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News

Bovine Tuberculosis

Bovine tuberculosis has been diagnosed in a wild white-tailed deer in Southeast Indiana (Franklin County, Indiana).

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Research

Krauss, S., Stallknecht, D. E., Slemons, R. D., Bowman, A. S., Poulson, R. L., Nolting, J. M.,...Webster, R. G. (2016). **The enigma of the apparent disappearance of Eurasian highly pathogenic H5 clade 2.3.4.4 influenza A viruses in North American waterfowl.** *Proceedings of the National Academy of Sciences of the United States of America*, 113(32), 9033-9038. doi: 10.1073/pnas.1608853113

BACKGROUND: The available evidence suggests that a Eurasian lineage highly pathogenic (HP) H5N8 influenza A virus (IAV) was introduced into the Americas by migratory waterfowl and subsequently reasserted with North American wild bird IAV lineages. Although the stamping out strategies adopted by the poultry industry and animal health authorities in Canada and the United States—which included culling, quarantining, increased biosecurity, and abstention from vaccine use—were successful in eradicating the HP H5Nx viruses from poultry, these activities do not explain the apparent disappearance of these viruses from migratory waterfowl.

PURPOSE: To examine current and historical aquatic bird IAV surveillance and outbreaks of HP H5Nx in poultry in the United States and Canada, providing additional evidence of unresolved mechanisms that restrict the emergence and perpetuation of HP avian influenza viruses in these natural reservoirs.

RESULTS: Wild bird testing was conducted in 2014 and 2015, before (8,962 samples), during (7,230 samples), and after (6,700 samples) the period December 2014 through June 2015, when HP H5Nx viruses were detected in poultry. Multiple HA-NA combinations of low-pathogenic (LP) IAVs were recovered in the 2014–2015 surveillance, representing the HA subtypes H1–H14 and H16 as well as each of the nine NA subtypes,

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but no highly pathogenic IAV isolates were detected. LP H5 IAVs are routinely detected in wild waterfowl, but other than this recent event, no HP H5 or H7 IAVs have been detected in any wild birds in North America over the past 43 years.

CONCLUSIONS: The authors concluded that the recent North American experience with HP H5Nx IAVs suggests that these viruses are not well fitted to persist in wild bird populations and likely will disappear without an endemic poultry source. It is likely that various poultry production systems and/or practices facilitate the perpetuation of HP IAVs, which can then spill over into wild birds and other host species. This observation is consistent with the apparent disappearance in Western Europe of HP H5N1 following detection in 2005, 2006, and 2007, and of H5N8 in 2014. Although not completely resolved, it is very possible that these HP H5 clade 2.3.4.4 viruses were eradicated in North America through the use of quarantine and stamping out policies for poultry by US and Canadian animal health authorities without the use of vaccination. These eradication strategies, in combination with naturally occurring resistance, likely prevented HP IAVs from being incorporated into the North American wild bird IAV pool.

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Baumrucker, C. R., Dechow, C. D., Macrina, A. L., Gross, J. J., & Bruckmaier, R. M. (2016). **Mammary immunoglobulin transfer rates following prepartum milking.** *Journal of Dairy Science*. Advanced online publication. doi: 10.3168/jds.2016-11370

BACKGROUND: Colostrum formation is thought to occur slowly over an extended period (4 weeks) prepartum. Furthermore, colostrum formation is highly variable among cows in total volume, IgG1 concentration, and mass obtained at first postpartum milking. Recent work has suggested that a rapid transfer of IgG1 to secretions may occur if animals are milked prepartum.

PURPOSE: The objectives were (1) to critically examine the animal-to-animal variation in IgG1 transfer from blood to mammary gland secretions obtained from dairy cows milked once before parturition and again after parturition; and (2) to define the blood plasma concentration decline and mammary appearance and establish IgG1 transfer rates into the first milked postpartum colostrum.

RESULTS: Blood concentrations of IgG1 were very low (<1 mg/mL) in 7 cows at prepartum milking and did not decline following prepartum milking. Cows showed variability in the capacity to recover total volume, IgG1 concentration, and IgG1 mass. Three groupings of cows were considered based on the time between the 2 milkings (prepartum + 4 h postpartum): long-time (-74 to -54 h, n = 3), medium-time (-25 to -17 h, n = 4), and short-time (< -13 h, n = 4) groups. The average rates of transfer of these groups were 1.4 ± 0.8, 3.0 ± 1.3, and 25.1 ± 15.8 g/h, respectively.

CONCLUSIONS: The authors concluded that during a very narrow period in the last days immediately prepartum, mammary IgG1 secretion appearance rates in milking cows were highly variable. Prepartum blood concentrations of IgG1 were extremely low, and one-time prepartum milking of cows did not affect IgG1 concentrations in the circulation. Nevertheless, IgG1 appearance rates in secretions can be high and are apparently not affected by plasma IgG1 concentration. Finally, blood IgG1 mass does not account for the appearance of postpartum colostrum mass, strongly indicating an unknown pool of available IgG1.

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Ribeiro-Lima, J., Carstensen, M., Cornicelli, L., Forester, J. D., & Wells, S. J. (2016). **Patterns of cattle farm visitation by white-tailed deer in relation to risk of disease transmission in a previously infected area with bovine tuberculosis in Minnesota, USA.** *Transboundary and Emerging Diseases*. Advanced online publication. doi: 10.1111/tbed.12544

BACKGROUND: While the mechanisms of intraspecific disease transmission have been described, little information exists regarding farm visitation by deer. A thorough understanding of deer–cattle interactions in a previously bovine tuberculosis- (bTB) infected area, focusing on the ‘when’ and ‘where’ of those events, is essential to implement cost-effective control strategies that will reduce the potential for disease to spillover to the wildlife population, or mitigate transmission to a susceptible cattle population. Although several studies have been conducted that describe the contacts between deer and cattle, there has been only one other study in the United States on the frequency and spatial–temporal distribution of contacts between deer and cattle.

PURPOSE: The primary goal was to infer the potential risk of bTB transmission to cattle in north-western MN by quantifying how deer movements overlap with the exact locations of cattle, stored feed and feeding sites on the farm landscape. A secondary objective was to better understand deer ecology in a transitional area between agricultural and forest land, where little is known about deer movements and behavior.

RESULTS: Twenty-one adult deer (16 females and 5 males) were captured during winter (January–March) 2011 in areas adjacent to where an outbreak (2005–2009) of bTB occurred in deer and cattle. The results indicated that 5 deer (25%) had home ranges that included 6 cattle farms (20%). Most (77%) of the deer visits occurred in areas where cattle were present, with most visits (60%) from 00:00 to 06:00. March to May revealed the most farm visitations by deer (37%).

CONCLUSIONS: The temporal patterns of deer locations on farms highlight the potential for targeted interventions that could reduce potential interactions between deer and cattle. Focused reduction of deer population densities to prevent the establishment of a wildlife reservoir while also controlling disease spread is one method. Other interventions could focus on implementing control measures directed towards high-risk locations that attract deer at certain times (e.g. during the spring season and at night), which could be augmented when preceded by a severe winter. Also, the state wildlife agency could increase deer harvest around agricultural lands. The rationale for such approaches is that risk for disease is not random but is based on a combination of magnifying risk factors.

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Addis, M. F., Tedde, V., Puggioni, G. M., Pisanu, S., Casula, A., Locatelli, C., ...Uzzau, S. (2016). **Evaluation of milk cathelicidin for detection of bovine mastitis.** *Journal of Dairy Science*. Advanced online publication. doi: 10.3168/jds.2016-11407

BACKGROUND: Mastitis can be difficult to detect before the onset of clinical symptoms which delays treatment and control. Mastitis monitoring is currently based on somatic cell count (SCC) and bacteriologic culture (BC) of milk. Nevertheless, inflammation-specific protein markers might provide more sensitive and reliable assays, enabling immunoassay-based screening strategies. Cathelicidin is an inflammatory protein released in milk that has recently demonstrated fair reliability and diagnostic potential for ewe mastitis.

PURPOSE: The purpose was to investigate the diagnostic potential of cathelicidin as a mastitis indicator in cow milk, and to assess the performance of our cathelicidin ELISA for its detection compared with SCC and bacteriologic culture (BC) results.

RESULTS: 29.0% of samples were positive for cathelicidin, 18.8% had SCC >200,000 cells/mL, and 13.7% were BC-positive. Cathelicidin showed a strong positive correlation with SCC as demonstrated by receiver operating characteristics curve analysis and by the clustering of cathelicidin-negative and cathelicidin-positive samples in association with low and high SCC values, respectively. For evaluating the diagnostic performance of a novel test, BC cannot be considered a reliable gold standard for true disease status because of its known limitations. Therefore, sensitivity and specificity of the milk cathelicidin ELISA were assessed using a latent class analysis approach together with BC and SCC by considering different diagnostic thresholds to identify the preferred sensitivity/specificity combination. They modeled conditional dependence of cathelicidin and SCC to account for their close association. The cathelicidin ELISA showed higher

sensitivity than SCC and BC for almost all threshold combinations. The limited sensitivity of BC (38.8%) was also confirmed in this study, and BC showed a slightly lower specificity than both cathelicidin and SCC for most of threshold combinations.

CONCLUSIONS: The authors concluded that this study confirmed that cathelicidin is released in the milk of cows with mastitis, that its presence is highly correlated with SCC, and that its measurement by ELISA may hold significant potential for improving the sensitivity of mastitis detection in dairy cows while maintaining high specificity.

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Calendar



A full calendar of all upcoming events and continuing education opportunities offered by the College of Veterinary Medicine is available on the website at <http://vet.osu.edu/>

[Farm Science Review](#)

Sept 20-22, 2016

Molly Caren Agricultural Center, London, Ohio

Please stop by and visit the College of Veterinary Medicine tent and the “Ask the Experts” program (formerly “Question the Authorities”) in the OSU Central Area.

Poultry Medicine Workshops

Practitioners will develop knowledge & skills to receive poultry clients

- Oct 4, 2016; Cleveland Area – OARDC FAHRP
- Oct 5, 2016; Columbus Area – ODA ADDL
- Oct 6, 2016; Cincinnati Area – Brown Mackie College

Details and registration information to be released next week...

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