Diagnostic tips: A smorgasbord

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Chill PRRSV samples

As summer approaches it is important to remember that samples for porcine reproductive and respiratory syndrome virus (PRRSV) isolation must remain chilled; avoid exposing specimens to heat. Dr. Steve Henry of Abilene Animal Hospital noted that centrifuges used in veterinary practices sometimes become quite hot after prolonged use. He speculates that inadvertent heating of serum might reduce the efficiency of isolating PRRSV because the virus is rapidly inactivated at high temperatures.

Zinc, greasy pigs, and parakeratosis

Consider zinc deficiency among your list of differential diagnoses when finishing pigs develop dermatitis suggestive of exudative epidermitis ("greasy pig" disease). Severe, primary exudative epidermitis is unusual at the grow-finish stage of production. I recently investigated several herds with dermatitis in grow-finish pigs. Pigs had locally extensive to diffuse, crusting dermatitis affecting the hind limbs or the entire body and ears. Histologic examination of skin biopsies revealed the classical lesion of zinc deficiency--parakeratosis. Measuring zinc concentrations in serum or liver of affected animals as well as in feed samples quickly confirmed the clinical diagnosis of zinc deficiency. Feed formulation errors are the usual cause of swine parakeratosis.

Keep colon and small intenstine samples separated

Package colon and small intestine in separate specimen containers, especially when submitting intestinal specimens for *Clostridium perfringens* anaerobic culture. Culture of jejunum is a useful adjunct to the diagnosis of neonatal *C. perfringens* type A diarrhea. *Clostridium perfringens* is normal flora in the large intestine but should not be found in high numbers in the jejunum of nursing piglets. *Clostridium perfringens* will contaminate the small intestine if small and large intestine are submitted in the same specimen container.

Formalin solution

Dilute stock solutions of formalin 1:10 to prepare a 10% formalin solution for tissue fixation. Stock solutions of formalin contain a formaldehyde concentration of 37%-40%. Nonetheless, the stock formalin solution should be considered 100% for the purposes of making 10% formalin. Make a 10% formalin solution by mixing one part stock formalin with nine parts water (1:10 dilution).

This is the formula for buffered neutral formalin:

100.0 mL	37%-40% formalin
900.0 mL	Distilled water
4.0 g	Sodium phosphate monobasic
6.5 g	Sodium phosphate dibasic (anhydrous)

It is important to use the proper strength of formalin and to buffer the formalin at pH 7.0 because immunohistochemistry (IHC) results are influenced by the quality and length of formalin fixation. Moreover, fumes from excessively concentrated (improperly diluted) formalin are especially irritating to the mucous membranes of laboratory personnel who are inadvertently exposed. An alternative to preparing 10% formalin is the purchase of buffered formalin from scientific product companies (e.g., Fisher Scientific, 711 Forbes Avenue, Pittsburgh, PA, 800-766-7000).

Isolate *H. Parasuis*, *S. suis* from lesions

Avoid overinterpreting the significance of respiratory tract isolates of *Haemophilus parasuis* and *Streptococcus suis*. Attempt to isolate *H. parasuis* and *S. suis* from other sites in addition to the lung when pigs have evidence of septicemia or central nervous system disorders. *Haemophilus parasuis* and *S. suis* are common respiratory tract inhabitants. These bacteria should be isolated from lesions to ensure their significance. Meningeal, pleural, pericardial, and peritoneal swabs, brain, cerebrospinal fluid, synovial fluid, and body cavity fluids are useful specimens for bacterial culture.

Nursing, weaned respiratory signs

Examine the upper and lower respiratory tract, including nasal turbinates, from nursing and weaned pigs with respiratory signs. Pigs may have exudate draining from upper respiratory passages, inducing a cough. The nasal cavity should be exposed and nasal and sinus passages examined and cultured. Turbinates should be collected for histopathologic examination because this currently is the most practical means of identifying porcine cytomegalovirus. Cytomegalovirus, *Bordetella bronchiseptica*, and *Pasteurella multocida* often are involved in the genesis of sneeze and cough. Upper (snout, turbinates, trachea) and lower respiratory tract should be included in most diagnostic investigations involving respiratory disease in nursing and weaned pigs.

Poor growth: examine intestine

Examine the intestinal tracts of pigs with poor growth. In a disconcerting number of diagnostic cases, practitioners submit respiratory tracts and other internal organs when poor growth is being investigated, but

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exclude the intestine. Follow-up diagnostic studies that include intestinal specimens often reveal disease caused by coccidiosis, rotaviral diarrhea, proliferative ileitis, or other enteric diseases. Small and large intestinal specimens should be included when investigating poor growth performance. A "healthy" intestinal tract is a major contributor to swine growth performance.

Acute PRRS

Acute and convalescent serology remains a useful diagnostic tool for PRRS. Acute PRRS outbreaks can be investigated by obtaining serum from aborting and nonaborting sows. Aborting sows seroconvert from negative to positive or have increasing S:P ratios (often as high as 3.0-5.0) when tested by PRRSV ELISA 2-3 weeks post abortion. In vaccinated, stabilized herds, PRRSV titers are sometimes low or negative, so acute and convalescent serology can still be a useful diagnostic tool in these herds.

Additional diagnostic strategies that can be attempted in cases of acute PRRS are

- PRRSV serology and virus isolation on presuckle serum from several weakborn piglets. Detecting PRRSV antibodies in presuckle serum samples and PRRSV isolation from weakborn pigs are indicative of in utero exposure to PRRSV.
- Histopathology, virus isolation, fluorescent antibody testing, and IHC on various specimens (lung, tonsil, lymph node, and serum) collected from pigs, especially those with fever and respiratory signs.
- Virus isolation on alveolar washing fluids from weakborn, nursing, and weanling pigs.[1]

Actinobacillus suis or *A. pleuropneumoniae?*

Pneumonia lesions of *Actinobacillus suis* and *Actinobacillus pleuropnemoniae* cannot be distinguished by gross and histopathologic examinations alone. Bacteriologic and, perhaps, polymerase chain reaction (PCR) tests are required to distinguish between these agents because the gross and microscopic pulmonary lesions caused by *A. suis* and *A. pleuropnemoniae* in finishing pigs are similar.[2] Use caution in making a diagnosis in grow-finish pigs of *A. pleuropneumoniae* based only on gross observations, because it is impossible to distinguish *A. pleuropneumoniae* from *A. suis* on that basis.

Choosing your samples

Sample acutely affected, untreated, live, or recently dead pigs for diagnostic purposes. Following this basic principle of diagnostic pathology whenever possible will ensure greater diagnostic success.

References

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