Backyard Poultry & Avian Influenza

Avian influenza (AI) is a highly contagious respiratory viral disease that affects both domestic and wild birds. AI viruses are classified into two types: 1) lowly pathogenic avian influenza (LPAI) which typically causes little to no clinical signs in poultry and 2) highly pathogenic avian influenza (HPAI) which typically causes high mortality. Waterfowl and shorebirds, such as ducks and geese, are natural hosts for the AI virus, and these birds can shed the virus, often without showing any signs of illness or death. Spring and fall are the peak seasons for bird migration, and many of these birds can be in your towns and neighborhoods, carrying the virus.

Backyard poultry are susceptible to AI infection and are at high risk. Many backyard flocks are kept outdoors, are free-range, have multiple ages, species and sources of birds, and have less strict standards for biosecurity compared to commercial flocks. This invariably results in mixing with other birds within the flock and contact with other wild waterfowl creates favorable conditions for disease spread within and between flocks. Many studies show that the backyard flocks with more types of poultry and flocks with lower sanitary conditions have higher incidences of AI.

If a flock has sudden (less than 24-48 hours), high death rates (close to or over 50%) or many birds with respiratory signs, suspect AI infection and proceed with testing. There is not an approved vaccine in the United States nor is there a treatment for AI. Good management and biosecurity practices are the only way to protect against AI infection in backyard poultry.
Best Practices for Culture of Septicemic Bacteria from Diseased Swine for use in Autogenous Bacterins

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The most common septicemic bacterial agents in swine cultured for use in autogenous bacterins include *Streptococcus suis*, *Glasserella (Haemophilus) parasuis*, *Arthrobaicus suis*, and *Mycoplasma hyopneumoniae*. Swine populations and individual pigs can harbor multiple virulent and avirulent strains of each, but one particular strain usually predominates in outbreaks of disease.

The efficacy of an autogenous bacterin depends, in part, on inclusion of the virulent strain of bacteria responsible for outbreaks of disease using best practices to assure that the correct (virulent) strain is cultured from diseased pigs.

**Etiology, Epidemiology, and Disease**

*S. suis* is an opportunistic pathogen and ubiquitous commensal of the upper respiratory tract, palate tonsil, and female reproductive tract, and it is considered an opportunistic salivary in swine. *35 polysaccharide capsular* serotypes are described, and strains vary greatly in virulence within and between serotypes. Numerous virulence factors are described, but there are some approaches to predict virulence of strains. When host innate, maternal and/or acquired immunity is diminished, it can cause *S. suis* of fibronadulin-producing pneumonia as part of the postinflammatory respiratory disease complex (PRDC); or it can invade by translocating tonsillar crypt epithelium or respiratory mucosal epithelium to cause septicemia, or at least bacteremia of sufficient duration to allow localization and sepsis. types of bacteria are most common in joints, leptomeninges, heart valves and/or respiratory mucosae. It is an opportunistic pathogen and is not, as foreign to the United States culture as she spent 6 months of her childhood in Georgia and South Carolina. She is not, as foreign to the University in Thailand. She moved to Ames in 2014 to pursue a combined PhD and anatomic pathology residency at Iowa State University. After spending time in Ames, she fell in love with the Midwest lifestyle and accepted a position at the IHSV as a diagnostic pathologist in 2019. She is a pathology nerd and enjoys solving cases assisting in diagnostic investigation, and loves a good discussion about disease pathogenesis.

Although she grew up half-way across the world, Pan is not foreign to the United States culture as she spent part of her childhood in Georgia and South Carolina. She was active in photography and traveling. One of her goals is to visit all 48 mainland states. She also enjoys swimming and hiking on a routine basis. Additionally, it should come as no surprise from her rich Thai heritage that she spends much of her spare time cooking Thai food. She is always open for Thai recipe requests and recommendations.

**HATS will be closed on Thanksgiving Day, but will be receiving drop-offs until 4pm on Friday, November 27th for PRRSV and PEDV/PDCoV/TGEV testing. **

**HATS will be receiving drop-offs until 3pm on Christmas Eve for PRRSV and PEDV/PDCoV/TGEV testing and CLOSED on Christmas day.**

**Interpretation**

1. Isolates used in an autogenous bacetrin should be cultured from a site with lesions typical of the disease that the bacterin is intended to prevent.

   - For pneumonia, the isolate should be from a pneumatic lung with gross and microscopic lesions typical of the specific isolate.

2. For septicaemia or localized systemic sites, the isolate should come from spleen or tissues with typical lesions, i.e., meningitis, pericarditis, polyserositis and/or polyarthritis (Glässer’s disease), and less commonly osteomyelitis/spondylitis.

3. Isolates used in autogenous bacterins include the primary agent.

4. Isolates from the lung are NOT appropriate.

5. Isolates used in autogenous bacterins include the primary agent.

6. High numbers in pure or nearly pure culture increase the probability that the bacterin will work.

**Sampling**

1. Select the right pigs to sample:

   - Animals exhibiting acute typical clinical disease, preferably untreated with antibiotics.

   - Avoid euthanasia methods that result in fracture of the caudal vertebrae (e.g. captive bolt/blunt force trauma).

2. Collect, preserve and transport the right samples:

   - Blood: Submit blood for culture and conducting airways of swine. Genetic and antigenic variation in strains is known, but routine methods of categorization are not available. Certain virulent strains invade and produce systemic disease.

   - CSF: CSF can also be of value if collected aseptically with a syringe and needle to prevent contamination. Submitting CSF in a snap cap for culture and EDTA is preferred. Anticoagulant information when tissues are not submitted.

   - Joint swabs should also be collected aseptically. This can be accomplished by first removing the skin over the joint and exterior of the joint and the knife should be flame-proned prior to opening the joint and swabbing.

   - Polysaccharide: Care should be taken to swab uncontaminated serosal surfaces using fibronadulin-producing serotypes. Alternately, fibrin can be collected and shipped in Ames transport media. Sampling abdominal serosa or mesentery is performed over visceral plaques since virulent strains of any of these agents can lead from the lung into fibronadulin exudate on the visceral pleura, when the pleuritis was caused by a different virulent agent.

   - Organ/tissue: When spleen, vegetative heart valves or pericardium is preferred over visceral pleura, they should be bagged separately for shipment. This prevents cross-contamination during shipment.

   - When pneumonia is the primary concern:

     - Fresh and fixed lung tissue is the appropriate sample.

   - When systemic disease is a concern, then isolates should be from organs affected based on clinical signs and/or gross lesions:

     - Brain samples are obligatory when nervous disease is observed.

     - Aspiration-collected meningeal swabs are preferred. This is best accomplished by removing the head by disarticulating the atlanto-occipital joint. The forebrain meninges should be gently flame using a propylene pipe's torch, then a swab inserted through the skin and swab over and beneath the cerebellum.

     - The surface of the brain can also be swabbed during removal; however, it is more difficult to avoid contamination.

     - Removing and sending the brain for culture is not recommended, due to the near certainty of contamination. However, fixed and unified brain should be included in the submittal for histopathology and to rule out other causes of neurologic disease.

   - Cerebrospinal fluid (CSF): CSF can also be of value if collected aseptically with a syringe and needle to prevent contamination. Submitting CSF in a snap cap for culture and EDTA is preferred. Anticoagulant information when tissues are not submitted.

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