

Titer Testing

(Notes and Quotes from Recognized Authorities)

CDV/CPV "...immunity provided by vaccination is a combination of cell-mediated and humoral immunity, and for some diseases, serum antibody titer, a measure of humoral immunity, does not necessarily correlate with protection from infection. On the other hand, serum CDV and CPV antibody titers have previously been shown to correlate with the level of immunity in dogs."⁶
Dudley McCaw, U of MO

"Furthermore, we have found that annual revaccination, with the vaccines that provide long term immunity, provides no demonstrable benefit and may increase the risk for adverse reactions."⁷

Ron Schultz, U of WI

CDV "Although CDV is not common in the United States, a practical serum (antibody) ELISA for the virus is needed. Such technology could determine whether a vaccine is providing protective serum antibody titer or whether a booster vaccination is needed annually."⁸
Johnny Hoskins, LSU

"Although multiple mechanisms are involved in resistance to CDV, detecting high antibody titers would indicate that an animal will likely be resistant to CDV. Measurement of antibodies against CDV for dogs would, therefore, be a useful prognostic tool."⁹

Ian Tizard, TAMU

CPV "Immunity was associated with persistence of antibody titers of >1:80 (HI test). In contrast, puppies with titers <1:40 remained susceptible. Thus, measurement of serum antibody concentrations appears to be a useful tool for determining protective status and the need for vaccination against CPV."⁹

Ian Tizard, TAMU

"A check for serum antibody titer or an additional vaccination could be done at 15 to 16 weeks old, especially in those breeds at high risk for CPV."¹⁰

Johnny Hoskins, LSU

¹ Twark L and Dodds WJ. Clinical use of serum parvovirus and distemper virus antibody titers for determining revaccination strategies in healthy dogs. *J Am Vet Med Assoc*. 2000; 217: 1021-1024.

² Schultz RD. Personal communication. Sep 2000.

³ Olson et al. *AJVR* 49: 1460-1466, 1998; *idem*, *J Vet Int Med* 11: 148, 1997.

⁴ Kapil S. Personal communication. Nov 1999.

⁵ Pollock RVH and Garmichael LE. Maternally derived immunity to canine parvovirus infection: transfer, decline, and interference with vaccination. *J Am Vet Med Assoc*. 180: 37-42, 1982.

⁶ McCaw DL, Thompson M, Tate D, Bonderer A, Chen, YJ. Serum distemper virus and parvovirus antibody titers among dogs brought to a veterinary hospital for revaccination. *J Am Vet Med Assoc* 1998; 213: 72.

⁷ Schultz RD. Duration of Immunity to Canine Vaccines: What We Know and Don't Know. *Proceedings of Canine Infectious Diseases: From Clinics to Molecular Pathogenesis* 1999; 22.

⁸ Hoskins J. News and Views. *Veterinary Forum* Dec. 1999: 14-16.

⁹ Tizard I, Ni Y. Use of serologic testing to assess immune status of companion animals. *J Am Vet Med Assoc* 1998; 213: 57.

¹⁰ Hoskins, JD. *Canine Viral Diseases, Textbook of Veterinary Internal Medicine* 5th ed: 422, 2000.

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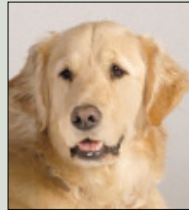
For Puppies^{1,5,9,10}

- Assess maternal antibody levels shortly after birth.
- Follow the decline of maternal antibody levels.
- Determine when to start and stop the vaccination series.
- Evaluate the CPV antibody levels in difficult to immunize breeds such as Dobermans & Rottweilers.
- Tailor vaccine programs for individual puppies.



For Adults^{1,6,9}

- Evaluate the need for re-vaccinations.
- Determine the antibody status of dogs with unknown vaccine histories.
- Evaluate and possibly avoid vaccinating dogs...
 - with a history of vaccine-associated adverse events.
 - with high CDV and CPV titers.
 - on chemotherapy that may be in danger of relapse.
 - with immune-mediated disease at risk for recurrence.
 - with allergies exacerbated by immune stimulation.

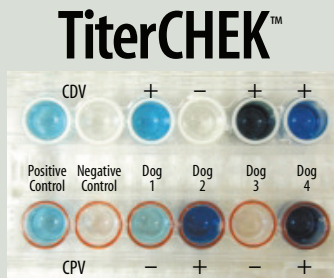


Interpretations and Actions

Positive Results:

(Sample is darker than + control)

- Humoral response correlates with the following titers:
 - CDV SN titer > 1:16
 - CPV HAI titer > 1:80
- Further vaccinations at this time may not be expected to enhance immunity.^{1,6,9}



Negative Results:

(Sample is lighter than + control)

- The level of antibody correlates with the titers below:
 - CDV SN titer < 1:16
 - CPV HAI titer < 1:80
- Further vaccination may be expected to produce an increase in antibody level.^{1,6,9}

Note: Repeated vaccination, in the presence of an adequate immune memory, may not offer additional humoral immunity since the antibody levels present will inhibit vaccine antigen. If serology indicates the animal has achieved less than an adequate immune response, additional vaccination may enhance humoral immunity. Unfortunately, given the complexity of the immune response to a specific challenge, there is no definitive proof that a specific level of humoral antibody is always protective. Conversely, animals with low measurable humoral antibody may, in fact, be protected by non-humoral mechanisms against disease challenge.⁹

Courses of Action^{1,6,9}

| | |
|---|---|
| Positive Results for both CDV & CPV: | Vaccination at this time may not be expected to boost distemper or parvovirus immunity |
| Negative Results for both CDV & CPV: | Patient may benefit from vaccination for both canine distemper and parvovirus |
| CDV Pos./CPV Neg. or vice-versa: | Patient may benefit from vaccination with that particular agent (i.e., distemper or parvovirus), or a combination vaccine |

TiterCHEK™ Accuracy

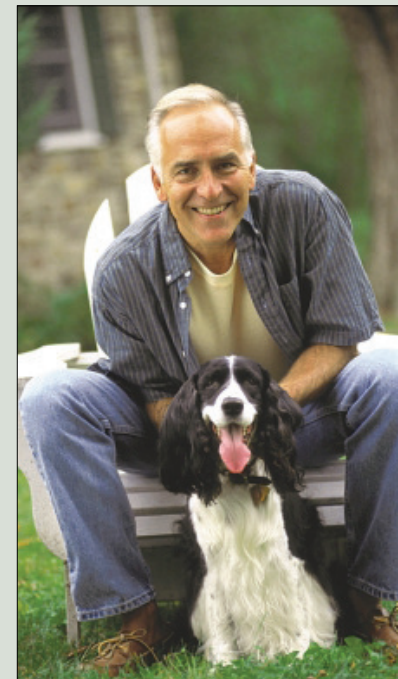
(Studies at Four Trial Sites)

- Kansas State University, Dr. Sanjay Kapil
- University of Georgia, Dr. George Baldwin
- University of Wisconsin, Dr. Ron Schultz
- Synbiotics Laboratories

Nearly 400 characterized samples submitted by participating laboratories

Results

| CDV | CPV |
|--|---|
| Sensitivity (n = 253): 94% correlation with SN titer ≥ 1:16 | Sensitivity (n = 263): 91% correlation with HAI titer ≥ 1:80 |
| Specificity (n = 133): 96% correlation with SN titer < 1:16 | Specificity (n = 115): 98% correlation with HAI titer < 1:80 |



Samples compared against accepted Gold Standards:

- Serum Neutralization (SN) for CDV:
 - ≥ 1:16 to 1:20 has been reported to correlate with protection according to the following sources:
 - Schultz, University of Wisconsin:² Titer ≥ 1:20
 - Olson, University of Guelph:³ Titer ≥ 1:16
 - Kapil, Kansas State University:⁴ Titer ≥ 1:16
- Hemagglutination Inhibition (HAI) for CPV:
 - ≥ 1:80 to 1:100 has been reported to correlate with protection according to the following sources:
 - Carmichael, Cornell University:⁵ Titer ≥ 1:80
 - Schultz, University of Wisconsin:² Titer ≥ 1:100
 - Olson, University of Guelph:³ Titer ≥ 1:80
 - Kapil, Kansas State University:⁴ Titer ≥ 1:80

