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Vaccination and Changing Protocols – Part 2

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In Part 1 *of this article (Summer 2014, IVC Journal), we covered the different types of vaccines, including core and non-core vaccines, along with the adverse effects associated with vaccination. In this issue, we'll focus on titer testing as an alternative to annual boosters, as well as vaccine dosages, duration of immunity, and the latest research projects being done on vaccination.*

REASONS FOR VACCINE TITER TESTING:

• To determine whether an individual animal has responded by producing antibody to a vaccine.

• To determine that an animal is protected (positive test result). A response to some antigens does not correlate with protection. For examples, the presence of antibody to Leptospira does not correlate with protection. The microscopic agglutination test (MAT) is used to diagnose disease.

• To identify a susceptible animal (negative test).

• To determine whether an individual vaccine is effectively immunizing animals.

• Available titers to determine immunity for dogs are distemper virus, parvovirus, and adenovirus 2 (hepatitis).

• Titers available for cats are panleukopenia virus (FPV), herpes virus (rhinotracheitis virus), and calicivirus serum titers. However, the only serum titer test that correlates with protection is FPV.

• Rabies virus for cats and dogs (RFFIT-rapid fl uorescent focus inhibition test: non-export). Note: RFFIT is the rabies titer standard established by the Centers for Disease Control within the US (0.1 IU/Ml) and the World Health Organization (0.5 IU/mL) for export to other rabies-free locations to be adequate to protect humans, not dogs, against rabies. There is no established standard for dogs or cats, which means that the human standards must be extrapolated when assessing.

• Protection for other species.

• Titer tests are accepted for humans for many different diseases, and titer results are also accepted in “rabies free” European countries and Hawaii for animals.

• An antibody titer to a complex vaccine indicates the animal has developed an immune response that includes both T cell and B cells. It also demonstrates that the animal is continuing to make antibody months/years after vaccination and therefore memory cells are present.

Several state diagnostic laboratories in the US perform canine and feline antibody testing. There are two commercial test kits available.

1. VacciCheck (Biogal Labs/Spectrum Labs, Phoenix US) tests for canine infectious hepatits (CAV), canine parvovirus (CPV-2), and canine distemper virus (CDV). A feline test for antibody to panleukopenia, herpes virus, and calici virus is also available. This practical test takes less than 30 minutes, uses whole blood or serum, and simultaneously tests for multiple viral antibodies. Excellent for use in shelters or clinics, giving same day results.

2. Titer Chek (Zoetis Diagnostics, Kalamazoo, MI) tests for CDV and CPV-2. This microplate format is best for use in laboratories.

INDIVIDUALIZING PROTOCOL FOR EACH PATIENT

This allows veterinarians to help clients make choices about vaccines for each pet.

• Understand that all pups/kittens must receive core vaccines.

• Understand duration of vaccinal immunity (“protection”).

• Decide which non-core vaccines are needed and the best time to administer.

• Accept potential for adverse events.

• Consider the threat of disease.

• Recognize adverse events rather than dismiss or deny them.

• Offer titers for core vaccines triennially (or more often if desired).

VACCINE DOSAGE

Many holistic veterinarians and a large number of clients question giving the same dose to toy and giant breeds. The immunogenic principle of MLV vaccines is not based on body mass, so the same dose is needed regardless of the dog's size. The temporary discomfort in smaller animals may arise from the amount of diluent, so a smaller volume of the latter could be used to reconstitute the lyophilized vaccine. Currently, some smaller volume vaccines are available in 0.5 ml, that contain a full dose of vaccine.

DURATION OF PROTECTION AND TIMING OF "BOOSTERS"

Vaccination and even re-vaccination does not assure that an animal is protected. A small number of dogs/cats may have no antibodies even after being repeatedly vaccinated. These dogs/ cats are non-responders. I estimate approximately 1/1,000 dogs can't respond to CPV-2 vaccine, and about 1/5,000 can't respond to CDV vaccine. This is based on genetics, so it may be much higher in a specific litter or breed. When challenged (exposed to a disease), these animals are susceptible. Also, some dogs/cats are low responders, but are generally resistant to disease. When animals do produce antibody reactions after vaccines to distemper, parvo and panleukopenia, they can have lifelong, usually sterile immunity.

The presence of antibody, even at low levels, means the immune memory response will kick in, and within hours of exposure, the dog's body will bring the infection under control. There will be infection, but it won't cause disease. There's a big difference between infection and disease. And in fact, re-infection without disease isn't a bad thing because it leads to natural stimulation of the immune response.

With live viral vaccines, when a "booster" is given to an already immune animal (antibody positive), the virus is immediately neutralized. There is no "boosting" of the antibodies because the virus does not have a chance to infect. When no viral antibody is present, the vaccine will either stimulate both the cellular and humoral response to the virus, or in a nonresponder will have no effect. So, only antibody negative dogs need re-vaccinating. Other vaccine components, such as tissue culture media, can cause harm (hypersensitivity and other adverse reactions), so annual re-vaccination is not recommended when not needed!

TIMING OF VACCINATION

• Avoid 30 days before and during estrus; pregnancy; lactation.

• Avoid if autoimmune disease or seizure disorder are present. It is well documented that predisposed animals will probably experience adverse reactions to vaccines.

CURRENT RESEARCH PROJECTS

• New vaccines continue to be developed and old vaccines are improved as needed.

• We recently performed studies to compare a live oral bordetella vaccine to the already available live intranasal and killed injectable bordetella vaccines. The oral live vaccine provided good local and systemic protection as did the intranasal live vaccine. The killed injectable is the most easily administered product, but didn't give as effective upper respiratory tract immunity as the live vaccines. The oral vaccine cannot be combined with the viral kennel cough vaccines (CPI, CAV-2) like the intransal vaccine can, because when given orally the viruses are killed and thus can't immunize.

• Duration of immunity studies continue, looking at dogs that have been vaccinated five or more years ago with the core as well as non-core vaccines.

• Does the recombinant canarypox distemper vaccine provide the same long lasting immunity seen with the traditional live canine distemper vaccines? The answer is yes. The recombinant, like the traditional live CDV, gives many years of immunity. This was the fi rst study in a target species showing that duration of immunity was the same for a modifi ed live and recombinant vaccine.

• We are also studying "immunologic memory" to most of the other canine vaccines, and have shown that canine adenovirus and canine parvovirus vaccine provide many years (up to a lifetime) of immunity based on antibody and challenge studies.

• In general, immunity to viruses is longer than immunity to bacteria, so the viral vaccines are longer lasting – up to a lifetime.