



## Vaccines: When too Much of a Good Thing Turns Bad

By W. Jean Dodds, DVM

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In my book, *The Canine Thyroid Epidemic: Answer You Need for Your Dog*, I discussed the critical role a properly functioning immune system plays in your dog's health. If the immune system is weak (immunodeficiency), your pet's ability to fight off disease is compromised or absent, which can expose them to many infections, including bacterial, viral and fungal infections. Immune deficiency may possibly also reduce the immune system's ability to recognize and attack cancer-specific antigens. On the other hand, an overly-stimulated immune system can trigger immune-mediated diseases – autoimmune disorders in which the immune system mistakes normal organs as foreign invaders and attacks them. Autoimmune diseases include those affecting many tissues of the body such as the blood, thyroid, adrenal glands, joints, kidneys, liver, bowel, reproductive organs, muscles, nervous system, eyes, skin and mucous membranes.

So, what does this post's topic – vaccinations – have to do with our pets' immune systems? Plenty! As a dutiful pet caretaker, you are no doubt vaccinating your pet against a host of diseases. And, of course, a proper vaccination program is essential to your pet's health. On the other hand, research shows that our pets simply don't require annual vaccination boosters to keep them protected. In fact, the American Animal Hospital Association's (AAHA) revised 2011 Canine Vaccination Guidelines recommend a revaccination program every 3 or more years for dogs. And the truth is that once your dog has completed his puppy series (or kitten series for cats) for the core vaccines, there is a good chance his body will maintain immunity to these diseases for life. Yet, many well-intentioned people continue to follow the advice of some veterinarians and give their adult dogs and cats annual (or even semi-annual) vaccine boosters. This can result in over-vaccination and a variety of potentially damaging – and in some cases, even life-threatening – adverse reactions (referred to as “vaccinosis”).

These risks are especially true for pets afflicted with immune-mediated disease, since over-vaccination places undue stress on the immune system and has been linked to autoimmune disease.

Side effects from canine and feline vaccinations can occur anywhere from instantly up to several weeks or months later. Vaccines can even cause susceptibility to chronic diseases later in life.

### **Mild reactions associated with canine or feline vaccines include:**

- Fever
- Malaise
- Urticaria [hives]
- Facial swelling
- Anorexia



- Vomiting
- Stiffness
- Sore joints
- Abdominal tenderness

**Severe and fatal adverse events include:**

- Susceptibility to infections
- Neurological disorders and encephalitis
- Aberrant behaviour, including unprovoked aggression
- Collapse with autoagglutinated [clumped] red blood cells and icterus [jaundice]; autoimmune hemolytic anemia (AIHA) or the synonym immune-mediated haemolytic anemia (IMHA), when red blood cells are damaged and destroyed; or petechiae [pin-point] and ecchymotic [splotchy] hemorrhages from immune-mediated thrombocytopenia (ITP), when the blood platelets are destroyed. Hepatic enzymes may be markedly elevated, and liver or kidney failure may occur by itself or accompany bone marrow suppression.

## **Vaccines: When too Much of a Good Thing Turns Bad (Part 2)**

In my last [post](#), I began discussing that when it comes to canine and feline vaccines, too much of a good thing can be problematic. To restate what I mentioned before, vaccinations at the appropriate times, for the appropriate animals, in the appropriate circumstances are of the utmost importance to preserve health and well-being. Responsible vaccination protocols have enabled us to safely and effectively protect our pets from infectious diseases. The puppy and kitten vaccine series, for example, should always be given. Puppies and kittens who do not receive this series are at critical risk of contracting one or more deadly infectious diseases. [Let's also not forget foals and young farm animals in this equation.]

The concern relates to the overuse of vaccines in these immunologically naive youngsters and adult dogs and cats, as well as to vaccines given to aged pets and those with already compromised immune systems. This is when you, as your companion animal's trusted guardian, should understand what is appropriate and put the brakes on giving unnecessary vaccines.

Let's take a look at the two types of vaccines – modified live-virus vaccines (MLV) and killed vaccines – and their potential effects on your pet's health.

### **MLV vaccines**

As the name suggests, MLV vaccines use a modified, but weakened, form of the live microorganism. When the virus is injected into the body, it multiplies many-fold and stimulates the immune system's production of antibodies, creating an immune response that protects the body against future exposure to the disease.



For dogs: Distemper virus, adenovirus-2 (hepatitis, canine respiratory virus) and parvovirus are all MLV canine vaccines, as are intranasal bordetella, intranasal coronavirus (not recommended by 2011 AAHA\* Canine Vaccine Guidelines), and parainfluenza virus. The first three vaccines plus rabies vaccine are the so-called “core” vaccines for dogs. (Note: a recombinant canine distemper virus vaccine is also available.)

MLV vaccines have been associated with the development of temporary seizures in both puppies and adult dogs of breeds or crossbreeds susceptible to immune-mediated diseases – especially those involving hematologic or endocrine tissues such as immune-mediated/autoimmune hemolytic anemia (IMHA/AIHA), immune/idiopathic thrombocytopenic purpura (ITP), a low platelet count and autoimmune thyroiditis. MLV vaccines – given singly or in combination – are also increasingly recognized contributors (albeit rarely) to immune-mediated blood disease, bone marrow failure and organ dysfunction. When MLV vaccines are given to pets with compromised immune systems, the animal is actually at risk of contracting a weakened form of the virus from the vaccine.

The introduction of MLV vaccines more than 20 years ago is linked to increasing allergic problems and immunological disease in companion animals. Dogs with pre-existing inhalant allergies (atopy) to pollens display an increased risk of vaccinosis (an adverse vaccine response).

### **Killed vaccines**

Killed vaccines use an inactivated “dead” form of the virus (previously live microorganisms that have been killed with chemicals or heat), along with an adjuvant (a substance added to a vaccine to enhance its effectiveness without itself causing an immune response).

For dogs: Killed vaccines include all rabies vaccines, canine leptospirosis, Lyme, canine influenza, injectable bordetella, injectable coronavirus (not recommended by 2011 AAHA\* Canine Vaccine Guidelines) and diamondback rattlesnake toxoid (does not protect equally against all types of rattlesnakes, including Mohave green variety).

For cats: Unlike canine vaccines, most vaccines for cats come in MLV (not recommended for pregnant queens or very young kittens), killed and intranasal versions. Vaccines for feline panleukopenia virus (a parvovirus, often incorrectly called feline distemper), feline viral respiratory disease complex (feline herpes virus and calicivirus) plus rabies vaccine are considered as “core” feline vaccines. Killed and so-called ‘lifestyle’ (see below) vaccines also include those for feline leukemia virus (a recombinant version is also available), feline immunodeficiency virus, chlamydia and intranasal bordetella (these latter two are not recommended for routine use).

As with MLV vaccines, killed vaccines can trigger both immediate and delayed adverse reactions. Of highest concern are the vaccine injection-site sarcomas most commonly seen after rabies vaccination in cats, but also seen occasionally in dogs. Genetic predisposition to these



disorders in humans has been linked to the leucocyte antigen D-related gene locus of the major histocompatibility complex, and is likely to have parallel associations in domestic animals. Killed vaccines can at worst aggravate an already existing autoimmune disease and may prove ineffective.

Although all dogs are susceptible to vaccine-related side effects, breeds at highest-risk of vaccinosis (in alphabetical order) are:

- Akita
- American Cocker Spaniel
- German Shepherd
- Golden Retriever
- Irish Setter
- Great Dane
- Kerry Blue Terrier
- Dachshunds (all varieties, but especially the long-haired)
- Poodles (all varieties, but especially the Standard Poodle)
- Old English Sheepdog
- Scottish Terrier
- Shetland Sheepdog
- Shih Tzu
- Vizsla
- Weimaraner

Breeds with white or predominantly white coats, as well as those with coat color and pigment dilution such as fawn (Isabella) or blue Dobermans, the merle coat color, blue Yorkshire Terriers, grey Collies, harlequin Great Danes, and Australian Shepherds are also more susceptible.

Note: Breed-susceptibility data are generally unavailable for vaccinosis in cats.

People often ask me about the non-core vaccines, such as leptospirosis, Lyme disease, Bordetella (a component of kennel cough) and canine influenza. These vaccines are considered “lifestyle” vaccines and should be assessed according to your dog’s individual risk factors. Does your dog play at a dog park with other animals? Is he boarded in a kennel? Does he attend doggy daycare? Does your geographic location have increasing outbreaks or incidences of a particular disease? All of these factors should come into play when deciding whether to vaccinate your pet against the lifestyle vaccines. Most non-core vaccines require annual revaccination to maintain immunity, so be sure that your dog really needs them.



## **Avoid unnecessary vaccines with titer tests (Part III)**

In my last two posts, I discussed the potential side-effects (vaccinosis) of over-vaccinating our pets, and the difference between MLV (modified live) and killed vaccines. I cautioned that dogs and cats with immune-mediated diseases are especially vulnerable to vaccinosis, since over-vaccination places additional stress on their already compromised immune systems and has been linked to autoimmune disease. So, then, what is the solution to this dilemma? How can you protect your pet from over-vaccination and the risk of contracting a life-threatening disease at the same time? Fortunately, the solution is simple and affordable, Titer tests.

### **What is a titer test?**

A titer test is a simple blood test that measures a dog or cat's antibodies to vaccine viruses (or other infectious agents). For instance, your dog may be more resistant to a virus whereas your neighbor's dog may be more prone to it. Titers accurately assess protection to the so-called "core" diseases (distemper, parvovirus, hepatitis in dogs, and panleukopenia in cats), enabling veterinarians to judge whether a booster vaccination is necessary. All animals can have serum antibody titers measured instead of receiving vaccine boosters. The only exception is rabies re-vaccination. There is currently no state that routinely accepts a titer in lieu of the rabies vaccine, which is required by law.

There are commercially available vaccine titer tests for dogs that can be performed in a laboratory or also in the veterinarian's office for faster results. Several commercial and university veterinary diagnostic labs and Hemopet offer reliable titer testing for dogs, cats and horses.

### **What do I do if the titer shows that my pet has immunity?**

If your pet's titer levels show that an adequate immune memory has been established, you do not need to create the potential for vaccinosis by introducing unnecessary antigen, adjuvant, and preservatives into his body via booster vaccines. Instead, skip the boosters and have your dog re-titered in three years.

### **Are there downsides to titering?**

There is no downside to titering your pet. However, be aware that some veterinarians may be resistant to performing titer tests in lieu of vaccination. These veterinarians are misinformed and incorrectly believe that measuring an animal's serum antibody titers is not a valid method of determining his immunity to infectious diseases, or that this testing is too costly.

With all due respect to these professionals, this represents a misunderstanding of what has been called the "fallacy of titer testing," because research has shown that once an animal's titer stabilizes, it is likely to remain constant for many years. Properly immunized animals have sterilizing immunity (immunity that prevents further infection even when an animal is exposed) that not only prevents clinical disease but also prevents infection, and only the presence of antibody can prevent infection.



As stated by the eminent expert Ronald Schultz, DVM of the University of Wisconsin in discussing the value of vaccine titer testing, “You should avoid vaccinating animals that are already protected, and titer testing can determine if adequate, effective immunity is present. It is often said that the antibody level detected is ‘only a snapshot in time.’ That’s simply not true; it is more a ‘motion picture that plays for years.’”

Furthermore, protection as indicated by a positive titer result is not likely to suddenly drop off unless an animal develops a severe medical condition or has significant immune dysfunction. It’s important to understand that viral vaccines prompt an immune response that lasts much longer than the immune response elicited by contracting the actual virus. Lack of distinction between the two kinds of responses may be why some practitioners think titers can suddenly disappear.

### **What if the titer test is negative?**

Interpreting titers correctly depends upon the disease in question. Some titers must reach a certain level to indicate immunity, but with the clinically important “core” diseases vaccines, the presence of any measurable antibody indicates protection.

A positive titer test result is fairly straightforward, but a negative titer test result can be more difficult to interpret. This is because a negative titer is not the same thing as a zero titer, and it doesn’t necessarily mean that the animal is unprotected. A negative result usually means that the titer has failed to reach a desired threshold antibody level, but a low titer may still mean that the dog is protected upon exposure, as it doesn't reflect tissue levels of immunity.

### **What’s the bottom line on titers?**

More than a decade of experience with vaccine titer testing and published studies in refereed journals show that 92 – 98% of dogs and cats that have been properly vaccinated develop good measurable antibody titers to the infectious agent measured. In general, serum antibody titers to the “core” vaccines along with any natural exposures last a minimum of 7 – 9 years, and likely are present for life. This corresponds with what we see clinically, as the number of cases and deaths due to these diseases has decreased significantly in the vaccinated population.

The bottom line is that using vaccine titer testing as a means to assess vaccine-induced protection will likely result in your pet avoiding needless and potentially harmful booster vaccinations. And that is a huge benefit for a simple blood test!

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