



### To Titer or Not?

Written by: Karen Carver, Ph.D.

Last week, I took my 10-month-old female Weimaraner “Gabi” into the vet for a routine visit. While there, my vet once again recommended that we subject Gabi to a second antibody titer test to check her immunization status for canine distemper virus (CDV) and canine parvovirus (CPV). Both are serious, often fatal, diseases in dogs, but can be prevented by vaccinations. A titer is a blood test that measures the amount of antibody against a virus or other antigen that is circulating in the blood. Because our first Weimaraner suffered a serious immune disorder as a puppy, and a serious reaction to a second rabies vaccination, we have come to overwhelmingly prefer titers to vaccines for our Weimaraners.

The first time our vet mentioned doing this test a second time, I resisted, knowing that Gabi’s previous distemper results had come back at 256, and her parvovirus results had come back at 320—fully within the Cornell Laboratory’s acceptable reference ranges. Cornell considers distemper titer results that are above 32 and parvo results above 80 as providing acceptable evidence of immunity.

My first dog’s illness had led me to fully investigate titer testing; and somewhat contrary to the Cornell ranges, the research seemed to suggest to me that ANY positive titer result was considered adequate. This recommendation was originally provided by my first breeder, but also seconded by Gabi’s breeder (within a

nearly half-inch thick professionally bound puppy manual presented to us along with Gabi). Now, if a new Weimaraner parent can’t trust her breeder—the same breeder who read me the riot act when I miscalculated Gabi’s age and was not quite a week late on her 2nd distemper vaccine—well, the world just needs to stop spinning right now.

But, I trust our own vet as well, and she has been absolutely adamant about doing this second test. In fact, a couple of months ago, my husband called from our vet’s office to put me on speaker phone. I guess he felt caught between two immovable forces—his wife and his vet—poor guy. I resisted (as he knew I would), and she withdrew—but apparently only temporarily. My visit last week helped me understand that my vet is determined to win this war. She’s my kind of vet. She fights when she believes she’s right. Really! I’m crazy about her, and I hate being at odds with her. The disagreement probably lies somewhere within the ambiguities of interpretation. So, let’s review the evidence.

The best information I’ve been able to gather suggests that vaccines generally work through two primary mechanisms. They stimulate the immune system to produce: (a) antibodies that circulate in the bloodstream to fight the current infection, and (b) memory cells that can produce future antibodies to fight future infections.

The detection of antibodies in the bloodstream allows us to know that an immune response took place, and when this happens, one can be fairly certain that memory cells are present. Titers as a measure of whether or not an animal formed immunity from a recent vaccination have been shown to be highly reliable (Ford & Schultz, 2000). Ambiguity only arises when a titer detects no antibodies. This might mean that an animal is not immune—that is, an immune response never occurred either because the animal was never exposed, the animal was a non-responder (these are relatively rare but possible), or the animal was still protected by maternal antibodies.

Or it could mean that while a response was mounted and memory cells exist (active immunity), circulating antibody presence is not currently detectable. Perhaps active immunity was established many years ago, but circulating antibody levels have declined to undetectable levels. Since memory cells can respond within hours to generate enough antibodies to be protective, lack of a currently circulating antibody response is never a sufficient reason to assume an animal is not immune.

So, if a strong result was ever present, but is no longer in evidence, the dog is still likely to be immune. In fact, even if revaccinated, memory cells will not increase, so it's not clear if additional vaccination is EVER warranted when a dog has previously shown acceptable titer results.

Dr. Robert Schultz—the leading canine vaccine researcher in the world and Chair of the Department of Pathobiology at the University of Wisconsin-Madison School of Veterinary Medicine—has argued

that previously established immunity will act like maternal antibodies and inactivate the vaccine. In other words, immunity will not be “boosted” in animals who have already established active immunity. In fact, “booster” shots will confer all of the risks of vaccination yet provide no additional benefit—clearly a scenario that is in no animal’s best interest (Shultz, 1998).

Gabi’s titer results were measured when she was 17 weeks old. We know that interference by maternal antibodies represents a major source of vaccine failures in young animals (Pollock & Carmichael, 1982). As stated earlier, circulating maternal antibodies can inactivate a vaccine and interfere with a puppy’s ability to form immunity. While maternal antibodies can fight disease, they do not stimulate the formation of memory cells. This is why we give multiple vaccines to puppies—to make certain that maternal antibodies are low enough that an immune reaction is generated. Is it possible that our vet has been worried that the titer results were picking up her mother’s immune status rather than her own?

Dr. Schultz’s research has suggested that every week to two weeks, the puppy loses one-half the antibody derived from mom. So, by 16 weeks of age a large proportion of puppies will have about 1/128th the level of maternal antibody that he or she started with.

Recommendations from Dr. Schultz’s laboratory suggest that a titer result of 8 for CDV or 20 for CPV in a vaccinated dog (all U.S. breeds) over 4 months old should be interpreted as having protective immunity. [His laboratory’s reference ranges may be

somewhat different from Cornell's due to slight differences in methodology, etc.] Gabi's results from the Cornell laboratory were 256 and 320 at 17 weeks. She seems to have exhibited sufficiently high results measured at a sufficiently old age.

In the vast majority of cases, maternal antibody levels at 16 weeks have been demonstrated to be too low to interfere with vaccine efficacy. However, what I haven't been able to answer is what happens in the case that maternal antibodies were off the scale to begin with? Would these puppies still have sufficiently high levels of circulating maternal antibodies at 16 weeks to interfere with vaccination? It's not currently clear what this threshold would need to be to ensure an immune response if an immune response is possible. Regardless, all evidence has led me to remain convinced that Gabi's protected. However, I do respect my vet's opinion. In addition, I can't help but think about my first Weimaraner and his own titer results. His second titer was drawn at one year and proved to be at the complete high end of the Cornell scale (1024). This response is probably not unexpected given the autoimmune disorder he suffered during his first year. So, it's clear that outside influences can affect titer results. But, in the interest of ensuring my dog's well-being, appeasing my curiosity, and keeping peace with my vet, a repeat test was conducted last week. Stay tuned for those results . . . in the meantime, we continue to choose titers in lieu of vaccinations when possible.

## References:

- Ford, R.B. and R.D. Schultz: "Vaccines and Vaccinations: Issue for the 21st Century." Kirk's Current Veterinary Therapy, XIII, 2000.
- Pollock R.V. and L.E. Carmichael: "Maternally Derived Immunity to Canine Parvovirus Infection: Transfer, Decline and Interference with Vaccination." Journal of the American Veterinary Medical Association, 1982, 180(1): 37-42.
- Schultz, R.D.: "Current and Future Canine and Feline Vaccination Programs." Veterinary Medicine, 1998, 3: No. 3, 233-254.

*Karen Carver, Ph.D. is a demographer working in the Washington DC area. She and her family recently added a second Weimaraner to their family—which has led them to re-discover that their first Weimaraner "Felix" is truly the kindest of souls. After 10 months, his nemesis, Gabi the puppy, still lives . . . Karen is a member of the WCA Health Committee and can be contacted at [K.Carver@Systemsdev.com](mailto:K.Carver@Systemsdev.com)*