease-associated mutations and have identified almost 10,000 dogs that are carriers of at least one disease mutation. In the absence of DNA tests it would be impossible to determine whether many of these dogs were carrying these mutations, meaning they might have been innocently bred to other carriers giving rise to affected offspring.

My research team uses state-of- the-art DNA sequencing technologies and in 2016 we launched the Give a Dog a Genome project. This exciting project will create the UK's largest genome bank and help us improve the genetic health of future generations of dogs.

Dr Mike Starkey

Head of Molecular Oncology

I lead a small team, the 'Molecular Oncology Group', working on cancer in dogs, cats and horses, at the Animal Health Trust (www.aht.org.uk), a research institute and registered charity in Newmarket. My colleagues and I work alongside pathologists, and clinical oncologists who are treating animals in the Trust's small animal and equine hospitals. The focus of our canine research is a number of cancers that are common and/or are serious, and that affect dogs of all breeds. We are attempting to identify: (1) inherited genetic variants that cause some breeds of dogs to have an increased risk of developing certain cancers, and (2) biomarkers of cancer and tumour behaviour, including response to treatment.

We are indebted to breed clubs for their support for our work, but also to individual dog owners for submitting samples from their pets. We are also reliant upon the continued cooperation of vet practices and commercial histopathology laboratories.

Our association with the Irish Wolfhound community began in 2005, when members of the Irish Wolfhound Club and the Irish Wolfhound Society (including 2 members of the current Irish

Wolfhound Health Group) attended 2 open days held at the Trust to launch a number of research studies, including a study to identify genetic risk factors for osteosarcoma in Irish Wolfhounds.

Prior to joining the AHT in 2004, I spent 13 years working on disorders such as Alzheimer's disease, whilst working at the Medical Research Council Rosalind Franklin Centre for Genomics Research at the Wellcome Trust Genome Campus near Cambridge. In 2004, I obtained an MSc in Computer Science (Open University), and more years ago than I care to remember, I obtained a BSc degree in genetics at the University of Liverpool and a PhD in molecular genetics at the University of Nottingham.

An integral member of my family is Basil, a 'super affectionate' 9-year old Romanian rescue dog.

Study update:

Identification of germ-line osteosarcoma susceptibility mutations in Irish Wolfhounds

On the basis of the results obtained in a previous research study, we suspect that inherited genetic variants that confer an increased risk of developing osteosarcoma are carried by most Irish Wolfhounds. Identifying the variants, and trying to understand their effect, are essential steps towards finding ways of trying to prevent osteosarcoma development, or treating the cancer in a 'targeted manner' should it arise. Funding from the IWHG will enable us to 'decode' the string of 2.4 billion letters that comprise the DNA (a procedure referred to as 'whole genome DNA sequencing') from 4 Wolfhounds with osteosarcoma and 1 unaffected Wolfhound. In addition, the DNA from a 5th Wolfhound with osteosarcoma will be decoded as part of the Animal Health Trust's '*Give a Dog a Genome*' initiative (www.aht.org.uk/gdg), which is being undertaken by the AHT's Canine Genetics Group with the support of the Kennel Club.

We will screen the DNA sequences for genetic variants that are present in the DNA of the 5 affected Wolfhounds, but are absent from the DNA of the unaffected Wolfhound, and which could potentially disrupt processes associated with 'bone biology'. However, we believe that a more effective approach for finding genetic variants that may confer an increased risk of developing osteosarcoma will be to compare the sequences of the DNA from the 5 Wolfhounds with osteosarcoma with the sequences of DNA from dogs belonging to breeds which are not susceptible to developing osteosarcoma. The '*Give a Dog a Genome*' initiative will give us the opportunity to adopt this approach by providing us with access to the DNA sequences of a large number of breeds unaffected by osteosarcoma, and thereby enable us to search for differences which may represent genetic variants associated with a susceptibility to developing osteosarcoma.

At the time of writing, we have just prepared 6 Wolfhound DNA samples for whole genome sequencing (within the next month) at a 'genomics facility' in Edinburgh. In the new year, the computationally-intensive hard work of analysing all the DNA sequence data will begin!

Victoria Mclaughlin

Sample and Data Curator

I studied for a degree in History and Third World studies in London, but decided that teaching history was not for me, so I ended up in science working at the Sanger Centre on the Nematode Genome (they'd take anybody in those days!). This sparked my interest in all things genetic, so I found a job in the department of Oncology at Cambridge University and worked on Breast and Ovarian Cancers looking for mutations in BrCa1 and BrCa2 and other associated genes. I took a part time HNC course in Applied Biology from the University of East Anglia whilst I was working to increase my knowledge of the subject. From Breast and Ovarian Cancer, I went on to a research job in Bowel Cancer, again at Cambridge University. Unfortunately, in science posts are limited by funding so when the funding finished I found myself looking for another position; I went to work in the Department of Paediatrics at Cambridge University looking into the genetics behind children born of no sex. It's very complicated and each case was individual, with different genes involved causing different out comes for the patient.

I took some time off to have my third child, and when the time came to return to work, I wanted to remain in research but use all of my skill set of laboratory research and data management; luckily, I found the perfect job at the Animal Health Trust.

My role is that of Sample and Data Curator for the Molecular Oncology group under Dr Mike Starkey. It's a very challenging but rewarding role, one which I thoroughly enjoy.

On a daily basis I am 'looking after' the samples by putting the data on the submission forms into the individual breed databases, requesting samples from poorly individuals or suitable controls, email correspondence with owners, vets, breed clubs etc, or coming up with strategies for getting more samples i.e. vet liaison, Kennel Club emails outs etc. I also manage the samples in the laboratory ranging from extracting DNA from blood or swabs to cutting biopsies up for freezing in the -80C Freezer. It's a varied and challenging job which I absolutely love. Plus, a huge bonus to working here is that we are able to bring our dogs in to work; I am lucky to have three wonderful, quirky dogs, alas sadly no Irish Wolfhound because we have no space for one (but I do keep trying!).

Our dogs are a Large Munsterlander called Murphy who is a big baby despite his large size, resulting in some separation anxiety from his family, a beautiful black Labrador called Tess; both of which are 10 years old. A Cocker Spaniel called Iris, who we welcomed into the family 4 years ago, she is an amazingly bright dog who seems to forget her recall when she sees a bird; I guess the force is strong in that one! We bring Murphy and Iris into work because Tess would rather lay on the sofa at home in the sunshine and snooze, she has recently got over a Mast Cell Tumour and radiation therapy so she is welcome to do what she pleases.

We still need samples from individuals sadly affected with Osteosarcoma, and samples for the DNA Repository. I appreciate that we are not the first thought when such tragedy occurs, or the joy of a new litter, but without samples then the research is severely affected. All samples and any information is treated in the utmost confidence and not discussed outside of the group so please be assured if you submit samples for whatever reason it is totally private.

My contact details are email: oncologyres@aht.org.uk. Tel: 01638 75100 ext 1214

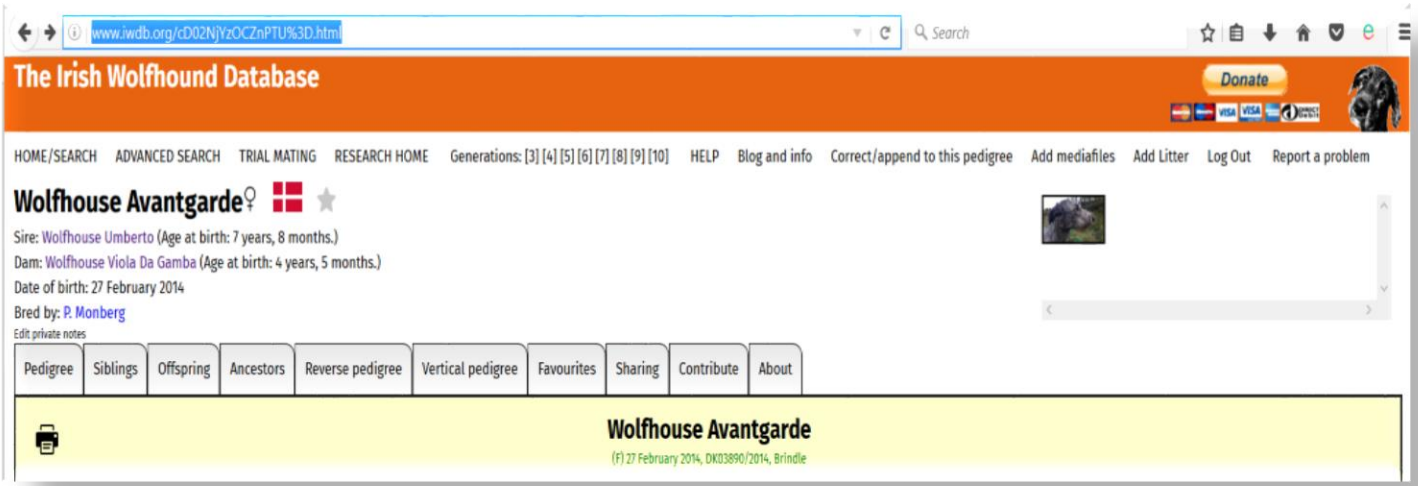
Irish Wolfhound Database

by Maura Lyons

A new Irish Wolfhound pedigree database (IWDB)was launched earlier this year and I am sure that many Irish Wolfhound owners will already have visited the site, at least I hope so! The new database is free and open for all, there are no application forms to fill out and no entrance exams to pass. The IWDB workgroup wants everyone to be able use it and to find it useful, from the pet owner to the serious breeder and scientific researcher. I hope that everyone will contribute any information they can to make this the biggest and best resource available to any pedigree dog community. In a little over 6 months, since the site was first launched, it has served 249,619 pedigrees to 12,685 users in 35,166 sessions. The IWDB workgroup are absolutely delighted that so many people find the database useful and interesting.

How to get started with IWDB

The front page simply requires a name to start searching. Once you find the name you are interested in, just click and the pedigree will appear. You can also search for an entire kennel: simply enter the kennel you are interested in and hit enter. If you don't know the full name don't worry, simply start with what you do know. Once you start typing in the search box, all options containing the search string will appear in a dropdown list. If that doesn't help you to narrow down the search, then hit enter and you will get a chronological list with full pedigree names plus a few more details to pinpoint the dog you are looking for.



The example above shows the information that is available along with the pedigree (which I have removed for the time being).
The simple and obvious information is the dog's name, the country of origin (if known), sire and dam (and their ages at time of birth), the date of birth and the breeder's name (if known).

If you are logged in you will have the option to Add Private Notes. Choosing this brings up a small textbox where you can add whatever information is of interest to you. This could include health or longevity information, owner details, show results, anything at all because it is all PRIVATE and only you can see these notes.
The pedigree itself is fairly self-explanatory but you may notice that some dogs have coloured boxes, this indicates that the dog appears more than once in the pedigree and so is an easy and quick guide to the diversity or lack of in the pedigree. You can adjust the number of generations being studied from 3 to 10 by using the options in the top middle of the page.
You can then choose to look at the siblings and the offspring of the dog. 'Siblings' lists both full and half siblings and associated information. 'Offspring' lists the mates and the offspring in chronological order.

The ancestors tab calculates a couple of genetic measures, the Coefficient of Inbreeding and the Ancestor Loss Coefficient. The first is an indication of how inbred the dog is – it calculates the possibility of the dog inheriting both copies of an allele at any given locus from the same ancestor on both sides of a pedigree. The second is a measure of the genetic diversity in the dog, it gives a simple count of all the unique ancestors in the pedigree and then shows that as a percentage of the maximum possible number of ancestors in the number of generations which you are looking at.

Reverse pedigree is exactly that, it shows the offspring and their offspring and their offspring etc in a standard pedigree format.
The vertical pedigree shows a pedigree with all the siblings of all the dogs in place, it can be very useful for longevity research, and very interesting for phenotypical comparisons.

Some more features…

If we move along the top row of options…
Home/Search – this takes you back to the front page showing the search bar.
Advanced Search – this gives more specific options for searching the database – so you can search all the dogs with a particular country of origin, born in a particular year etc. There are options to search combinations of the Name field, Title, Registration, Colour, Year born, and Country of Origin fields. For example, the following search terms allow you to find all the Irish Wolfhounds born in the UK in 1989, simply hit the Search Now button and you get the list of all 815 dogs.

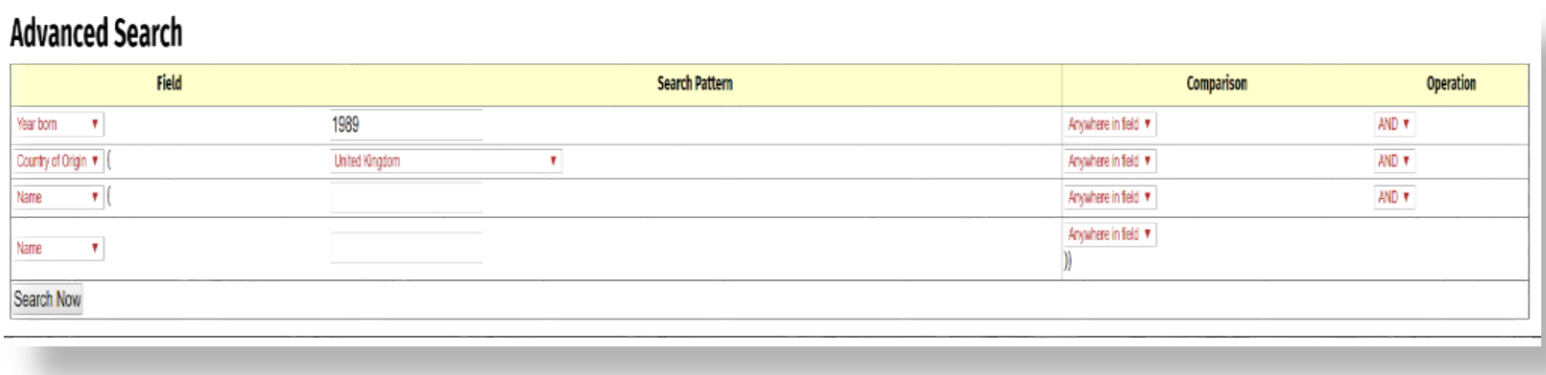
Trial Mating – Simply choose a sire and a dam, if you want, you can give the mating a name and a date of birth, then choose Create Trial Mating. This shows the pedigree and associated information for a proposed mating, so you can see exactly what to expect and even compare different combinations very easily. If you are logged in, any trial matings you create can be saved in your Favourites, which only you can see.

Registering is very quick and simple and allows access to some additional features, including the invaluable Private Notes, the option to 'Favourite' a dog – simply click the star next to the country flag, and the ability to add files and amendments to your own dog's pedigrees.

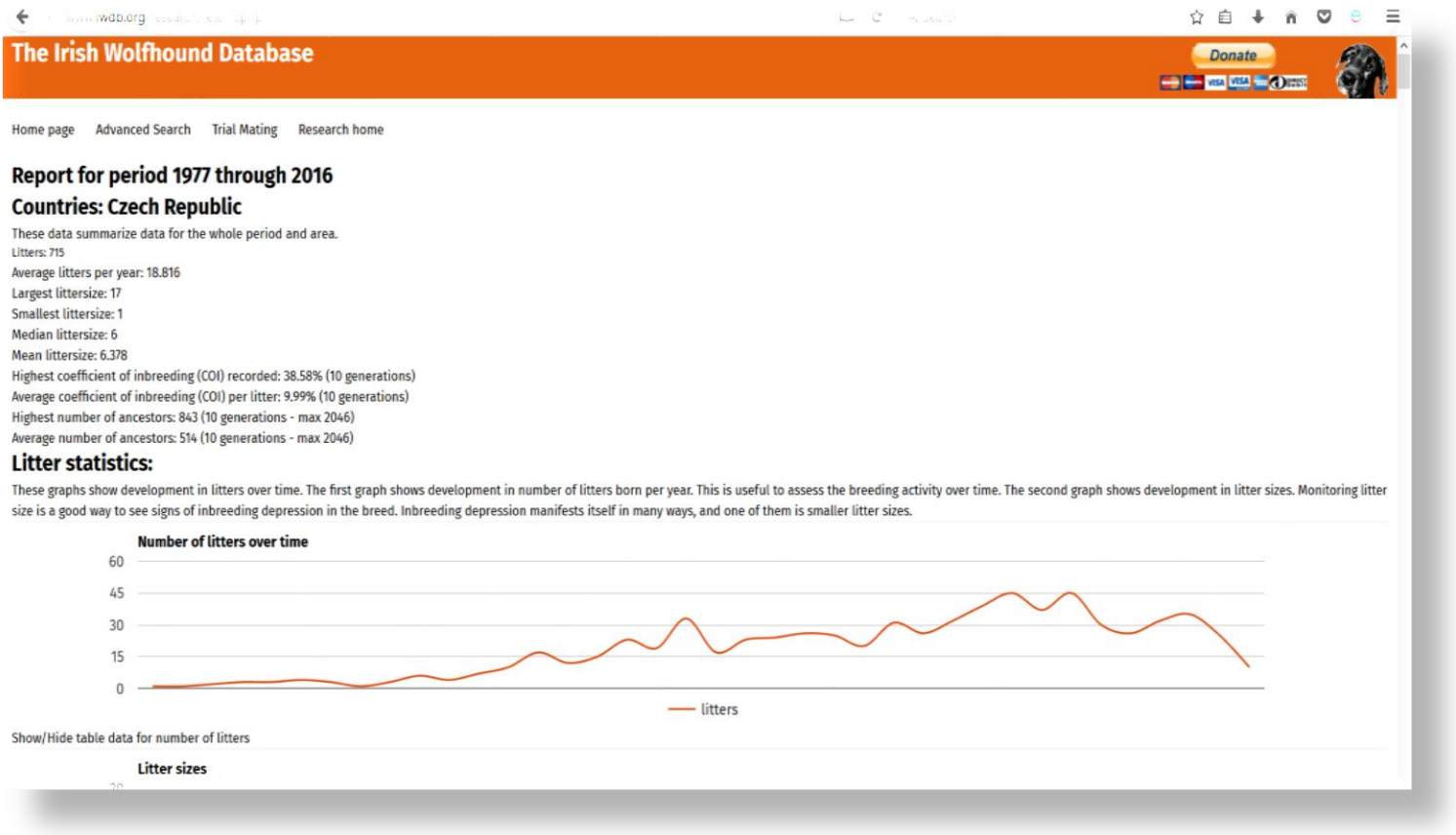
Let's dig a little deeper

Research Home – Clicking this option takes you to a different style of page, with options available for the researchers of population trends rather than individual pedigrees. You can choose one country or several or All Countries and then specify a date range. What you then see is a summary of all data within the search parameters, there is lots of data, keep on scrolling down the page! This includes averages and extremes for litter size and number, coefficient of inbreeding and ancestor loss coefficients, calculated for each year of the date range. This gives a comprehensive overview of the Irish Wolfhound population, within the country or countries that you are investigating.

As you scroll down through the information, you will also see the country of origins of the sires and dams used in breeding, and following that a complete list of the sires and dams used, and the number of times they have been used. It could be useful to know the extent of the influence of imported breeding stock. Alongside the graphs and information available there are explanations of what it means and why you might find it useful. This is the sort of information which may be used by breed clubs to inform their breeding strategies or advice.



Please take the time to explore all the options available, how they work and what they do, and see how these tools can help you with your own research. If you enjoy using IWDB please help us to improve it, by checking the information we hold about your own dogs, and if you see any errors in it, take the time to report them, so they can be corrected. To make IWDB the envy of the pedigree dog world everyone must play a part and upload information about their own dogs. Valuable information that IWDB encourages owners to contribute are things like photographs and cause and date of death, this allows researchers to properly evaluate pedigrees of interest. Most importantly, please keep using IWDB.org and helping to improve it. If there are functions you think would be a useful addition, please let the IWDB workgroup know. Get involved and contribute to ensure IWDB continues to grow and expand to become the most useful research tool available. And above all I wish you many happy hours of pedigree surfing.



Allele = A version of a gene inherited from one of the parents. A gene may have many different alleles, but only 2 will occupy the gene locus, one from the dam and one from the sire

Gene = A piece of DNA that provides the 'recipe' for an enzyme or a protein.

Gene locus = The position of a gene on a chromosome.

Phenotype = The physical characteristic that is visible when a genotype is expressed.

Longevity Recognition Programme

by Gary Bogart

There's something very special about an Irish wolfhound veteran. They have a very special blend of charms and virtues that have developed as they aged. They can be funny in new ways, vulnerable, trusting or just plain stubborn. You will have travelled a long way together and you love them more each day. Time is precious and birthdays, and half-birthdays are celebrated. The seventh birthday is always a milestone: as this is when they officially become a veteran. It is an age to treasure.

There are often posts on Facebook, where owners celebrate their hound's longevity. It is wonderful to see the photographs and share in these special moments. Indeed, it is not unusual to see photographs of wolfhounds of 9, 10 and older. Many of them still active and looking great.

Yet the very nature of Facebook means that the celebrations are transient and the posts soon move down the timeline and are replaced by others. There is no permanent place where longevity is recognised and, of course, not everyone uses Facebook.

In the USA, there is a Longevity Recognition Program. But, here in the UK, there is no procedure where our long-lived Wolfhounds can be honoured and remembered.

The IWHG believe that there should be something and, to this end, we will be launching our own Longevity Recognition Programme. It will be based on the successful IWCA model, and we are very grateful to A.I. (Nina) Gottsch, IWCA Longevity Recognition Program Chair for all her help in explaining the scheme to us and allowing us to use it as the basis for own system.

The IWHG Longevity Recognition Programme will be launched in January 2017. It will be an opportunity to remember and honour our super-veterans - Irish Wolfhounds who have reached the age of eight or older.

Daisy aged 9 years

Any Irish Wolfhound that is registered with the Kennel Club will be eligible for inclusion on the programme. They do not have to be show dogs.

When a hound reaches its seventh birthday, the owner can apply for their hound to be placed on the veteran list. They will need to provide some objective proof that the dog is still alive. This is so that the register is robust and accurate.

Just before the hound reaches its eight birthday, we will check with the owner to see if their Wolfhound is still alive. If it is, we shall send out a birthday card and inform the owner that their hound qualifies for the Irish Wolfhound Health Group Longevity Recognition Programme. Their details will be added and the Wolfhound is then placed on the Longevity Qualified List. This list will be available on the IWHG website

When the hound dies, the owner informs us and the hound's details are transferred from the Qualified List to the Certified List.

A certificate, suitable for framing, will then be sent to the owner to recognise the longevity of their Wolfhound.

If a hound is over the age of eight when it dies, but the owner has not registered on the programme, it will still be possible to apply for the Certified part of the programme. They just need to meet the requirements and send in the proper documentation.

We hope you agree that there is something special about our veteran wolfhounds and hope you will support this programme.

A Research Update from the Canine Health Genomics Team

In an effort to engage more closely with our research teams we asked Dr Mark Dunning to provide an update on all the ongoing research projects we are working on with Nottingham Vet School. I think you'll agree they have been very busy over the past year! Whilst we have updates on our own IW projects there are also exciting new avenues and possibilities for collaborative studies being developed. One thing is for sure though, they cannot complete these studies without our input and support, so please make sure you fill out all the forms that are relevant to the projects you have signed up for and fill out the treatment surveys relevant to your own experiences. In our next Newsletter, we hope to introduce all the different people involved in the Canine Health Genomics Team so you can meet them all individually and learn more about what they each do.

The University of Nottingham
UNITED KINGDOM · CHINA · MALAYSIA
School of Veterinary Medicine and Science

Dear Irish Wolfhound owners and breeders,

We would like to give you an end of year update of the progress we have made with the projects that are currently running with Nottingham Vet School and in particular the Canine Health genomics group.

It is important to remember with all of the projects that we are running, these are in place because the diseases that they are investigating are those which are perceived to be a problem in the breed and in most cases have no available cure or no effective long-term treatments. This is why our continued engagement with you as owners and breeders of these lovely dogs is so important.

One of the longest running projects is the survey designed **to review how common Fibrocartilaginous embolisms are in young Irish Wolfhounds (IWH)**. This was identified at our first owner-breeder seminar to be an important cause or morbidity in young IWHs. At present, we have had 7 replies from UK dogs. We would therefore very much like to hear from more owners whose dogs have a suspicion for having suffered an FCE. We have yet to analyse the data, given the small numbers, as we were hoping at least for double figures. The survey will be loaded online to facilitate easier completion; this should be by the beginning of next year. **Please continue to bear this project in mind when you hear of any young dogs with compatible clinical signs.**

One new and exciting project we have been running with the **Deerhound and Greyhound groups is a review of factors that are influencing the development of bloating and gastric torsions**. This is to determine which (if any) of the many factors that are reported to increase the risk of developing bloat or a torsion in all dogs, apply to Deerhounds. A research abstract from the Deerhound study has been submitted for presentation at the BSAVA conference in April, we hope this will be accepted. Bloat was a topic that was also identified at one of our owner-breeder seminars. **We hope therefore that this project can be extended to the IWH in due course** to see if we can find any particular factors that influence the development of bloat or torsion in this breed, as they may differ from the Deerhound.

Nottingham's research into **canine osteosarcoma** is something we have all great enthusiasm and energy for. At present we are accumulating samples from both normal IWH and those sadly affected by the disease in addition to the samples from the tumours themselves. We are looking to gather substantial numbers of these important samples so that once the analysis is carried out, we have a sizeable group which will enable us to draw important and clinically significant conclusions. **We would therefore encourage as many IWH owners as possible to get involved by submitting swabs for DNA collection and also completing the online questionnaire** which is crucial for us to understand the genetics of any of the dogs that are enrolled in the study:

IWH Health Survey

To date, we have had 24 owners complete the online version of the questionnaire and we would really

hope that more of you will use this route. The study will remain open, it is not closing, as our research is ongoing.

One facet of the osteosarcoma research is examining owner's opinions of the treatment of osteosarcoma in the breed. This is a crucial project to carry out as it is important to know that any new treatments that are recommended would be taken up by IWH owners. The more we can understand about the reasons that owners choose a particular treatment for osteosarcoma and how their dogs cope with this treatment, the better placed we are to refine and improve future therapies. The current response from the IWH owners is excellent and we can't thank you enough. We have 21 responses so far, which is excellent as we know how difficult answering questions about this experience will be. The link to the survey can be found here: IW_osteosarcoma_treatment_survey

We have an undergraduate working on this osteosarcoma treatment project who will start in October of next year. This will form her dissertation for her degree; she is a very engaging student and will no doubt do a great job of analysing the data. Until then **please continue to complete the questionnaire online**. We have a number of other aspects to this study which we will update you about in the New Year. **The results of this project are fundamentally important for us to understand how the results of any of our current research can be developed into new therapies**.

We have been redrafting the **pneumonia health guides** for the vets and owners of IWH suffering with this terrible condition. We have almost completed the redraft of the owner's guide and are now about to complete the vet's guide. Once these are complete, we hope very much these will help with increasing awareness of the severity and therefore the importance of identifying and treating the disease promptly to improve the outcome in affected dogs. These new documents will be circulated in due course.

We are also beginning a project looking into the causes of death in IWH suffering with Atrial fibrillation. This is to determine whether these dogs have any need for treatment with anti-clotting drugs as is the norm in people. We have a very engaging undergraduate student that will be working on this next year. Further updates on this will follow but we are excited by this project given the frequency with which we see AF in the breed.

We have also just completed the first phase of a project looking at the **vaccination practices amongst Rottweiler owners and breeders**. This exciting project has been created to understand whether Rottweilers are particularly at risk of contracting parvovirus and whether vaccination practices influence this. **We are planning on extending this to other breeds** as a comparison to see whether the vaccination practices followed by Rottweiler owners are similar to that seen in other breeds or unique to themselves.

We also wanted to update you with **a summary of the scientific publications** from the group over the past year which are relevant to IWH:

A predictive model for canine dilated cardiomyopathy- a meta-analysis of Doberman Pinscher data. Simpson S, Edwards J, Emes RD, Cobb MA, Mongan NP and Rutland CS, 2015. Peerj. 3, e842

Genetics of Human and Canine Dilated Cardiomyopathy. Simpson S, Edwards J, Ferguson-Mignan TF, Cobb M, Mongan NP and Rutland CS International journal of genomics., 2015. 204823

Multiple genetic associations with Irish Wolfhound Dilated Cardiomyopathy

S. Simpson, M. Dunning, S. Brownlie, J. Patel, M. Godden, M. Cobb, N. Mongan and C.S. Rutland. Biomed Research International – Cardiovascular disease special edition.

Accepted In press, published on line early: Due 24th Feb 2017

Copies of these can be made available on request.

We would like to close the update with a massive thanks to all of you for being involved in these studies. We truly hope that their outcomes will lead to a positive impact for the long-term health of Irish Wolfhounds. We wish you and your dogs a very happy 2017 and look forward to continuing to work with you all. Please do not hesitate to contact us if you have any questions or suggestions about these or any other aspects of research into Irish Wolfhound health: sv-dogs@nottingham.ac.uk

Dr Mark Dunning

(on behalf of the Canine Health Genomics Team)

Heart testing in Ireland

by Marion Finney

The last weekend in November has now become a fixed date for heart testing in Ireland. We are very lucky Dr Serena Brownlie is always so willing to travel over to attend clinics in both Northern & Southern Ireland.

Our Northern clinics are held in the home of Larry & Gill Scott who entertain Serena & open their home to Wolfhound owners who wish to have their hounds heart tested. This year we had 10 dogs attending the NI session & we must thank Shane McDonnell, John Haughey, Anna Marie Farrell & Eamon Connolly & of course Larry & Gill for all bringing hounds along for testing.

Here in Dublin we had a full house of hounds for Serena to test. Our own pack and Petra Tomasovicova Paul Langan, Irene Lawlor, James Flynn and Sharon Carroll-Young brought along hounds so

between testing & many cups of coffee it was late evening before Serena finished her day here.

Unfortunately, it has been difficult convincing Irish Wolfhound owners in Ireland, the importance of heart testing their hounds on a yearly basis. We do appreciate how much owners love & cherish their hounds but without doubt part of the care package should be annual heart testing. We are advised to get a yearly MOT, so why not give the same to your hounds?

At the end of the day, Tim Finney President/Chairman of the Irish Wolfhound Club of Northern Ireland presented Serena with a little surprise gift from the Club to mark her 30 years of heart testing Irish Wolfhounds. Serena was delighted with her Newbridge sterling silver double heart pendant, a fitting tribute to a lady whose heart is really in Irish Wolfhounds.

Neutering Factsheet

Many new Wolfhound owners ask for advice about spaying or neutering their puppy. The IWHG has created this factsheet to assist owners looking for information about the benefits and risks associated with this procedure.

Whilst many vets may recommend *early* spay or neuter, this document will hopefully help you and your vet to understand why **this is not a recommended procedure in a giant breed like wolfhounds.** There is now a great deal of research showing that to remove the sex hormones of an immature animal of a large or giant breed can lead to serious long term health issues.

Having researched the available literature, we have found one review paper which we feel best summarizes the findings of over 50 scientific papers dealing with this topic. It is very easy to read and has been linked to on our website, you may even want to download it, print it out and take it to your vets: Long-Term Health Risks and Benefits Associated with Spay / Neuter in Dogs Laura J. Sanborn, M.S. May 14, 2007

The following are a few key reasons taken from the above paper why the Irish Wolfhound Health Group does not recommend early spay or neuter.

Osteosarcoma

For both male and female dogs, if they are neutered before 1 year of age, the risk of osteosarcoma, or bone cancer, is significantly increased. Since it is estimated that osteosarcoma already kills around 20% of Irish Wolfhounds, increasing this risk further is not considered an advisable action.

Bone growth and development

Irish Wolfhounds take a long time to reach full growth and maturity. Spaying or neutering an immature dog delays the closure of the growth plates in bones that are still growing, causing those bones to end up significantly longer than in intact dogs or those spay/neutered after maturity. Since the growth plates in various bones close at different times, spay/neuter that is done after some growth plates have closed but before others might result in a dog with unnatural proportions, possibly impacting performance and long term durability of the joints. It has been shown in other breeds that neutering, particularly of immature animals, leads to an increased risk of cranial cruciate ligament injury and hip dysplasia. It has also been shown to lead to remodelling of certain joints and a net loss of bone mass.

Cancer

When a dog is neutered the risks of some cancers increases while the risk of others decreases. These risks should be weighed for each different dog breed, but for Wolfhounds, after osteosarcoma at 20%, lymphoma at 4.7% and hemangiosarcoma at 2.3% (figures from IWF newsletter Summer 2016) are the two most common cancers. The risk of developing either of these types of cancer has been shown to increase in spayed/neutered dogs with an association not only with an increase in likelihood of development but a correlation between ages of spay/neuter and age at diagnosis. That is, dogs which were spayed/neutered earlier also developed cancer earlier in life. The risk of hemangiosarcoma is particularly increased in female dogs. Therefore, especially in female dogs the increased risk should be weighed against the benefit from the decreased risk of mammary tumours, the most common malignant tumours in female dogs across all breeds.

In short, every case must be treated individually, and the risks and benefits weighed for each dog (and owner). There are no 'one size fits all' solutions. Other considerations might include the possibility of behavioural changes, risk of urinary incontinence and obesity.

Traditionally vets will recommend spay/neuter at around 6 months of age, some will even perform paediatric operations much earlier than this - we strongly recommend that this is not undertaken until the dog is at least two years old and in bitches, not before their second season.

However, there are now other options available to owners wishing to remove the breeding capability of their dog without removing the hormones. Instead of an entire gonadectomy, (castration or spay), owners might consider a vasectomy or chemical castration for males (e.g. Supralorin), and tubal ligation or an ovary-saving spay for females. These options should be discussed in full with your primary care vet and could provide a way of allowing earlier neutering without increasing the risk of later health problems, but this would still not be a recommended option for paediatric or immature dogs.

Whichever route is chosen, we hope you will understand why for a giant, fast growing breed like wolfhounds we recommend you should wait until our young hounds are physically and sexually mature.

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Irish Wolfhound Health Group

Join the discussion

https://www.facebook.com/groups/IWhealthgroup/

We'd love to hear your feedback on any of the articles or information in this newsletter…

Gulliagh Istalea aged 10 years

…. and don't forget, the IWHG IS YOUR IWHG.
Your input to all the research programmes is as important as the researchers themselves –
They need your help.

So keep filling in those surveys and keep in touch!