New Diseases and Old Diseases Revisited

By: Steve Bolin, DVM, PhD; Dalen W. Agnew, DVM, PhD, Dipl ACVP; Roger Maes, DVM, PhD

Canine respiratory viruses – new and newer. Canine respiratory coronavirus (CRCoV); an apparent close cousin to group 2 coronaviruses of humans, cattle and swine; and canine pneumovirus, a close cousin to murine pneumovirus, are in North America and can be added to the list of infectious agents associated with canine respiratory disease. In a recent serological survey, 54.7% of the samples collected from dogs in the US contained antibodies against CRCoV, with the highest seroprevalence in dogs that were 7-8 years of age. Frequently, CRCoV is detected in association with *Bordetella bronchiseptica* virus. The virus can be detected in swab samples from the nasal cavity and trachea, and also can be detected less frequently in lung, bronchial lymph nodes and palatine tonsil. Canine pneumovirus can be detected in nasal and pharyngeal swabs, and is associated with acute respiratory disease. The prevalence of canine pneumovirus in the US remains to be determined, as does its importance as a respiratory pathogen.

Bovine chlamydiosis – not one of your “usual suspects.” Recent studies from Europe and the U.S. show that chlamydial organisms may play a significant role in bovine abortion, sub-clinical (but economically relevant) mastitis, and calf pneumonia. *Chlamydia* sp. have been identified at DCPAH in abortion cases from several herds around Michigan. While *Chlamydia* may not be one of the “usual suspects” veterinarians pursue in working up an infertility case, it should be on the list of differential diagnoses. Samples routinely submitted for other causes of abortion, pneumonia, or mastitis can be used for detection of chlamydial organisms. The DCPAH has a unique set of tools, including PCR and *in situ* hybridization, to identify chlamydial organisms and confirm their significance as a cause of disease.

White-Nose Syndrome in bats – a serious threat to insect control. Bat White-Nose Syndrome (WNS) is a disease of high mortality caused by the fungus, *Geomyces destructans*. The disease spreads readily under cool, damp conditions while bats are closely clustered together during hibernation. Skin irritation induced by the fungus causes infected bats to wake up more frequently while hibernating, which forces them to use stored fat that is needed to survive winter. The infected bats essentially starve to death. A high mortality rate that can reach 81-100% in certain hibernacula has had devastating effects on bat populations. Currently, there is no treatment for WNS. The MDNR is committed to identifying where the disease may be in the state of Michigan, and the DCPAH has acquired specialized media to isolate the fungus and has a PCR assay to confirm its identity.

From down under – neurological disease in Australian horses. Reports of several hundred Australian horses showing unusual neurological signs have come from New South Wales, Victoria, and South Australia since early February. The signs include high stepping in front, weakness in the hind quarters, muscle twitching, facial paralysis—especially of the lips, and increased responsiveness to touch and sound. Although most horses recover, some horses suffer a loss of coordination, fall repeatedly, develop convulsions, and must be humanely euthanized. Initial serologic assays indicate several known arboviruses, including Ross River virus, Murray Valley Encephalitis virus, and Kunjin virus (a subtype of West Nile virus) may be involved in the disease outbreak. This rash of neurological disease may be linked to the recent extremely wet season across much of Australia that has led to large numbers of mosquitoes.
Does Your Puppy or Kitten Immunization Series Induce Active Immunity?

By: Roger Maes, DVM, PhD

There is a correlation between the potential for spread of infectious diseases in dogs, cats and other species and the level of population immunity. When vaccination coverage falls below 70%, epidemics are possible. An example was the re-emergence of canine distemper in Finland in 1994-1995, when more than 5,000 dogs were infected and the mortality rate was above 30%. In the specific context of canine and feline viral diseases, this concept implies that it is important to systematically immunize puppies and kittens with vaccines containing the core agents or components thereof. The core vaccines for dogs contain canine distemper virus, canine parvovirus-2 and canine adenovirus-2. Core vaccines for kittens contain feline herpesvirus-1, feline calicivirus and feline panleukopenia virus.

Immunization of puppies is readily accomplished when they are antibody negative, but not as straightforward when they have passively acquired antibodies against these viruses. Passive antibody levels decline according to a specific half life. There is a window, however, when passive immunity levels are at a level that still interferes with immunization, but no longer protects against field virus infection. Based upon the potential interference of passive immunity with active immunization, it is recommended in most cases that the first dose of vaccine is given to puppies at 8-9 weeks of age. Follow-up doses should be administered at 11-12 weeks of age and at 14-16 weeks of age. A recent recommendation to continue the immunization protocol until the age of 16 weeks is based upon studies showing that, depending on the vaccination history of the bitch or queen, maternally derived antibodies can persist longer than was assumed previously. A booster dose should be administered one year after the puppy or kitten series ends. The puppy or kitten immunizations, together with this booster given one year later, are now defined as “the basic immunization protocol.”

The current guidelines of the World Small Animal Veterinary Association recommend serological testing at 2-3 weeks after the last vaccine is administered, as a way to ensure that active immunization was indeed accomplished. Figure 1 gives an abbreviated overview of the timing and decision making associated with this testing in puppies. The same approach can be used for kittens.

DCPAH offers serology screens to evaluate vaccine efficacy and now offers testing to demonstrate development of active immunity in both dogs and cats. Please visit our website at http://www.animalhealth.msu.edu for current ordering and pricing information, or call the laboratory at 517.353.1683 for additional information.

References

How to Get the Good Stuff: Specimen Collection and Transport for Bacteriology

By: Carole A. Bolin, DVM, PhD

Conducting a culture and susceptibility is the best way to determine the bacterial pathogens associated with disease in an animal and to guide selection of the appropriate antimicrobial. To do this, it is important to submit samples of the highest quality to the Bacteriology Laboratory.

The cornerstone of sample collection for bacterial culture is to collect samples from a site representative of the active disease process as soon as possible after the onset of disease and before the initiation of antimicrobial therapy. Sites of inflammation and free of contaminating flora are optimal. If performing a biopsy, tissue at the ‘leading edge’ of infection that includes both healthy and diseased tissue is ideal. For more complete instructions regarding sample collection from a variety of body sites see the table: “Sample Submission and Pathogen Guidelines” on the DCPAH website under Diagnostic Sections/Bacteriology.

Samples of fluids such as urine or joint fluid should be collected in a sterile container and shipped chilled to the laboratory. Many non-fluid samples can be effectively collected with a bacteriological transport swab. These swabs serve two purposes: first, to collect the sample of tissue/liquid which may contain bacteria, and second, to keep the bacteria in suitable condition during transport to the laboratory. Aerobic transport swabs should be kept cool during transport to prevent overgrowth of bacteria.

Collection of samples for anaerobic culture is somewhat more complicated. First and foremost, the specimen itself must be suitable for anaerobic culture. Tissues and samples from areas of the body that are naturally rich in oxygen are generally not suitable for anaerobic culture unless there has been an illness or injury which renders the tissue oxygen deprived. For more complete instructions regarding anaerobic sample collection see the table: “Sample Submission and Pathogen Guidelines” on the DCPAH website under Diagnostic Sections/Bacteriology. Second, samples for anaerobic cultures must be collected and transported using an anaerobic swab transport system which is available from a number of vendors. Unlike the aerobic samples which are to be kept chilled, anaerobic samples are to be trans-

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Reevaluating the Use and Interpretation of Serum Non-Esterified Fatty Acids (NEFA) in the Metabolic Monitoring of Dairy Herds

By: Thomas H. Herdt DVM, Dipl. ACVN

The use of serum concentrations of non-esterified fatty acids (NEFA) as predictors of disease risk in dairy cows is now well established (see LeBlanc 2010 or Oetzel 2004 for review). The DCPAH Nutrition Section was one of the first veterinary laboratories to offer these tests on a diagnostic basis, beginning in about 1990. The interpretative criteria that have been in place for these tests have not changed and were based on the empirical evaluation of data from a large field study in Michigan (Cameron et al. 1998) and an assessment of the literature currently available at that time. Substantial additional research has followed, continuing to define not only the relationship of NEFA to disease risk, but also to reproductive efficiency and milk production.

Of particular interest are data and observations published in 2010 by collaborators in the Colleges of Veterinary Medicine and Agricultural at Cornell University (Ospina et al., 2010). Their research offers new insights into the use of serum NEFA concentrations in the prediction of disease risk. Furthermore they expand these observations to examine the negative effect of increasing serum NEFA concentrations, both pre- and post-partum, on reproductive efficiency and milk production. For example, Figure 1 illustrates the negative effect of elevated serum NEFA during the dry period on fertility in the subsequent lactation.

Table 1 shows the “cut points” determined by the Cornell investigators for interpretation of serum NEFA concentrations, relative to various outcomes.

**TABLE 1: “Cut points” determined by the Cornell investigators for interpretation of serum NEFA concentrations**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Serum NEFA “Cut Points” (mEq/L) for the interpretation of individual cow values. Concentrations above these result in increased disease risk, reduced fertility, and reduced productivity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-Partum</td>
</tr>
<tr>
<td>Displaced Abomasum</td>
<td>&gt; 0.27</td>
</tr>
<tr>
<td>Clinical Ketosis</td>
<td>&gt; 0.26</td>
</tr>
<tr>
<td>Metritis or Retained Placenta</td>
<td>&gt; 0.37</td>
</tr>
<tr>
<td>Any of the above three</td>
<td>&gt; 0.29</td>
</tr>
<tr>
<td>Reproductive efficiency</td>
<td>&gt; 0.27</td>
</tr>
<tr>
<td>Milk production</td>
<td>0.35</td>
</tr>
</tbody>
</table>

* values selected to maximize the area under the receiver-operator characteristic curve.
* 19% decrease in the probability of a cow becoming pregnant in the 60 days after the herd voluntary waiting period.
* 16% decrease in the probability of a cow becoming pregnant in the 60 days after the herd voluntary waiting period.
* 683 kg less 305ME milk
* 647 kg less 305 ME milk (mature cows only, effect not seen in two-year-olds)

For herd-level interpretation, the Cornell investigators suggest an “alarm level” prevalence of 15%, meaning that if an estimated 15% or more of the cows have NEFA values above these cut points it should be considered a herd problem.

Current cut points for interpretation of serum NEFA concentrations by DCPAH are > 0.32 mEq/L for cows more than two weeks prior to calving, > 0.4 mEq/L for cows between two weeks and two days before calving, and > 0.7 mEq/L for fresh cows. The suggested action level is > 40%, which is substantially higher than suggested by the Cornell researchers. In view of the Cornell results, DCPAH cut points for serum NEFA concentrations will be changed to > 0.27 mEq/L for cows more than two weeks prior to calving, > 0.3 mEq/L for cows in the last two weeks of gestation, and > 0.65 mEq/L for fresh cows. The Cornell action level prevalence of 15%, if applied to DCPAH data would result in a very large majority of herds being classified as having herd-level metabolic problems. This is consistent with the Cornell study in which 75% and 65% of herds were above the action level for close-up and fresh cows, respectively. This may indeed represent a very large opportunity for the dairy industry to improve animal health by managing for lower serum NEFA concentrations. However, for the present time DCPAH will take an intermediate approach and lower our suggested action level prevalence to 25%, a value intermediate between the previous 40% and the Cornell suggested 15%.

References


Specimen Collection and Transport for Bacteriology (continued from page 2)

...ported at room temperature. This is because oxygen diffuses into chilled samples much more rapidly which will result in decreased viability of anaerobic organisms.

All samples for bacteriological culture should be transported to the laboratory as soon as possible for the best results. DCPAH has a number of shipping options (including prepaid FedEx) to facilitate the reliable transport of samples to DCPAH for bacteriological culture.

Special collection instructions and materials are needed for isolation of organisms from blood or fastidious organisms such as campylobacter, etc. We have information on our website about some of these special circumstances, but you are also welcome to call the Bacteriology Laboratory at 517.353.1683 for advice.
DCPAH Web Services

How familiar are you with DCPAH Web services?

Our easy-to-use website contains the following helpful information:

- Searchable test catalog that includes specimen requirements, test cost, days the test is run, turn around times, shipping suggestions, and other useful information
- Submittal forms that you can complete on-line and print
- Shipping solutions with packaging instructions to ensure the timely and traceable delivery of your samples
- An archive of DCPAH Newsletters
- Detailed information about each of our laboratory sections

If your account has been set up for WebView access, you also have the ability to:

- Monitor your submissions to us, letting you know when your package was received as well as view your results as soon as they are available
- Access your monthly billing statement
- Modify your clinic information

- Modify how you receive your results
- Sign up to receive DCPAHealth News via e-mail

Visit www.animalhealth.msu.edu to see what you have been missing!