Ectopic Ureter in the Golden Retriever
Written by Sy Guth (New Zealand)

What are the symptoms?
Ectopic Ureter puppies are frequently referred to as “wet puppies” because they are always wet from uncontrolled urine leakage. In a female puppy, the defect is normally detected between a few days old and eight weeks of age. Sometimes, it can appear around six to eight months, but this is less likely. The defect is caused by the ureter(s) not connected correctly from the kidney to the bladder. It can be unilateral or bilateral (one ureter affected or both ureters). The defect can vary in the diagnosis. In some cases the ureter does not connect to the bladder at all and in other cases the ureter can enter the bladder, run close to the wall and end at the bottom of the bladder. In both cases, the result is uncontrollable “leaking” of urine from a female puppy. Most breeders notice the leaking urine in a female puppy around three to four weeks of age. The reason for detecting it so late, is that early on the dam normally cleans the puppies frequently and it is difficult to tell if the puppy is actually leaking. Once the dam is away from the puppies for a period of time, it becomes more evident as the puppy is always wet.

The defect also occurs in male puppies, but is not normally seen until they are adults. More on this is discussed in the “What is the incidence ....” section.

How is the defect diagnosed?
Detection and analysis of the defect can sometimes be very frustrating if the breeder’s vet is not familiar with the defect. The original test for detecting an ectopic ureter defect was to use a dye test and then x-ray the puppy to determine if the ureters were connected properly. This is not always reliable because sometimes one ureter can hide behind organs and not be seen on the x-rays. Ultrasound tests can be performed, but require someone with outstanding skill and experience. Many vets consider cystoscopy to be the best approach to diagnosis.

Remedies for fixing the defect
Depending on the outcome of the diagnosis, the common remedies have been to either euthanize the puppy or have
corrective surgery performed. Surgery can include repairing the ureter to connect properly to the bladder or in some cases veterinarians have removed one kidney and the ureter if the condition is unilateral. Normally the expense of the procedures leads the breeder to choose euthanizing the puppy since the affected puppy should not be bred from. Costs can vary by country and type of surgery – generally running from $500 to $5,000.

**Is it hereditary or congenital?**

Because veterinarians do not see the defect that often, they often tend to think it is sporadic and not inherited. However, it is most definitely a hereditary defect and at this time it is believed that it does require two carriers to produce the defect. It is also known to frequently skip several generations before appearing again. These are classic features of recessive disease traits. Unfortunately without knowing what the genetic cause of the condition is, it is impossible to be certain of the pattern of inheritance.

**What is the incidence of ectopic ureter in Golden Retrievers?**

Based upon our information it appears that this defect is rare in the golden retriever with less than 2% of puppies being affected. When an affected puppy is produced, it is usually the only abnormal puppy in the litter (although this is not always the case). True incidence is a bit difficult since we know that affected male dogs may not show signs until they reach an adult age or perhaps never developed recognizable signs. Affected males do not normally exhibit urine leakage until adulthood. The difference in timeframes for females versus males is due to the difference in “plumbing”. In the male dogs, the prostate gland acts as a muscle sphincter that limits the dribble of urine and the incontinence problem is known as “urethral sphincter muscle incompetence.” Either through more awareness or more inbreeding, the number of instances does seem to be on the rise. Also there appear to be “pockets” or “regions” that tend to have higher instances of the defect. One of the more important aspects of the defect that GREUDNA.org have noted over the last few years, is that breeders who believe they are doing the breed
good by importing dogs from overseas to expand the gene pool, are just as likely to have a litter with an ectopic ureter puppy or two as those who breed from local stock.

**What is the history of the defect?**

In my 18-month study of pedigrees from EU affected litters, I traced the defect back to a pair of dogs from the early 1930s. These two dogs are behind nearly every show or dual purpose Golden Retriever in the world. Because they were both champions and because it was at the beginning of the war years, this “couple” became one of the bottlenecks of the Golden Retriever breed. In some EU affected pedigrees, these two dogs and a couple of their litter mates appear as many times as 327,416 incidents in a pedigree traced back to 1900. That is a lot of inbreeding. Which brings us to the fact that the number of unique ancestors in today’s Golden Retriever is somewhere around 0.07% or less – well below 1%. In a pedigree traced back to 1900 with 1.9 to 2.5 million ancestors, only 3300 to 3500 will be unique. In my pedigree research of nearly a hundred affected litters, there are four dogs who appear in multiple numbers in the first 9 generations in nearly every “English” Golden Retriever EU litter pedigree since 2000. In the US and the “US” Golden Retrievers the number is slightly higher, but again the list of suspect dominate EU carriers is consistent. It is important to note, that although we tend to “type” the Golden Retrievers by country type or activity type, 99.9% of all Golden Retrievers worldwide go back to four foundation pedigrees in the 1920s. These pedigrees can be found on the website – [www.standfastdata.co.uk](http://www.standfastdata.co.uk) It is also my personal belief through my studies of the pedigrees that there are “dominate” carriers that tend to influence the risk of producing an ectopic ureter puppy. There are early kennels who fell victim to the defect to a higher degree than others. One of the earlier kennels in the UK did so much inbreeding that one of the suspect dominate EU carriers appears up to 10 times in a 5g pedigree and his half-brother appears 4 times. More can be found on this topic in the GREUDNA.org fundraiser paper entitled Ectopic Ureter Defect in Golden Retrievers; Hereditary Blood Profile Study by Sy Guth
and can be obtained with a donation on the GREUDNA.org website.

Most breeders do not have a high interest in the defect until it happens in their litter. Then they become advocates for the DNA study, because it is normally the pick of the litter that is affected and the breeder is then devastated with the choices they have to make. The percentage of affected puppies is ‘best guess” because for many decades the topic has been hidden by those affected by it. Presumably this has been to protect their kennel name and breeding program. Still today, there are many misconceptions about the defect that keeps it hidden away. But through a campaign over the past 5 years, the topic is being more openly discussed and breeders are coming to realise that they did not create the defect and that it has been around for many decades if not a hundred years.

**How can breeders avoid the defect?**

Without a DNA test, there is no way to be sure which dogs are suspected EU carriers and which are not. At this point in time and without the benefit of the DNA findings, if a bitch or dog are known to have produced an ectopic ureter puppy then I have termed them to be a “carrier.” Common sense and common gene knowledge will dictate that a litter mate from an EU litter is at higher risk of being a carrier than normal. Avoiding inbreeding or line breeding in the first 5g is not a guarantee to avoiding the defect. From personal experience, both my EU litters in 2007 and 2009 had one and two EU pups respectively. The dams and sires were different in each of the litters. Both sires were from outside my kennel and neither of them had common ancestors to each other in the first 5g. Nor did the sires and dams have any common ancestors to each other in the first 5g of the pedigrees. Most breeders would term these litters an outcross mating. However, going back just another two generations and all the common ancestors begin to appear. In my 2007 pedigree there are only 3 known carriers or suspected dominate EU carriers in the first 5 generations. However, there are 36 known carriers or suspected dominate EU carriers between the 6th and 10th
generation. In the 2009 pedigree there are 5 known carriers or suspecteddominate EU carriers in the first 5 generations and there are 46 known carriers or suspected dominate EU carriers between the 6th and 10th generation. Demonstrating that breeders need to be looking at pedigrees further back than 5 generations. They also need to ask the tough question of the breeders behind their lines – “Do you know of any EU puppies behind this dog?”

**How can breeders participate in the DNA study?**
GREUDNA.org searched from December 2009 until 2013 to find an institution that was both qualified and willing to take on the ectopic ureter DNA study to find the markers for the defect and create a DNA test so that breeders could identify carriers from non-carriers. By mating carriers to non-carriers, it is believed that a breeder can avoid the defect – thereby not having to throw the baby out with the bath water. However, only the DNA test will provide us with all the answers.
In September 2013, Dr Josh Stern approached GREUDNA.org with an interest in partnering in an EU DNA project. We agreed terms for a partnership in September 2013 and have been working to both educate and solicit and collect blood samples from affected puppies and those older dogs that were surgically corrected to provide DNA samples to UC Davis for this important DNA study.

Those Golden Retriever breeders / owners interested in partaking in the project can contact either GREUDNA.org or Dr Josh Stern at UC Davis to obtain the forms to submit blood samples. In many cases, UC Davis will pay the costs to ship affected samples from overseas to their lab in California.
Contact information for Golden Retrievers and other breeds is as follows:
Golden Retrievers: website www.greudna.org / email info@greudna.org or Stern Laboratory, University of California, Davis, One Shields Avenue, 2108 Tupper Hall, Davis, California, 95616 USA. Eric Ontiveros; Phone: +1 530 752 4892 esontiveros@ucdavis.edu
Labrador Retrievers and Newfoundlands: Bannasch Laboratory, University of California, Davis One Shields Avenue, 4206 VM3A