Talking Titers

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Producing effective and safe vaccines for prevalent infectious diseases in animals has become increasingly challenging. In veterinary medicine, evidence implicating vaccines in triggering immune-mediated and other chronic disorders (vaccinosis) is compelling.

While some of these problems have been traced to contaminated or poorly attenuated batches of vaccine that revert to virulence, others apparently reflect the animal's genetic predisposition to react adversely upon receiving the single (monovalent) or multiple antigen "combo" (polyvalent) products routinely given to pets. Animals of certain susceptible breeds or families appear to be at increased risk for severe and lingering adverse reactions to vaccines. In cats, while adverse vaccine reactions may be less common, aggressive tumors (fibrosarcomas) can occasionally arise at the site of vaccination.

We need to acknowledge, however, that these concerns are being addressed today because the widespread use of vaccination programs has effectively reduced the risk of disease while simultaneously increasing the population's "herd immunity".

Serologic vaccine titer testing

Some veterinarians continue to challenge the validity of using vaccine titer testing to assess whether individual animals are protected against the common, clinically important infectious diseases. Nevertheless, titer testing has been around for more than a decade now, and published studies along with extensive clinical experience has shown them to be useful and reliable for monitoring immunity to canine distemper virus (CDV), canine parvovirus (CPV-2), canine adenovirus (CAV-1 and -2), feline panleukopenia virus (FPV), and rabies virus (RV).

Modified-live virus (MLV) vaccines for the first four listed viruses induce sterile immunity when the animal has been properly immunized, thereby rendering him immune to viral replication and re-infection upon exposure. Serum titer levels for these diseases are directly proportional to the degree of clinical protection. By contrast, titers for feline herpes virus (rhinotracheitis virus) and feline calicivirus are less reliable. All licensed rabies vaccine are inactivated, killed products, so they cannot replicate in the host animal, but still convey long-lived immunity.

Today, vaccine titer tests are routinely offered by university teaching hospitals, state and provincial diagnostic laboratories, and private laboratories. There are now also two USDA-approved in-hospital tests available that provide a positive or negative result: Canine TiterCHECK®, Synbiotics Corp. (Pfizer Animal Health, www.synbiotics.com) and VacciCheck ®, ImmunoComb (Biogal-Galed, www.biogal.com).

The antibody tests performed most often to monitor immunity are CDV, CPV-2 and FPV, especially after completion of the puppy and kitten vaccination series (at least two to four weeks later, and then a year later). Once an animal's titer has stabilized, it should remain constant for many years. Importantly, this animal has immunity to prevent clinical disease, and doesn't need to be revaccinated, especially when the vaccine could cause an adverse reaction (hypersensitivity or other adverse event). Actually, one should avoid vaccinating animals that are already protected. It has been said that the antibody level detected is "only a snapshot in time". That's simply not true; it is really a "motion picture that plays for years".

The presence of any measurable serum antibody titer indicates the presence of "immune memory" and signifies protection from disease. However, titers do not distinguish between immunity generated by vaccination and/or by exposure to the disease, and one should expect the magnitude of immunity produced just by vaccination to be lower (but still adequate).

Interpreting results

Some laboratories may report results with an actual titer measurement, or as less than, equal to, or greater than a measured titer, while others simply indicate a result that's either positive (antibody is present) or negative (no antibody was detected). The positive titer test result is fairly straightforward, but a negative result is more difficult to interpret, because it is not the same thing as a zero titer and doesn't necessarily mean the animal is unprotected. A negative result usually means the titer has failed to reach the threshold of providing protective immunity. For the clinically important viral diseases of dogs and cats (CDV, CPV-2, CAV-1, FPV), a negative or zero antibody titer indicates the animal is likely to be unprotected against these diseases.

Please remember that some dogs and cats are genetically unable to mount protective immunity to these agents. They are termed low- or non-responder animals, and are still susceptible to contracting these diseases, so exposure risk should be minimized. The estimated frequency of non-responders for CPV is 1:1,000 and for CDV is 1:5,000.

Black Labrador retrievers and Akitas are more likely to be non-responders to CPV, whereas greyhounds are more often non-responders to CDV. To date, there have been no documented non-responder cases to CAV-2 vaccine, and relevant data are not available for FPV in cats.

Finally, what does more than a decade of experience with vaccine titer testing reveal? Published studies in refereed journals show that 90% to 98% of dogs and cats that have been properly vaccinated develop measurable antibody titers to the infectious agent measured. Thus, using vaccine titer testing as a means to assess vaccine-induced protection will most likely result in the animal avoiding needless and unwise booster vaccinations.

When a measurable immune memory has been established, there is no reason to introduce unnecessary antigen, adjuvant, and preservatives by administering booster vaccines. By measuring titers every three years or more often, if desired, one can determine whether a given animal's circulating immune response has become inadequate, so that an appropriate vaccine booster can be administered.

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