



## Breeders' Briefcase

by Amy & Bonnie

### “GETTING TO KNOW YOU”

#### A Conversation with Noa Safra, DVM, PhD

We are very fortunate to have as one of our own, a veterinary geneticist, whose passion is finding the key to unlock the mystery of HOD and other Weimaraner genetic disorders. For those of you not familiar with Noa, or the new ground-breaking genetic research she is leading, we'd like to take this opportunity to introduce her and her work to the WCA membership.

- *Tell us about your origins in Israel and what inspired you to study veterinary medicine.*

I grew up in a small suburb in Israel. As a child, I was drawn to animals in general and to dogs in particular. I had a number of small pets; hamsters, rabbits, mice, fish, and birds. I was finally allowed to own my first dog when I was ten, as I was then mature enough to be a responsible dog owner. I was always aware that my pets may get sick; my father has a tape recording of a five year old Noa worrying about what would be done if the fish were to get sick. I was eager to learn about taking care of my own pets and this is what eventually led me to veterinary medicine.

- *How did you become involved with Weimaraners?*

The first Weimaraner I met belonged to my neighbor, Ilana Bar-Tal, (who today serves as the president of the Israeli Weim club, and is a long-time WCA member). I was in awe when I first saw her Weimaraner bitch, Dona. Dona looked like a dog in a fairy

tale; her silver coat gleamed and her floating stride made her look as if she was gliding on air. It was then, that I decided that one day, I would have my own Weimaraner.

Ilana became involved with exhibiting and training purebred dogs while in her teens, and it was through her that I became similarly involved. I began training and working with my first dog; a Miniature Poodle and copied everything Ilana did.

I was fascinated by the different breeds and memorized every word on every page of the FCI Book of Breed Standards. My obsession with the defining differences in conformation and behavior traits of the many breeds piqued my interest in genetics. I consumed textbooks on genetics and attend genetics classes offered by the Open University. Looking back I was quite the dork growing up...

I started searching for a puppy after reading Weimaraner Ways. I read it cover-to-cover, again and again, and finally contacted Ginny Alexander to assist me in importing a puppy bitch to Israel. An additional 18 months passed while I searched for the right puppy. In 1996, just when I began vet school, Eleanor, my first American-bred Weimaraner arrived.

- *What inspired you to change the focus of your career from practicing veterinary medicine to genetics and research?*

While I was in vet school, there were several familial cases of Weimaraners with HOD. Aware of my interest in the breed, the faculty at the teaching hospital kept me apprised of the treatment and progress of these sick pups. The vets were also working to establish a Weimaraner-tailored vaccine protocol. It was at this time that I bred Eleanor and was eagerly anticipating the arrival of my first litter. Imagine my horror when 8 of Eleanor's 10 pups were diagnosed with HOD.

Any breeder who has experienced serious illness in his or her pups can appreciate how devastating the situation can be. It was then that I decided to become a veterinary genetic researcher in order to improve breeders' means of coping with inherited diseases in dogs. After practicing small animal medicine for two years, I pursued a PhD in canine genetics at the University of California, Davis.

- *While at U.C. Davis, who did you study with, and were you involved in any Weimaraner specific projects?*

I came under the sponsorship of Niels Pedersen DVM PhD. I contacted Dr. Pedersen about the planned study of HOD in Weimaraners and had hoped to join Dr. John Angles (who trained under Pedersen) to be a part of his research team. Unfortunately, as I enrolled in graduate studies at UC Davis, Dr. Angles was leaving to pursue studies in Ireland

As it turned out, I was ever so fortunate to join the laboratory team of Danika Bannasch DVM PhD. Dr. Bannasch is the head of the clinical genetics service at the Veterinary Medical Teaching Hospital (VMTH).

She is also a breeder of Nova Scotia Duck Tolling Retrievers and a superb dog trainer. Dr. Bannasch is a mentor and a role model to me in science as well as in dogs. For my PhD project, I identified the DNA mutation that causes Dalmatian dogs to form bladder stones. Dalmatian breeders can now select against the defective gene and breed dogs free from urinary stones.

- *We understand that after completing your doctoral program in genetics at U.C. Davis, you and your family temporarily relocated to Maine for a research opportunity for your husband, who is also a veterinarian. Your family is anticipating the return to California in early 2009, where you will return to U.C. Davis for work on an exciting new project.*

This is REALLY EXCITING!!! While visiting with friends and colleagues at UC Davis, I discussed HOD in Weimaraners (for the millionth time) with Dr. Pedersen. Dr. Pedersen expressed his regrets about the premature termination of the previous study supported by the WCA and AKC and offered me the opportunity to return to the VMTH and employ a new approach to study HOD. All I need to bring on board are the samples.

Since the completion of the dog genome sequence in 2005, there have been great advances in the techniques available for disease gene mapping. These are new techniques, and were not available during the WCA's previous HOD study. A large number of abundant genetic markers, called SNPs are now available in a form called "chip". A SNP chip is a panel of genome spanning markers designed to give a dense coverage of the genome. The canine SNP chip is a new tool that contributes to fast progress and

recognition in genetic studies for dogs. Use of the SNP chip technique has resulted in the successful mapping of white spotting in the Boxer and the dorsal hair ridge in the Ridgeback breed. SNP chip technology can span 25,000 markers as compared to 300 markers using the older technology. Many other studies are on their way. This is a robust tool that is going to bring about great advances in the field of genetics.

- *What are the goals of this new project?*

The goal of the project is to correlate between SNP variants and predisposition to HOD. In general terms, one can imagine that few SNPs spread across the genome may show correlation to HOD affected status. A risk status analysis can be done assessing the risk level of individuals to come down with or pass HOD. This prediction is made based on the presence of few or all of the specific SNP variants (read: alleles). The risk assessment can be developed into a DNA test. A more long term goal then would be to study the genes located in the regions of the SNPs and possibly coming down with the mechanism of HOD.

This new technology offers additional exciting possibilities. When using the SNP chip, it is feasible to load different types of affected samples. This means multiple inherited disorders could be searched for simultaneously.

- *How can Weimaraner fanciers participate or assist in this study?*

The role of the Weimaraner fancier is central. A genetic study is only as good as the samples used to run it. The major, and perhaps only limitation

of this project is the number and the quality of the DNA samples we obtain. The samples needed are whole blood samples (in "EDTA" or purple top test tubes). The reason whole blood is required, is that the SNP technique is very sensitive to contamination and requires large amounts and top quality DNA. Buccal (cheek) swabs are not clean enough to successfully perform accurate SNP analysis, and the yield of DNA is less. This type of analysis must be reproducible, sensitive and accurate. We can't allow the lower quality of the DNA found in buccal swabs to negatively affect the reliability of the results. This study is just too important for the future of our breed.

Ideally, samples from affected dogs should be accompanied by samples from the two parents and from a normal littermate. Additional relatives are welcome. If all these samples are not available please submit whatever you can. These samples should be shipped as fresh as possible and should be kept refrigerated, but not frozen, until shipped. Ideally, the samples should be shipped in Styrofoam with an ice pack to keep it cool. Use overnight shipping.

Please contact me for forms to accompany your blood samples, addresses and additional information.

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